SiRFLive™

User Guide

Issue 5

Document History

Revision	Date	History
1	05 DEC 08	Original publication of this document
2	28 JUL 09	Added chapters GUI screenshots, GUI descriptions, Appendix, receiver configuration screenshots, Power Modes, 3GPP and Automation Tests section, USB com port connection and driver section 3.2.1, Rx Session, Rx TTB, and AutoReply Summary section. Updated syntax and merged changes, all screen shots and reset section, COM port settings and SiRFaware sections, 3GPP images, reset type descriptions, expanded the troubleshooting section, and explained the Loopit logging event. Merged in device control, RF playback, automation and reporting changes.
3	28 JAN 10	Added the Switch Operating Mode section, the Log Duration section, the Performance Monitor and Extended Ephemeris sections. Added Counter and Non-Counter method settings for 3GPP, File Format Conversion section, the AutoDetect feature of the GPS to NMEA file format conversion. Added TBD to Tracker IC and Config section, 3GPP Scenario explanation and more acronyms, Auto-Detect information, MEMS section and updated the IC Configuration images. Added the Set ABP Mode and Switch Protocol sections for GSD4e. Updated 3GPP section with Spirent information window and Status and Abort menu items, the Installing SiRFLive portion and opening the application, Rx Settings images, Loopit logging images, all of the Menu bar items in the COM window, the CSR logo, the Action section to include the same images as the EE section, Rx View Section and corrected header syntax. Updated the SiRFaware section images, the 3GPP Setup Config section, format issues for .chm conversion, TTFF and CW Interference sections. Updated the CW Interference configurations, Section 4.2.1 Test Station Setup parameter descriptions, recommended screen resolution, EE and Loopit images, and updated the Python Console section. Removed redundant data on Rx Port Settings and used hyperlinks instead and moved Troubleshooting to its own section number.
4	22 NOV 10	Added the Force Freq Trans Data Use checkbox image for Frequency Transfer, Aiding Bit section in TTFF, Response View information. Added the Mapit information in the Location Map View, Log File and Replay to Open/Close menu items. Added Playback section details, FAQ section, I2C hardware configuration, new FAQ and Track Bar Slider under Playback section. Added details for Regular Expressions and an Installation question under the FAQ section. Added File | Plot, View | Compass, SiRFDRive Status, SiRFDRive Sensor, Command | Set CGEE, Set Debug Levels, Set DGPS, and IC Peek/Poke. Added new SiRFaware section and images.

Revision	Date	History
		Added new Track View and TTB images, updated 5Hz Nav mode section, Appendix with MEMS calibration procedure, the Convert GPS to KML section, Help icon on Tool Strip. Updated Switch Operation Mode images showing output in Response View window, new SiRFaware window and 4e information. Updated image for Test Mode 7: SVs disabled, new SiRFLive GUI, Location, Radar, and TTFF View images, SGEE server addresses, IC Config and assorted images. Updated Loopit section, Logging, and Signal View GUI, Tracker IC Config, Plots, Connect TTB menu item image, I2C section with Slave mode. Updated Reset, Comm Setting, Signal View, and Loopit window. Updated images that had red boxes drawn by Word instead of the image capture app. These came out incorrectly in the .chm file.
5	14 DEC 11	Added the SPI section under Rx Settings | Host App, GSS6700 notice regarding necessary software update to run 3GPP test suite, 4e and 4t images for the Reset window. Added Flash Log section, description for regular expressions for Message View, the MS-AB aiding settings from the 3GPP tests, Test Mode 7 plotting features. Added Test Mode 9 Plots, Switch Comm Settings, and added the Reset Log Report and E911 Report sections. Added States definitions table for the Signal View window and section on Poll QZSS Almanac. Added Repeat Duration Log section with images. Updated Message View window and the Toolbar images, menu item names with better image clarity, Low Power Buffer window and TTB section. Updated I2C image to include SPI radio button, add warning messages for I2C/SPI if no device is detected. Updated Plot & Analysis section. Updated IC Configuration section with new images and descriptions for added features. Changed CSR/SiRF to CSR. Fixed broken links within document. Made changes so SiRFLive works for both 32-bit and 64-bit machines.

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Contents

Tables, Figures and Equations

1. Introduction

This document describes how to use the SiRFLive software.

SiRFLive is a software tool built to interact with CSR GPS receivers for validation and characterization. In particular:

- SiRFLive is designed to work with the communication protocols used by CSR GPS products (4t, 4e and SoC), including NMEA and One Socket Protocols (OSPs).
- SiRFLive is configured to automatically run 3GPP tests when you use a Spirent STR4500 or GSS6700 simulator.

This document describes:

- the SiRFLive GUI for manual control
- the screenshots and windows associated with SiRFLive

Note:

Unless explicitly stated, functionality applies to both GSD4t and GSD4e.

2. Setting Up SiRFLive

This section describes how to install SiRFLive on a local PC.

2.1. Software Requirements

Minimum software requirements:

- Win XP
- .NET Framework 2.0: SiRFLive automatically installs this if necessary. An internet connection is required.

This works on both 32-bit and 64-bit OS machines.

2.2. Hardware Requirements

Minimum PC requirements:

- Pentium CPU 2 GHz
- 1 GB of RAM
- 100 MB hard drive

Recommended PC features:

- 2 GB of RAM
- 1280 x 1024 screen resolution
- USB Dual Drivers CDM 2.06.00 or later

2.3. Using USB to Connect the Receiver to the PC

The quickest way to connect the receiver (Rx) to the PC is to use a USB cable connection.

To install USB drivers:

1. Double-click `CDM 2.06.00.exe` (or later version) to run the file
2. Plug the USB B end into the Rx and the USB A end into an available port on the PC.

Windows searches for the new device and installs the DualRS232 drivers.

To confirm the new COM port numbers for the USB drivers:

1. Right-click **My Computer**, click **Manage**, then click **Device Manager** in the left navigation bar.
2. In the list box expand **Ports (COM & LPT)** to see the available ports.

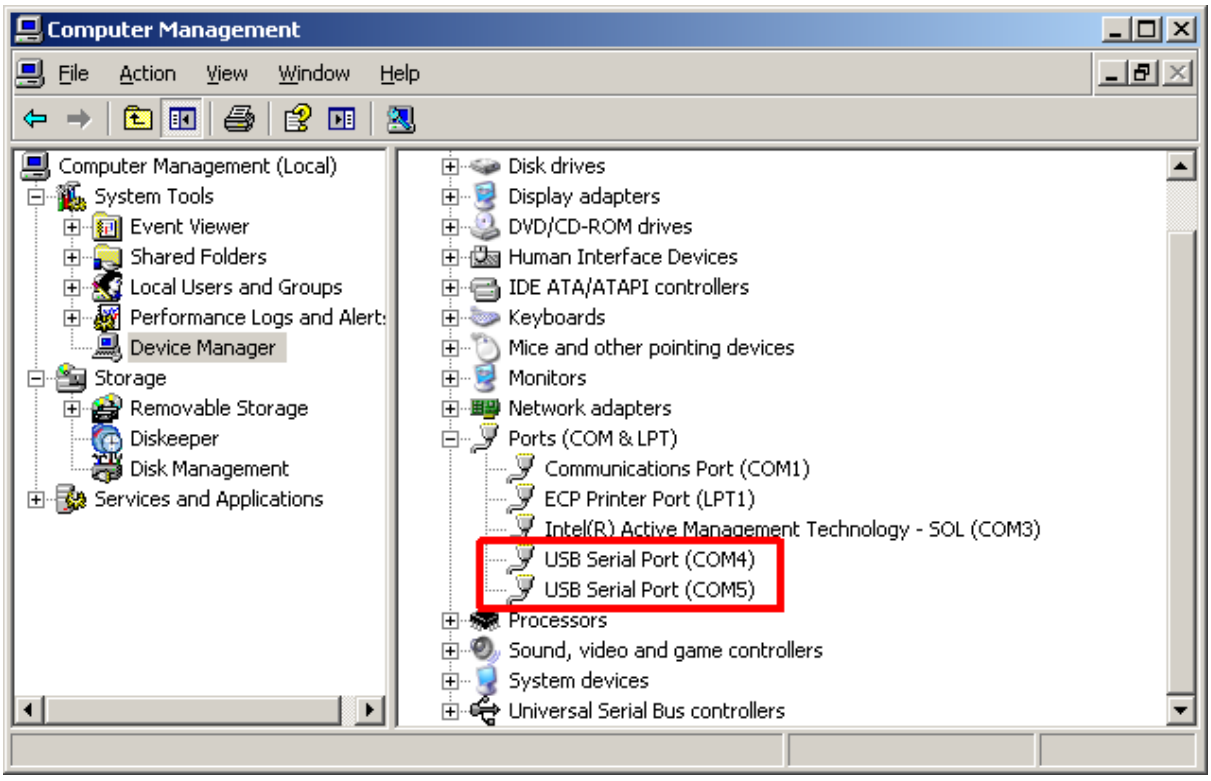


Figure 2.1: Computer Management Window

To uninstall the drivers:

1. On the **Start** menu, click **Settings** / **Control Panel** / **Add or Remove Programs** then **Change or Remove Programs** from the left navigation bar to list the drivers.

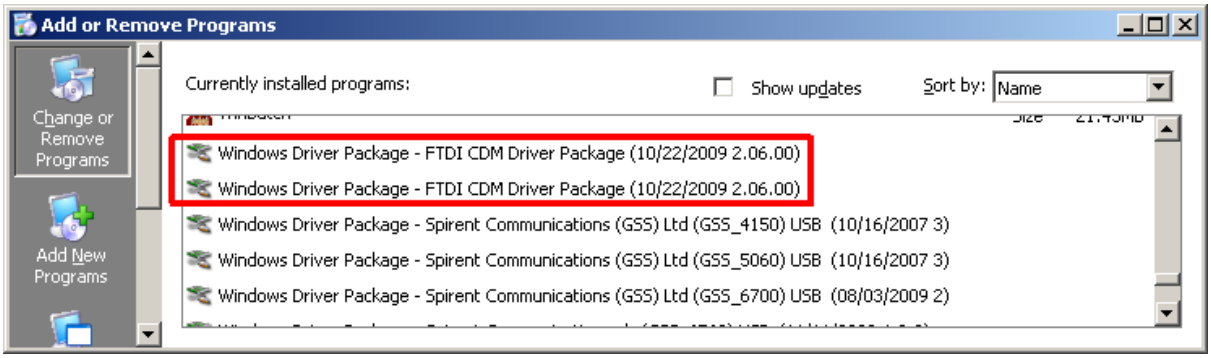


Figure 2.2: Change or Remove Programs Window

2. Select the drivers and click **Remove**.

2.4. Installing SiRFLive

1. Run the current `Setup.exe` file with the `SiRFLiveInstaller.msi` supplied by CSR or available from www.csrsupport.com.
2. Follow the instructions to install SiRFLive to your local machine. CSR recommends that you install SiRFLive to the default location `C:\Program File\SiRF\SiRFLive`, but you can install it elsewhere if necessary.

3. Main Interface

This section shows SiRFLive main interface functions.

Figure 3.1: The Menu Bar

Figure 3.2: The Main Toolbar

The Main Toolbar has buttons for quick access to the most popular features of SiRFLive.

Figure 3.3: The Log File Status Bar

The **Log File Status** Bar is below the Main Toolbar. It is empty until a log file is saved.

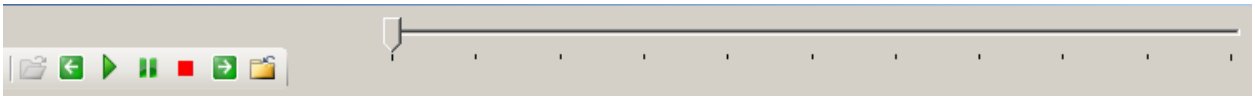


Figure 3.4: The Replay Toolbar and Track Bar

The Replay Toolbar is to the right of the Main Toolbar. The Track Bar appears when a replay file is opened.

3.1. Help

To find answers to questions about SiRFLive, on the Main Toolbar click the **Help** button  . This opens the SiRFLive User Manual.

4. Starting SiRFLive

When it is installed, to start SiRFLive either:

- Double-click the desktop icon:

- From the **Start** menu click **Programs** / **SiRF** / **SiRFLive**
- Go to the default location `C:\Program File\SiRF\SiRFLive\Release\Run` and run the executable program `SiRFLive.exe`

5. Setting Up and Using the Receiver

To establish GPS receiver communication over COM Port(s) via multiple protocols (OSP, NMEA) set up the receiver by either:

- On the Main menu click **Receiver** / **Connect**
- On the Main Toolbar click the **Connections** button
- On the Main Toolbar click the **Receiver Settings** button

The **Rx Port Settings** window appears.

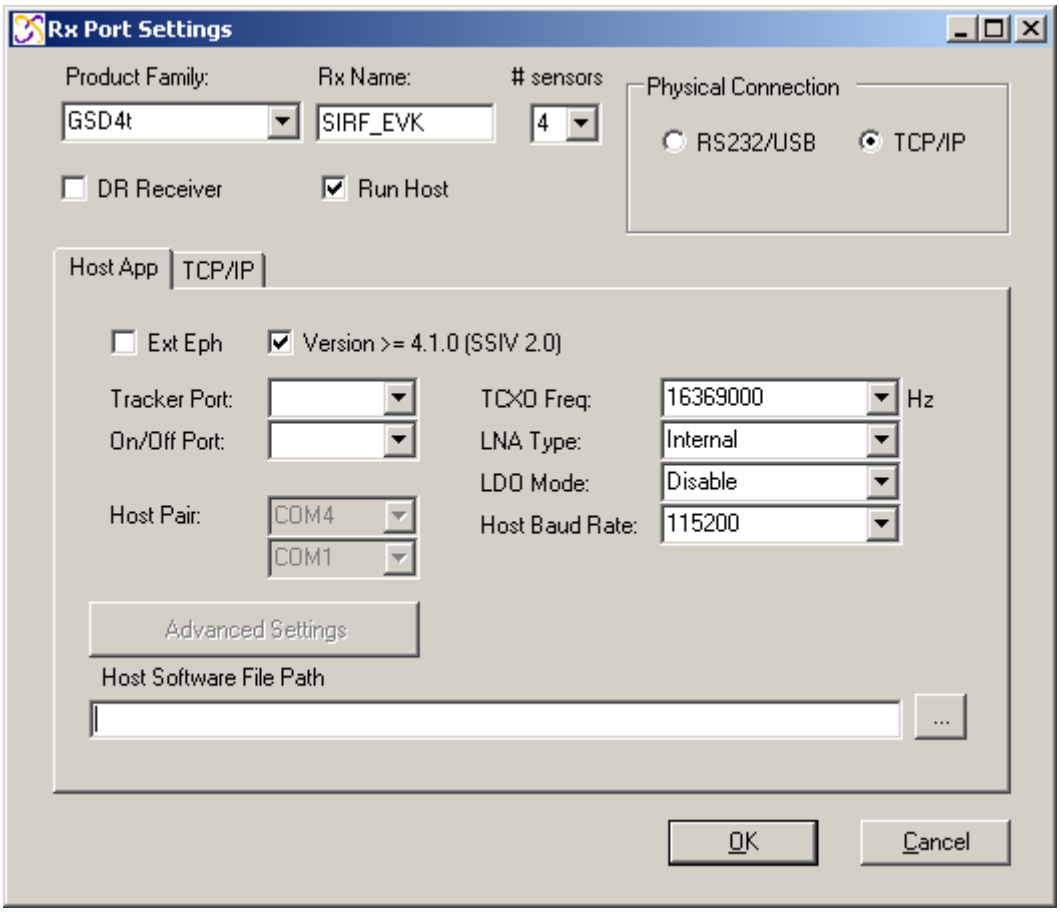


Figure 5.1: Example Rx Port Settings Window

1. Select the correct **Product Family** from the drop-down list.
2. Type a name for the Rx. CSR recommends that you enter a unique **Rx Name** for the specific unit under test so you can track any anomalies that may be associated with it.
3. Select the correct **# sensors** from the drop-down list.

5.1. Host Application

If the Rx requires a host application to run for the tracker: from the **Host App** tab select the **Run Host** check box. Default is:

- **Run Host** check box is unselected
- **RS232/USB** is selected using **Port** COM1 at **Baud Rate** 115200 with OSP **Protocols**
- **Version > = 4.1.0 is selected**

The other selections depend on your individual setup of the UART connection and the specific EVK used.

To select the Host Software File Path either:

- Type the full path name in the box
- Navigate to the host software by clicking the **ellipsis** button to the right of the text box:

5.2. RS232

One way for SiRFLive to interface with the Rx is by using an RS232 connection. This can either be a serial com port or a USB connection.

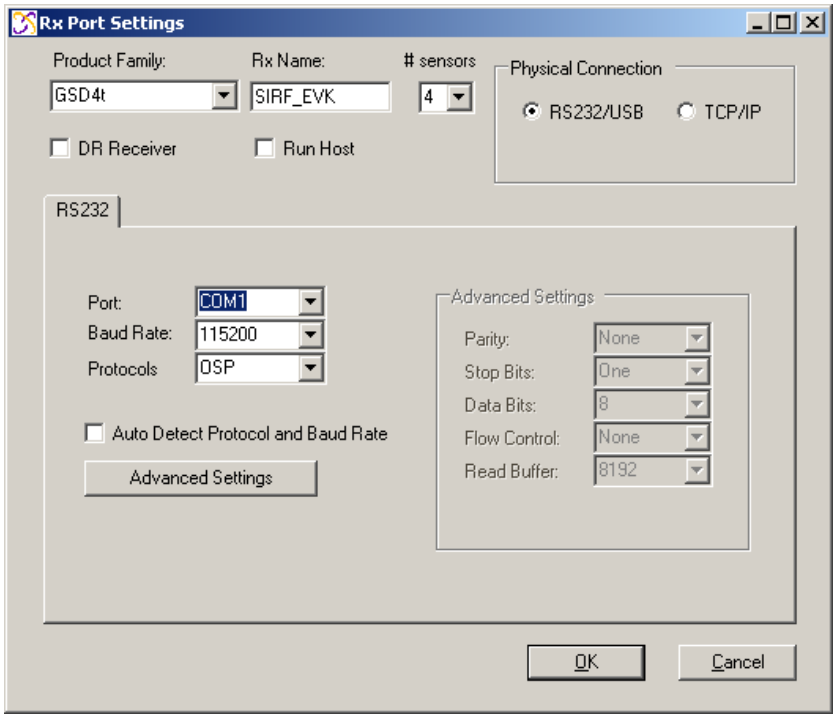


Figure 5.2: Example GSD4t RS232/USB Settings

1. Select **RS232/USB** to use UARTs.
2. Select the COM **Port** from the drop-down list.
3. Either:
   - Select **Baud Rate** and **Protocols** from the drop-down list
   - Select **Auto Detect Protocol and Baud Rate** See Section 5.2.1
4. Click **Advanced Settings** to access **Advanced Settings** area. You do not have to change the default.

Read Buffer refers to the size of the buffer for read.

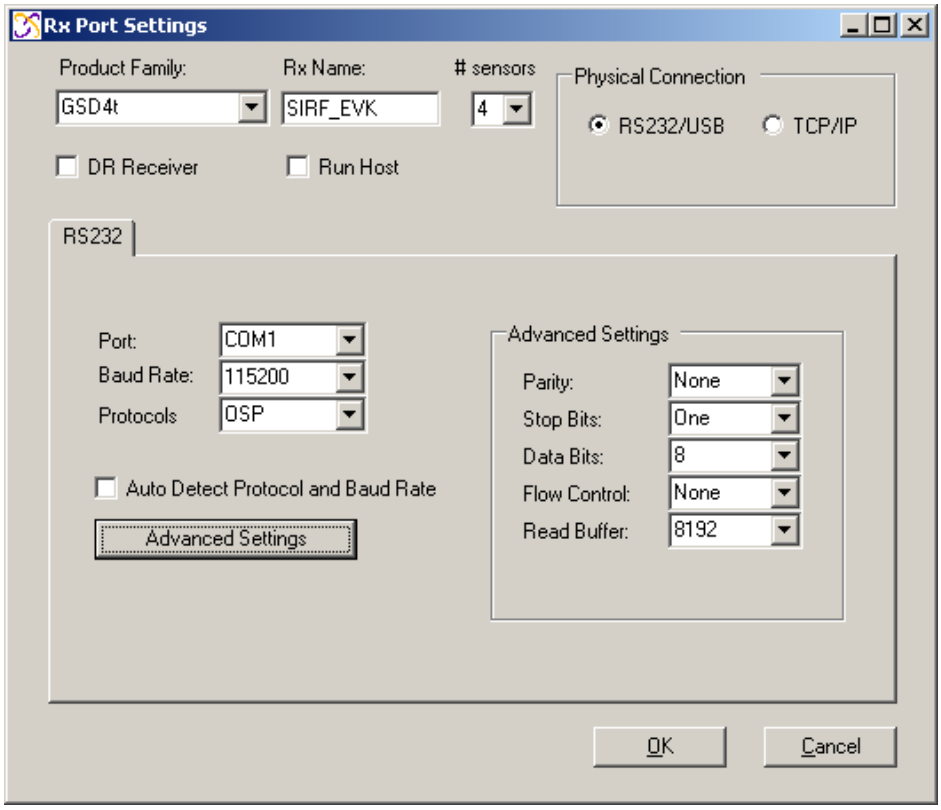
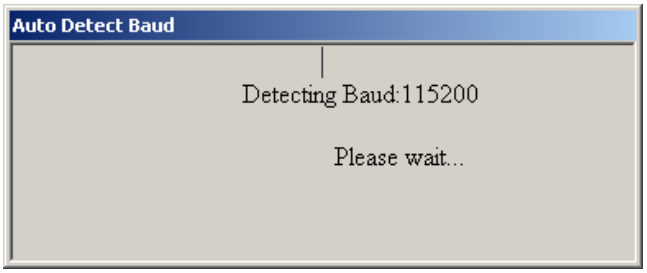


Figure 5.3: Example GSD4t RS232 Settings

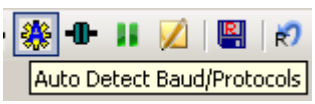
5.2.1. Auto Detect Protocol and Baud Rate

The Auto-detect feature automatically deciphers the protocol and baud rate that the receiver being connected is running. This helps you get started without worrying about selecting the wrong baud rate or protocol, and allows for faster connectivity:

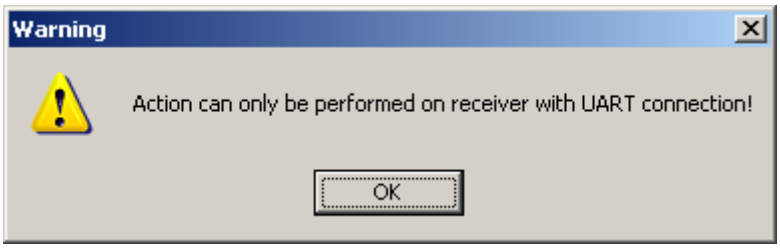


Note:

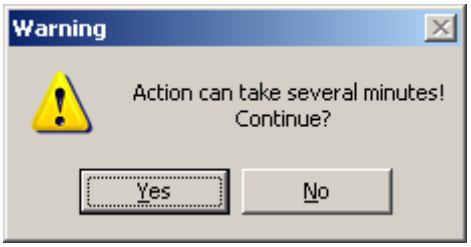
Use the **Auto Detect** button on the Main Toolbar for UART connections only:



If you are not using UART you see this warning:



1. Select the **Auto Detect** button if there are connectivity problems. You see the following message:



2. Click **Yes** and SiRFLive attempts to synchronize the protocol type and the baud rate of the receiver under test.

5.3. TCP/IP (4t)

Either:

- Select **TCP/IP Client**. In most cases, select this and use the default IP address (local: 127.0.0.1) and port (7555).
- Leave **TCP/IP Client** unselected to use Server as the **TCP/IP Mode Selection**.

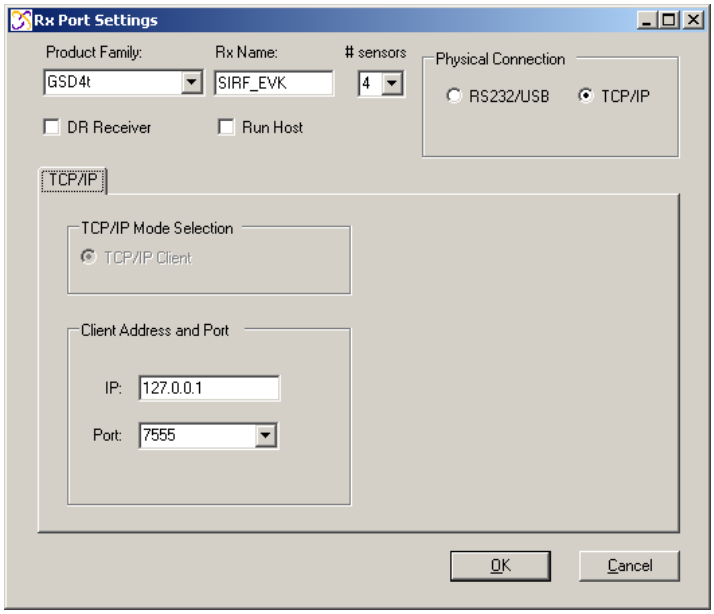


Figure 5.4: Example GSD4t TCP/IP Settings

5.4. I²C (4e)

To use I²C:

1. In the **Physical Connection** area click **I2C**.
2. Use the default values for the **Read Port**, **Write Port**, Master and **Slave Mode** settings.

I²C requires the appropriate hardware and must be connected to the Rx correctly. See your I²C manual for more information.

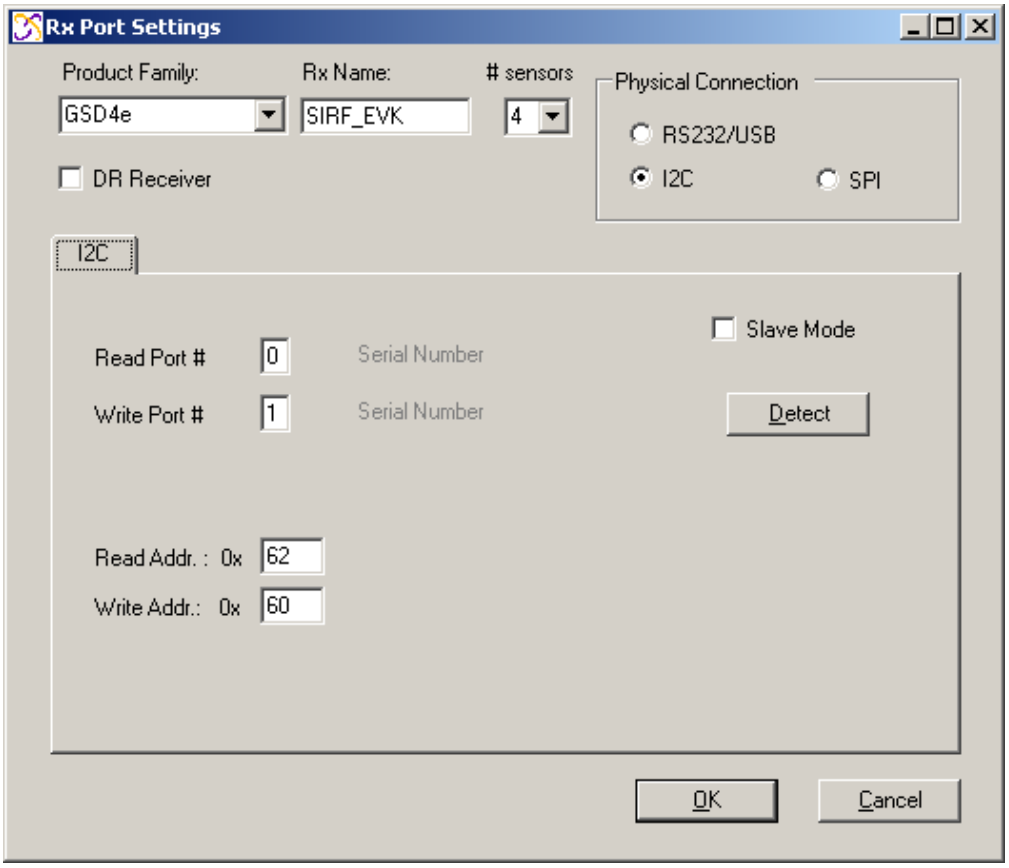


Figure 5.5: Example GSD4e I²C Settings

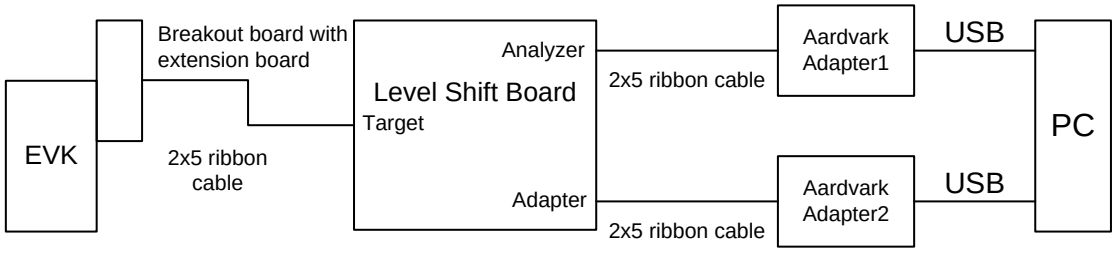


Figure 5.6: I²C Hardware Configuration

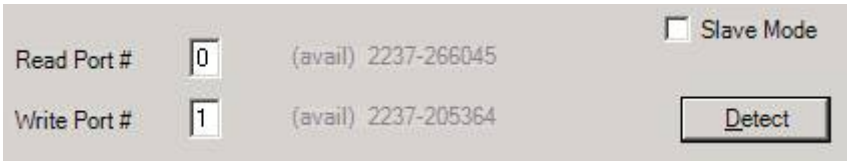
The hardware configuration for I²C requires:

- Aardvark I2C/SPI Level Shift board: v1.0 or higher
- Aardvark I2C/SPI adapters x2: v3.0 or higher
- USB cables x2
- Breakout board and extension board
- Level Shift board settings have jumpers on: **TPWR**, **3.3V**, and **Disable**

Contact your CSR representative for more information.

1. Click **Detect** to check connectivity before proceeding.

If devices are found, a message shows the serial numbers of the I^{2}C devices available:



If a device is not found, the following warning message appears:

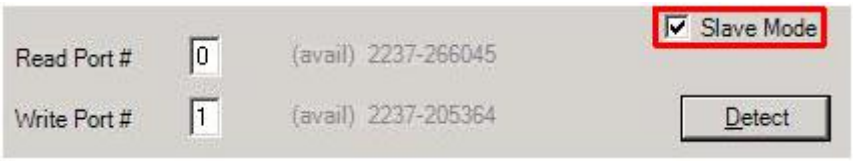
5.4.1. Multi-Master Mode

By default, I^{2}C runs in Multi-Master mode on start-up. To change to Multi-Master mode, if I^{2}C is in Slave mode, send a Factory reset to the receiver.

5.4.2. Slave Mode

To use Slave Mode either:

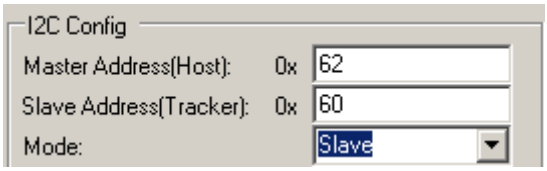
- Select the **Slave Mode** checkbox in the Rx Port Settings window on the initial start-up of the receiver:



- Select Slave mode in the **Advanced** section of the IC Configuration window to switch from Multi-master mode, click **Receiver** / **Command** / **IC Configure**.

Note:

Click **Poll** before changing the Mode to ensure that none of the other fields are incorrectly set. The receiver may stop operating if there is an incorrect setting.



5.5. SPI (4e)

Use the default values for **Port**, **Bit Order**, **Mode**, **Bit Rate**, **Length**, and **Delay** settings. SPI only works if the appropriate SPI hardware is available and connected to the Rx correctly. Check the SPI manual for more information.

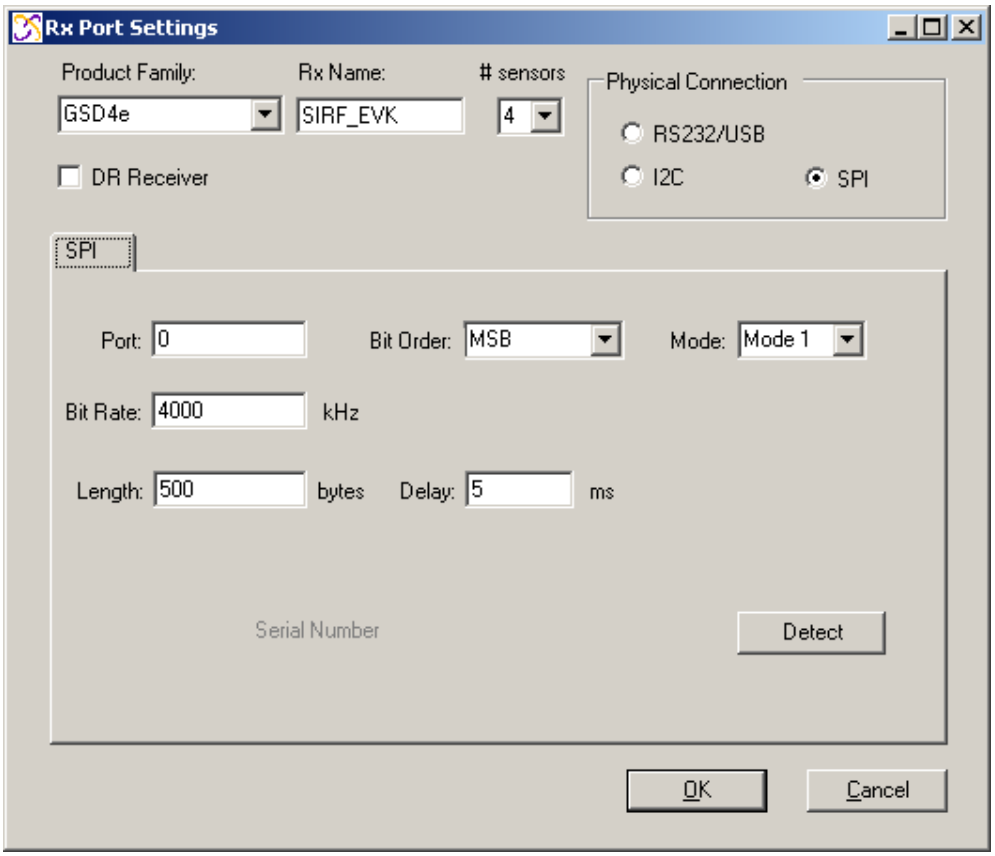


Figure 5.7: Example GSD4e SPI Settings

Figure 5.8 shows SPI hardware configuration.

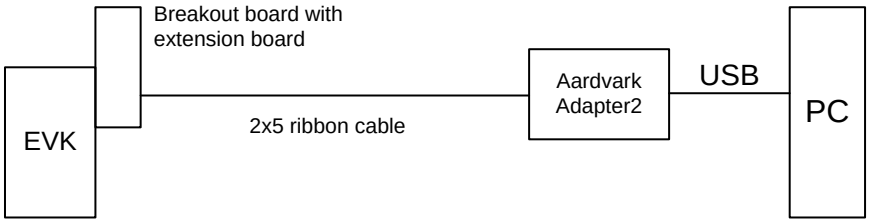


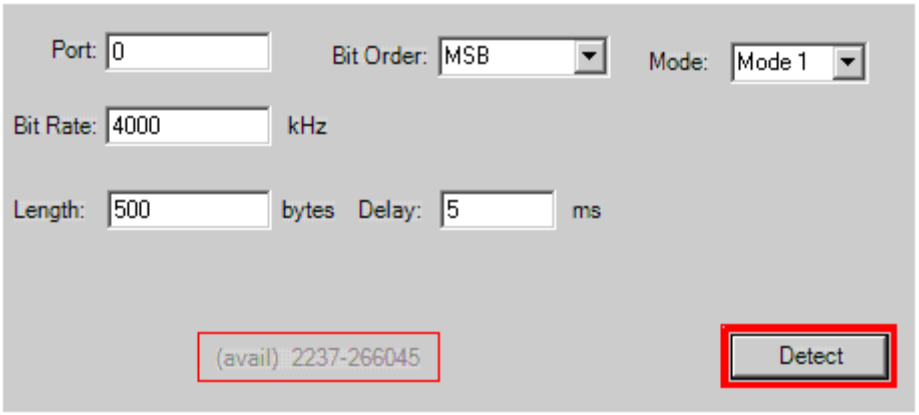
Figure 5.8: SPI Hardware Configuration

The hardware configuration for SPI requires:

- Aardvark I^2C/SPI adapter v3.0 or higher
- USB cable
- Breakout board and extension board

Contact your CSR representative for more information.

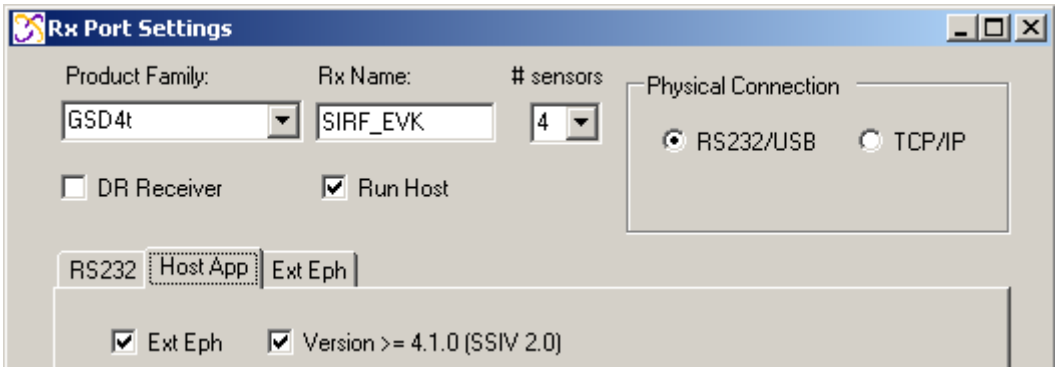
Click **Detect** to check connectivity before proceeding.



- If a device is found, the message shows the serial number of the SPI device available.
- If a device is not found, the following warning message appears:

5.5.1. Ext Eph (4t)

Click **Run Host** to enable access to extended ephemeris. Select **Ext Eph** on the **Host App** tab.



The **Ext Eph** tab enables you to access server-generated, client-generated or mixed extended ephemeris to assist in getting a position, see Figure 5.9.

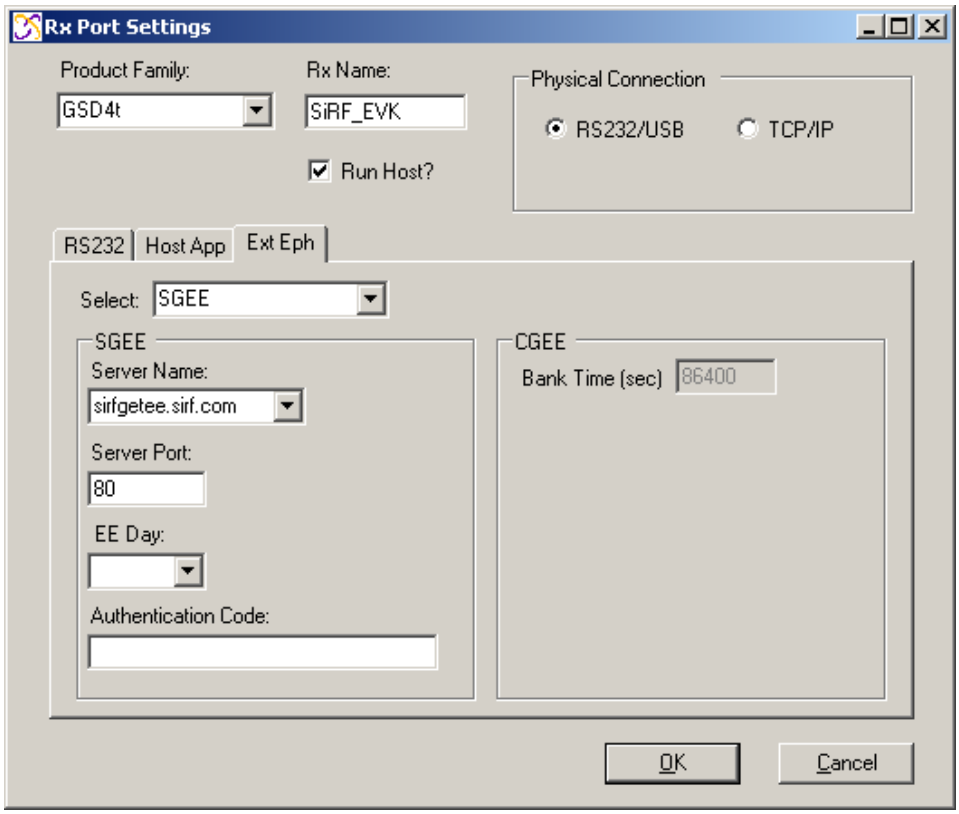
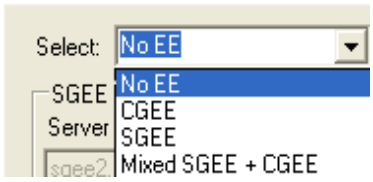


Figure 5.9: Extended Ephemeris Options

- Select one of **No EE**, **CGEE**, **SGEE** or **Mixed SGEE + CGEE:**



5.5.2. SGEE

1. Select the **Server Name**, i.e. the IP address of the server to connect to. Default is **sirfgetee.sirf.com**.
2. In the **Server Port** box, type the port number to be used from the server, e.g. `80`.
3. Select **EE Day**, i.e. the validity, in days, for extended ephemeris. Values are 1, 3, 5 and 7
4. In the **Authentication Code** box, type the code string that grants access to the EE on the server.

Note:

The CSR Server Team gives you the Authentication Code. Contact your CSR representative for help.

When you select a type of Extended Ephemeris (EE) you see a **COM** window similar to Figure 5.10.

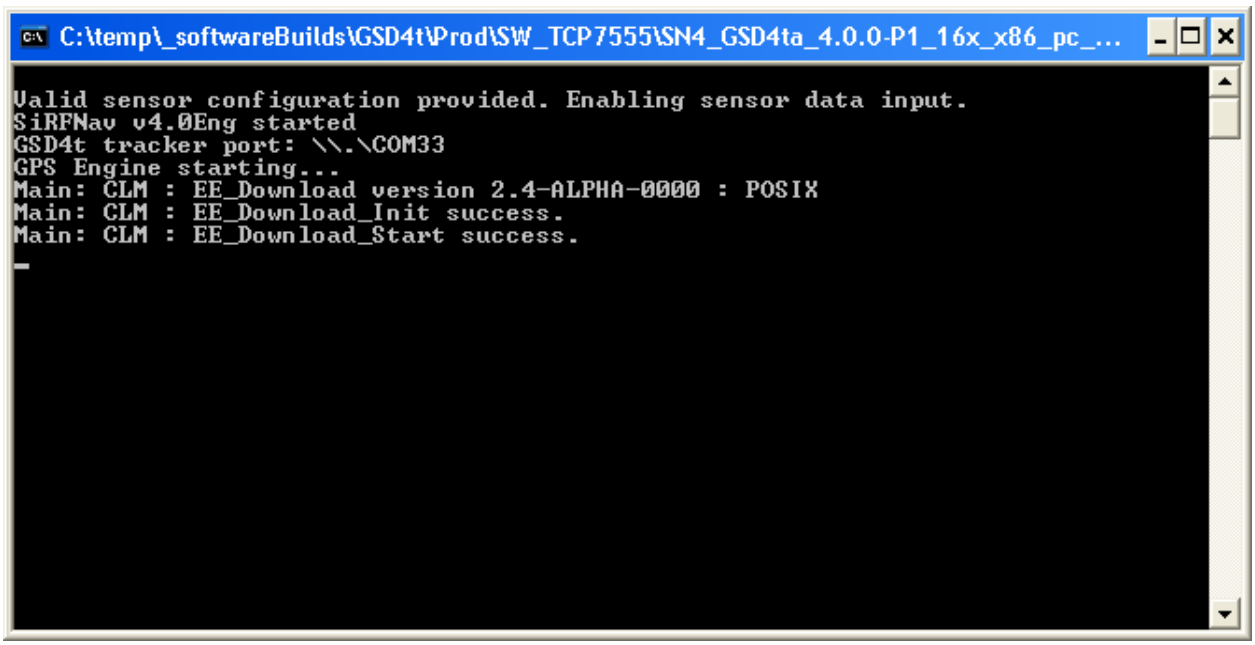


Figure 5.10: Extended Ephemeris COM Window

Note:

The content of the last three lines depends on the EE used.

The **Signal View** window shows EE information displayed in purple; see Figure 5.11.

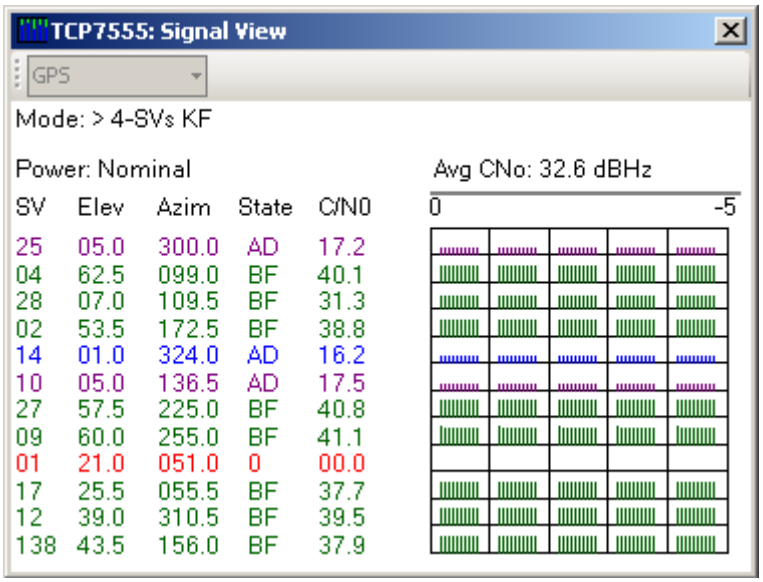


Figure 5.11: Signal View Window

If the server does not connect, you receive a `failed` message in the **COM** window, see Figure 5.12.

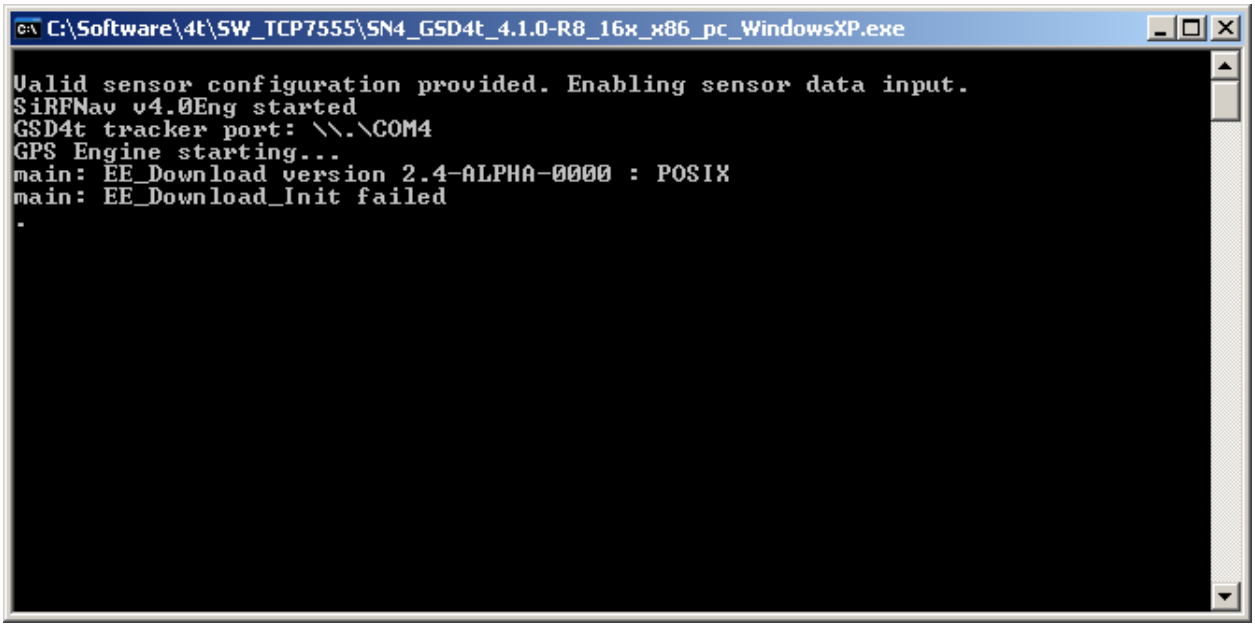
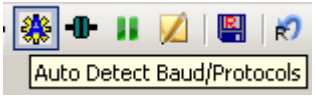


Figure 5.12: Connection Failed Message

When you click **OK**, data displays in the main window, including the time, com port, baud rate, Rx type selected, and software version, if applicable.

5.6. Auto Detect Baud/Protocols

- Click the Auto Detect Baud/Protocols button on the Main Toolbar if there are connectivity problems



SiRFLive attempts to synchronize the protocol type and the baud rate of the receiver under test.

5.7. Connecting and Disconnecting

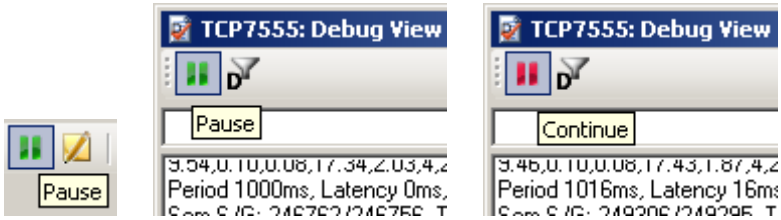
To connect or disconnect either:

- Click the **Connect** button on the Main Toolbar to toggle between connecting and disconnecting. Disconnecting stops serial communication between the receiver and SiRFLive.

- Use the menu options **Receiver** / **Connect...** and **Receiver** / **Disconnect...**

5.8. Pausing

To pause the flow of data in the **Debug View** window, click the **Pause** icon on the Main Toolbar or on the **Debug View** window:



Pausing enables you to scroll through the displayed messages to find particular information.

All other View windows that are open but not the focused window e.g. **Radar View**, **Signal View** etc, continue to output data. Clicking the **Pause** button in individual Views freezes the displays.

The receiver continues to work and there is no interruption to the flow of data when logging.

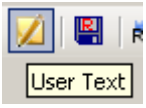
When selected, the icon changes color from green to red to show that it is paused and the icon label changes to **Continue**.

Click the red **Pause** button to resume displaying current data.

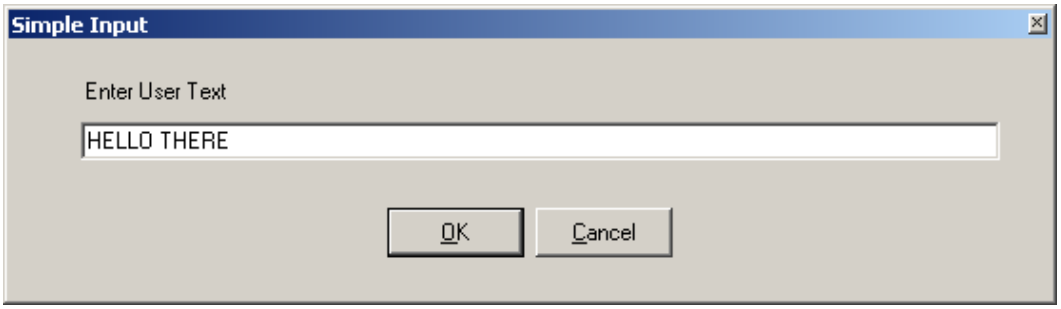
5.9. User Text

You can add your own text to the content of the **Debug View** window. This can help you find a particular section of data later or note an incident that happened at a particular time while logging data.

1. Click the **User Text** button to insert comments into the **Debug View Output** window and the log file:



You see a **Simple Input** window:



2. Type the appropriate text and click **OK**. Your text appears in the **Debug View** window and is recorded with the date and time in the log file if one is being collected:

5.10. Logging a GPS File

Log a GPS file to help you interpret data at a later time.

To begin capturing GPS information coming from the Rx either:

- Click the **Log File** 

button on the Main Toolbar
- Use the menu option **File** / **Log File / Start...**, a **Log File** window appears, see Figure 5.13.

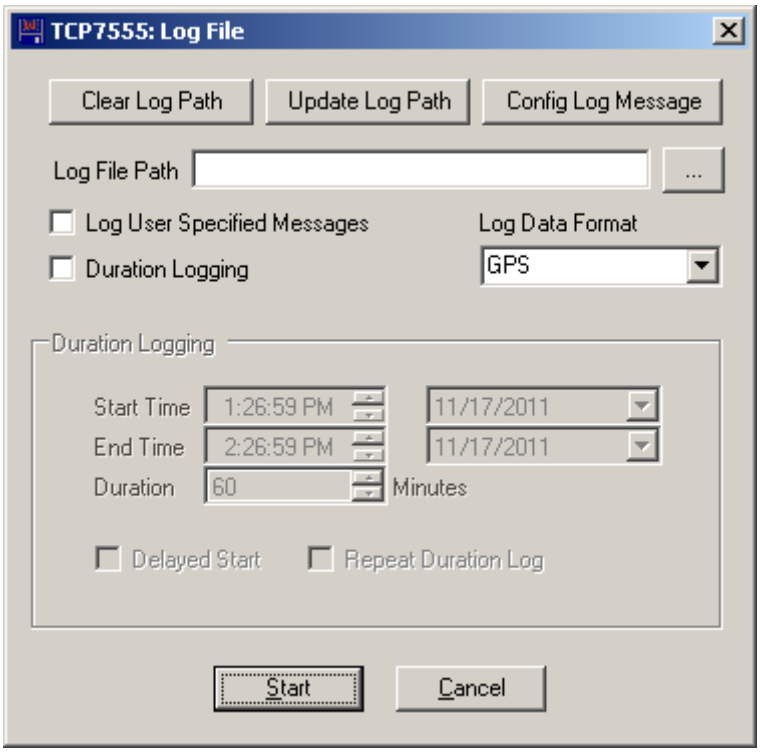


Figure 5.13: Log File Window

Either:

- Click the **ellipsis** button (**...**) to browse to an existing log file location and name.
- Type the location into the **Log File Path** field.
- Then click **Start**.

5.10.1. Clear Log Path

You can terminate current logging and remove the path from the log file status bar.

1. In the **Log File** window click **Clear Log Path.**

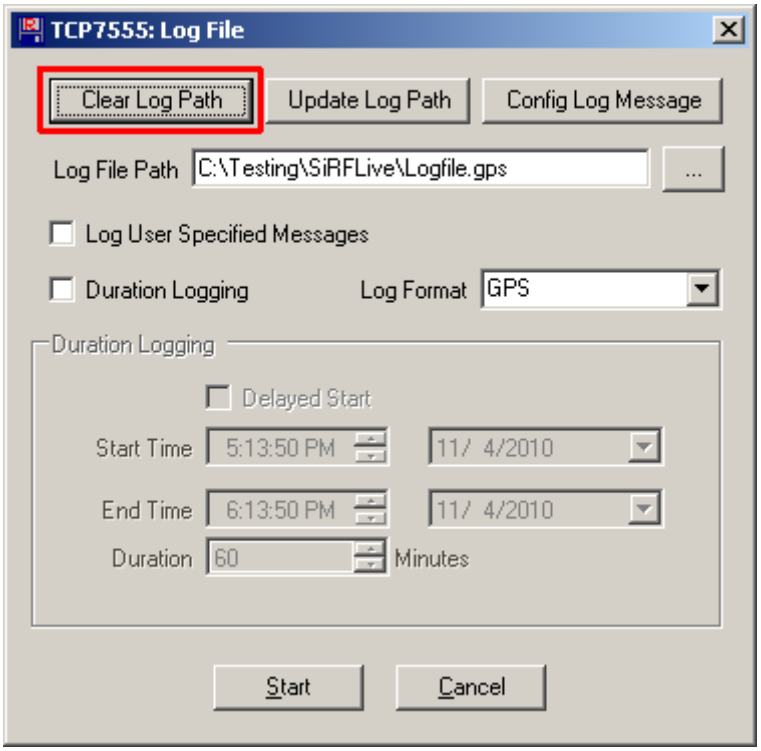
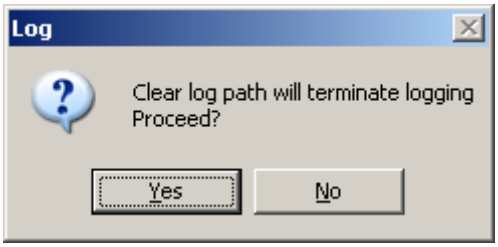
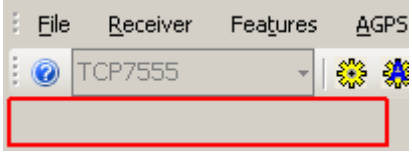


Figure 5.14: Clear Log Path

- You are asked to confirm you want to proceed:



2. Click **Yes** to confirm. You see a blank log path.



5.10.2. Update Log Path

You can update the log file status bar with the currently selected log file path.

1. In the **Log File** window click **Update Log Path**.

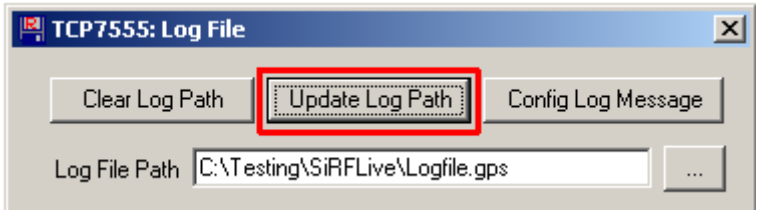
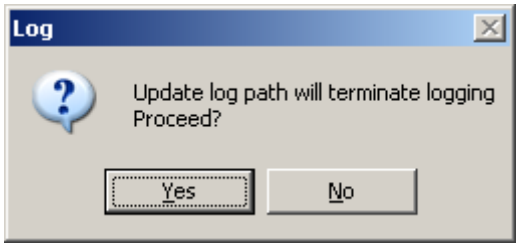


Figure 5.15: Update Log Path

You are asked to confirm you want to proceed:



2. Click **Yes** to confirm. You see the updated log path.

5.10.3. Config Log Message

You can collect specific user log messages.

1. In the **Log File** window click **Config Log Message**.

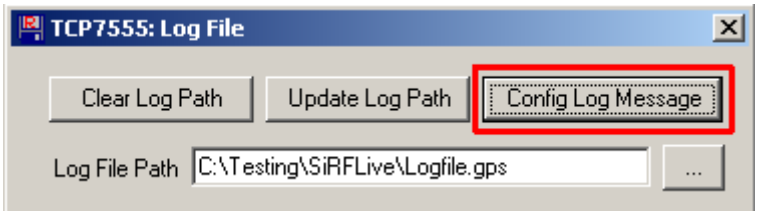


Figure 5.16: Config Log Message

The **Set User Log Messages** window appears:

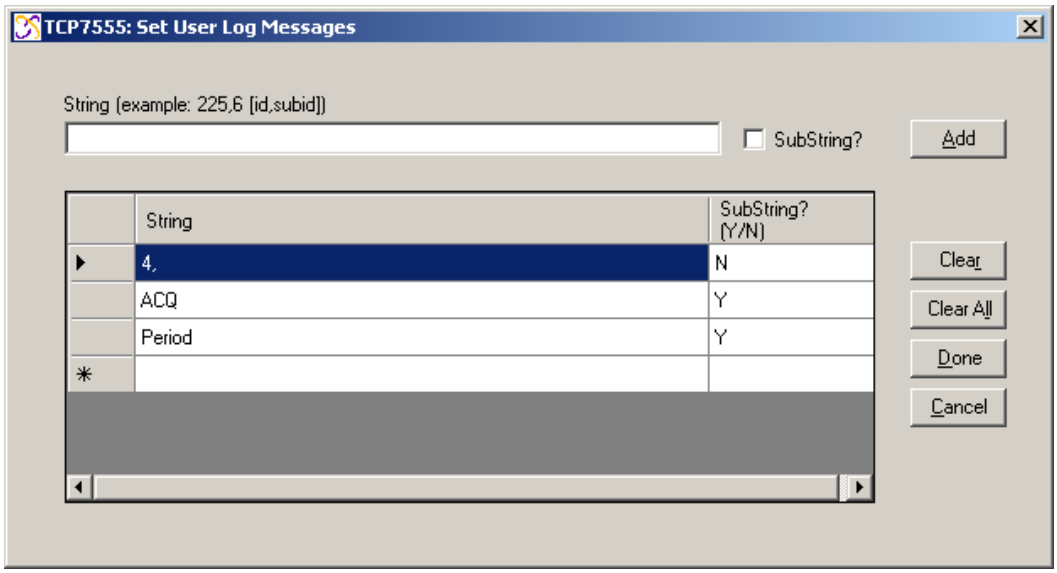


Figure 5.17: Set User Log Messages

Figure 5.18 shows three example messages added to the configuration.

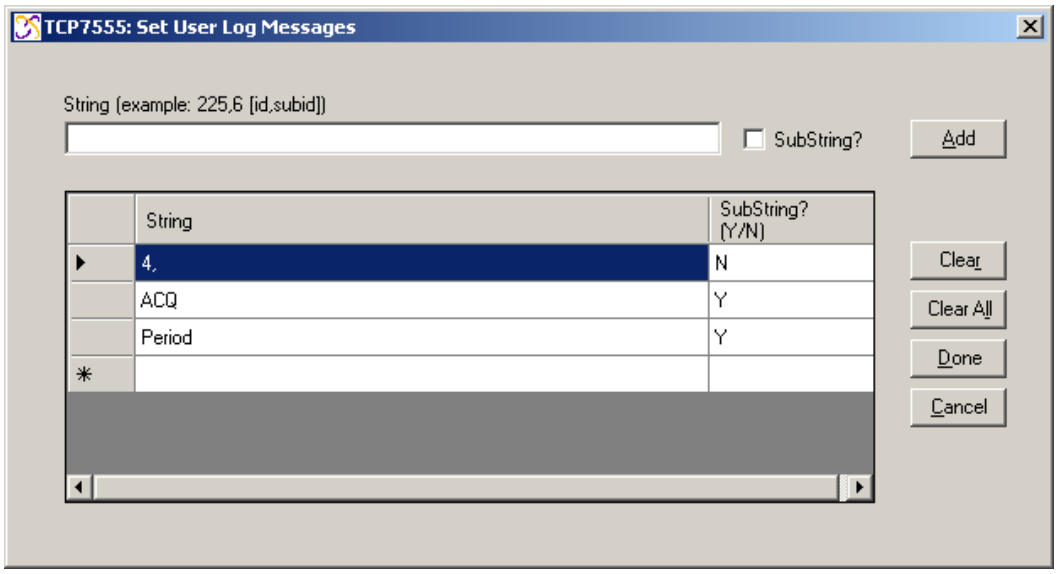
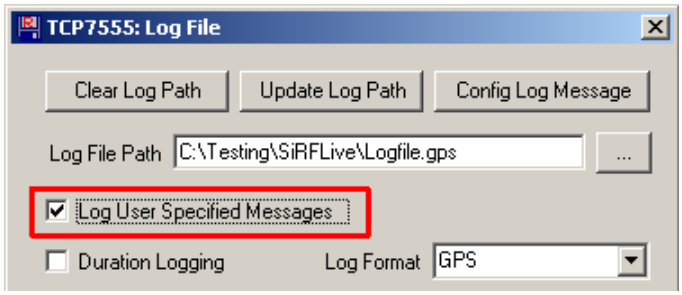


Figure 5.18: Example Set User Log Messages Entries

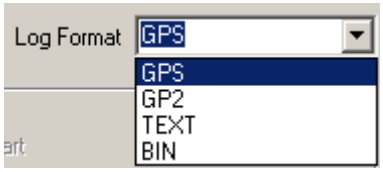
Use this window with the **Log User Specified Messages** check box.



Check the **Log User Specified Messages** option in the **Log File** window to log only the messages described in the **Set User Log Messages** window. When the option is not selected, all messages are logged.

5.10.3.1. Log Format

The log formats available are:



- **GP2:** This is similar to GPS but includes a Time and Date stamp at the beginning of each line.
- **TEXT:** This is mainly used for NMEA log files.
- **BIN:** This records as raw binary data.

5.10.4. Duration Logging

You can define the length of the logging event.

- Click **Duration Logging**.

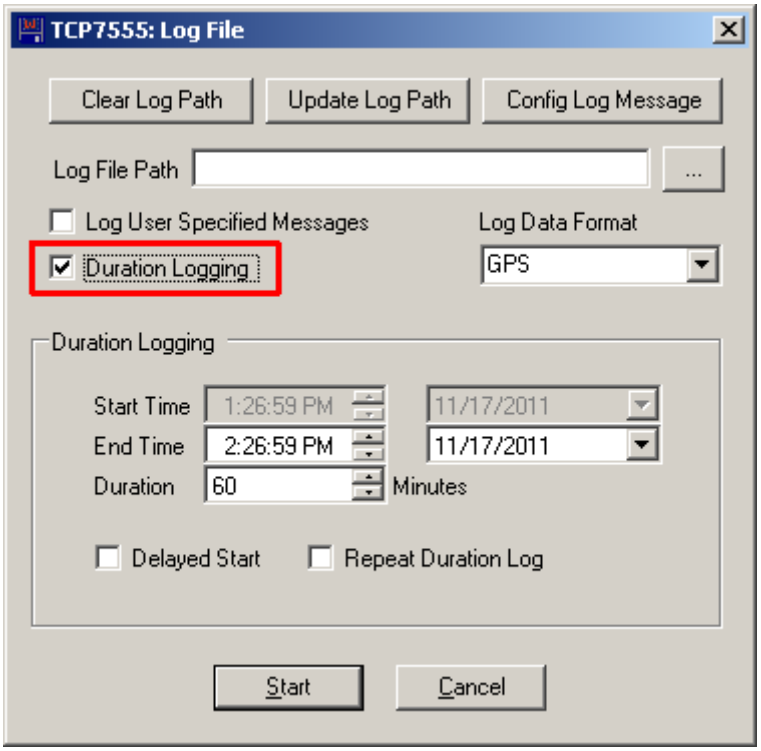


Figure 5.19: Duration Logging

The default logging time is for one hour after the current time. You can adjust the **End Time** as required by either:

- Select a time and date
- Select a number of minutes to log

5.10.4.1. Delayed Start

You can also delay the logging event. Click **Delayed Start**. This activates the **Start Time** time and date fields. For example:

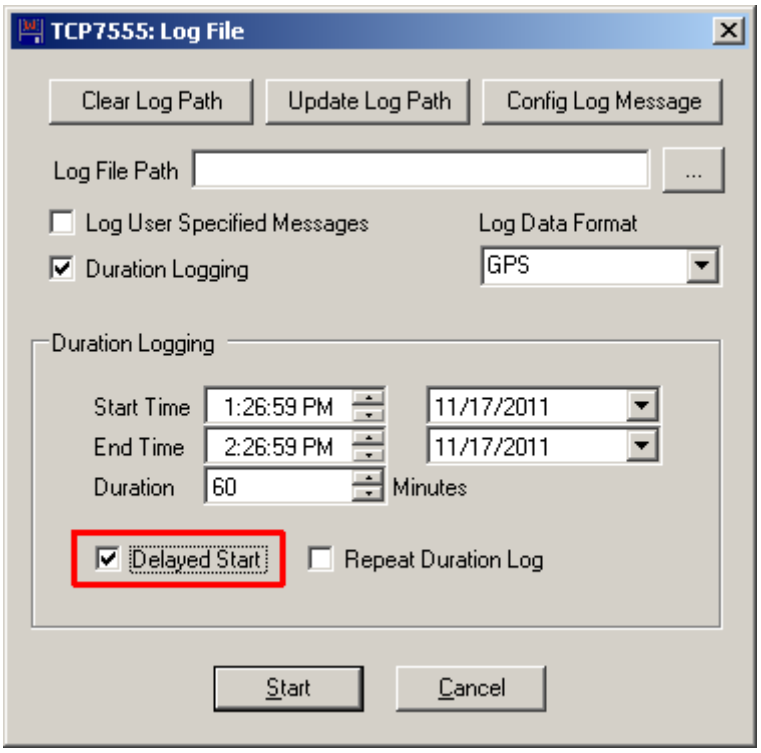
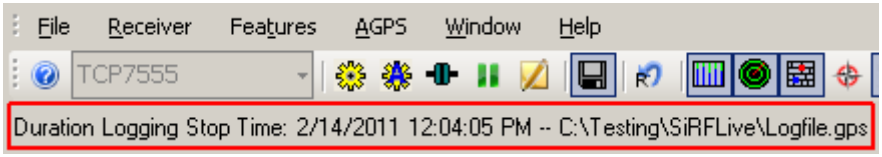


Figure 5.20: Delayed Start

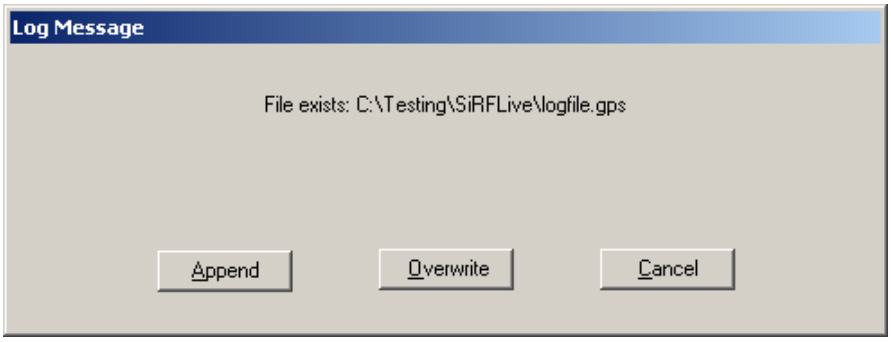
Note:

The maximum duration you can set is 9999 minutes (i.e. just under 7 days).

When selected, the time of the logging duration appears underneath the Main Toolbar:



If the specific log file exists, the following **Log Message** window appears:



- Click **Append** to append the log file
- Click **Overwrite** to write over the existing log file
- Click **Cancel** to exit the request and select a new filename for the log

5.10.4.2. Repeat Duration Log

You can define if the logging event is to be repeated. This will allow for the log file to be logged for the duration and then a new log file will be created and logged for the same duration. This will continue until you stop the logging.

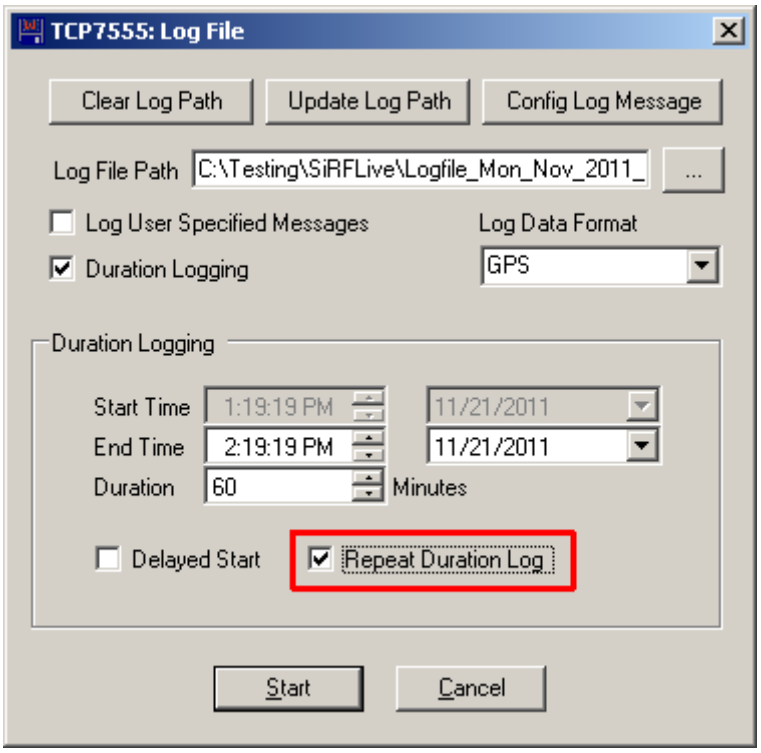
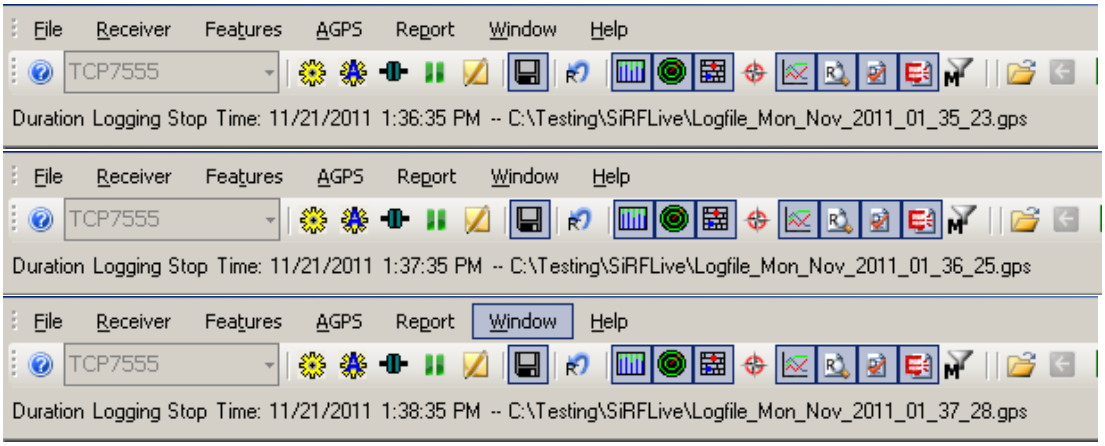


Figure 5.21: Repeat Duration Log

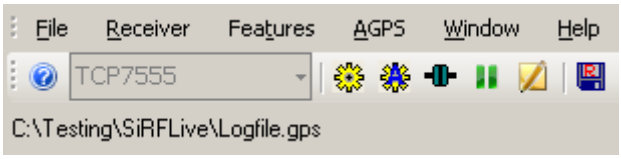
Note

The log files will be based on date and time

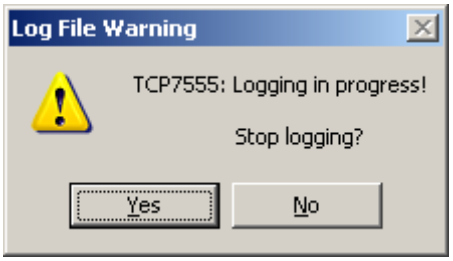


5.10.4.3. Stop Logging

Click the **Log File** icon again to stop the logging, even if it was a set-duration log event. The icon highlight is removed:



The following window appears:



Click **Yes** to stop logging or **No** to continue logging.

5.11. Reset

The **Reset** command enables you to send different resets to the Receiver.

To reset either:

- Click the **Reset** button on the Main Toolbar 

- Select the menu option **Receiver** / **Command** / **Reset...**

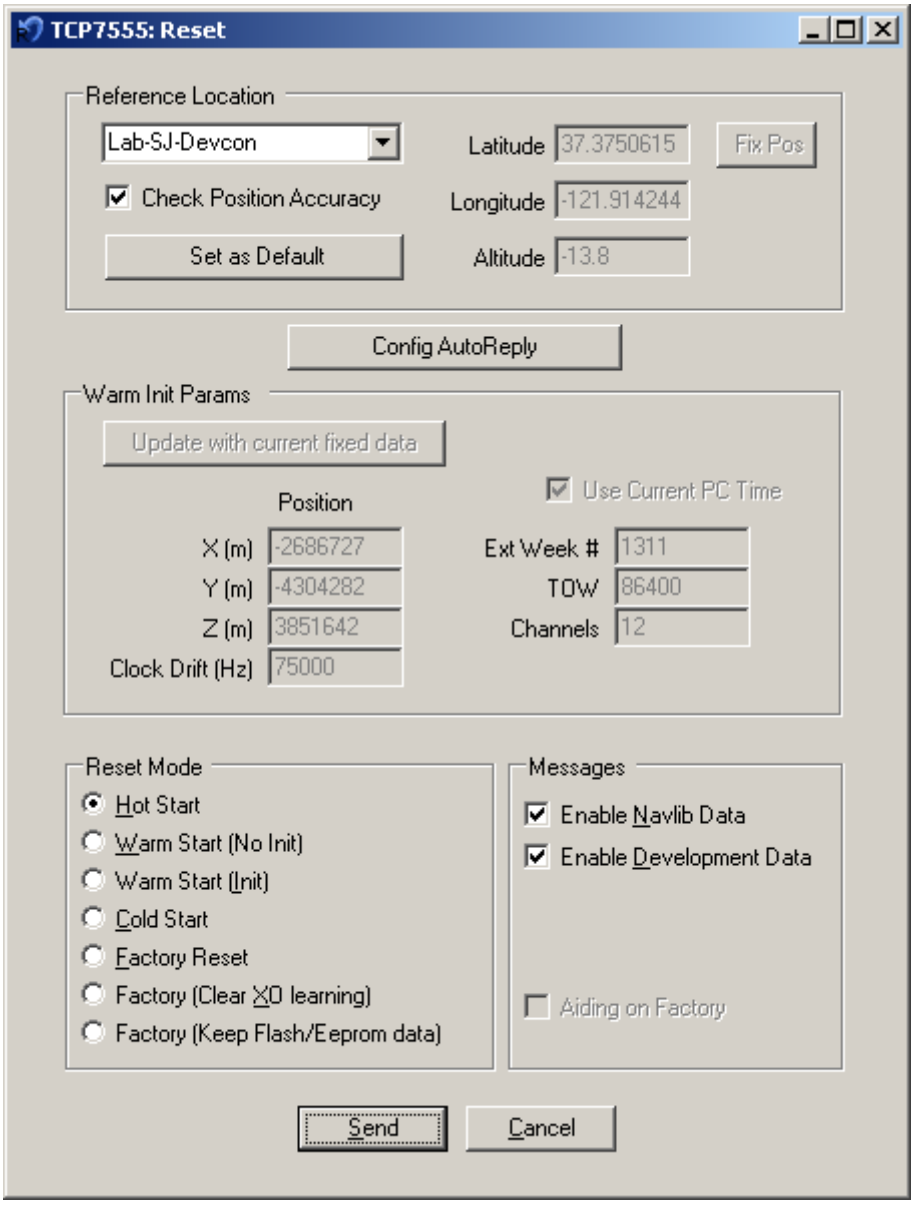


Figure 5.22: GSD4t Reset Window

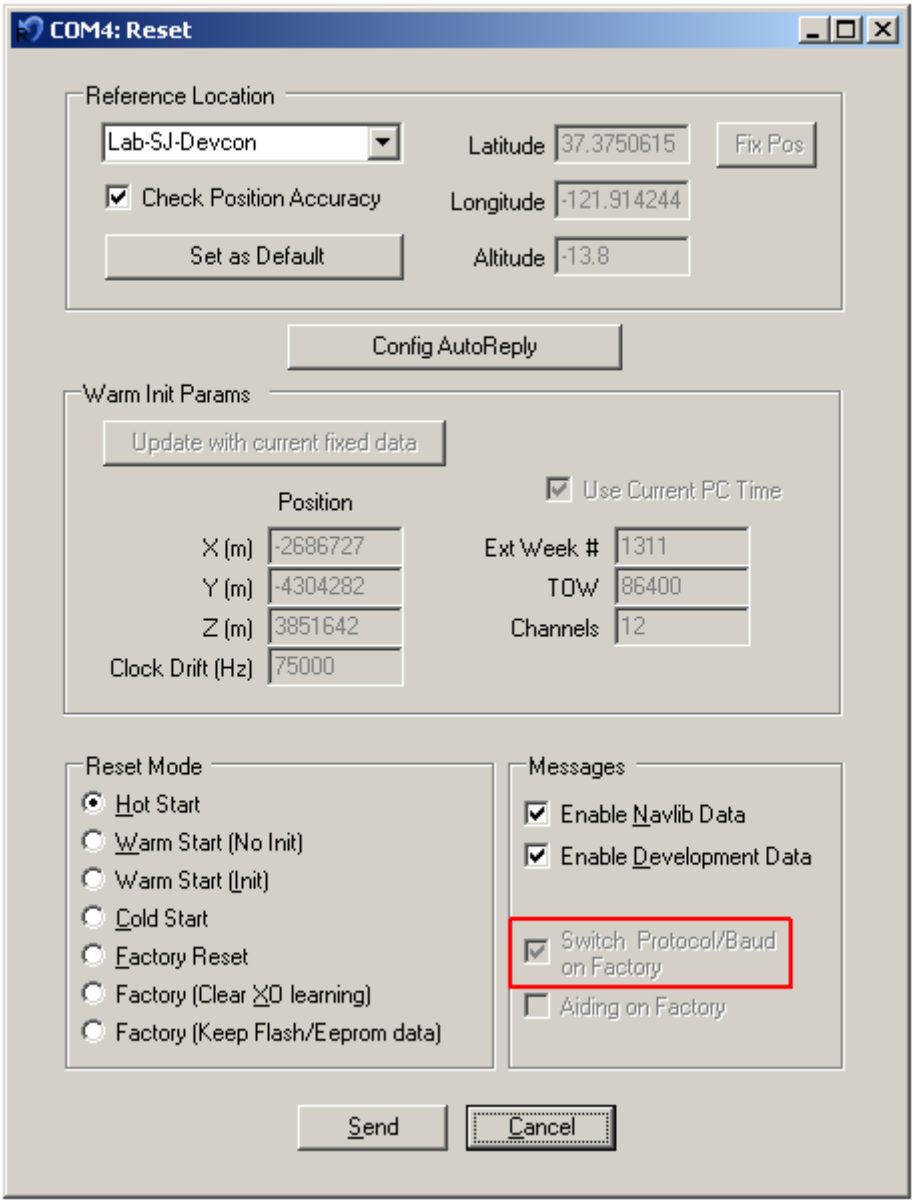
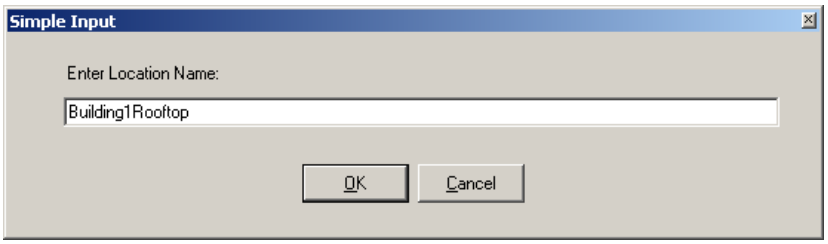


Figure 5.23: GSD4e Reset Window

5.11.1. Reference Location

Use the **Reference Location** section to help determine position accuracy in conjunction with the TTFF values. Set this location to the position of the antenna used for the receiver under testing to ensure the accuracy of horizontal and vertical errors:

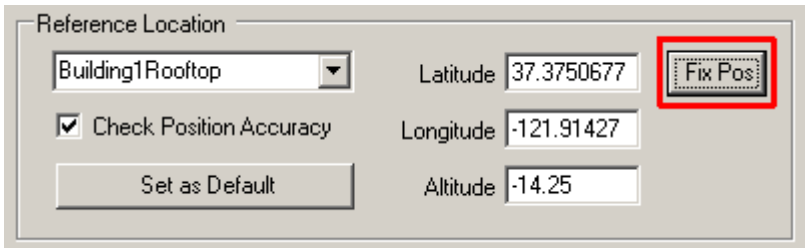
1. Select USER_DEFINED to specify the antenna position.
2. Type a descriptive location name into the field.



3. Either:

   - Enter LLA coordinates:

   - Click **Fix Pos** to automatically load the current coordinates into the fields.



4. Click **Set as Default** to save the reference and use it every time SiRFLive is activated.

By default, the **Check Position Accuracy** checkbox is selected. This considers the TTFF window content and whether the accuracy is used on any reset.

5.11.2. Config Auto Reply

Click the **Config Auto Reply** button to open the **AutoReply Settings** window for modification. See here for more information.

5.11.3. Warm Init Params

The **Warm Init Params** section is enabled when you select **Warm Start (Init)** reset from the **Reset Mode** section:

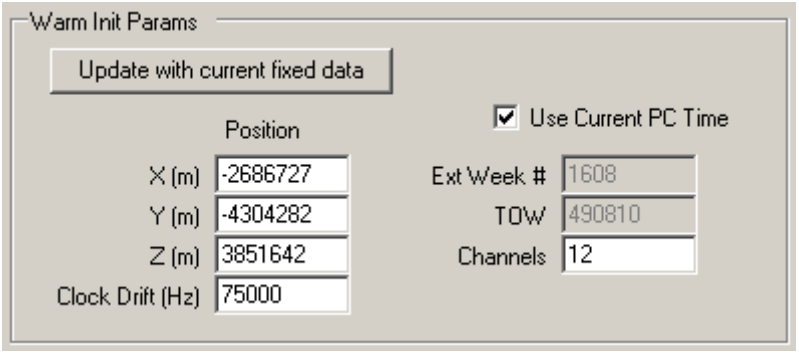


Figure 5.24: Warm Init Params

You can modify any of the seven parameters, referring to position, frequency or time, in an attempt to place the receiver somewhere else before the reset.

- Click the **Update with current fixed data** button to load the current location information into the fields and use it for the reset.
- Click the **Use Current PC Time** checkbox to disable the Extended Week number and TOW, and use the current time from the PC running SiRFLive.

5.11.4. Reset Mode

Resets modes are:

Hot Start	The GPS receiver restarts using the values stored in its internal memory, validated ephemeris and the almanac.
Warm Start (No Init)	The GPS receiver restarts using the values stored in its internal memory and the almanac.
Warm Start (Init)	This reset clears all initialization data in the GPS receiver and subsequently reloads the data that is currently displayed in the **Warm Init Params** section. The almanac is retained but the ephemeris is cleared.
Cold Start	This reset clears all data that is currently stored in the internal memory of the GPS receiver including position, almanac, ephemeris and time. However, the stored clock drift is retained.
Factory Reset	This reset clears all data including position, almanac, ephemeris, time and the stored clock drift. All GPS receiver parameters are also set back to the factory defaults.
Factory (Clear XO learning)	This reset clears all data, as well as any stored TCXO learning values.
Factory (Keep Flash/Eeprom data)	This reset clears all data, but keeps any flash and/or EEPROM data.

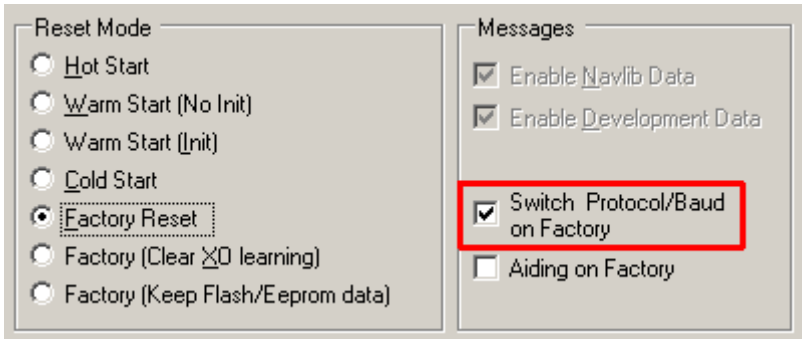
5.11.5. Messages

- Click **Enable Navlib Data** to log navigation library data.
- Click **Enable Development Data** to turn on message 255.

  Development data output by a GPS receiver is required to assist analysis and debugging of system performance problems. CSR highly recommends enabling Development Data during development and testing in case you require support from CSR.
- Click **Aiding on Factory** after a factory reset to send aiding parameters to the receiver to expedite the reset.

5.11.5.1. Switch Protocol/Baud on Factory (GSD4e only)

Select this option to automatically switch the protocol and baud rate after a factory reset is sent. This can help simplify the manual switching from the default NMEA mode to OSP after factory resets.



5.12. View

Several views display additional information.

5.12.1. Signal View

The **Signal View** window displays the SVs available, plus the corresponding C/N0 values and state for each, see Figure 5.25.

To display the **Signal View** window either:

- Click the **Signal View** button on the Main Toolbar 
- Click **Receiver / View / Signal View**

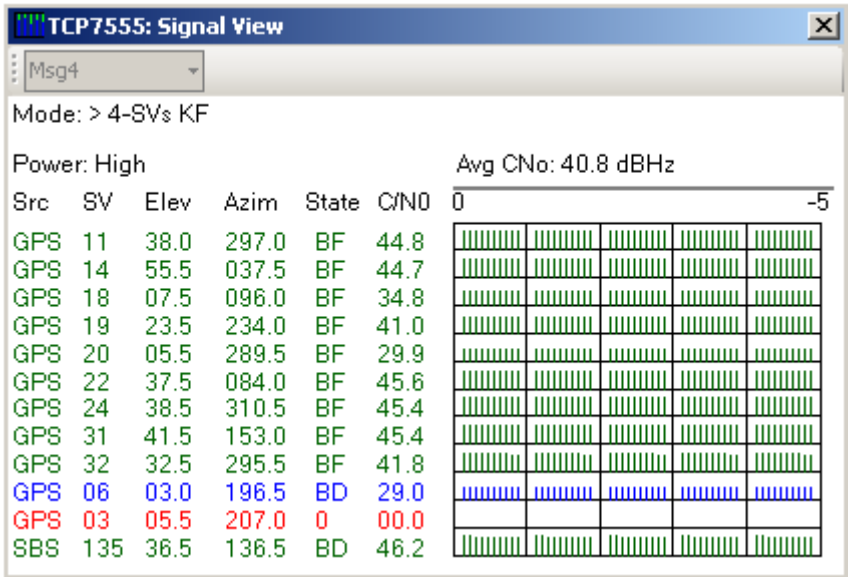


Figure 5.25: Signal View

Red	The satellite location is known from almanac information; however, the satellite is not currently being tracked.
Blue	The satellite is being tracked; however, it is not being used in the current position solution.
Green	The satellite is being tracked and is being used in the current position solution.
Sky Blue	For SBAS satellites only. The satellite is being tracked and corrections are being used in the current position.
Orange	For Almanac Based Positioning.
Purple	The satellite is being tracked; however, a SiRFInstantFix Client Generated Extended Ephemeris (CGEE) is being used for the position solution.
Pink	The satellite is being tracked; however, a SiRFInstantFix Server Generated Extended Ephemeris (SGEE) is being used for the position solution.
Circles	GPS
Squares	GLONASS

Table 5.1 shows definitions of State shown in the Signal View window.

Tracking Status		**Acq Success**	**Data Phase Valid**	**Bit Sync Done**	**Sub-frame Sync Done**	**Carrier Pullin done**	**Code Locked**	**Acq Failed**	**Ephemeris Data Available**
	Dec	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**
Hex		**0x0001**	**0x0002**	**0x0004**	**0x0008**	**0x0010**	**0x0020**	**0x0040**	**0x0080**
00	0								
01	1	■							
03	3	■	■						
21	33	■					■		
23	35	■	■				■		
25	37	■		■			■		
27	39	■	■	■			■		
2D	45	■		■	■		■		
33	51	■	■			■	■		
35	53	■		■		■	■		
37	55	■	■	■		■	■		
3D	61	■		■	■	■	■		
3E	63	■	■	■	■	■	■		

Tracking Status		Acq Success	Data Phase Valid	Bit Sync Done	Sub-frame Sync Done	Carrier Pullin done	Code Locked	Acq Failed	Ephemeris Data Available
	Dec	1	2	4	8	16	32	64	128
Hex		0x0001	0x0002	0x0004	0x0008	0x0010	0x0020	0x0040	0x0080
8D	141								
AD	173								
AE	175								
BE	191								
40	64								
4C	76								
C0	192								
CC	204								
CD	205								

Table 5.1: Signal View States

5.12.2. Radar View

The **Radar View** window displays the location of the SVs by azimuth and elevation, see Figure 5.26.

To display the **Radar View** window either:

- Click the **Radar View** button on the Main Toolbar 
- Click **Receiver / View / Radar View**

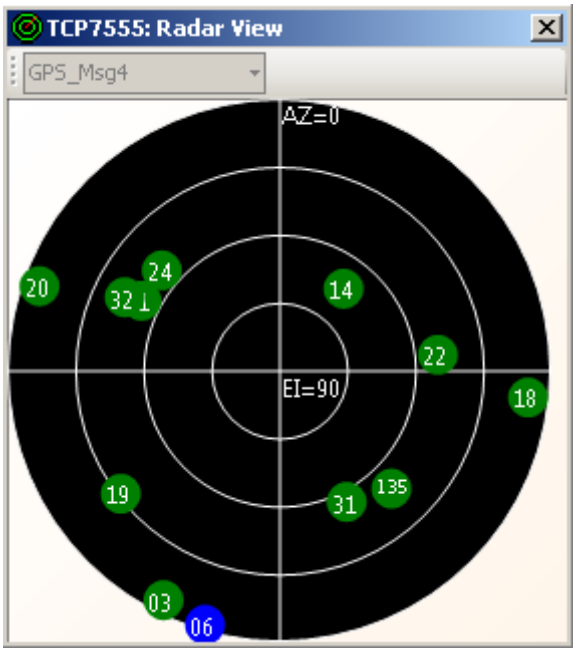


Figure 5.26: Radar View

5.12.3. Location View

The **Location View** window displays detailed information about the UTC, TOW, latitude, longitude, height/altitude, etc, see Figure 5.27.

To display the **Location View** window either:

- Click the **Location View** button on the Main Toolbar 
- Click **Receiver / View / Location View**

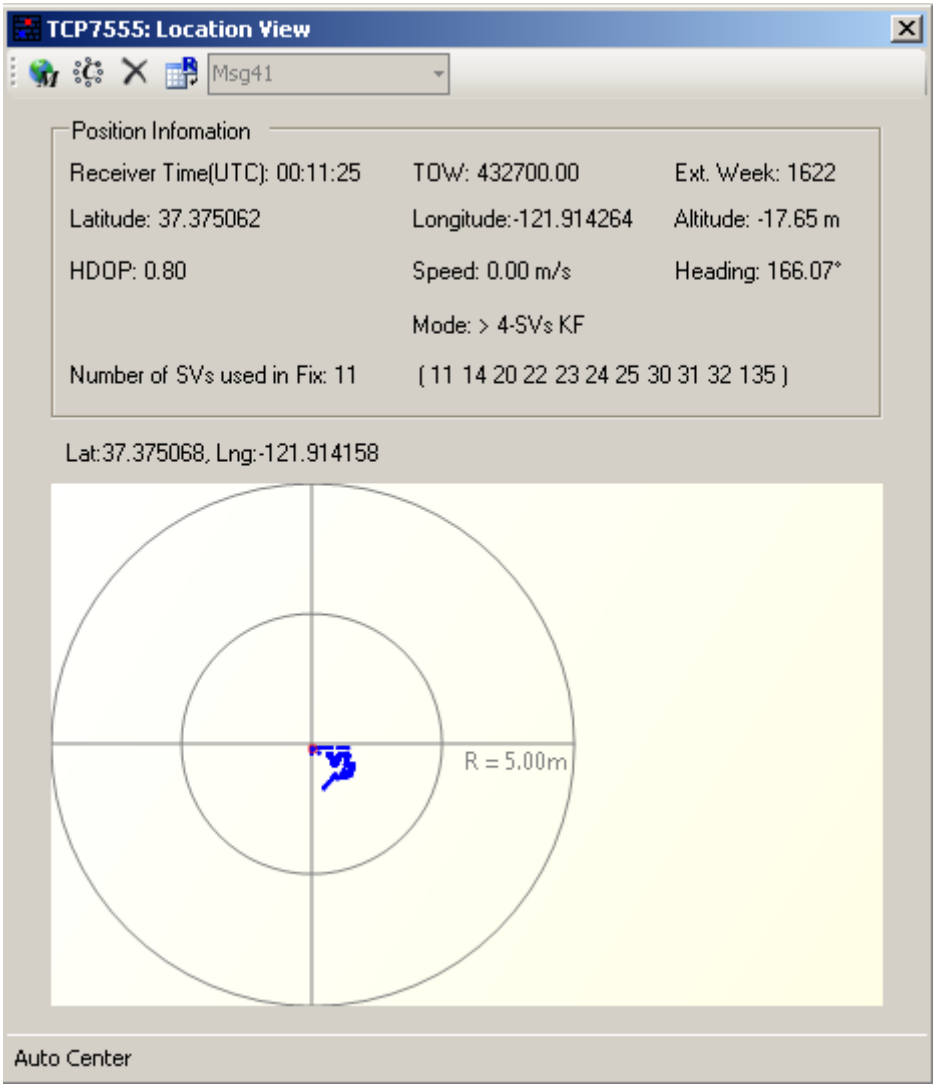


Figure 5.27: Location View

5.12.3.1. Map Position

This option enables you to see your position on a Google map.

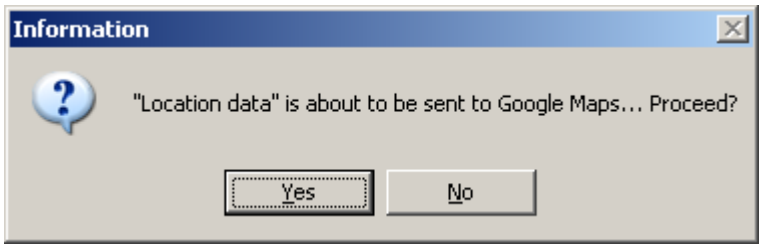
Note:

You need internet access for the **Map Position** button to work.

1. Click the **Map Position** button 

   If there is no internet access the following message appears:

   If there is internet connectivity the following message appears:



2. Click **Yes**.

   A Google map window opens with your current location marked by a green arrow.

3. Move the pointer over the green arrow to display coordinates on the map, the same as those in the text box, see Figure 5.28.

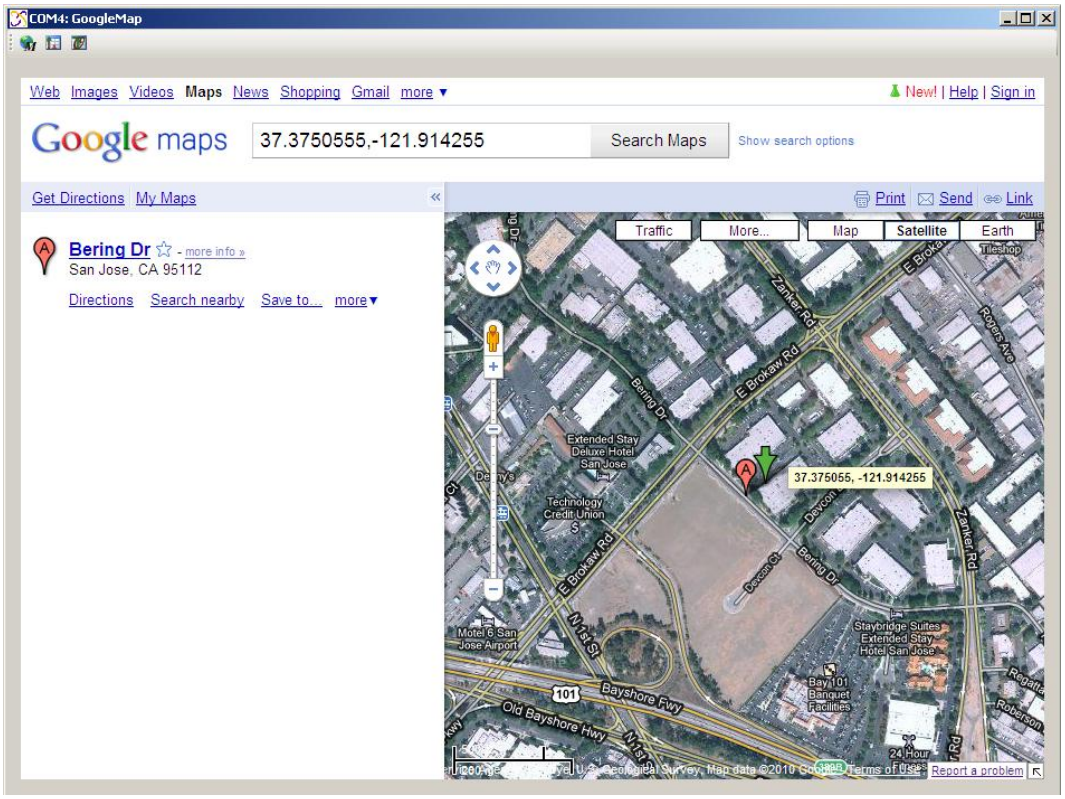


Figure 5.28: Map Position

- Click the **Street View** button  to display a snapshot of the position from Google Street View mode.
- Click the **Track View** button  to display a snapshot of the position from the default overhead view.

5.12.3.2. Configuration

This option enables you to set the radius of the location map circle as well as the centre point location.

1. Click the **Configuration** button 

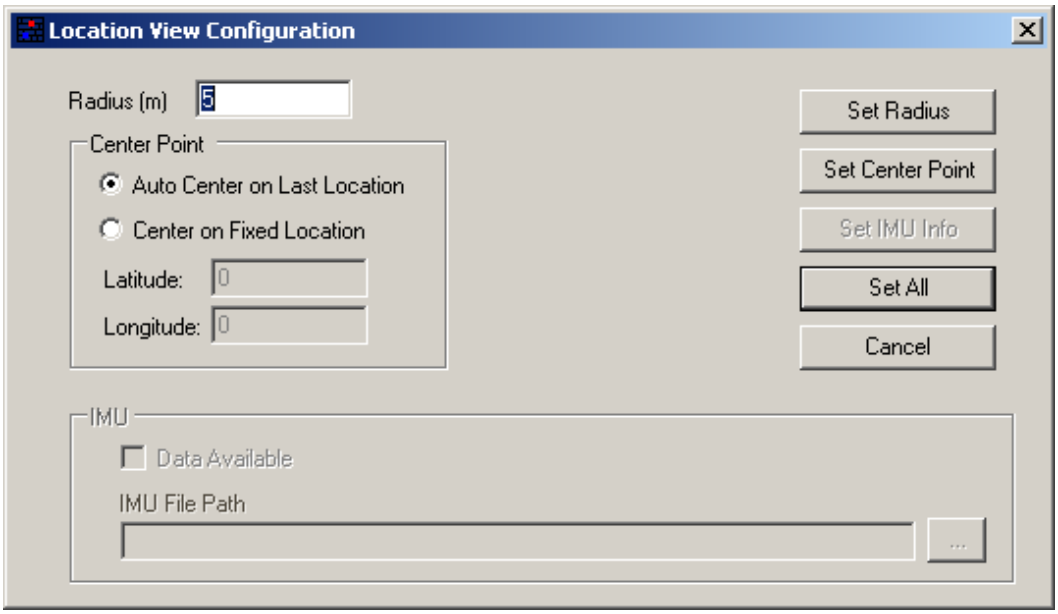


Figure 5.29: Location View Configuration

2. Set the radius to the required size in meters.
3. Click the **Set Radius** button to change the scale of the location map.
4. Set the center point of the map by either:
   - **Auto Center on Last Location** to automatically set the centre to the position of the last location.
   - **Center on Fixed Location** to automatically set the centre to a point you type in the **Latitude** and **Longitude** boxes.
5. Click **Set Center Point**.

Figure 5.30 and Figure 5.31 show how you can toggle the location center by right-clicking within the **Location View** window.

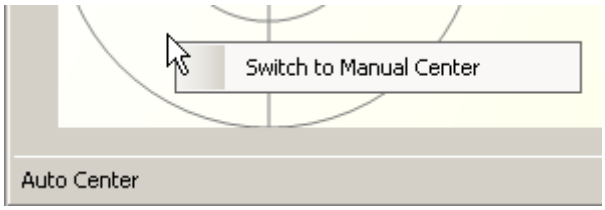


Figure 5.30: Switch to Manual Center

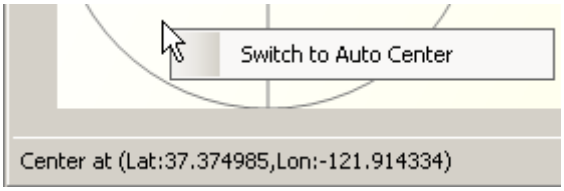
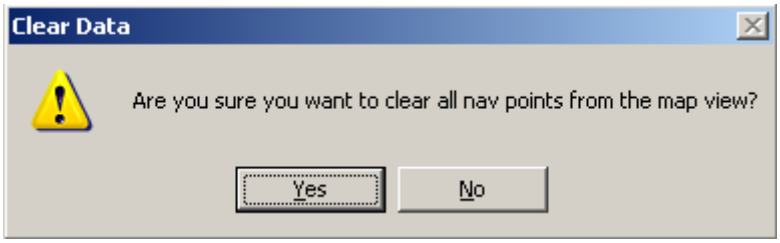


Figure 5.31: Switch to Auto Center

5.12.3.3. Clear Data

You can clear all the positions that are shown in the Location Map view.

1. Click the **Clear Data** button 
   The following message appears:



2. Click **Yes** to clear the field or **No** to cancel the action.

5.12.3.4. Set Reference Location

You can change the position used as the reference location.

1. Click the **Set Reference Location** button 
2. See section 5.11.1 for more information.

5.12.3.5. Point and Tell

When MEMS is enabled and calibrated, you can use the Point and Tell feature in the Google Map portion of the Location View.

1. Click the **Street View** icon  to refresh the map image.

For example, Figure 5.32 to Figure 5.37 show various headings and pitches.

Figure 5.32: Heading 226°

Figure 5.33: Heading 290°

Figure 5.34: Heading 137°

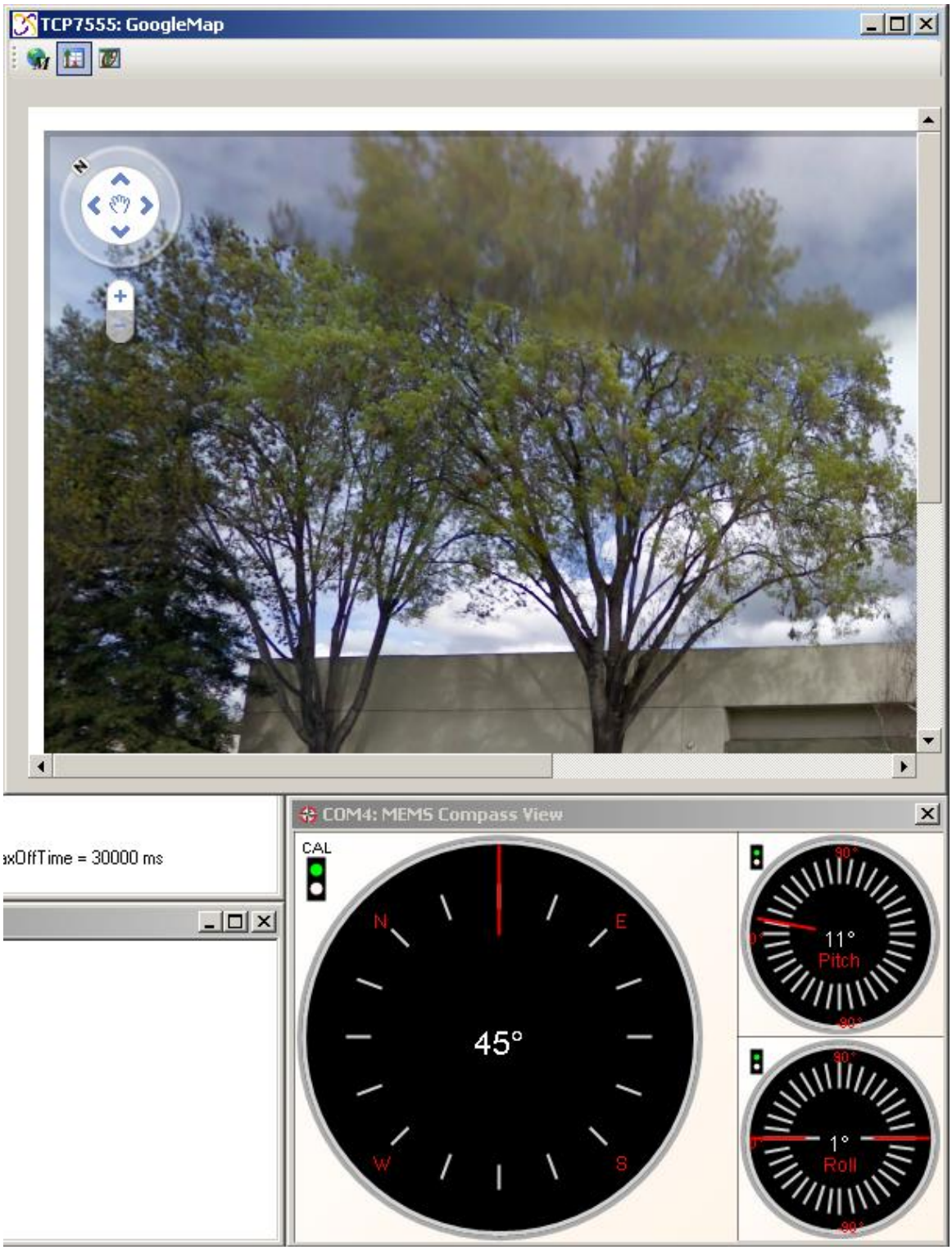


Figure 5.35: Pitch 11°

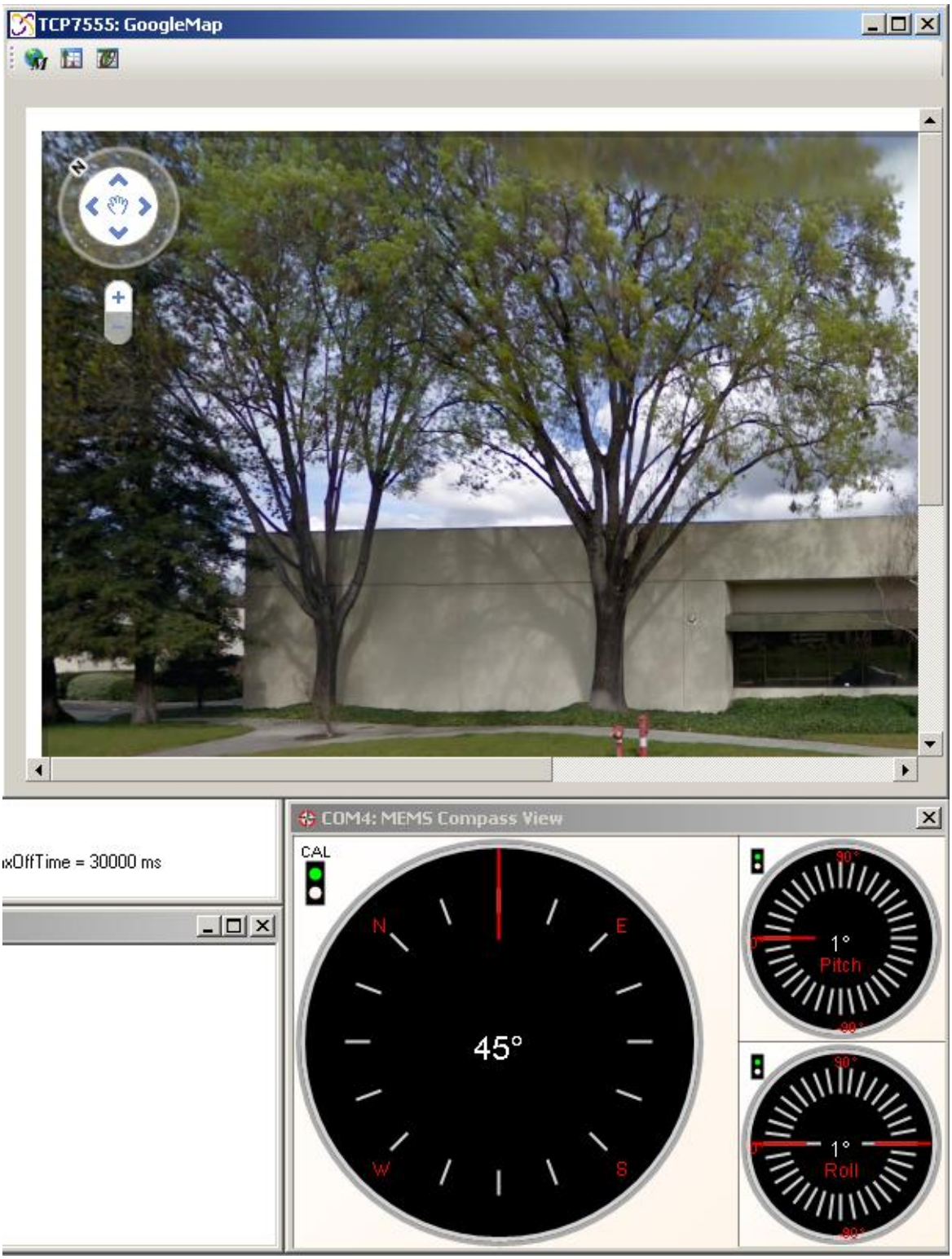


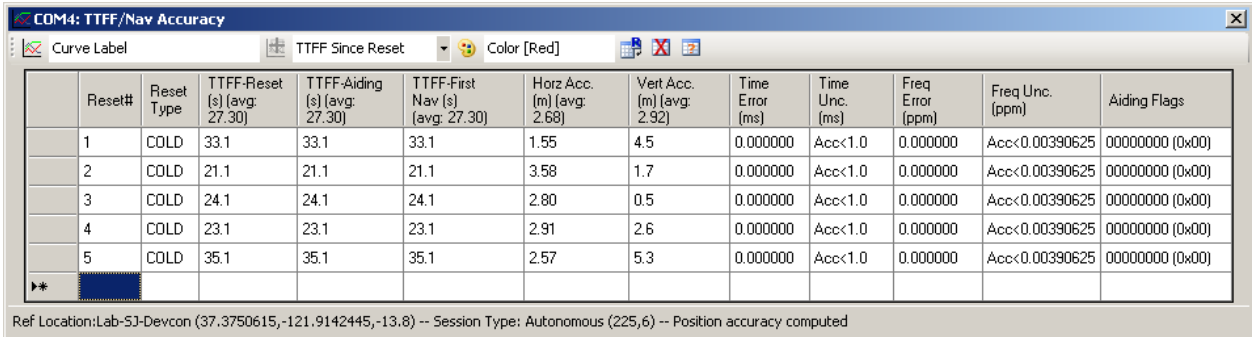
Figure 5.36: Pitch 1°

Figure 5.37: Pitch -25°

5.12.4. TTFF/Nav Accuracy View

To display the **TTFF/Nav Accuracy** window either:

- Click the **TTFF View** button  on the Main Toolbar
- Click **Receiver / View / TTFF and Nav Accuracy View...**



	Reset#	Reset Type	TTFF-Reset (s) (avg: 27.30)	TTFF-Aiding (s) (avg: 27.30)	TTFF-First Nav (s) (avg: 27.30)	Horz Acc. (m) (avg: 2.68)	Vert Acc. (m) (avg: 2.92)	Time Error (ms)	Time Unc. (ms)	Freq Error (ppm)	Freq Unc. (ppm)	Aiding Flags
	1	COLD	33.1	33.1	33.1	1.55	4.5	0.000000	Acc<1.0	0.000000	Acc<0.00390625	00000000 (0x00)
	2	COLD	21.1	21.1	21.1	3.58	1.7	0.000000	Acc<1.0	0.000000	Acc<0.00390625	00000000 (0x00)
	3	COLD	24.1	24.1	24.1	2.80	0.5	0.000000	Acc<1.0	0.000000	Acc<0.00390625	00000000 (0x00)
	4	COLD	23.1	23.1	23.1	2.91	2.6	0.000000	Acc<1.0	0.000000	Acc<0.00390625	00000000 (0x00)
	5	COLD	35.1	35.1	35.1	2.57	5.3	0.000000	Acc<1.0	0.000000	Acc<0.00390625	00000000 (0x00)

Figure 5.38: TTFF/Nav Accuracy View

The Status bar shows the reference location being used for the TTFF criteria, the Session Type, and the message used for the computation.

5.12.4.1. CDF Plots

To display the **CDF Plots** window click the **CDF Plot** button  the graph of the TTFF resets.

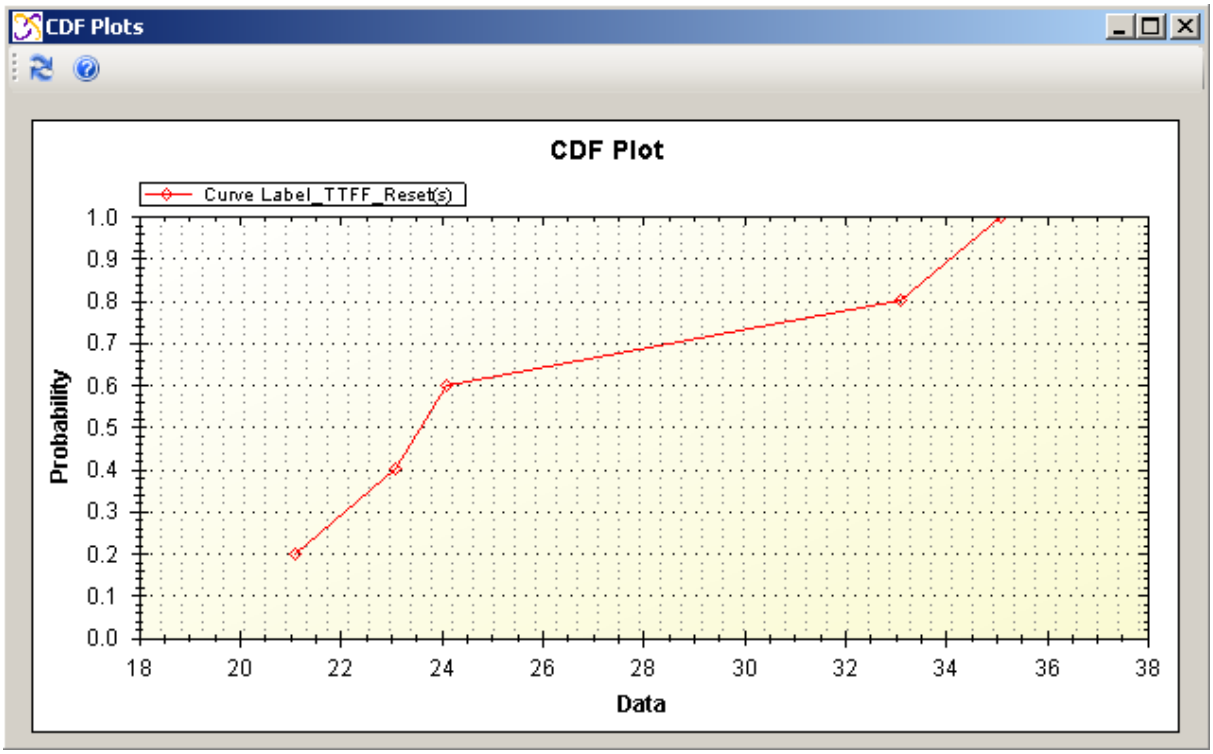


Figure 5.39: CDF Plot

5.12.4.2. Refresh

- Click the **Refresh** button  to update any new data for the plot.

5.12.4.3. Help

- Click the **Help** button  for information on how to manipulate the graph area:

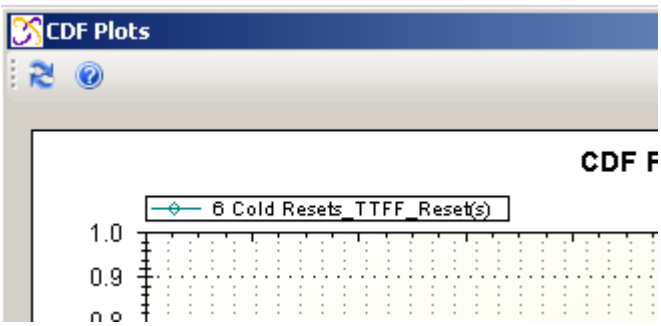
Figure 5.40: Plot Help Window

5.12.4.4. Curve Label

The **Curve Label** box enables you to name the plot. Otherwise a default name is used.

1. Type `6 Cold Resets` in the box:

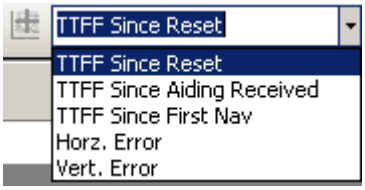
2. Click the **CDF Plot** button to display the plot name with `_TTFF_Reset(s)` appended to your name:



3. If you enter no name `TTFF Since Reset_TTFF_Reset(s)` is used, i.e. the name in the **Add Curve** field.

5.12.4.5. Add Curve

- Click the **Add Curve** button  to select an option for the CDF Plot curve graph:



5.12.4.6. Curve Color

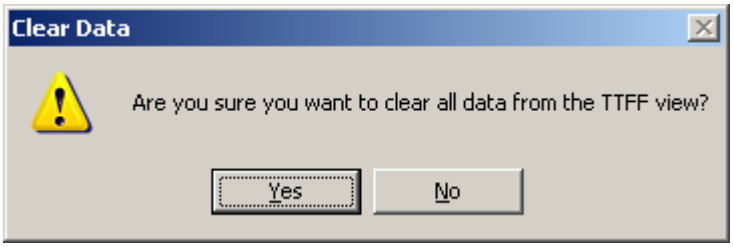
- Click the **Curve Color** button  to display the colors available for the line in the curve:

5.12.4.7. Set Reference Position

- Click the **Set Reference Position** button  to change the reference position if necessary. See section 5.11.1 for more information.

5.12.4.8. Clear

- Click the **Clear** button  to clear all information in the reset fields. Confirm you want to proceed:



5.12.4.9. Column Description

- Click the **Column Description** button  to display a window explaining the column headings.

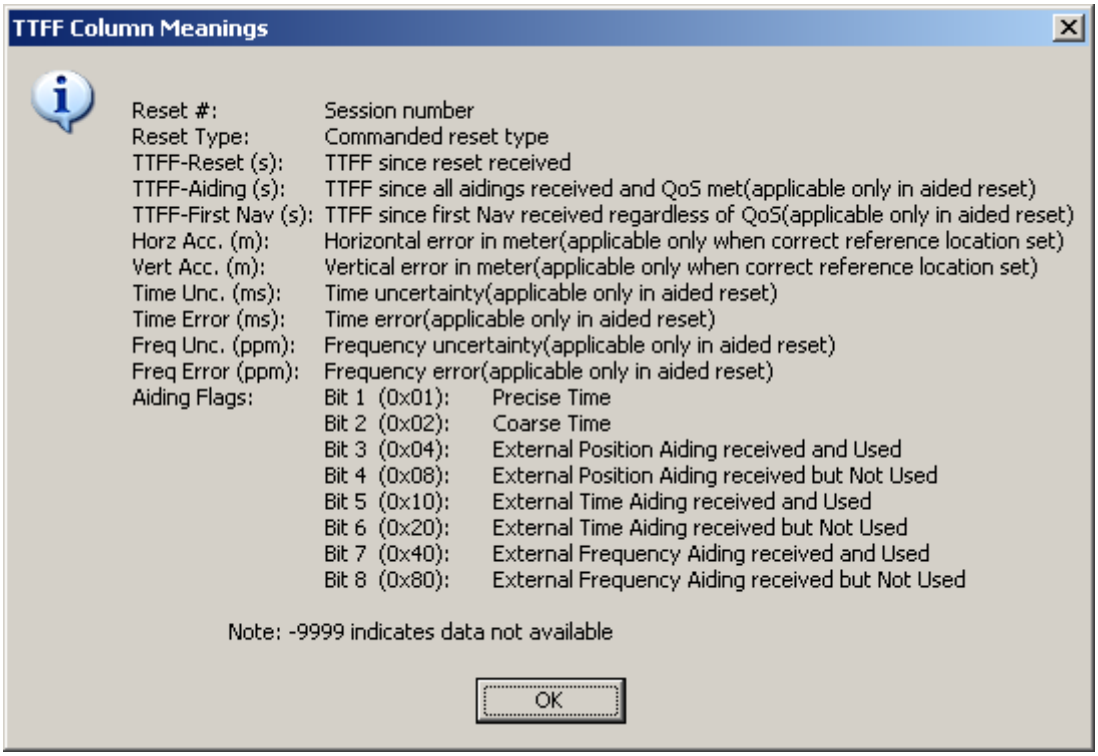


Figure 5.41: TTFF Column Meanings

5.12.4.10. Aiding Flags

The last column in the TTFF window represents the aiding flags that are being used for the particular reset:

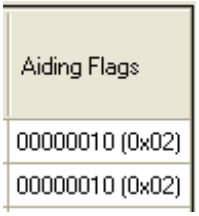


Figure 5.42: Aiding Flags Column

The example in Figure 5.42 shows the default for an autonomous session where the only bit set is the Coarse Time bit 2 (`0x02`) and there is no aiding received (all other bits are `0`).

You can also see this information when you capture a log file using 3GPP Automation Tests or Loopit in SiRFLive. Logging data also creates a `<log file name>_ttff.csv` file with the `.gps` file. The last column in the `.csv` file shows the value of the aiding bits used:

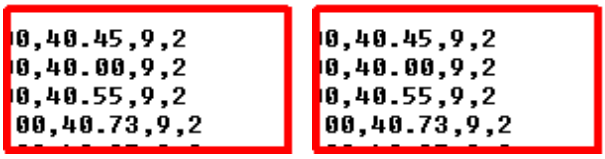


Figure 5.43: Example Log Files I

The **2** indicates that only the Coarse Time bit was set, i.e. this was an autonomous session.

Figure 5.44 examples show that Frequency Aiding was received but not used (`0x82`), Bit[8] + Bit[2] and Frequency Aiding and Position Aiding were received but only Position Aiding was used (`0x86`), Bit[8] + Bit[3] + Bit[2] with Coarse Time.

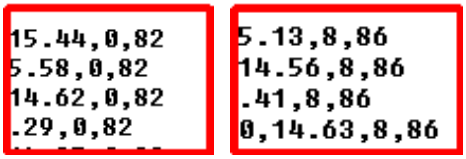


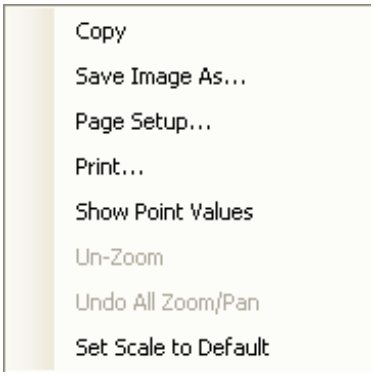
Figure 5.44: Example Log Files II

Note:

You cannot open the **TTFF** window while in NMEA protocol mode. You must switch to OSP protocol to characterize TTFF performance.

5.12.4.11. Options

- Right-click on the **CDF Plot** window to display options that are described in section 5.12.4.3:



5.12.5. Response View

To display the **Response View** window either:

- Click the **Response View** button  on the Main Toolbar
- Click **Receiver / View / Response View...**

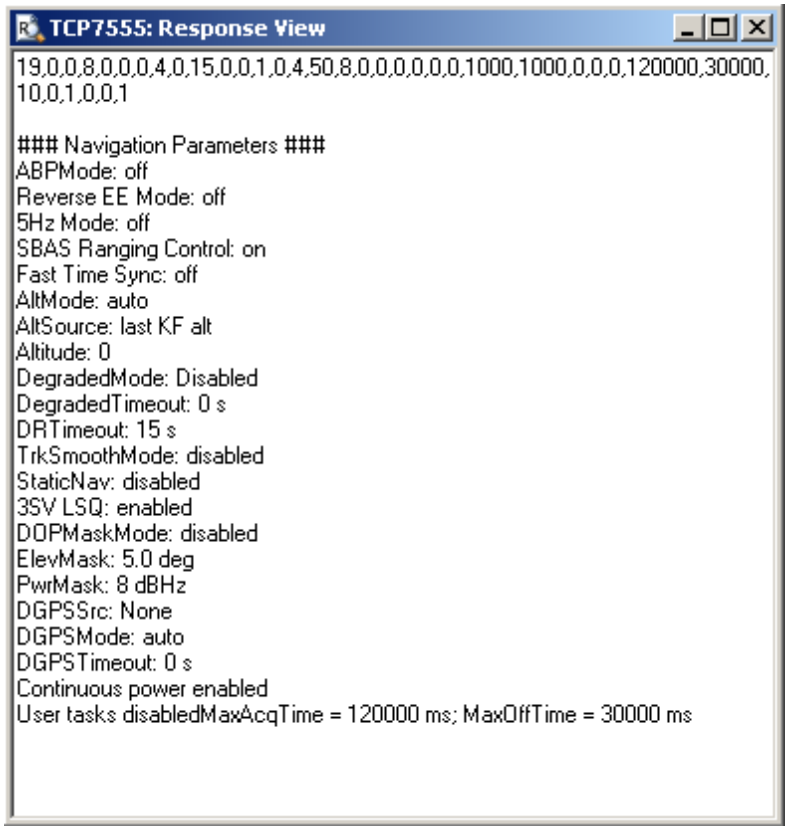


Figure 5.45: Response View Window

Some of the output shown in this window is from the Poll S/W Version request and the Poll Nav Parameters request. Message 19 is the Navigation Parameters message.

5.12.6. Debug View

The **Debug View** window displays all of the messages that are coming out of the receiver.

To display the **Debug View** window either:

- Click the **Debug View** button  on the Main Toolbar
- Click **Receiver / View / Debug View**

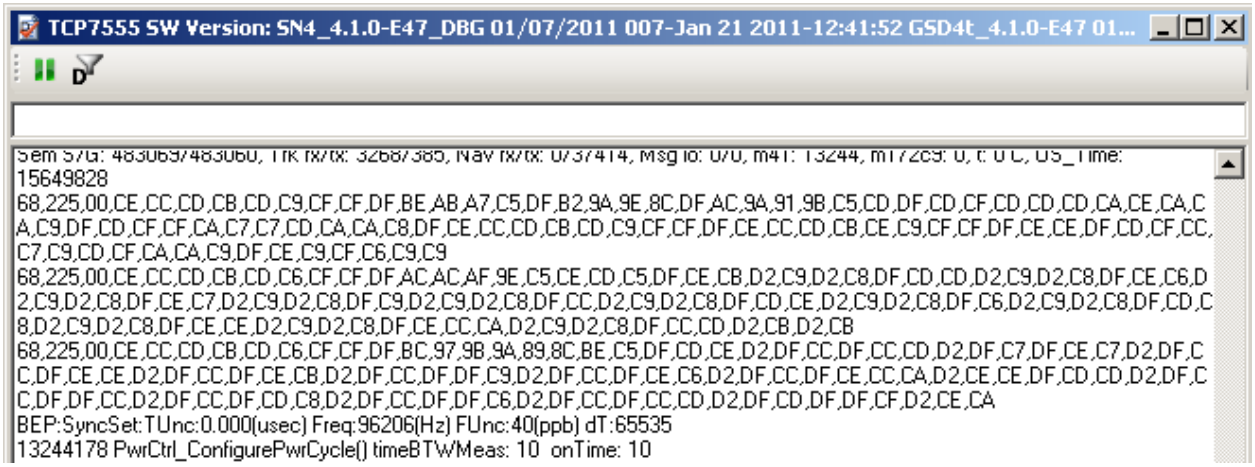


Figure 5.46: Debug View

To help you find messages within the window the following buttons are available:

- **Pause:** See section 5.8
- **Filter:** The message filter is similar to the **Regular Expression** section of the **Message View** window. The font changes to bold blue:

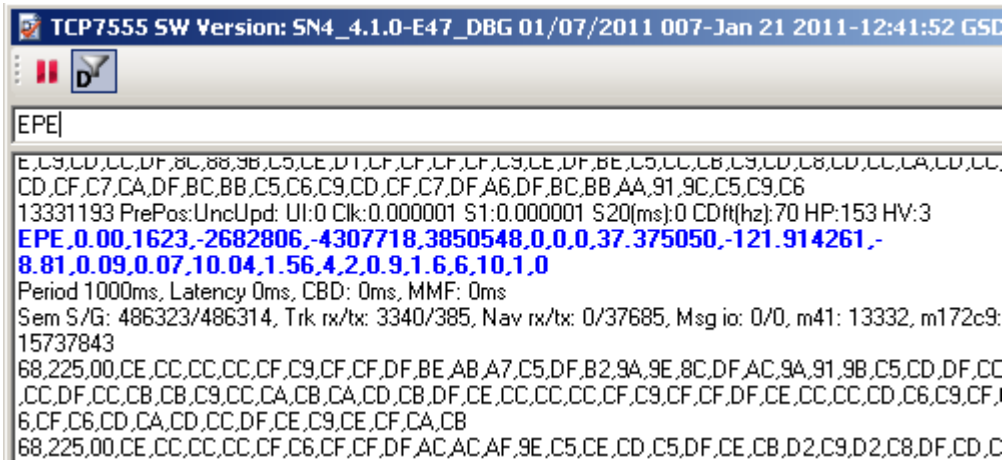


Figure 5.47: Debug View Filter

5.12.7. Error View

The **Error View** window shows any errors that may appear while using the receiver.

To display the **Error View** window either:

- Click the **Error View** button  on the Main Toolbar
- Click **Receiver / View / Error View**

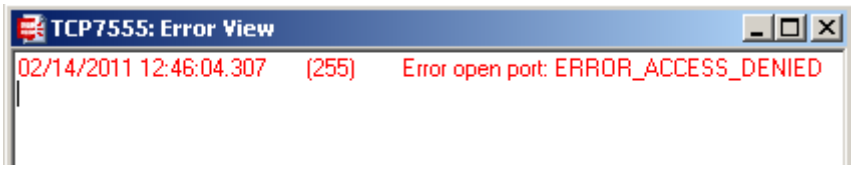


Figure 5.48: Error View Window

5.12.8. Message View

The Message View window shows particular messages in the output window.

To view the **Message View** window either:

- Click the **Message View** button  on the Main Toolbar
- Click **Receiver / View / Message View**

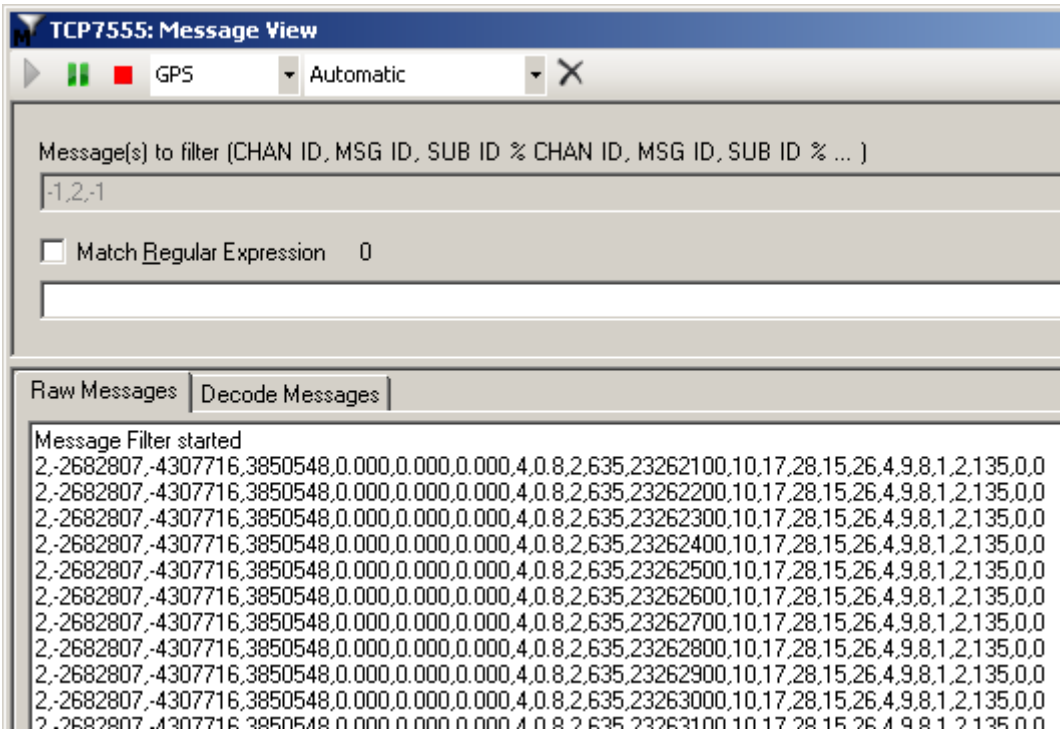
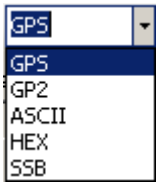


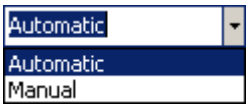
Figure 5.49: Message View Window

From the Toolbar in the **Message View** window:

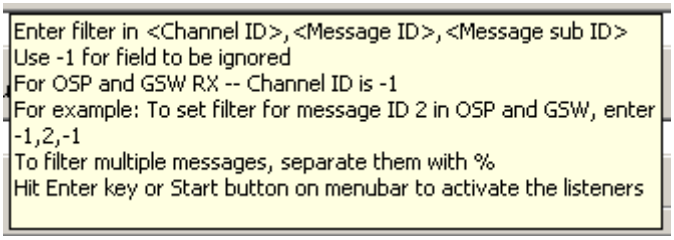
- Click the **Start** button  to begin the message operation.
- Click the **Pause** button  and **Resume** button  to pause and restart the operation.
- Click the **Stop** button  to cancel message output.
- Select the message type form the output list. Default is **GPS**:



- Select the run mode to use for decoding messages. Default is **Automatic**:



- Click the **Exit** button  to close the **Message View** window.
- Move the pointer over the message text field for details:



5.12.8.1. Select Single Message

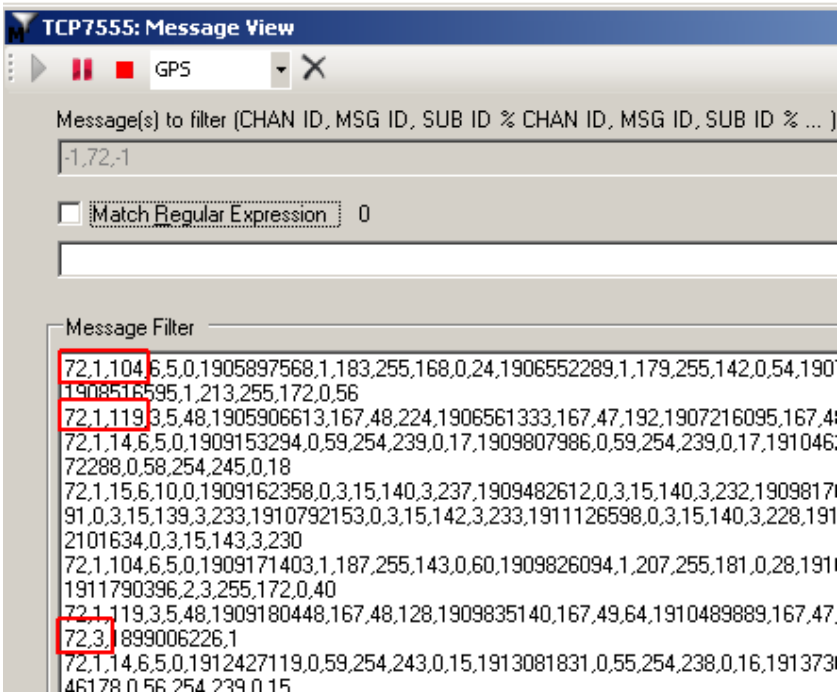
As shown:

1. Enter a filter in `<Channel ID>, <Message ID>, < Message sub ID>` format.
2. Type `-1` for OSP and GSW receiver Channel ID.
3. Type `-1` to ignore a field.
4. Press **Enter** or click the **Start** button.

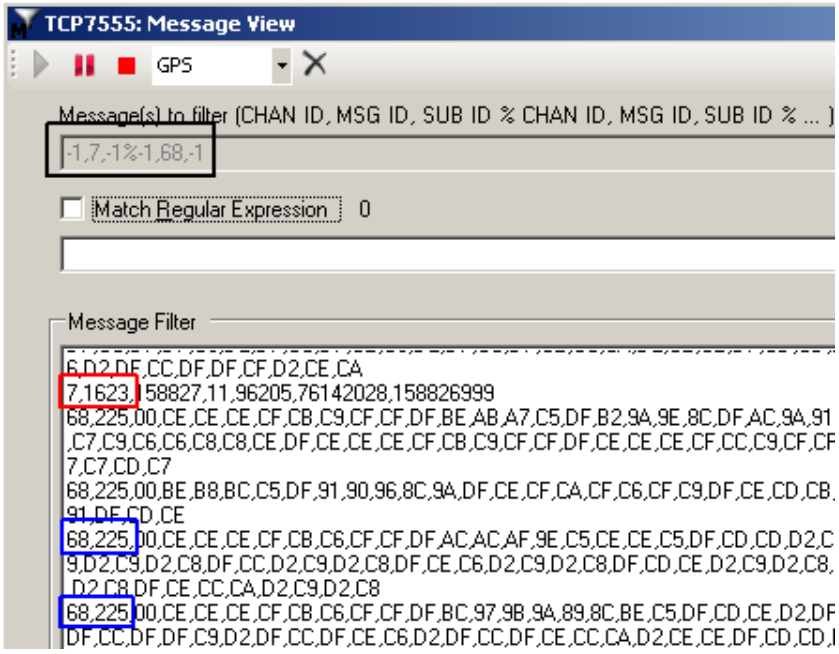
5.12.8.2. Select Multiple Messages

You can select multiple messages to view in several ways:

- Type `-1` as the Sub message ID value. This displays all Sub message IDs for the Message ID selected:



- Use `%` between messages to add more messages:



5.12.8.3. Regular Expression

1. Check the **Match Regular Expression** checkbox.
2. Type the text to match in the filter.
3. Press **Enter**.

   The text displays red in the message filter window.

Note:

The following metacharacters are for advanced use only:

- `^ [ ] . $ { } * ( ) \ + | ? < >`

Figure 5.50 shows all message `72`s are filtered and regular expression `1,14` is highlighted in blue.

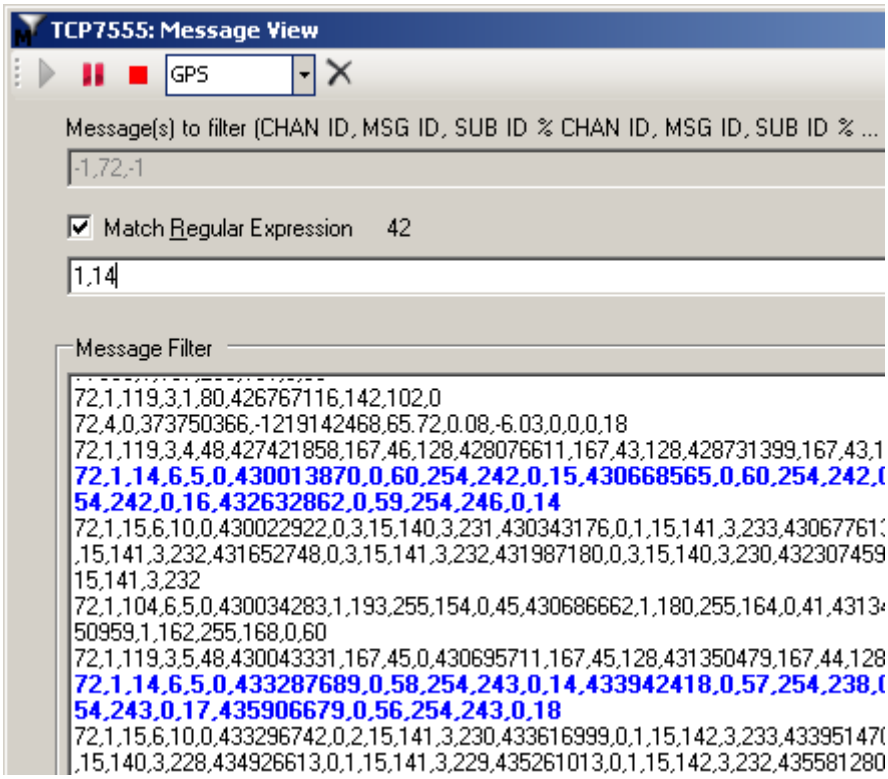


Figure 5.50: Example Multiple Messages View

Note:

The value to the right of the checkbox (42 in this example) is a real-time counter for the number of times the regular expression appears in the filter.

5.12.8.4. Raw Messages

The **Raw Messages** tab is the default output for the Message View dialog.

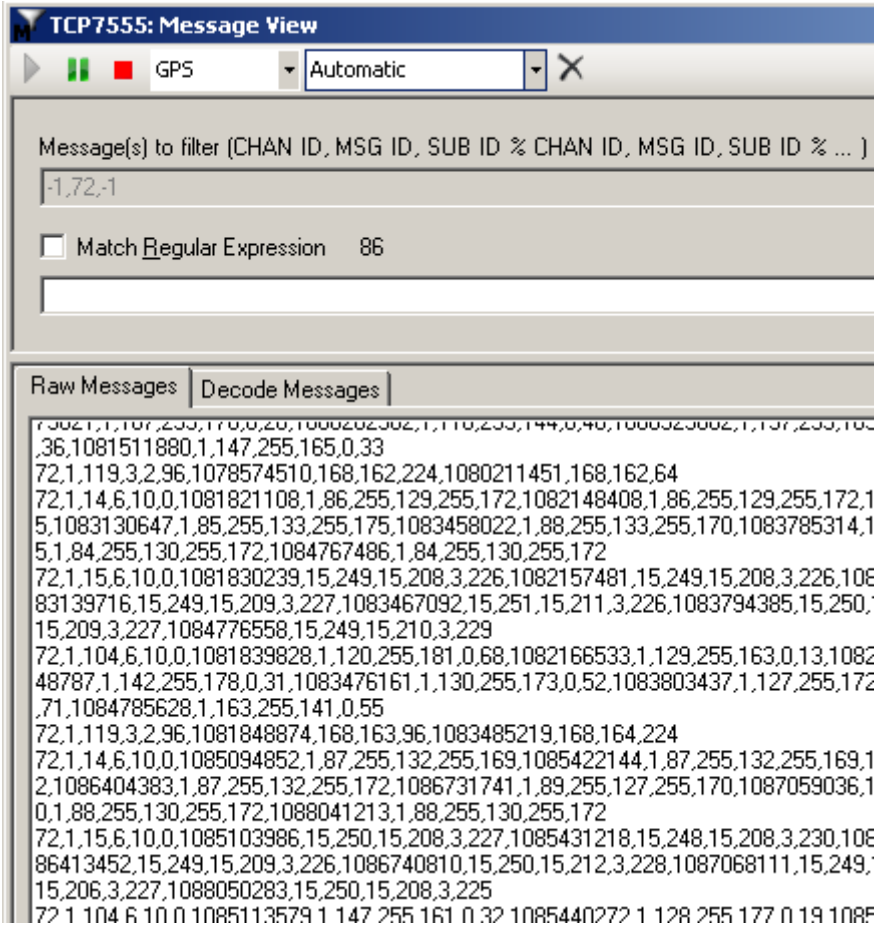
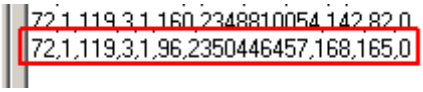


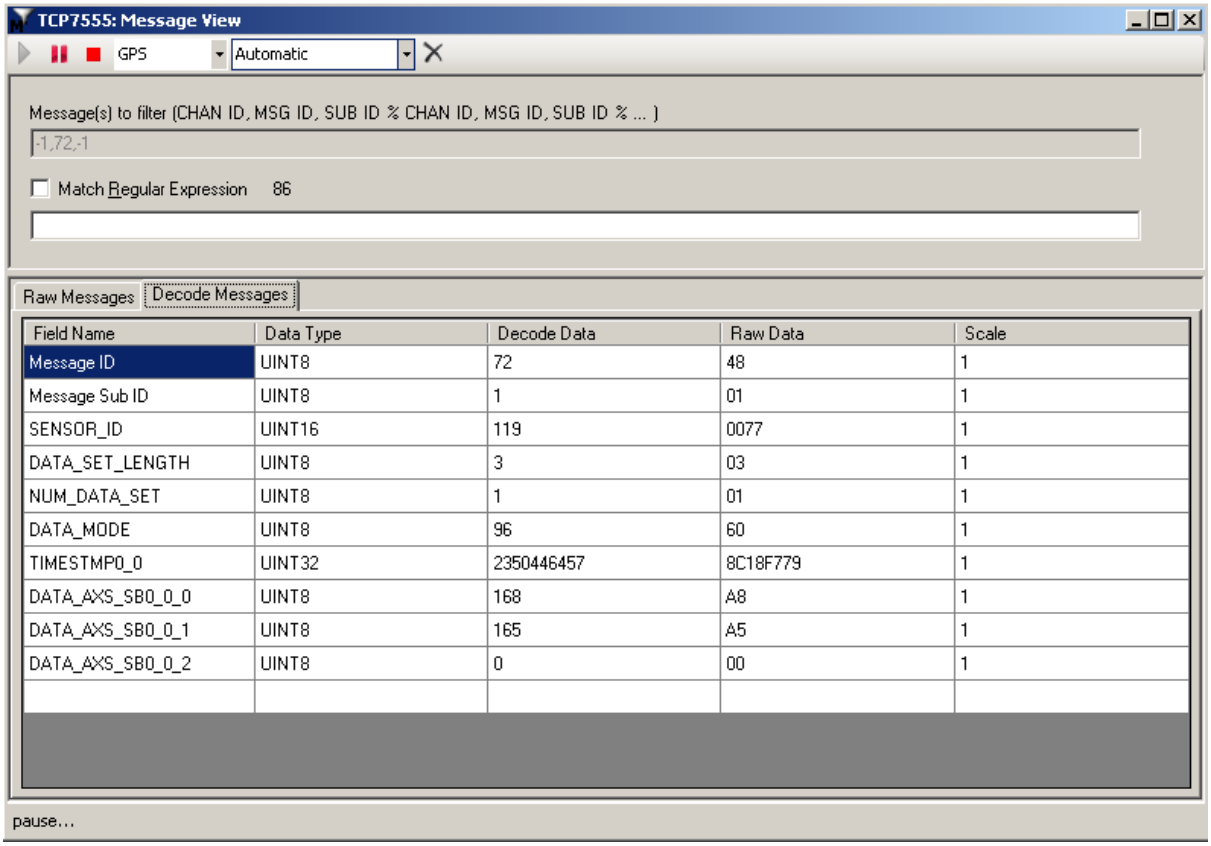
Figure 5.51: Raw Messages Example

5.12.8.5. Decode Messages

Click the **Decode Messages** tab to put the current output into the appropriate decoded fields. For example, assume the current message from the Raw Messages view is:



The Decode Messages view shows:



Field Name	Data Type	Decode Data	Raw Data	Scale
Message ID	UINT8	72	48	1
Message Sub ID	UINT8	1	01	1
SENSOR_ID	UINT16	119	0077	1
DATA_SET_LENGTH	UINT8	3	03	1
NUM_DATA_SET	UINT8	1	01	1
DATA_MODE	UINT8	96	60	1
TIMESTMP0_0	UINT32	2350446457	8C18F779	1
DATA_AXS_SB0_0_0	UINT8	168	A8	1
DATA_AXS_SB0_0_1	UINT8	165	A5	1
DATA_AXS_SB0_0_2	UINT8	0	00	1

Figure 5.52: Decode Messages Example

This enables you to check that the field values are within their correct range without having to remember all the fields for that message.

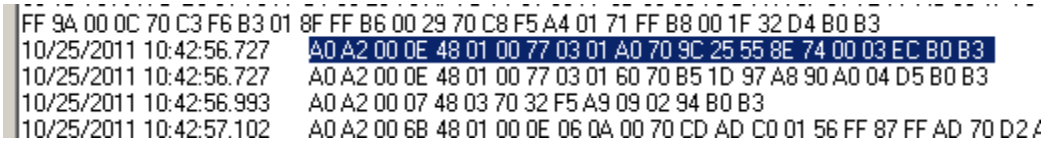
5.12.8.6. Manual Message Decoding

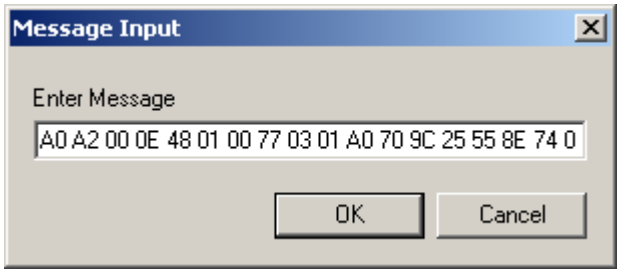
This manual decoding message feature is useful for taking any message, e.g. from a file already collected, and placing it into the Decode Messages fields to look at the subsequent field names for each of the values.

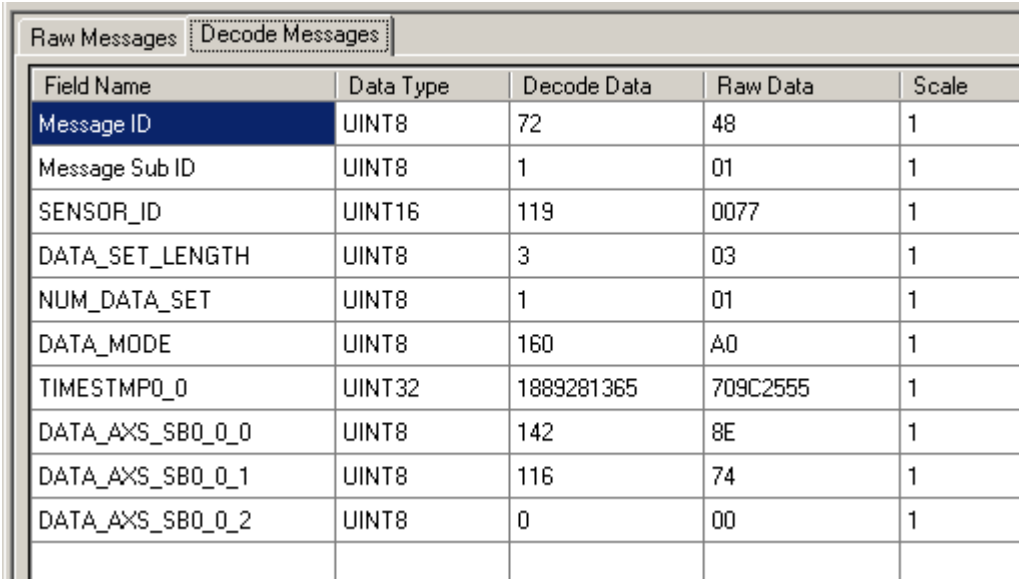
To use this feature:

1. Copy the whole message to the clipboard (Ctrl + c).
2. Click **GPS** for GPS messages and **GP2** for gp2 messages.

   You can insert GP2 messages but you must not include the date and time stamp portion of the message.



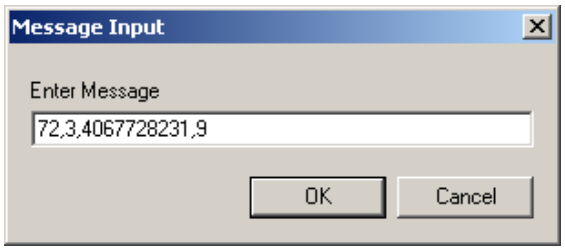




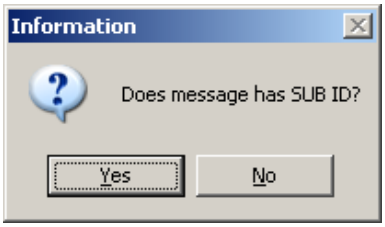
Field Name	Data Type	Decode Data	Raw Data	Scale
Message ID	UINT8	72	48	1
Message Sub ID	UINT8	1	01	1
SENSOR_ID	UINT16	119	0077	1
DATA_SET_LENGTH	UINT8	3	03	1
NUM_DATA_SET	UINT8	1	01	1
DATA_MODE	UINT8	160	A0	1
TIMESTMP0_0	UINT32	1889281365	709C2555	1
DATA_AXS_SB0_0_0	UINT8	142	8E	1
DATA_AXS_SB0_0_1	UINT8	116	74	1
DATA_AXS_SB0_0_2	UINT8	0	00	1

   Only GPS and GP2 formats are currently accepted.

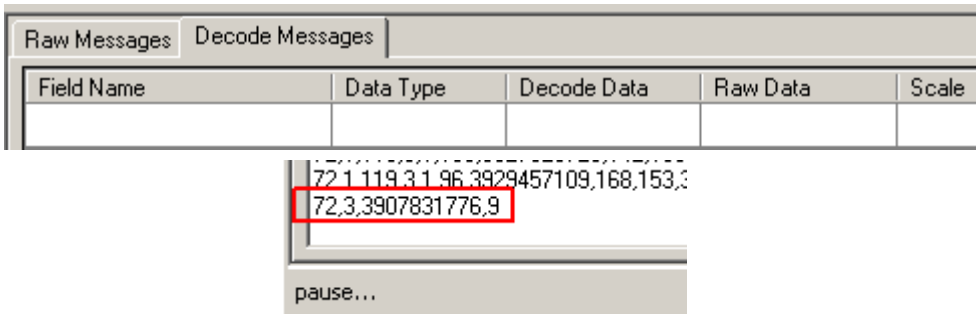
   Note: The Output View format must match the message being decoded, either GPS or GP2.
3. Click **Manual** from the Run Mode dropdown list on the menu bar.
4. Paste the clipboard contents into the dialog as prompted, making sure that the format selected corresponds to the message to be decoded.



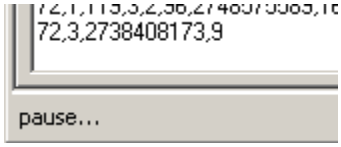
5. Click OK.
6. Make sure you select the correct button when prompted if the message has a sub ID (GPS messages only).



Note: For GPS messages only, if you select **No** Sub ID when the message has one, there is no output in the Decode Messages window. The entered message is mirrored to the end of the Raw Message tab window:



The message is mirrored to the end of the Raw Message tab window:



The output of the Decode Messages view displays the message with the associated field names (Figure 5.52).

If you do not enter the whole message with all fields, then an error message appears:

This appears because the fields associated with that particular message do not match the set fields.

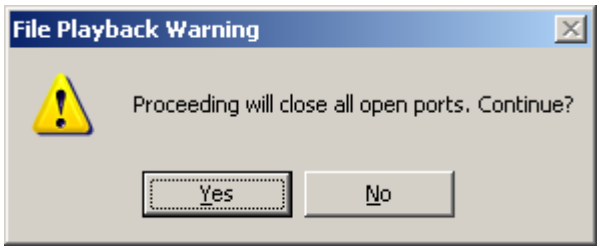
5.13. Playback

Playback options enable you to replay GPS files. When a file is replayed, all of the information is displayed as it was originally collected.

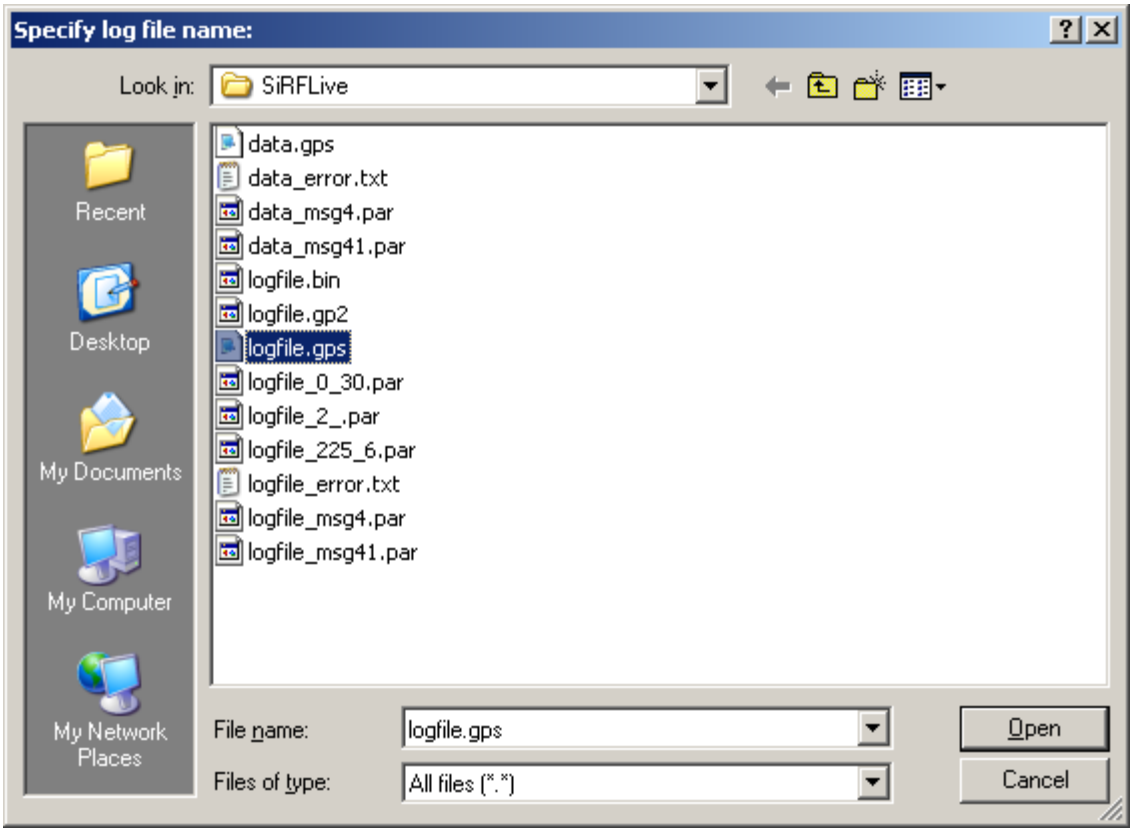
5.13.1. Open File

1. To open a file either:

   - Click the **Open File** button  on the Main Toolbar
   - Click **File/Replay Open**
   - A **File Playback Warning** message appears:

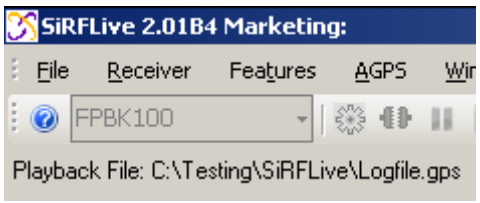


2. Click **Yes** to open the dialog to specify the log file to use in the playback.



3. Click the required file then **Open**.

The COM port displayed in the view windows (FPBK100) shows that it is a file playback. The file being used is displayed in the log file status bar:



5.13.2. Previous Epoch

- To move the playback backwards one epoch click the **Previous Epoch** button  on the Main Toolbar.

The Title Bar displays 

5.13.3. Play File

- **To start file playback** click the **Play File** button  on the Main Toolbar.

The Title Bar displays 

Note:

The file starts from the beginning whenever the **Play File** button is selected.

5.13.4. Pause

- To pause file playback click the **Pause** button  on Main Toolbar.

The button turns red  . The Title Bar displays 

5.13.5. Stop

- To stop file playback click the **Stop** button  on the Main Toolbar.

The Title Bar displays 

5.13.6. Next Epoch

- To move the playback forwards one epoch click the **Next Epoch** button  on the Main Toolbar.

The Title Bar displays 

5.13.7. Close File

Closing a file shuts down all playback functionality.

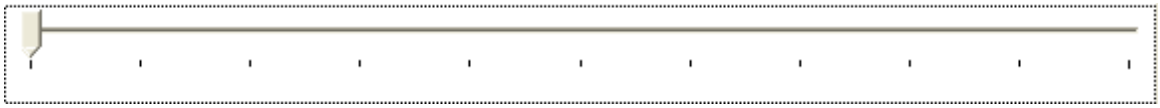
To close a file either:

- Click the **Close File** button  on the Main Toolbar
- Click **File/Replay Close**

The Title Bar displays 

5.13.8. Track Bar

The Track Bar, to the right of the Main Toolbar, displays the length of the playback file as a percentage of the total duration of the file:



Each mark is an increment of 10%. During playback, the bar updates to correspond to the time of the file.

Note:

To move quickly to another section of the playback file, pause playback and drag the tracker along the bar.

6. File Menu

This section describes **File** menu options.

6.1. Log File

File / Log File

See section 5.10 for more information.

6.2. Convert

File / Convert enables you to convert log files from one format to another.

6.2.1. GP2 to GPS

- Select **File / Convert / GP2 to GPS** to convert a `.gp2` file format to a `.gps` format.

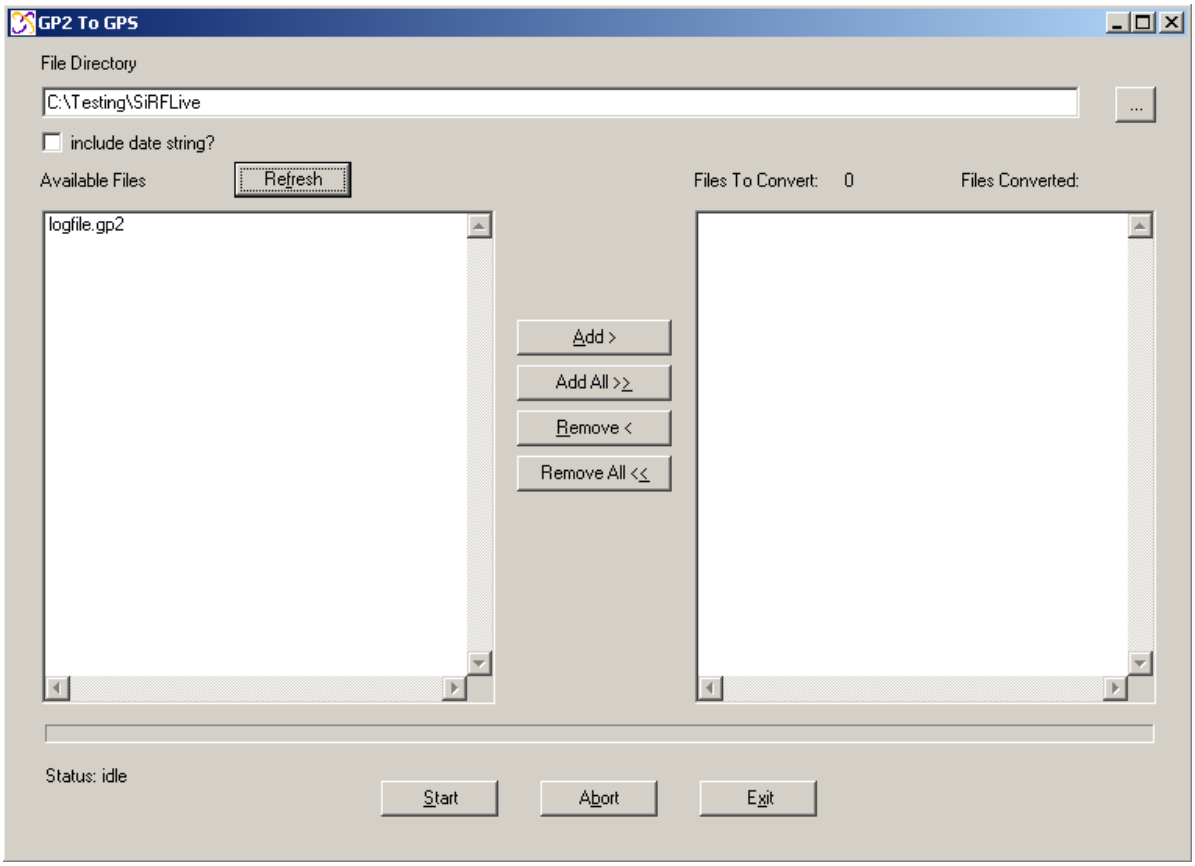


Figure 6.1: Convert GP2 to GPS Window

File Directory

Displays the path of the directory that contains the GP2 files. To find files either:

- Click the ellipsis button to browse to the directory that contains the GP2 files.
- Cut and paste the absolute path of the directory containing the GP2 files to the **File Directory** textbox and click the **Refresh** button.

Include Date String

When selected, adds the log date to each line of the converter file

Available Files	Displays all of the GP2 files in the directory specified in the **File Directory.** Double-click on a file in this box to add it to the **Files to Convert** box.
Refresh	Refreshes **Available Files** box
Clear	Clears all files listed in **Available Files** box
Files to Convert	Displays the files converted when you click **Start.** Double-click on a file in this box to remove it.
Files Converted	Displays the number of files that were converted
Add>	Adds the selected file in **Available Files** box to **Files to Covert** box
Add All>>	Adds all files in the **Available Files** box to **Files to Convert** box
Remove <	Removes the selected file in the **Files to Convert** box
Remove All <<	Remove all files listed in **Files to Convert** box
Start	Starts the conversion process. When you click **Start**, all the files listed in **Files to Convert** are converted. The converted files are stored in the same directory as the original files with the extension `.gps`.
Abort	Aborts the conversion in process. If you click **Abort** you receive a message asking you to confirm this request. Click **Yes** to abort the conversion.
Exit	Quits

You receive a "Conversion Done" message when the conversion is complete:

6.2.2. Bin to GP2/GPS

- Select **File / Convert / Bin to GP2/GPS** to convert a binary file format to a `.gp2` format.

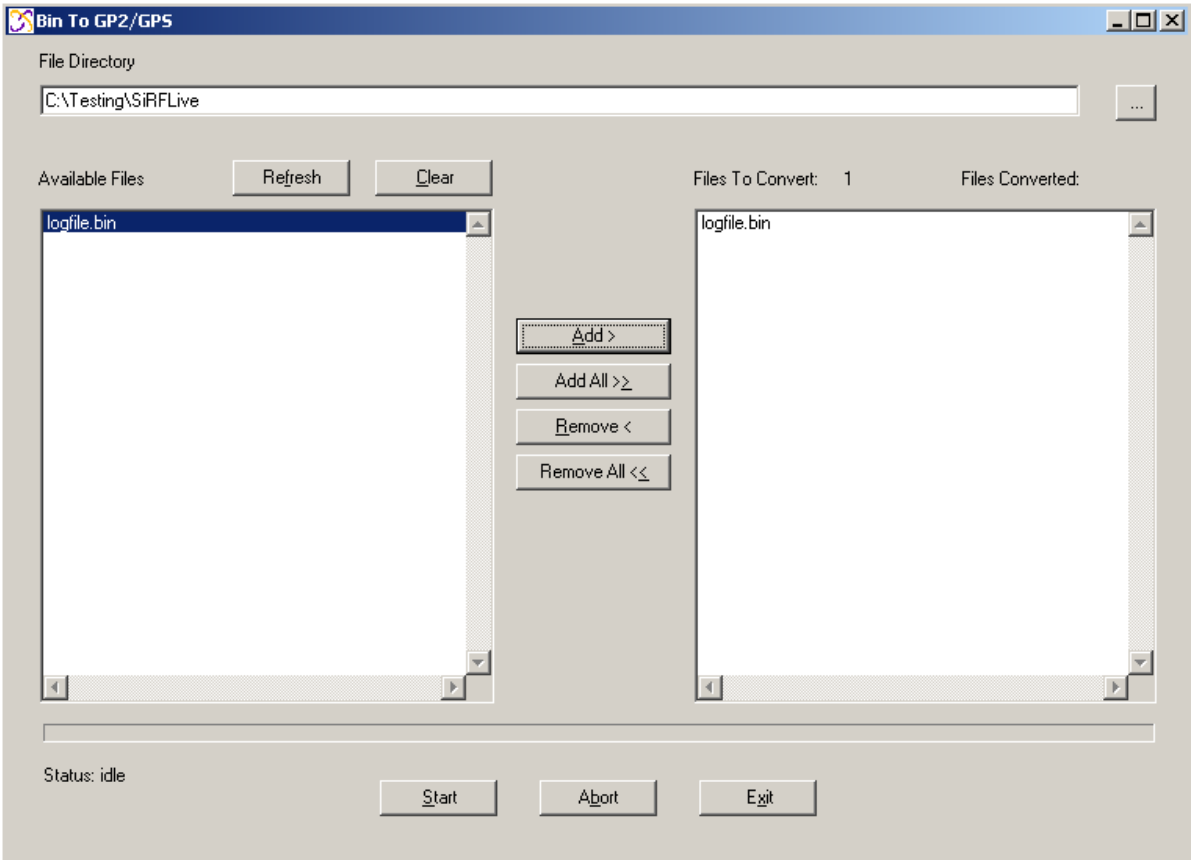
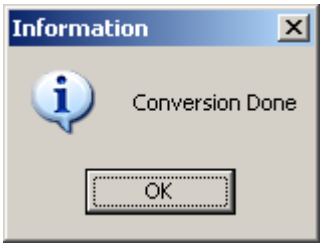


Figure 6.2: Convert Bin to GP2/GPS Window

File Directory	Displays the path of the directory that contains the BIN files. To find files either: ▪ Click the ellipsis button to browse to the directory that contains the BIN files. ▪ Cut and paste the absolute path of the directory containing the BIN files to the **File Directory** textbox and click the **Refresh** button.
Available Files	Displays all of the BIN files in the directory specified in the **File Directory.** Double-click on a file in this box to add it to the **Files to Convert** box.
Refresh	Refreshes **Available Files** box
Clear	Clears all files listed in **Available Files** box
Files to Convert	Displays the files converted when you click **Start.** Double-click on a file in this box to remove it.
Files Converted	Displays the number of files that were converted
Add>	Adds the selected file in **Available Files** box to **Files to Covert** box
Add All>>	Adds all files in the **Available Files** box to **Files to Convert** box

Remove <	Removes the selected file in the **Files to Convert** box
Remove All <<	Remove all files listed in **Files to Convert** box
Start	Starts the conversion process. When you click **Start**, all the files listed in **Files to Convert** are converted. The converted files are stored in the same directory as the original files with the extension `.gps`.
Abort	Aborts the conversion in process. If you click **Abort** you receive a message asking you to confirm this request. Click **Yes** to abort the conversion.
Exit	Quits

You receive a "Conversion Done" message when the conversion is complete:



6.2.3. GPS to NMEA

- Select **File / Convert / GPS To NMEA...** to convert a `.gps` file to NMEA format.

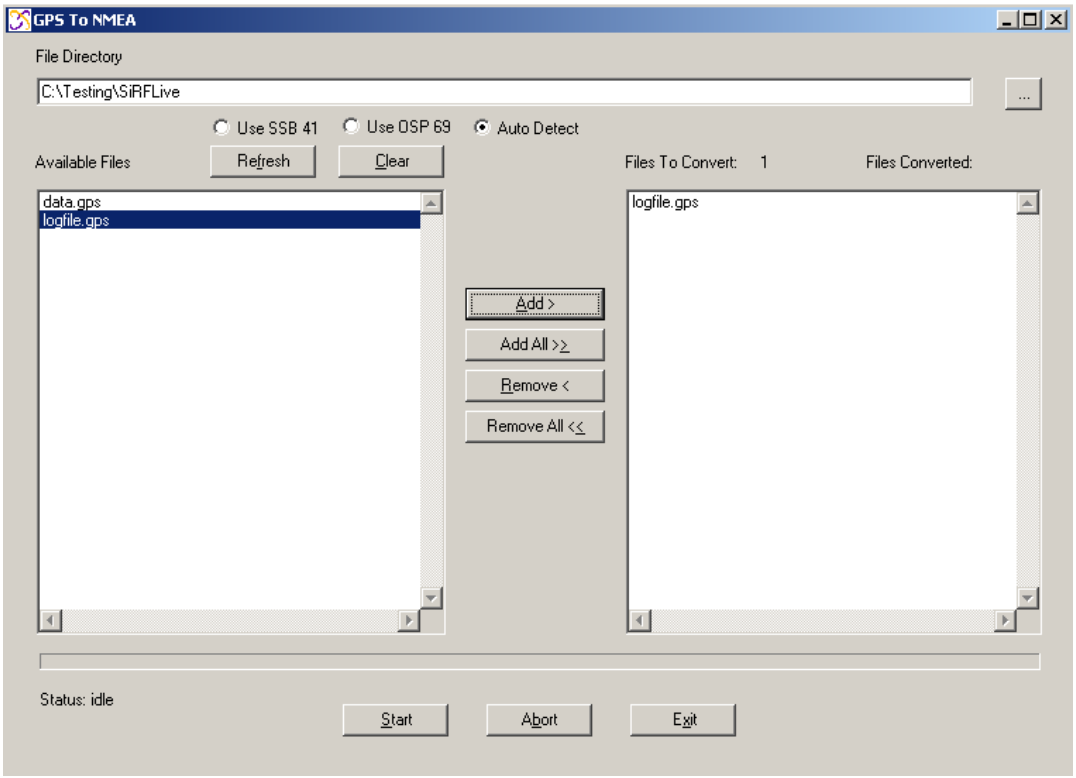
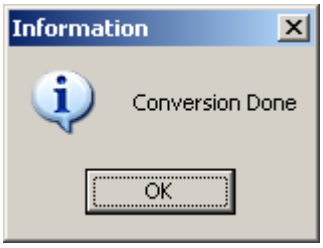


Figure 6.3: Convert GPS to NMEA Window

File Directory	Displays the path of the directory that contains the GPS files. To find files either: ▪ Click the ellipsis button to browse to the directory that contains the BIN files. ▪ Cut and paste the absolute path of the directory containing the BIN files to the **File Directory** textbox and click the **Refresh** button.
Use SSB 41	Option to convert GPS to NMEA using SSB message 41
Use OSP 69	Option to convert GPS to NMEA using OSP position response
Auto Detect	Default option that looks for both messages 41 and 69 and aligns the TOW timestamps and output both messages. If message 69 is not found then it only uses message 41.
Refresh	Refreshes **Available Files** box
Clear	Clears all files listed in **Available Files** box
Available Files	Displays all of the GPS files in the directory specified in the **File Directory.** Double-click on a file in this box to add it to the **Files to Convert** box.
Files to Convert	Displays the files converted when you click **Start.** Double-click on a file in this box to remove it.
Files Converted	Displays the number of files that were converted
Add>	Adds the selected file in **Available Files** box to **Files to Covert** box
Add All>>	Adds all files in the **Available Files** box to **Files to Convert** box
Remove <	Removes the selected file in the **Files to Convert** box
Remove All <<	Remove all files listed in **Files to Convert** box
Start	Starts the conversion process. When you click **Start**, all the files listed in **Files to Convert** are converted. The converted files are stored in the same directory as the original files with the extension `.nmea`.
Abort	Aborts the conversion in process. If you click **Abort** you receive a message asking you to confirm this request. Click **Yes** to abort the conversion.
Exit	Quits

You receive a "Conversion Done" message when the conversion is complete:



6.2.4. GPS to KML

- Select **File / Convert / GPS To KML...** to convert a `.gps` file to `.kml` format that can be viewed in Google Earth.

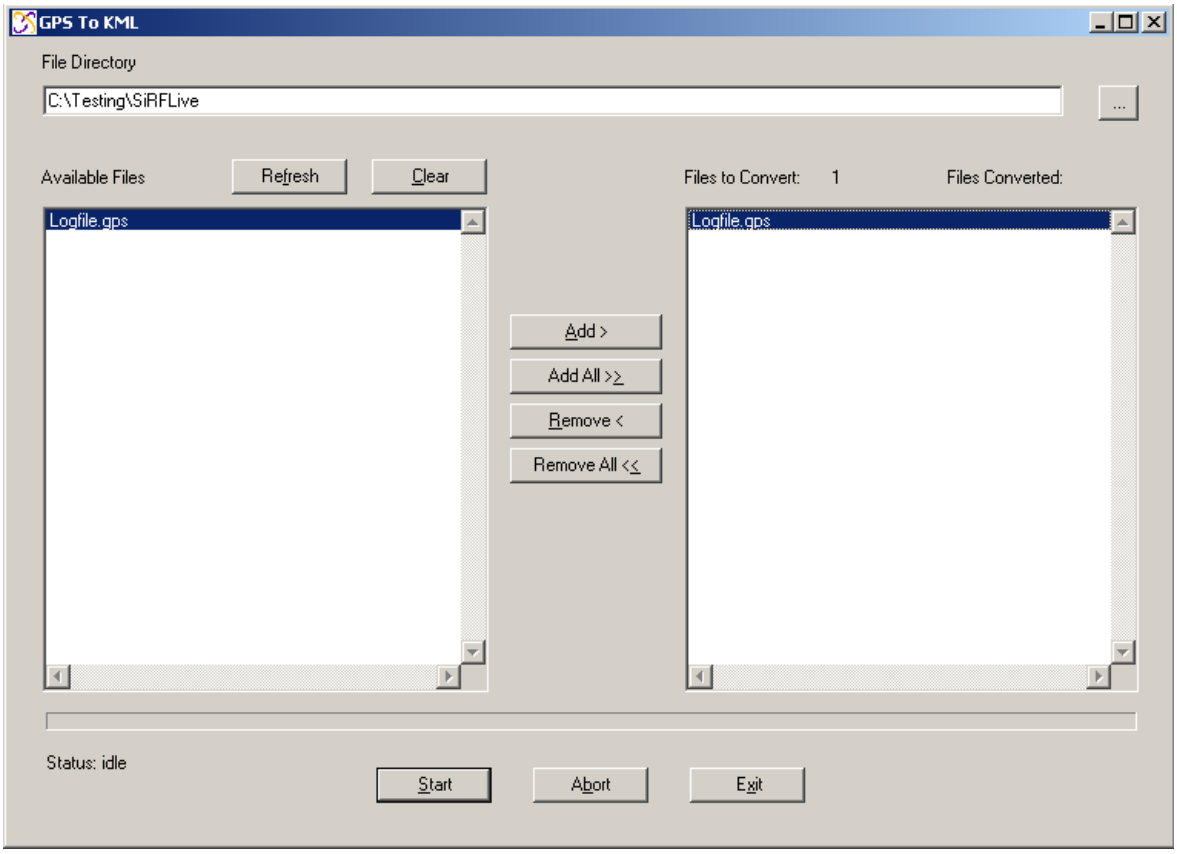


Figure 6.4: Convert GPS to KML Window

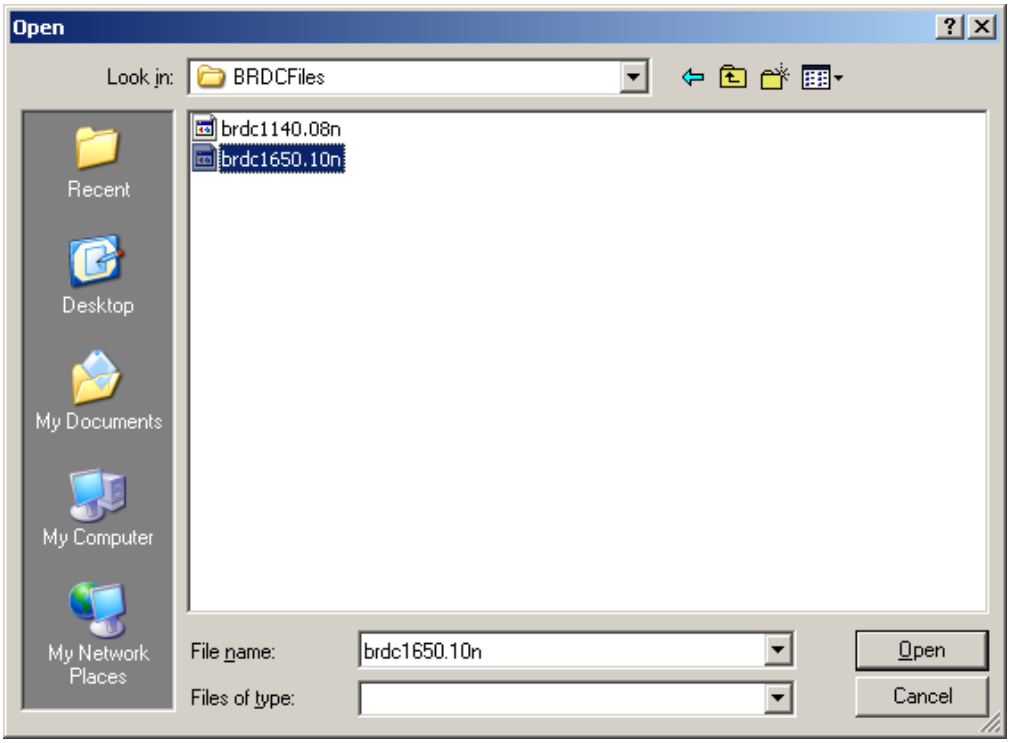
File Directory	Displays the path of the directory that contains the GPS files. To find files either: ▪ Click the ellipsis button to browse to the directory that contains the BIN files. ▪ Cut and paste the absolute path of the directory containing the BIN files to the **File Directory** textbox and click the **Refresh** button.
Available Files	Displays all of the GPS files in the directory specified in the **File Directory.** Double-click on a file in this box to add it to the **Files to Convert** box.
Refresh	Refreshes **Available Files** box
Clear	Clears all files listed in **Available Files** box
Files to Convert	Displays the files converted when you click **Start.** Double-click on a file in this box to remove it.
Files Converted	Displays the number of files that were converted
Add>	Adds the selected file in **Available Files** box to **Files to Covert** box
Add All>>	Adds all files in the **Available Files** box to **Files to Convert** box

Remove <	Removes the selected file in the **Files to Convert** box
Remove All <<	Remove all files listed in **Files to Convert** box
Start	Starts the conversion process. When you click **Start**, all the files listed in **Files to Convert** are converted. The converted files are stored in the same directory as the original files with the extension `.kml`.
Abort	Aborts the conversion in process. If you click **Abort** you receive a message asking you to confirm this request. Click **Yes** to abort the conversion.
Exit	Quits

You receive a "Conversion Done" message when the conversion is complete:

6.2.5. RINEX to ai3eph

1. Select **File / Convert / RINEX to ai3eph...** to convert a RINEX file to ai3eph format so data used as aiding can be used by the receiver.
2. Select the RINEX file.



If the conversion is successful the following message appears, showing where the newly created file is located. This is usually the same folder as the RINEX file used.

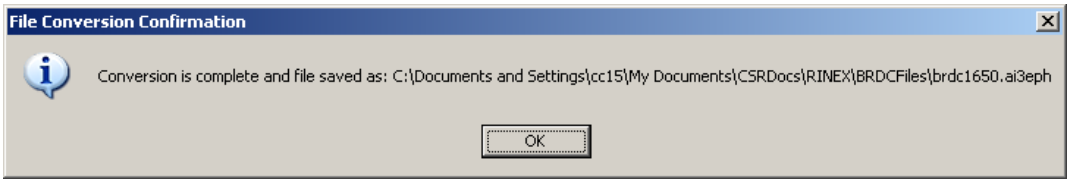


Figure 6.5: Conversion Message for RINEX File

If the conversion cannot be completed, for example because of an incorrect file being selected or corrupted data, the following message may appear:

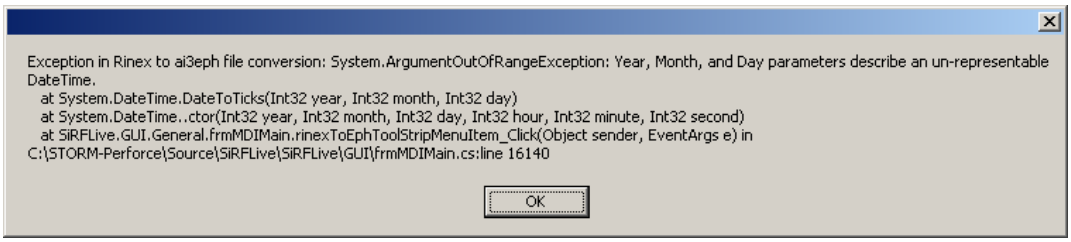


Figure 6.6: Error Message for RINEX File

```
     2             NAVIGATION DATA                         RINEX VERSION / TYPE
CCRINEXN V1.6.0 UX  CDDIS               15-JUN-10 02:51     PGM / RUN BY / DATE
IGS BROADCAST EPHEMERIS FILE                                COMMENT
    0.5588E-08  0.1490E-07 -0.5960E-07 -0.1192E-06          ION ALPHA
    0.8397E+05  0.9830E+05 -0.6554E+05 -0.5243E+06          ION BETA
    0.558793544769E-08 0.710542735760E-14   319488     1588 DELTA-UTC: A0,A1,T,W
    15                                                      LEAP SECONDS
                                                            END OF HEADER
 1 10  6 14  0  0  0.0-0.130418688059E-03-0.397903932026E-11 0.000000000000E+00
    0.790000000000E+02-0.123250000000E+03 0.418838874892E-08 0.275041722740E+01
   -0.645965337753E-05 0.479622429702E-02 0.100471079350E-04 0.515480395698E+04
    0.864000000000E+05-0.391155481338E-07-0.310462217410E+01-0.763684511185E-07
    0.965355468713E+00 0.189218750000E+03 0.872757523408E+00-0.769424906779E-08
    0.382158775590E-10 0.100000000000E+01 0.158800000000E+04 0.000000000000E+00
    0.200000000000E+01 0.630000000000E+02-0.190921127796E-07 0.790000000000E+02
    0.826200000000E+05 0.000000000000E+00 0.000000000000E+00 0.000000000000E+00
 2 10  6 14  0  0  0.0 0.264376401901E-03 0.329691829393E-11 0.000000000000E+00
    0.780000000000E+02-0.102812500000E+02 0.544701260422E-08 0.104825849937E+01
   -0.443309545517E-06 0.958517659455E-02 0.503472983837E-05 0.515357994843E+04
    0.864000000000E+05 0.987201929092E-07-0.102155471167E+01 0.221654727259E-06
```

Figure 6.7: Example RINEX Format

```
// Hour 00-02
// Ephemeris Collection Time(UTC): Mon Jun 14 00:00:00 2010
************ Ephemeris Data at GPS time: 960508800************
//
//
1, 1, 79, -3944, 36841, -2147483648, -3468, 41199252, 5394, -2147483648, 5
2, 1, 78, -329, 47912, -2147483648, -238, 82336039, 2703, -2147483648, 540
3, 1, 12, 395, 48512, 2089052086, 475, 113175045, 5280, -2147483648, 5400,
4, 1, 87, -465, 47092, -2147483648, -421, 77961424, 2927, -2147483648, 540
5, 1, 65, 1904, 37325, -2147483648, 1644, 15566126, 6470, -2147483648, 540
6, 1, 88, 586, 46398, -2147483648, 577, 54179230, 4859, -2147483648, 5400,
8, 1, 89, -2855, 35836, -2147483648, -2579, 95481394, 529, -2147483648, 54
9, 1, 16, -1596, 39565, -2147483648, -1129, 147077710, 211, -2147483648, 5
10, 1, 94, 2102, 37086, -2147483648, 1793, 78752923, 6505, -2147483648, 54
11, 1, 52, -174, 59935, -1433454236, -142, 91768492, 2201, -2147483648, 54
12, 1, 61, -4321, 36700, -1272264251, -3752, 30200858, 5344, -2147483648, 5
13, 1, 129, 4542, 32443, -2147483648, 3938, 38683208, 2053, -2147483648, 5
14, 1, 73, 4331, 33816, -2147483648, 3848, 43993839, 2414, -2147483648, 54
15, 1, 53, 5005, 39646, -2147483648, 4310, 21377615, 2966, -2147483648, 54
16, 1, 68, -3927, 35613, -2147483648, -3397, 51193703, 5724, -2147483648, 5
17, 1, 97, 282, 41167, -2147483648, 194, 46844507, 4819, -2147483648, 5400,
18, 1, 66, 1482, 39433, -2147483648, 1259, 98751214, 6392, -2147483648, 54
19, 1, 98, 749, 42976, -2147483648, 811, 56572561, 4291, -2147483648, 5400,
20, 1, 87, 1897, 40482, -2147483648, 1651, 36170648, 6044, -2147483648, 54
```

Figure 6.8: Example ai3eph Format

6.3. Extract/Find

- Select **File / Extract/Find** to parse data from a file.

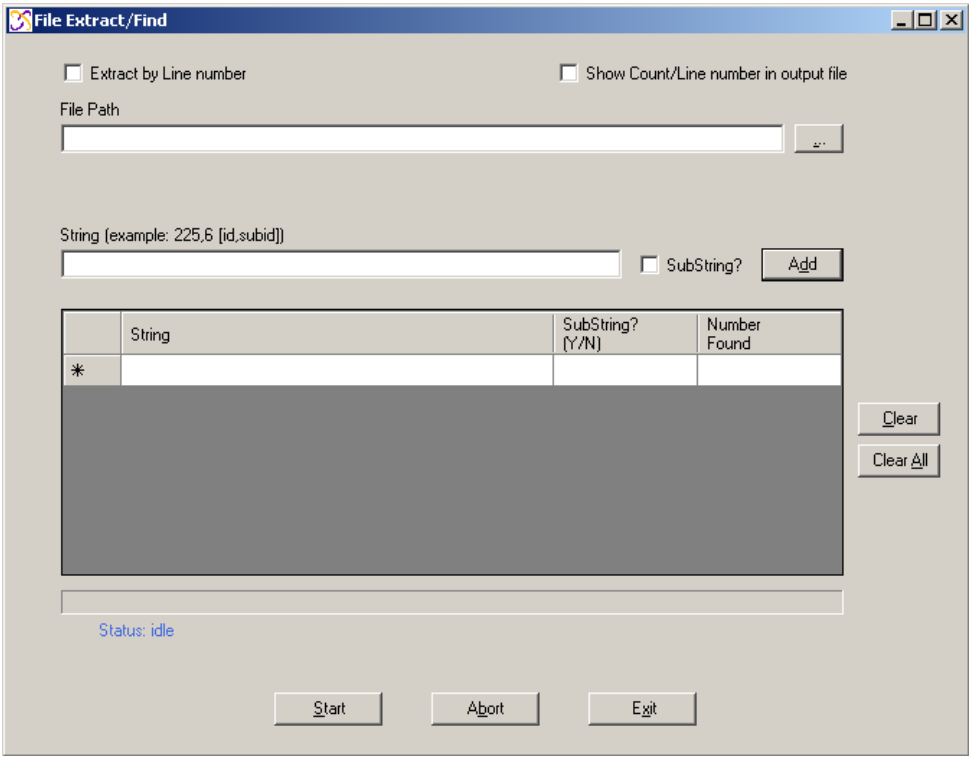
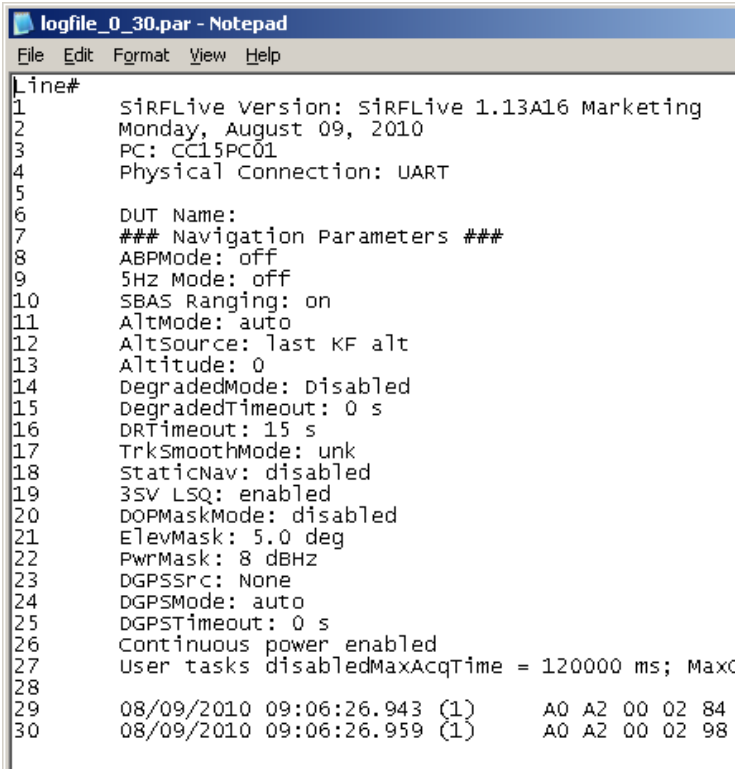


Figure 6.9: File Extract/Find

Extract by Line Number	Enables you to parse out a section of the log file from a starting line number to an ending line number
Show Count/Line number in output file	Inserts the line numbers into the output file. For **Extract by Line number** displays the line numbers for all other extractions/finds displays the count of the requested string/substring.
File Path	The path to the file to use. To find files either: ▪ Click the ellipsis button to browse to the directory. ▪ Type or paste the absolute path of the directory.
...	Opens a window to select the file to use
String (example: 225,6 [id,subid])	the string to search for in the file
SubString	Select this checkbox if the string to search for can be found anywhere in the file (not just at the beginning of each line)
Add	Adds the string to the data grid
*** Data grid fields**	Displays the strings to search for in the file, if the string is a substring or not, and the number of instances found in the file
Clear	Removes the highlighted row in the Data Grid area
Clear All	Removes all rows in the data grid area
Progress bar	Shows the progress of the extraction/find process.
Status	Displays the current status of the process, the total number of lines that were processed, and a hyperlink to the output file
Start	Initializes parsing the file
Abort	Stops parsing the file
Exit	Closes the File Extract/Find window

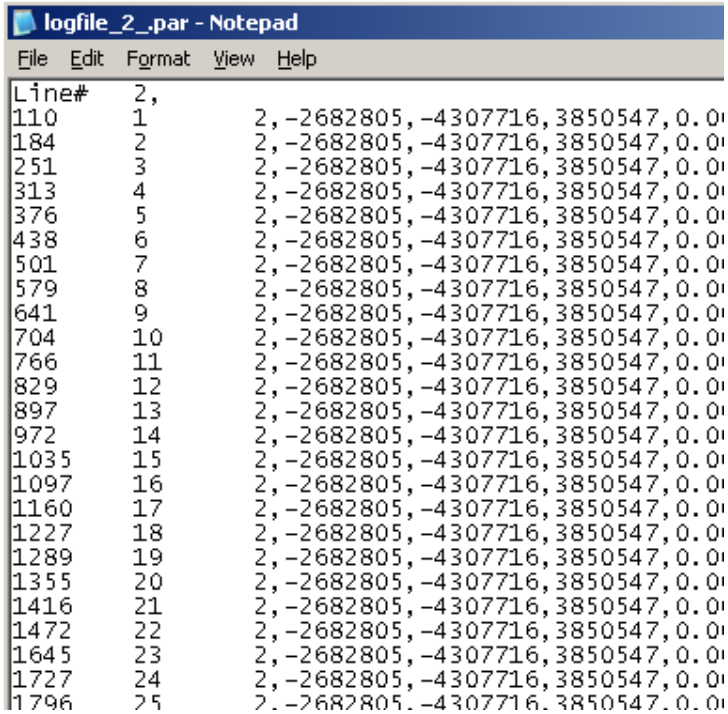


logfile_0_30.par - Notepad

File Edit Format View Help

```
Line#
1       SiRFLive Version: SiRFLive 1.13A16 Marketing
2       Monday, August 09, 2010
3       PC: CC15PC01
4       Physical Connection: UART
5
6       DUT Name:
7       ### Navigation Parameters ###
8       ABPMode: off
9       5Hz Mode: off
10      SBAS Ranging: on
11      AltMode: auto
12      AltSource: last KF alt
13      Altitude: 0
14      DegradedMode: Disabled
15      DegradedTimeout: 0 s
16      DRTimeout: 15 s
17      TrkSmoothMode: unk
18      StaticNav: disabled
19      3SV LSQ: enabled
20      DOPMaskMode: disabled
21      ElevMask: 5.0 deg
22      PwrMask: 8 dBHz
23      DGPSSrc: None
24      DGPSMode: auto
25      DGPSTimeout: 0 s
26      Continuous power enabled
27      User tasks disabledMaxAcqTime = 120000 ms; MaxC
28
29      08/09/2010 09:06:26.943 (1)     A0 A2 00 02 84
30      08/09/2010 09:06:26.959 (1)     A0 A2 00 02 98
```

Figure 6.10: Example of Extract by Line Number



logfile_2_.par - Notepad

File Edit Format View Help

```
Line#   2,
110     1       2,-2682805,-4307716,3850547,0.0
184     2       2,-2682805,-4307716,3850547,0.0
251     3       2,-2682805,-4307716,3850547,0.0
313     4       2,-2682805,-4307716,3850547,0.0
376     5       2,-2682805,-4307716,3850547,0.0
438     6       2,-2682805,-4307716,3850547,0.0
501     7       2,-2682805,-4307716,3850547,0.0
579     8       2,-2682805,-4307716,3850547,0.0
641     9       2,-2682805,-4307716,3850547,0.0
704     10      2,-2682805,-4307716,3850547,0.0
766     11      2,-2682805,-4307716,3850547,0.0
829     12      2,-2682805,-4307716,3850547,0.0
897     13      2,-2682805,-4307716,3850547,0.0
972     14      2,-2682805,-4307716,3850547,0.0
1035    15      2,-2682805,-4307716,3850547,0.0
1097    16      2,-2682805,-4307716,3850547,0.0
1160    17      2,-2682805,-4307716,3850547,0.0
1227    18      2,-2682805,-4307716,3850547,0.0
1289    19      2,-2682805,-4307716,3850547,0.0
1355    20      2,-2682805,-4307716,3850547,0.0
1416    21      2,-2682805,-4307716,3850547,0.0
1472    22      2,-2682805,-4307716,3850547,0.0
1645    23      2,-2682805,-4307716,3850547,0.0
1727    24      2,-2682805,-4307716,3850547,0.0
1796    25      2,-2682805,-4307716,3850547,0.0
```

Figure 6.11: Example of Extract/Find Result

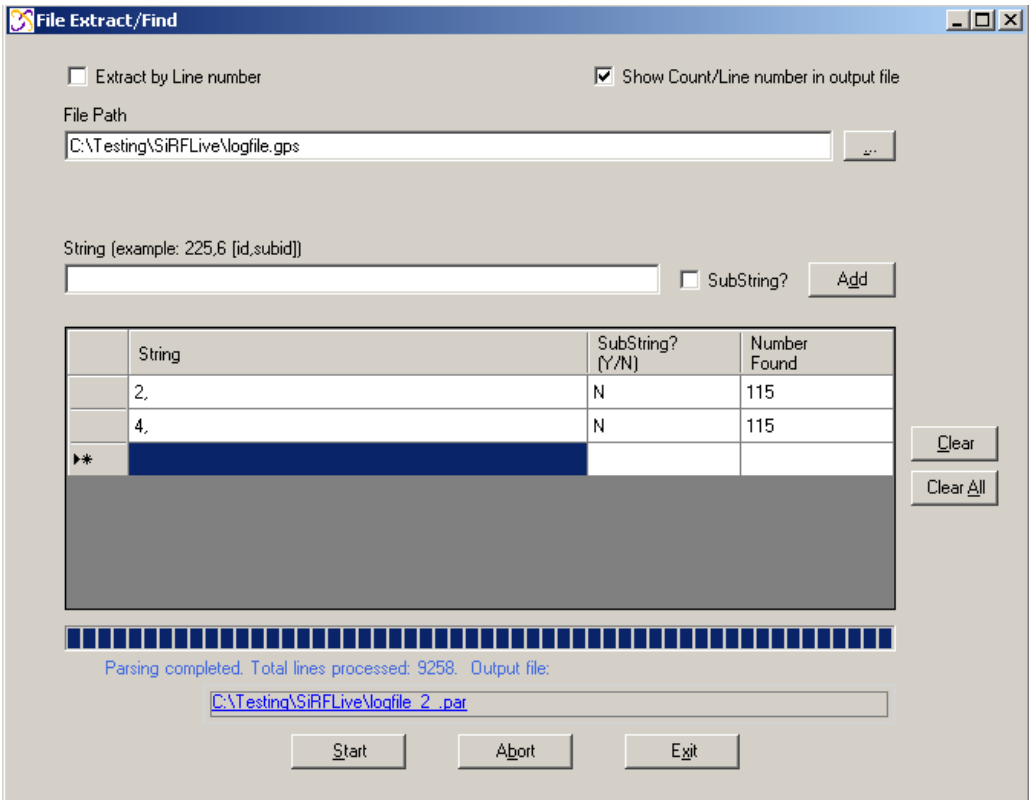


Figure 6.12: Example of Two-string Search

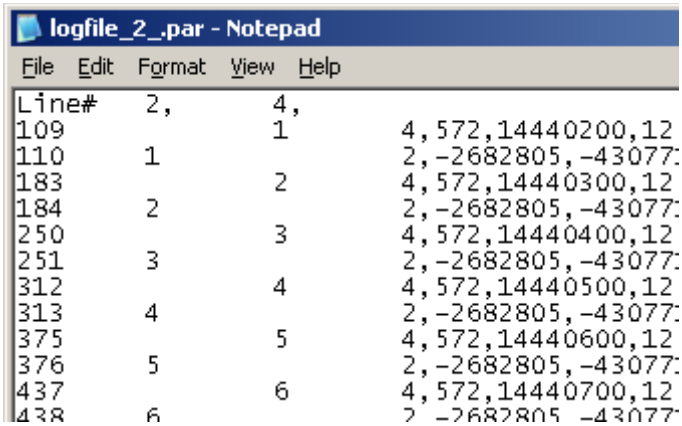


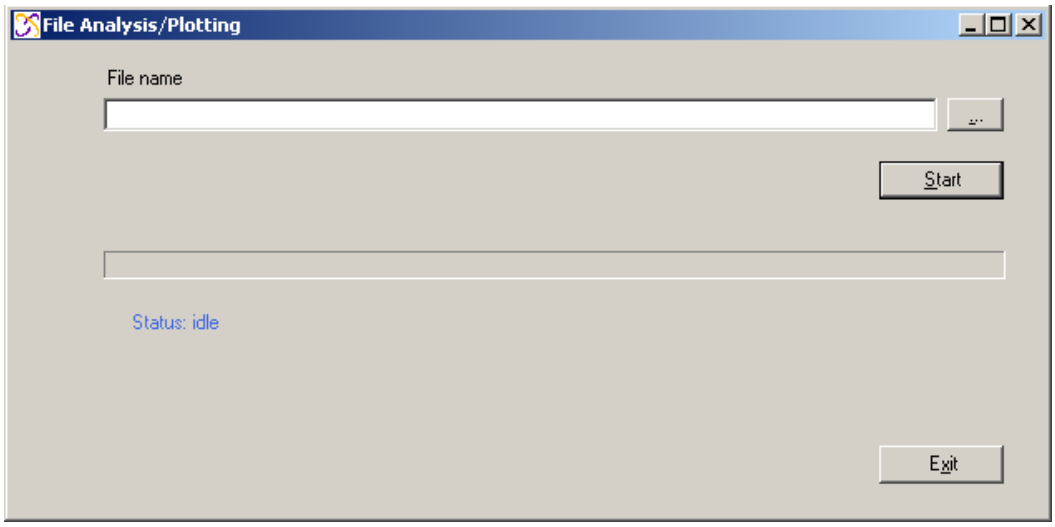
Figure 6.13: Parsed File Sample

6.4. Plot

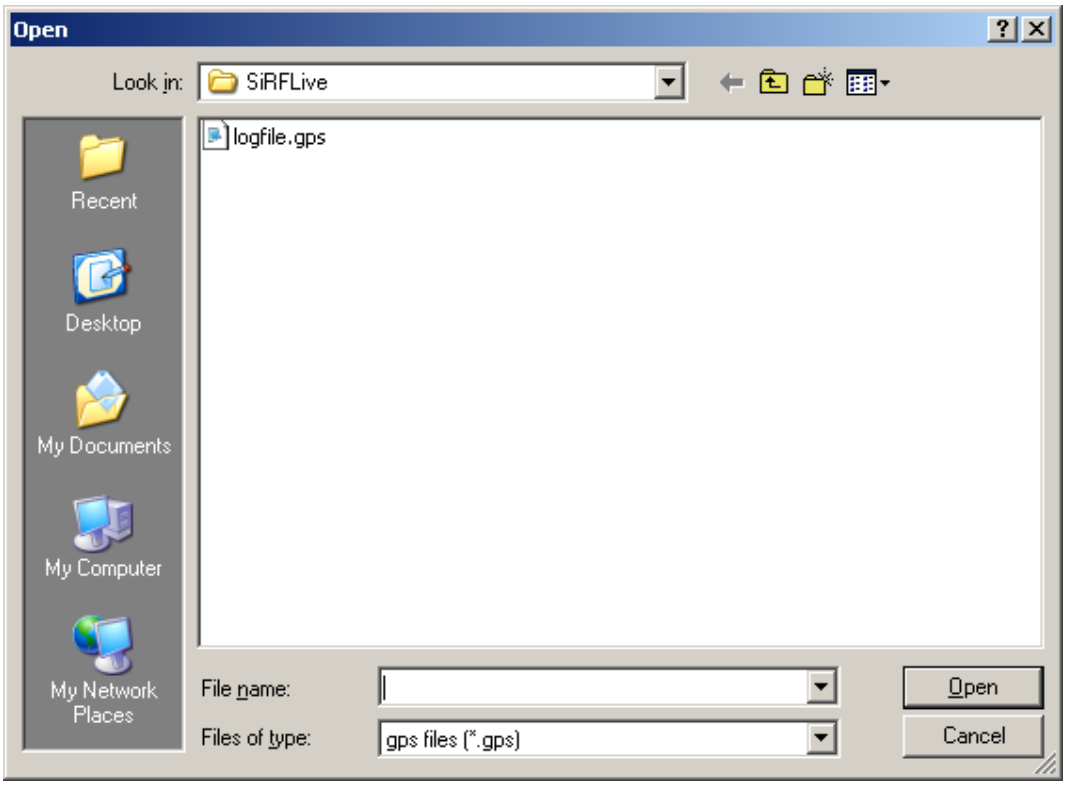
- Select **File / Plot** to enable GPS data to generate plots.

6.4.1. Standard Plots

1. Select **File / Plot / Standard Plots** to enable file analysis and GPS data plotting.



2. Click the ellipsis button  to search for the GPS file.



3. Select the file and click **Open**.
4. Click **Start** to start the analysis and plotting.

   A progress window appears.

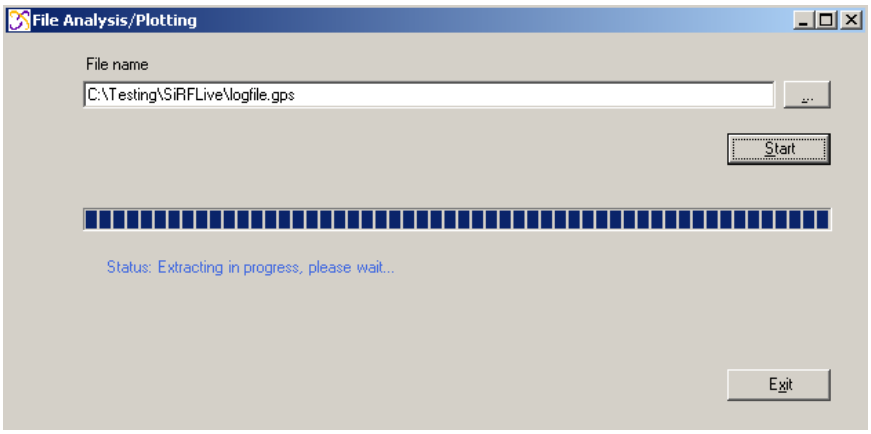
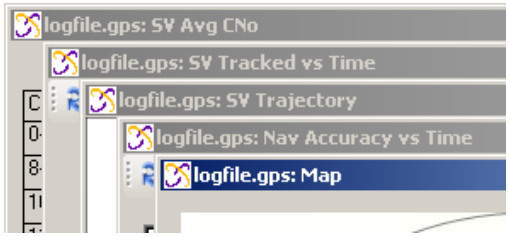


Figure 6.14: File Analysis/Plotting Progress Window

When the file has been parsed, five windows open that refer to the GPS file:



6.4.1.1. Map

- The **Map** view shows the position of the file data.

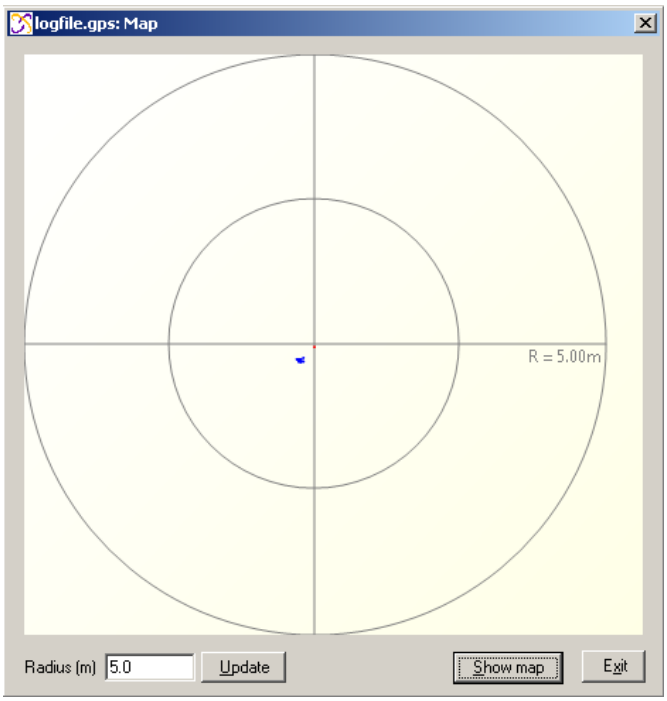


Figure 6.15: GPS Logfile Map View

You can change the radius to enhance the appearance of the map. The minimum radius is 2 m.

With Internet access, click **Show Map** to display the position on Google maps in Map view. See section 5.12.3 for more information. All features of Google Maps are accessible.

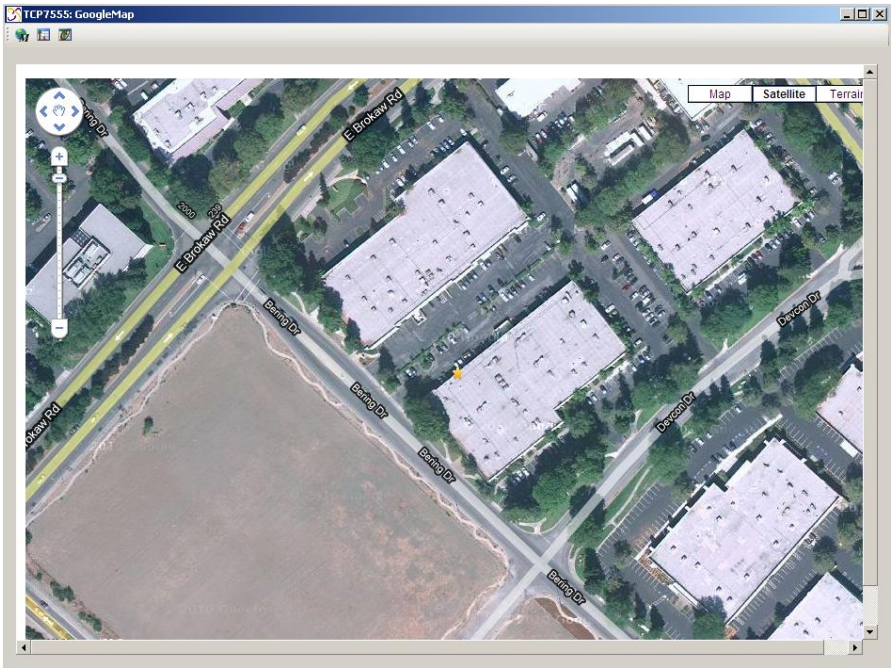


Figure 6.16: Example Satellite View

Figure 6.17 is an image from a log file showing how Track View mode works.

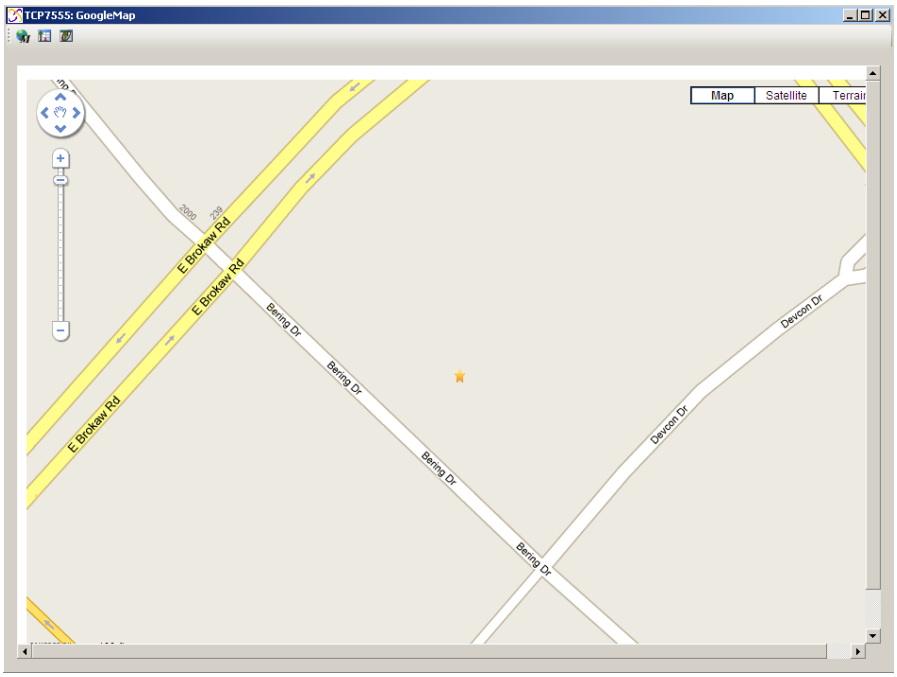


Figure 6.17: Log File Example of Track View

With live signal the Track View is only a snapshot of the position.

6.4.1.2. Nav Accuracy vs Time

With the **Nav Accuracy vs Time** view, you can show the horizontal error in meters versus TOW or sequentially:

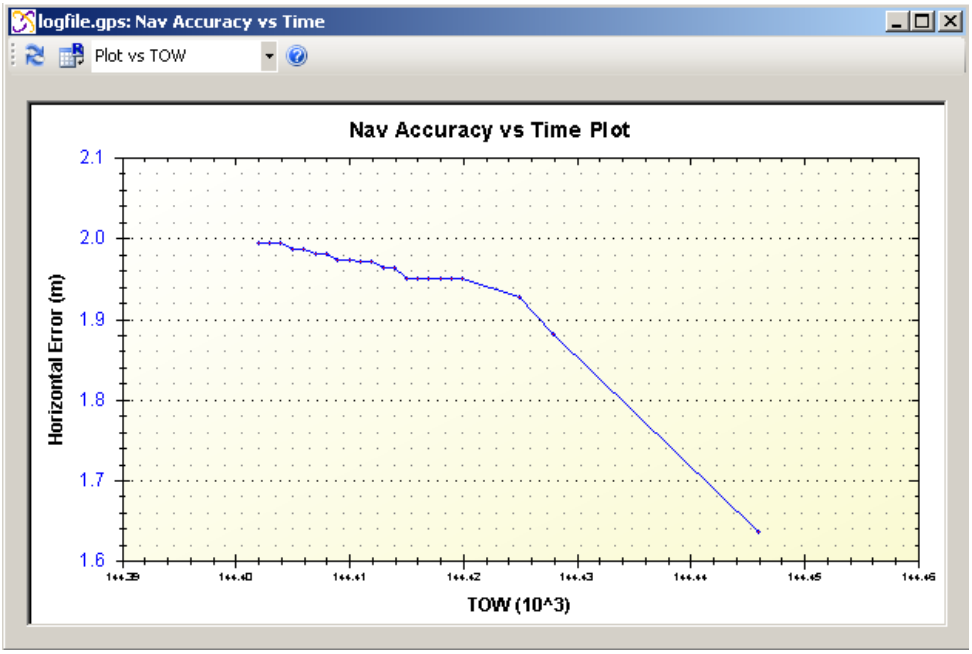


Figure 6.18: Nav Accuracy vs Time Plot

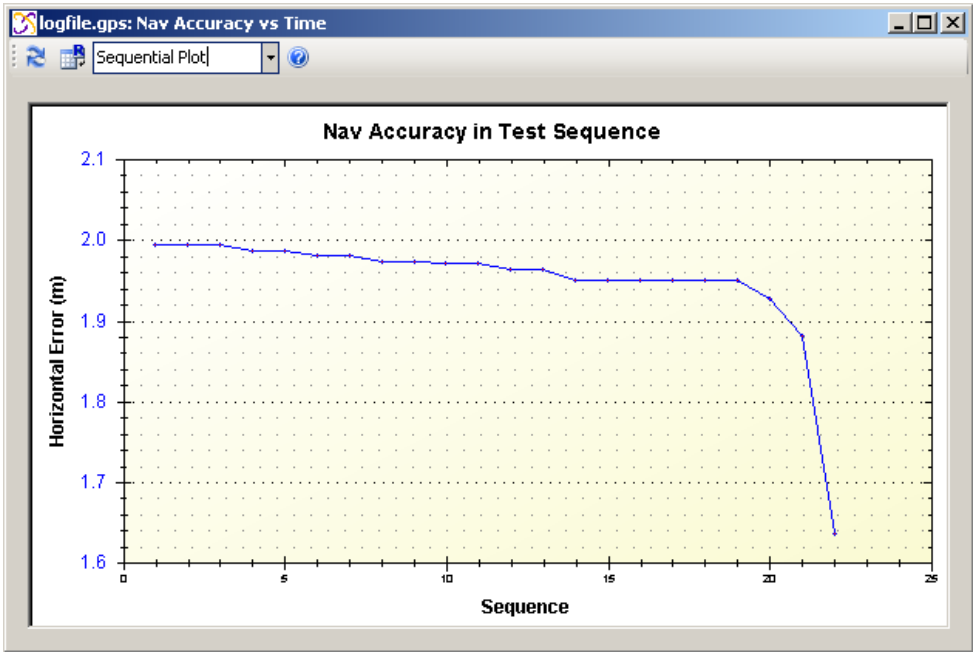


Figure 6.19: Nav Accuracy in Test Sequence

- Click the **Help** button  for information on how to manipulate the graph area.

Figure 6.20: Plot Help

- Right click the plot window to open the context menu:

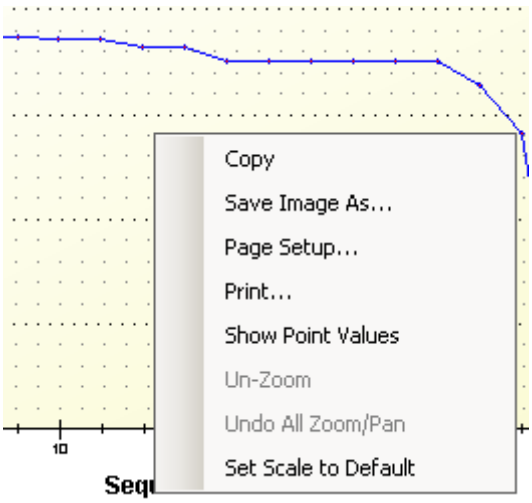


Figure 6.21: Plot Context Menu

6.4.1.3. SV Trajectory

The **SV Trajectory** view displays the satellite trajectory position over time.

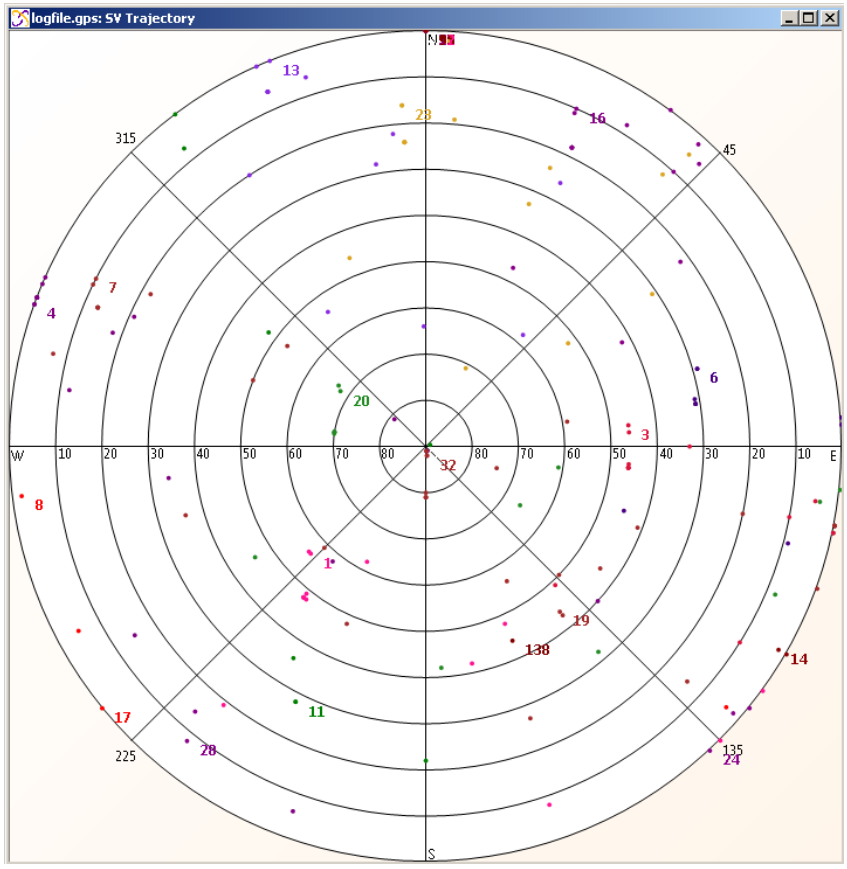


Figure 6.22: SV Trajectory Position over Time

6.4.1.4. SV Tracked vs Time

With the **SV Tracked vs Time** view, you can show the horizontal error in meters versus TOW or sequentially:

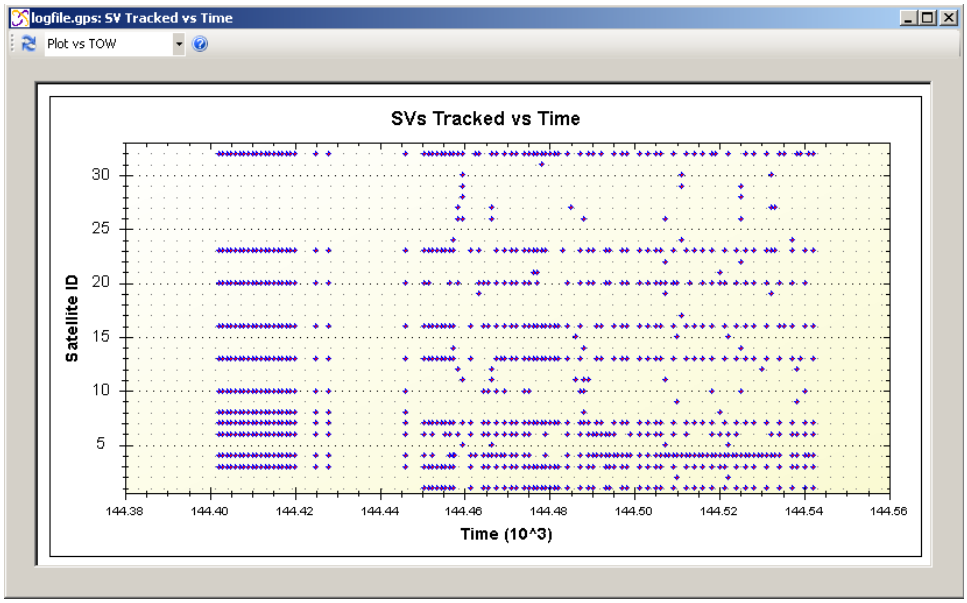


Figure 6.23: SVs Tracked vs Time

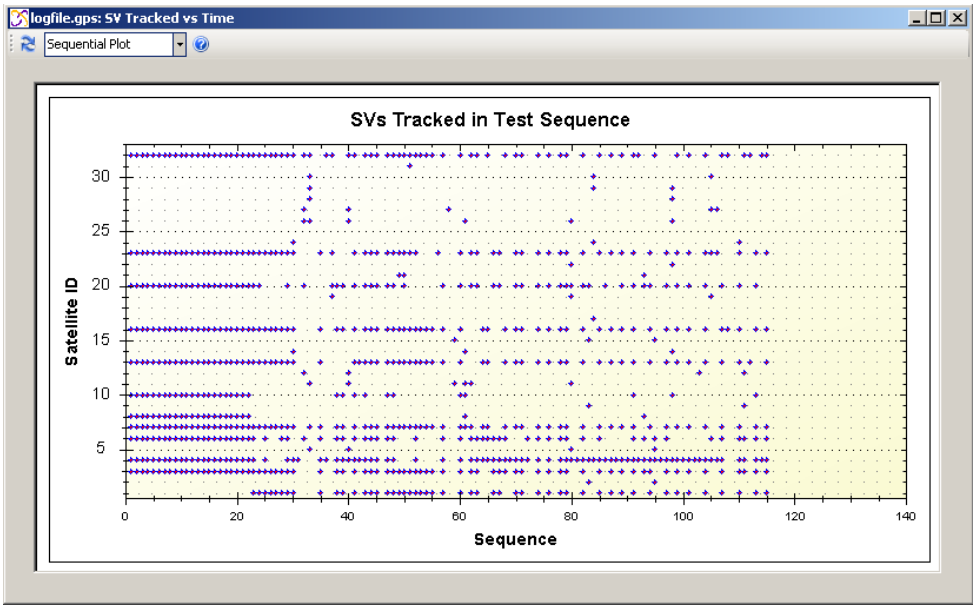


Figure 6.24: SVs Tracked in Test Sequence

- Click the **Help** button  for information on how to manipulate the graph area.
- Right-click the plot window to open the context menu.

6.4.1.5. SV Average C/N0

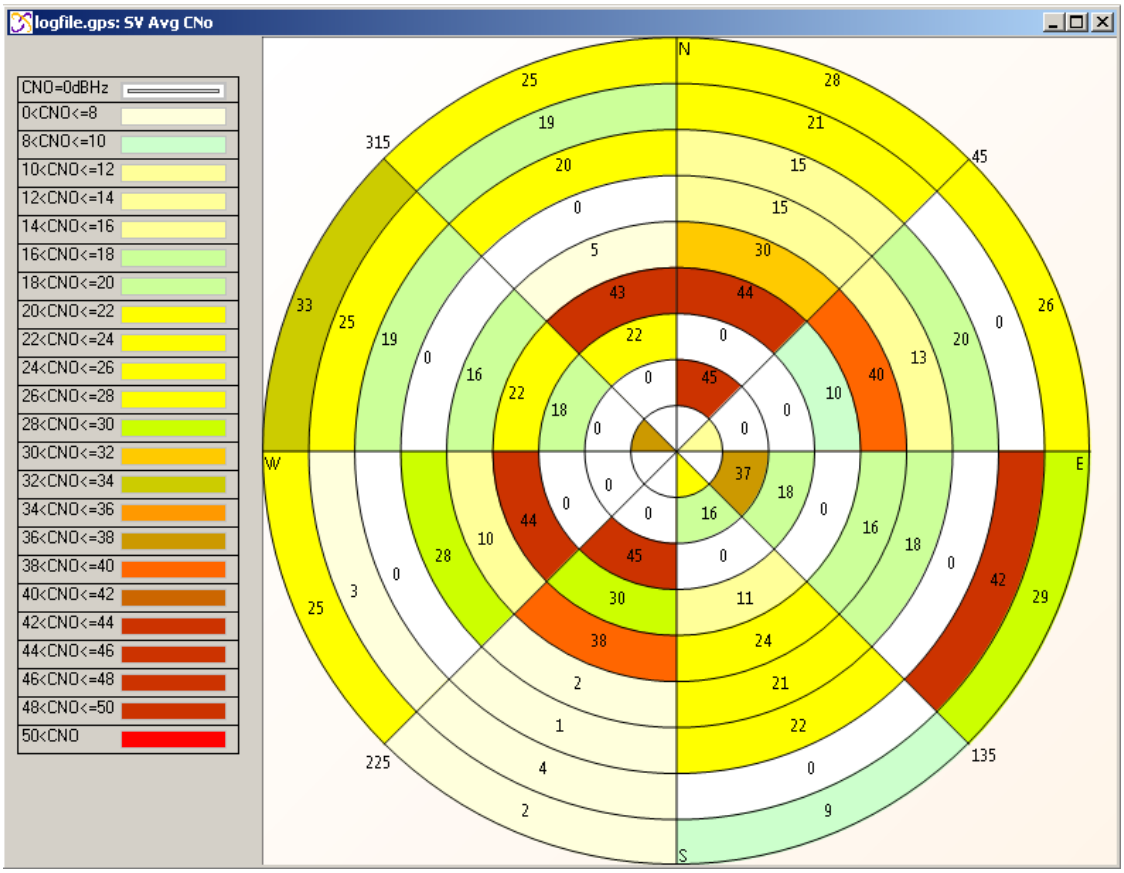


Figure 6.25: SV Average C/N0

- Click on the color chart on the left and select a color to change the color for the C/No. For example:

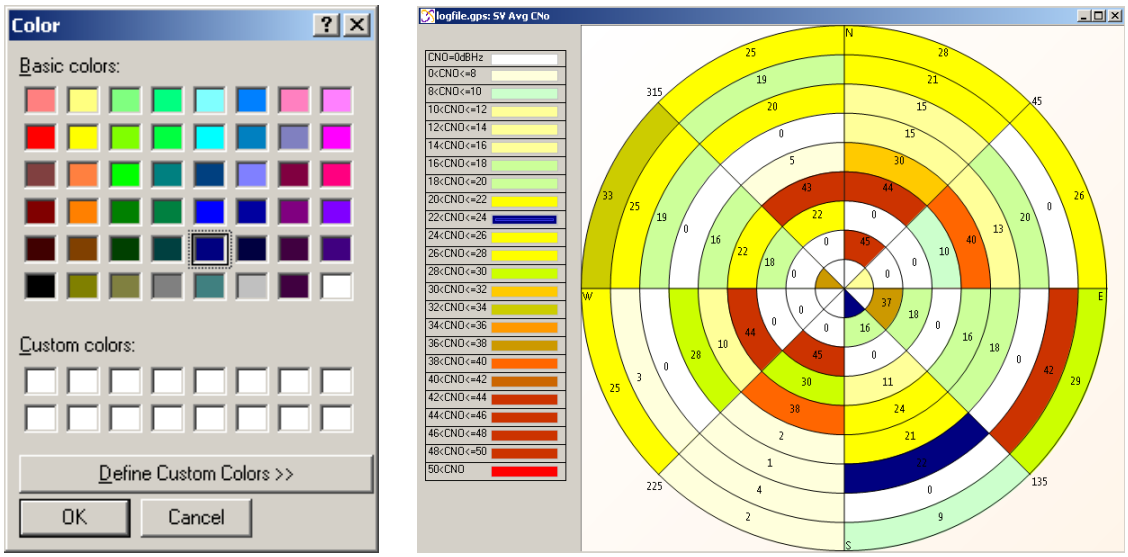


Figure 6.26: Alternative Color for C/No

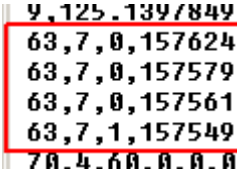
6.4.2. Test Mode 7

1. Select **File / Plot / Test Mode 7** to open the **Test Mode 7 Plots** window.

2. Click the Open File button  and select the `.gps` file containing Test Mode 7 data.

Note:

A log file with Test Mode 7 data in it contains lines beginning with `63,7,` when viewed in a text editor:



3. Click the **Plot** button  when you have selected the log file.

   Test Mode 7 generates two plots based on Message 63, 7 from the data.

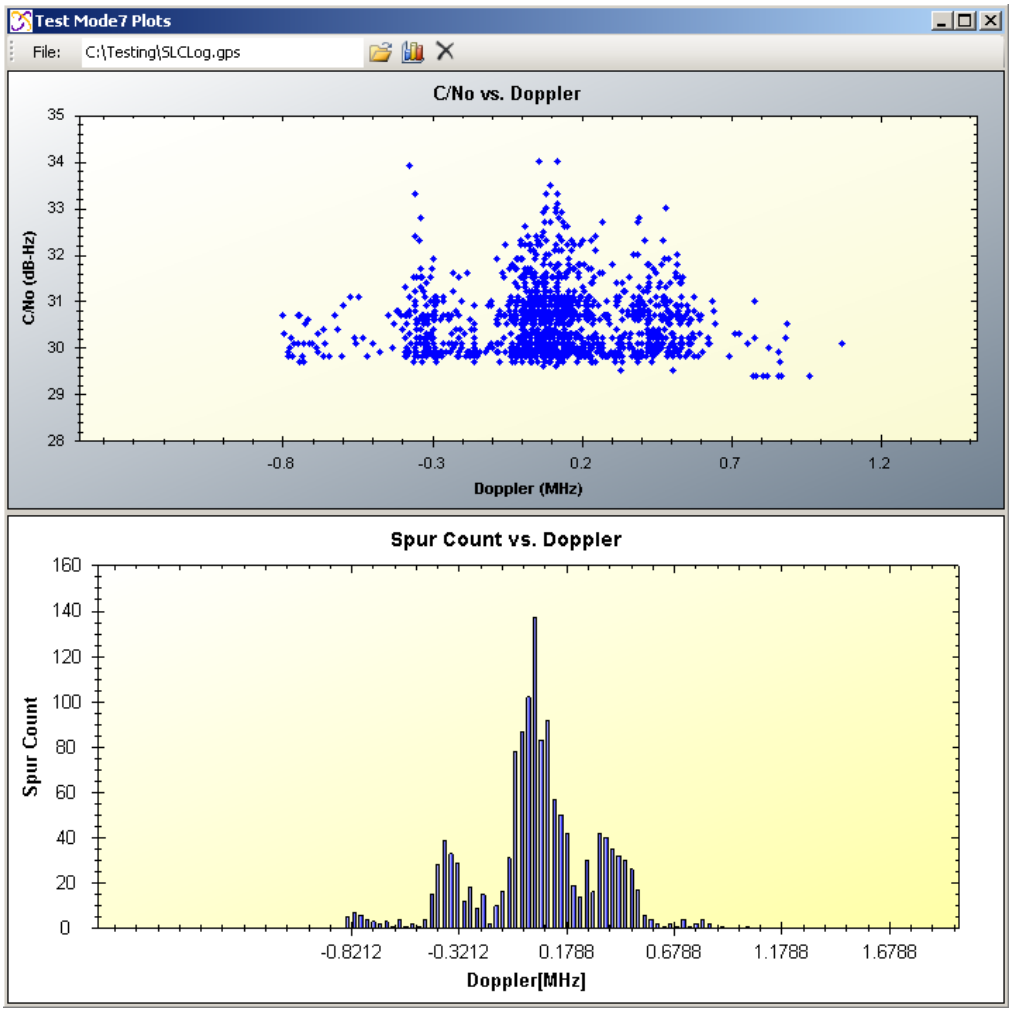
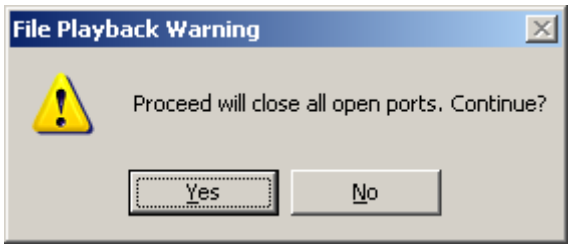


Figure 6.27: Test Mode 7 Plots

- Hold down CTRL + left mouse button and drag the mouse to pan the plot.
- Right-click the individual plot windows to display the context menu.
- Click the **Clear Graph** button  to remove all data from the windows.

6.5. Replay Open

1. Select **File / Replay Open** to enable open a Replay file.
   You are asked to confirm proceeding:



2. Click **Yes** to activate the playback function buttons, the track bar and the file name in the log file status bar.

6.6. Replay Close

- Select **File / Replay Close** to close the Replay File

6.7. Exit

- Select **File / Exit** to terminate the application and close SiRFLive. This also saves the location of any open windows in SiRFLive.

7. Receiver Menu

7.1. Connect

- Select **Receiver / Connect** to connect the receiver

7.2. Disconnect

- Select **Receiver / Disconnect** to disconnect the receiver

7.3. View

7.3.1. Signal View

- Select **Receiver / View / Signal View.** See Section 5.12.1

7.3.2. Radar View

- Select **Receiver / View / Radar View.** See Section 5.12.2

7.3.3. Location View

- Select **Receiver / View / Radar View.** See Section 5.12.3

7.3.4. TTFF and Nav Accuracy View

- Select **Receiver / View / TTFF and Nav Accuracy View...** See Section 5.12.4

7.3.5. Response View

- Select **Receiver / View / Response View.** See Section 5.12.5

7.3.6. Debug View

- Select **Receiver / View / Debug View.** See Section 5.12.6

7.3.7. Error View

- Select **Receiver / View / Error View.** See Section 5.12.7

7.3.8. Message View

- Select **Receiver / View / Message View.** See Section 5.12.8

7.3.9. MEMS View

- Select **Receiver / View / MEMS View.**

If the MEMS state of the Rx is enabled, then the MEMS View looks similar to Figure 7.1:

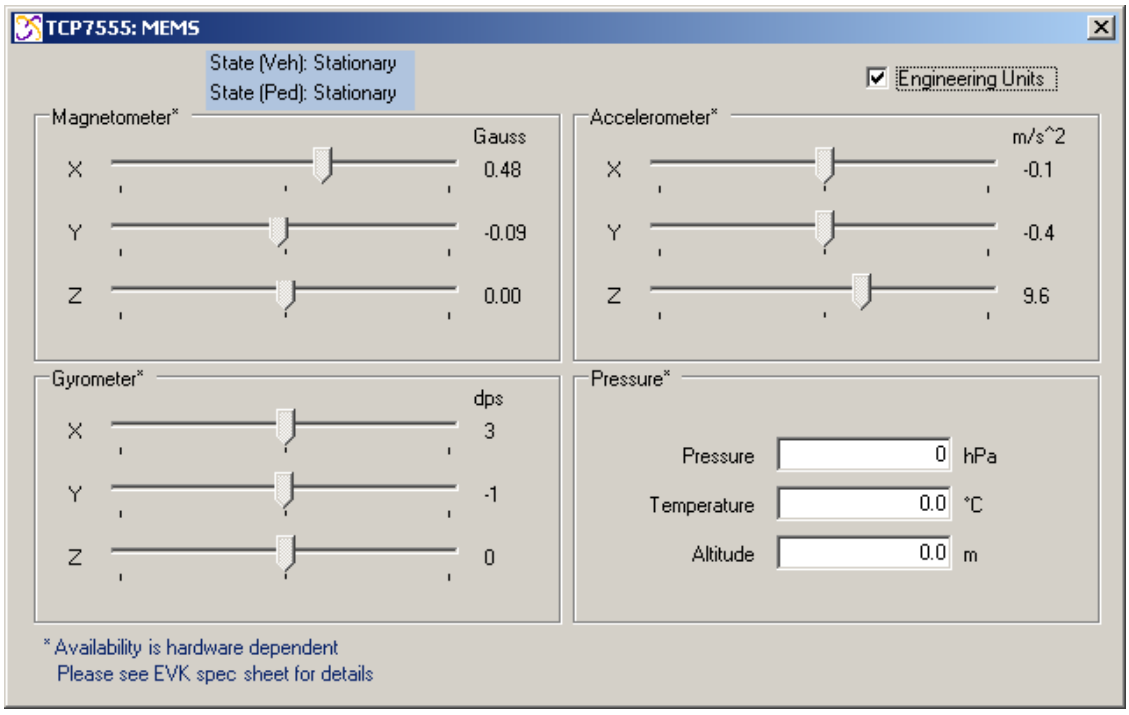
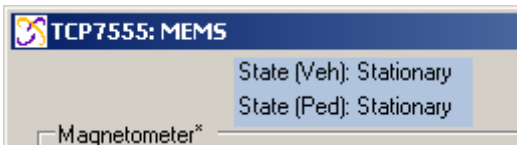


Figure 7.1: MEMS View, Enabled

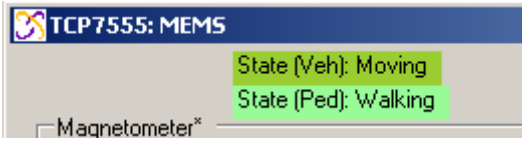
When enabled for vehicle, MEMS can be in the following states:

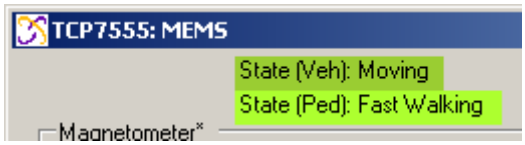
- Unknown: When there is not enough information for the unit to make a decision.
- Stationary: When there is enough information to tell that the unit is motionless:



- Moving: When there is enough information to tell that the unit is in motion

Other states for Pedestrian mode include: Walking, Fast Walking, Jogging, Stairs Up, Stairs Down, Ramp Up, Ramp Down, Elevator Up, Elevator Down, Escalator Up, and Escalator Down.





Engineering Units are on by default showing the Gauss, m/s2, and DPS units for the sensors.

Disable the checkbox to output the converted high and low values as one value for the X, Y, and Z axis for each sensor in the Rx (Figure 7.2):

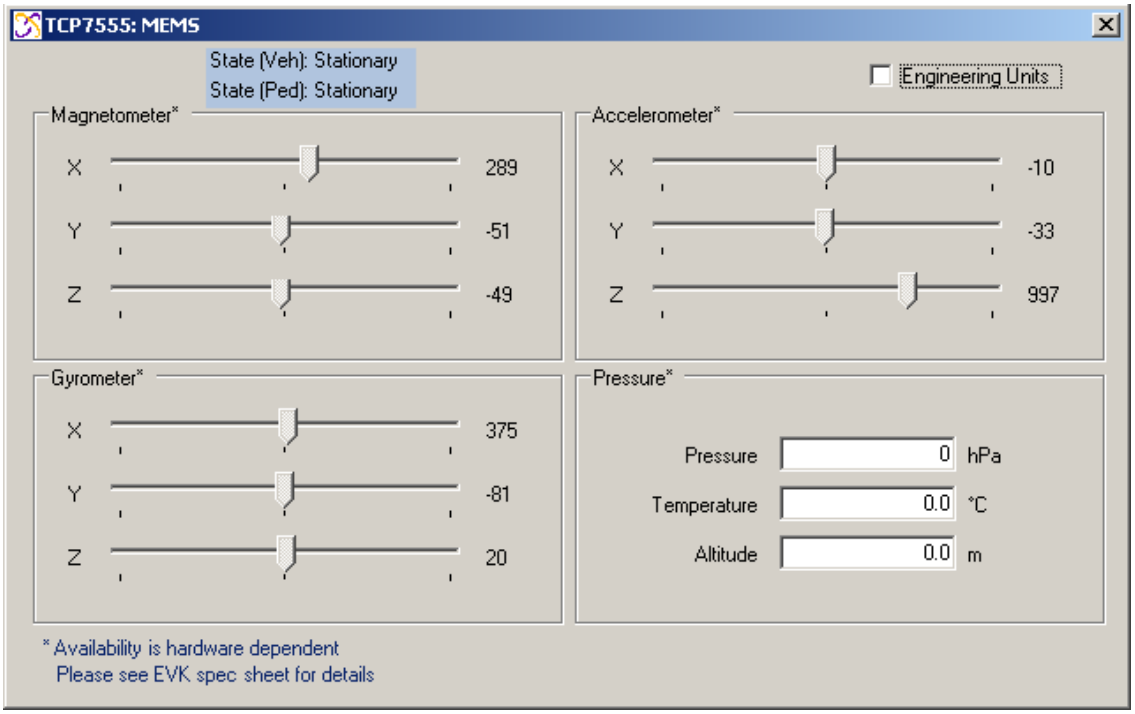


Figure 7.2: Example of Disabled Checkbox

7.3.10. Compass View

- Select **Receiver / View / Compass View** to display the Heading with the Pitch and Roll (for receivers with MEMS sensors).

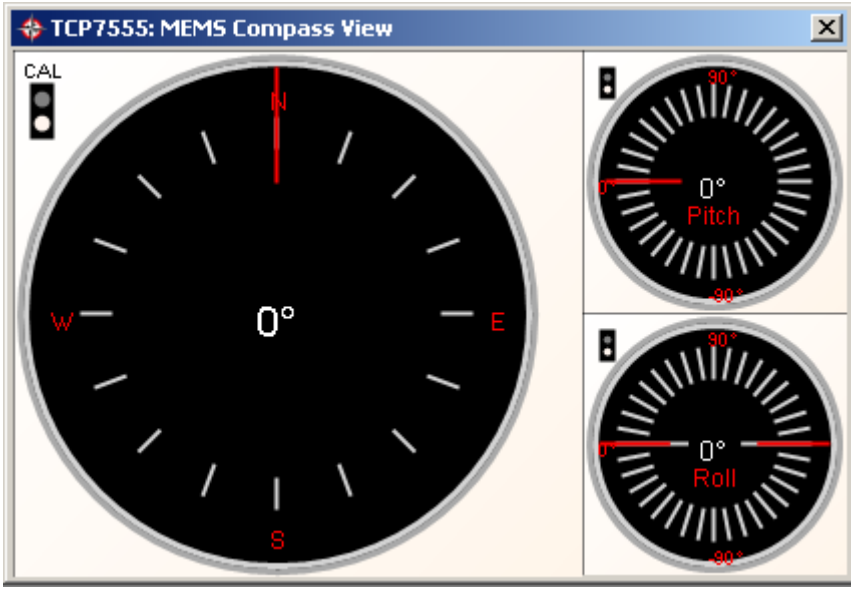
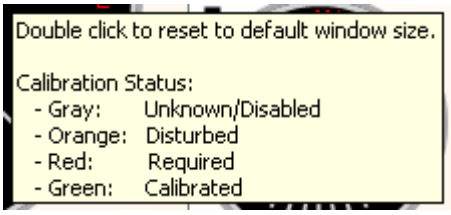


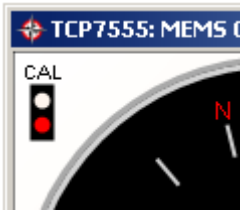
Figure 7.3: MEMS Compass View

- Set MEMS to enable this feature. See section 7.4.14 for more information.
- Move the pointer over the Compass View window to open a message describing the calibration colors:

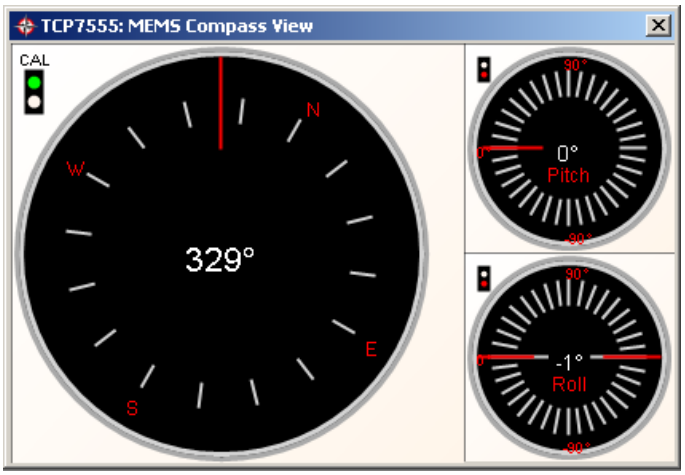


See Appendix A for the MEMS calibration procedure. For more information contact your CSR representative.

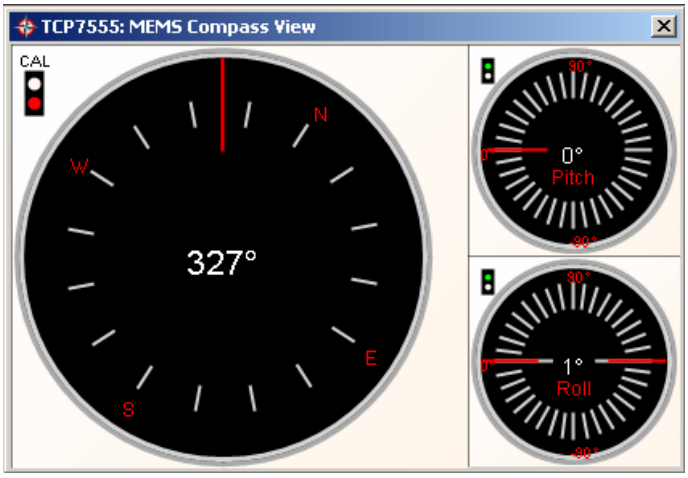
Heading, Pitch, and Roll values show red in the calibration signal light if MEMS is not calibrated:



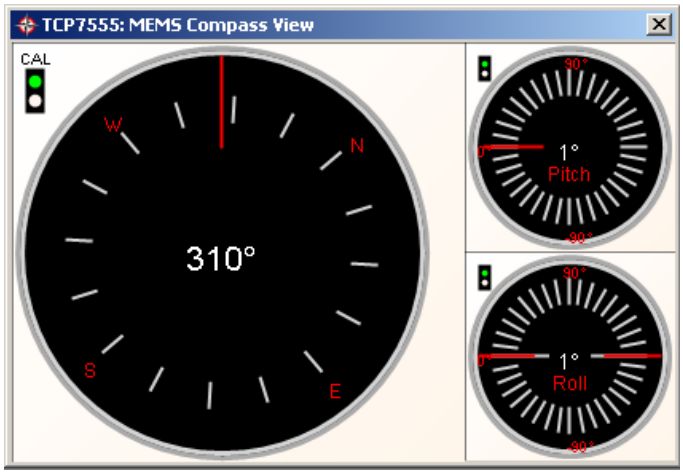
If the heading is calibrated with the magnetometer calibration procedure but Pitch and Roll is not calibrated, the following lights show:



If Pitch and Roll are calibrated with the accelerometer calibration procedure but Heading is not calibrated the following lights show:



If Heading, Pitch, and Roll are all calibrated the following lights show:



7.3.11. CW Detection View

- Select **Receiver / View / CW Detection View...** to display the jamming effect caused by an external signal.

Figure 7.4 shows a jamming signal being inserted at 1.576 GHz.

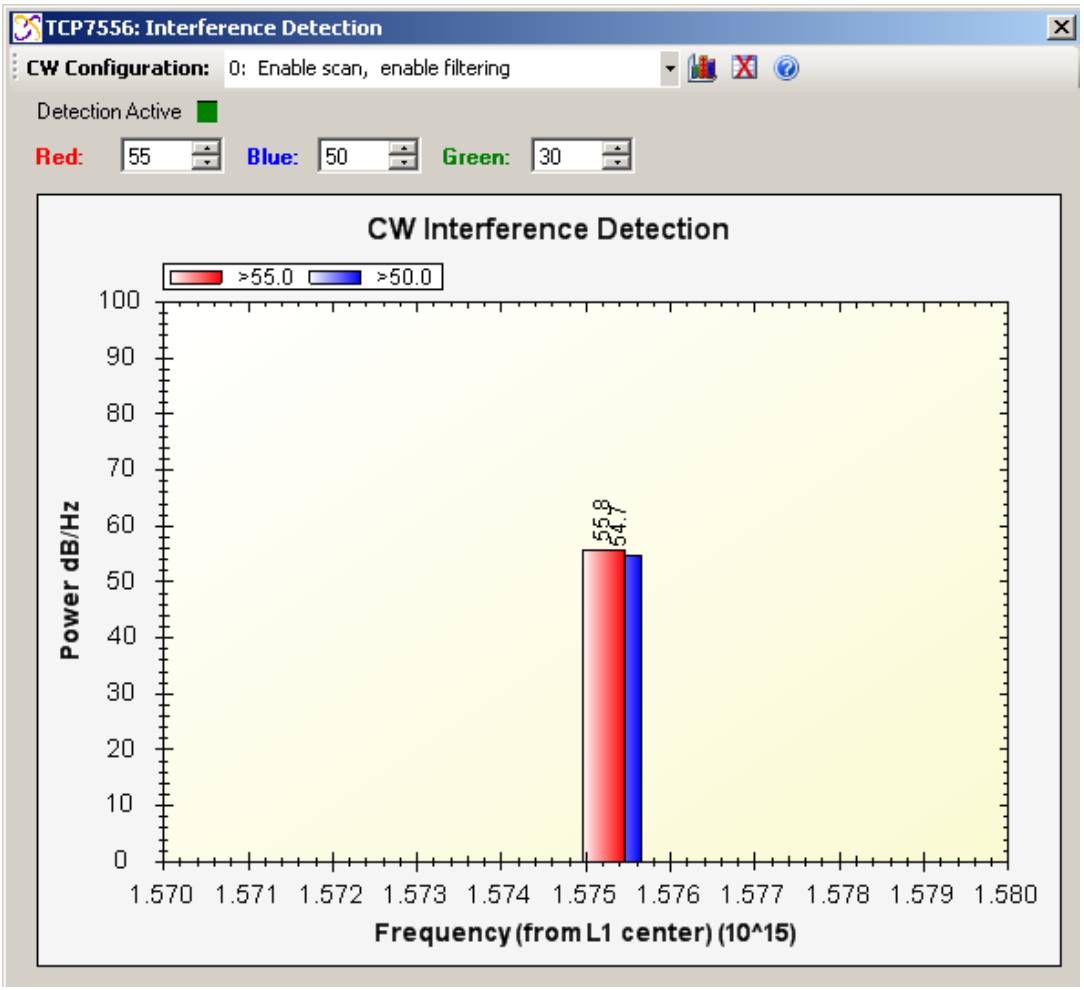


Figure 7.4: CW Interference Detection

Filter values are:

- Red > green filter value and > blue filter value. Default = 50.
- Blue > green filter value and < red filter value. Default = 40.
- Green < red filter value and < blue filter value. Default = 30.

CW Configuration options are:

`0: Enable scan, enable filtering`	Normal operation. Turns on the OFFT filter if the interference is in the band. Turns on 2 MHz filter if strong interference is present.
`2: Enable scan, use 2MHz`	Disables the OFFT filter
`3: Enable scan, no filtering`	Disables all filtering (2 MHz and OFFT)
`4: Disable scan, disable filtering`	Completely disables both scanning and filtering

Interference detection can detect up to 8 separate signals being inserted.

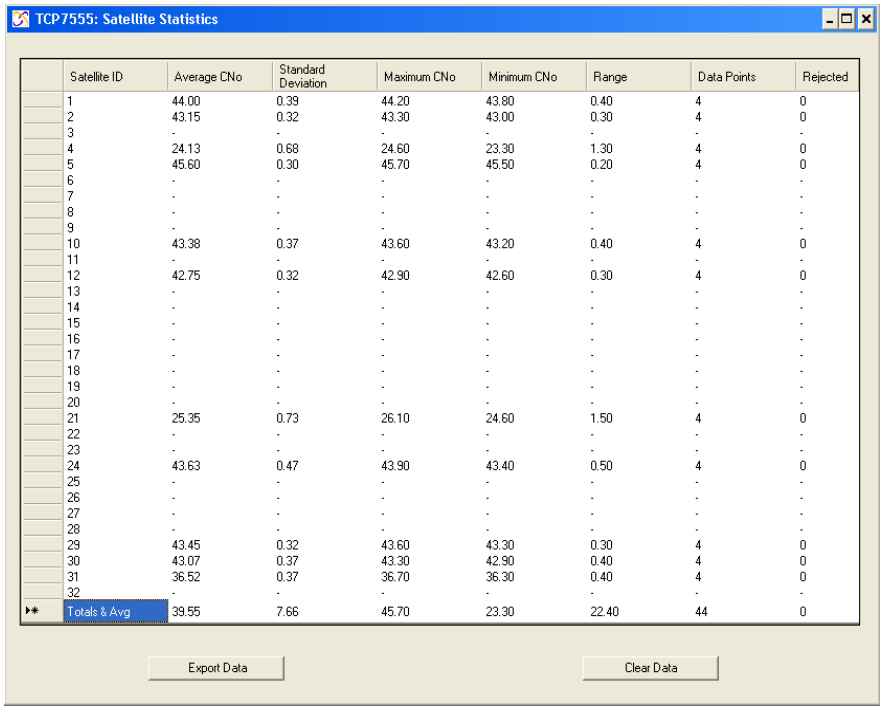
- Click the **Set** button  to activate the configuration option shown in the **CW configuration** edit box.
  - The **Detection Active?** Box shows:
    - Green if the scan is enabled 

    - Grey if the scan is disabled 

- Click the **Clear** button  to clear all of the data in the plot.
- Click the **Help** button  for information about the CW Detection plot window.

7.3.12. Satellites Statistics View

- Select **Receiver / View / Satellite Statistics View...** to display per SV: Average C/No, Standard Deviation, Maximum C/No, Minimum C/No, Range, Data Points, and Rejected.



Satellite ID	Average CNo	Standard Deviation	Maximum CNo	Minimum CNo	Range	Data Points	Rejected
1	44.00	0.39	44.20	43.80	0.40	4	0
2	43.15	0.32	43.30	43.00	0.30	4	0
3	-	-	-	-	-	-	-
4	24.13	0.68	24.60	23.30	1.30	4	0
5	45.60	0.30	45.70	45.50	0.20	4	0
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	43.38	0.37	43.60	43.20	0.40	4	0
11	-	-	-	-	-	-	-
12	42.75	0.32	42.90	42.60	0.30	4	0
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-
21	25.35	0.73	26.10	24.60	1.50	4	0
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	43.63	0.47	43.90	43.40	0.50	4	0
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-
29	43.45	0.32	43.60	43.30	0.30	4	0
30	43.07	0.37	43.30	42.90	0.40	4	0
31	36.52	0.37	36.70	36.30	0.40	4	0
32	-	-	-	-	-	-	-
Totals & Avg	39.55	7.66	45.70	23.30	22.40	44	0

Figure 7.5: Satellite Statistics View

- Click **Export Data** to export the data shown in the Satellite Statistics window to a `.csv` file.
- Click **Clear Data to c**lear all fields of the Satellite Statistics window.

7.3.13. SiRFaware Mode View

- Select **Receiver / View / SiRFaware Mode View...**. See section 8.4.

7.4. Command

- Select the **Receiver / Command** menu to send Rx commands.

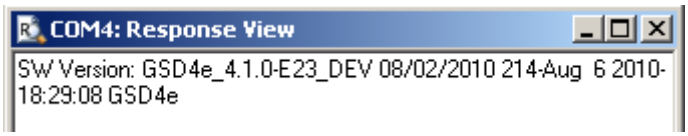
7.4.1. Reset

- Select **Receiver / Command / Reset...**. See section 5.11.

7.4.2. Poll S/W Version

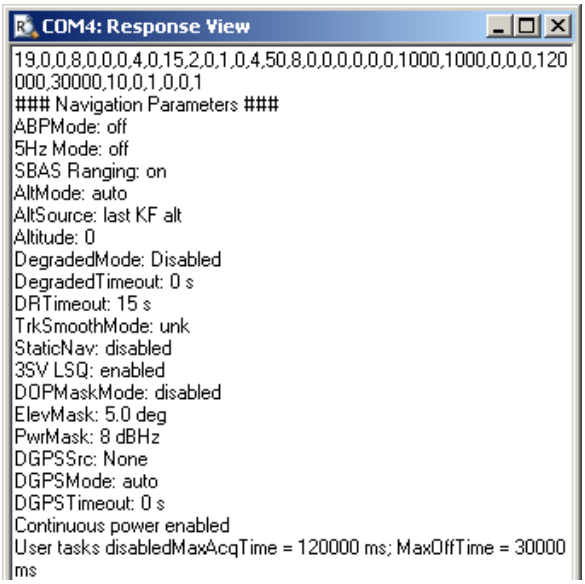
- Select **Receiver / Command / Poll S/W Version** to display the current software version in the **Debug View** title bar:

  - And in the **Response View** window:



7.4.3. Poll Nav Parameters

- Select **Receiver / Command / Poll Nav Parameters** to display the information in the window as both Message 19 output and as user-friendly text for quick and easy interpretation.



7.4.4. Poll GPS Almanac

1. Select **Receiver / Command / Poll GPS Almanac...** to save the current almanac into a file with an `.alm` file extension.

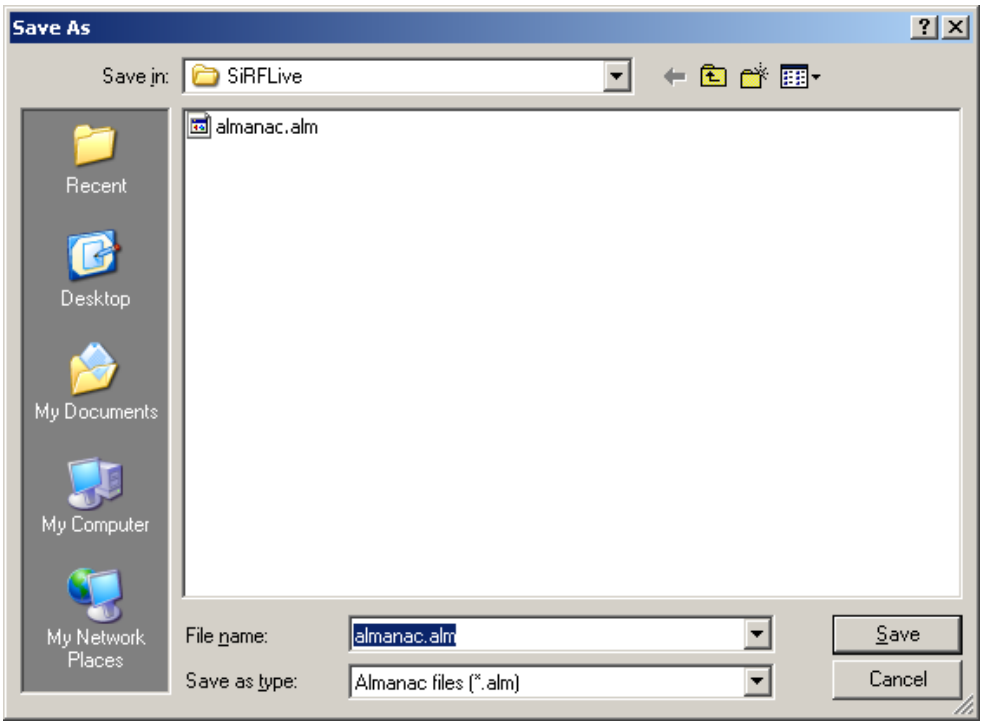


Figure 7.6: Poll Almanac Save As Window

2. Click **Save**. A dialog opens to confirm the selection to save.
3. Click **Yes** to confirm you want to proceed (or **No** to return to the **Save As** window).

   The file selected is saved.

   If a file already exists with this name you can choose to replace the existing file or return to the **Save As** window.

7.4.5. Poll GPS Ephemeris

1. Select **Receiver / Command / Poll GPS Ephemeris...** to save the current ephemeris into a file with an `.eph` file extension.

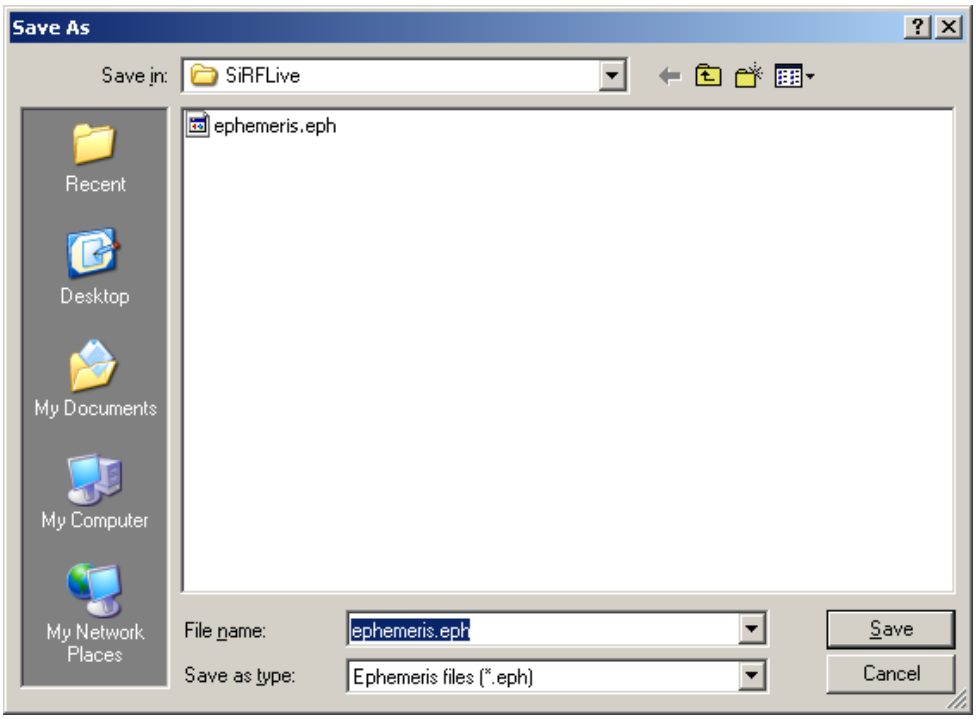


Figure 7.7: Poll Ephemeris Save As Window

2. Click **Save**. A dialog opens to confirm the selection to save.
3. Click **Yes** to confirm you want to proceed (or **No** to return to the **Save As** window).

   The file selected is saved.

   If a file already exists with this name you can choose to replace the existing file or return to the **Save As** window.

7.4.6. Poll QZSS Almanac

1. Select **Receiver / Command / Poll QZSS Almanac...** to save the current ephemeris into a file with an `.eph` file extension.

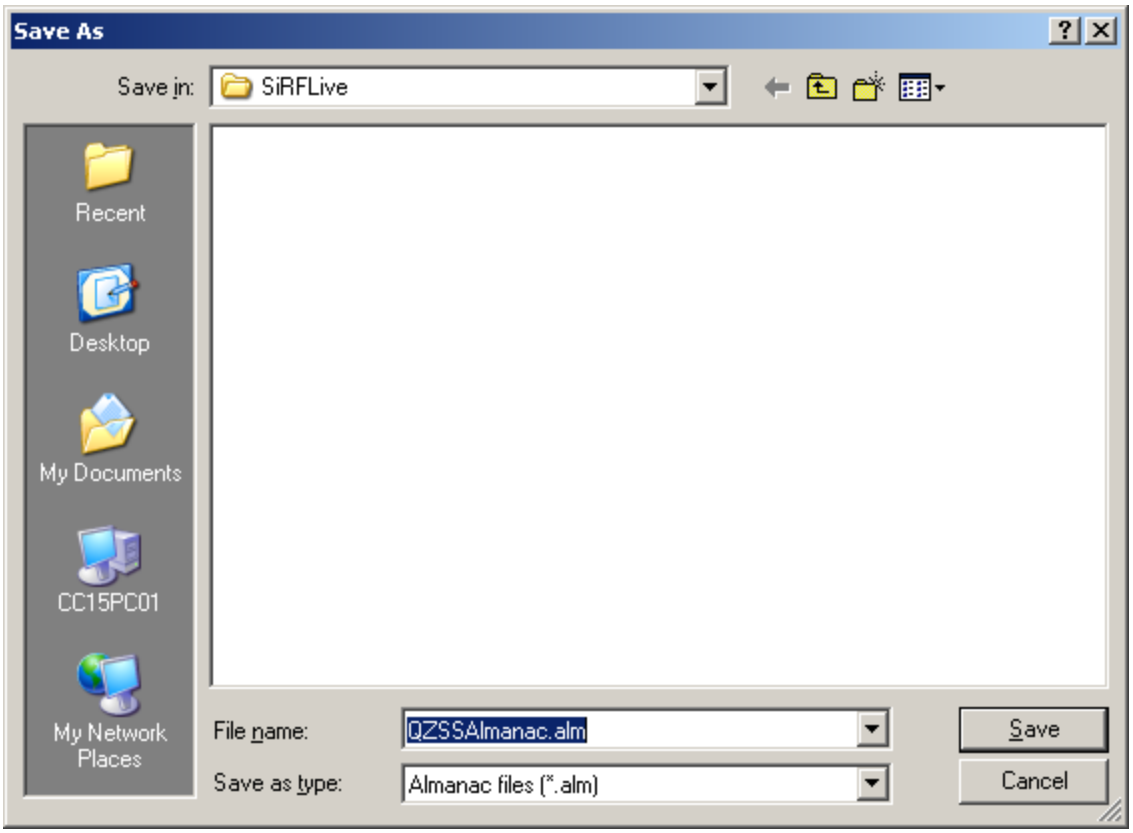
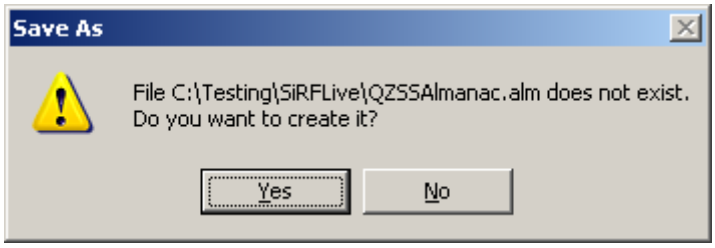


Figure 7.8: Poll QZSS Almanac Save As Window

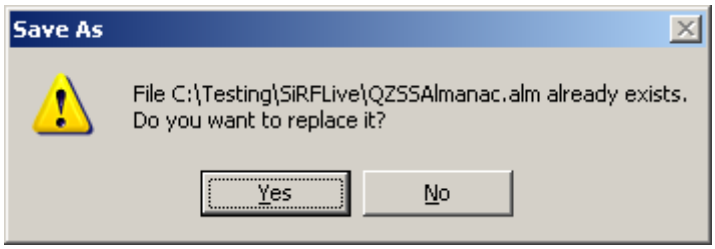
A dialog appears.



2. Click **Yes** to save the file as selected.

   Click **No** to go back to the **Save As** window to select another file name.

   If a file already exists with the selected name, a dialog appears requesting you confirm replacing it:



3. Click **Yes** to overwrite the existing file as selected.

   Click **No** to go back to the **Save As** window to select another file name.

7.4.7. Switch Operation Mode

This is specifically for developers with the understanding of the RF signal input and the use of a single channel simulator.

1. Select **Receiver / Command / Switch Operating Mode...** to enable the different Test Modes.
2. Select the length of time to run the test and which SV to track in the appropriate fields.

Figure 7.9 shows an example with a message used to set the receiver into Test Mode.

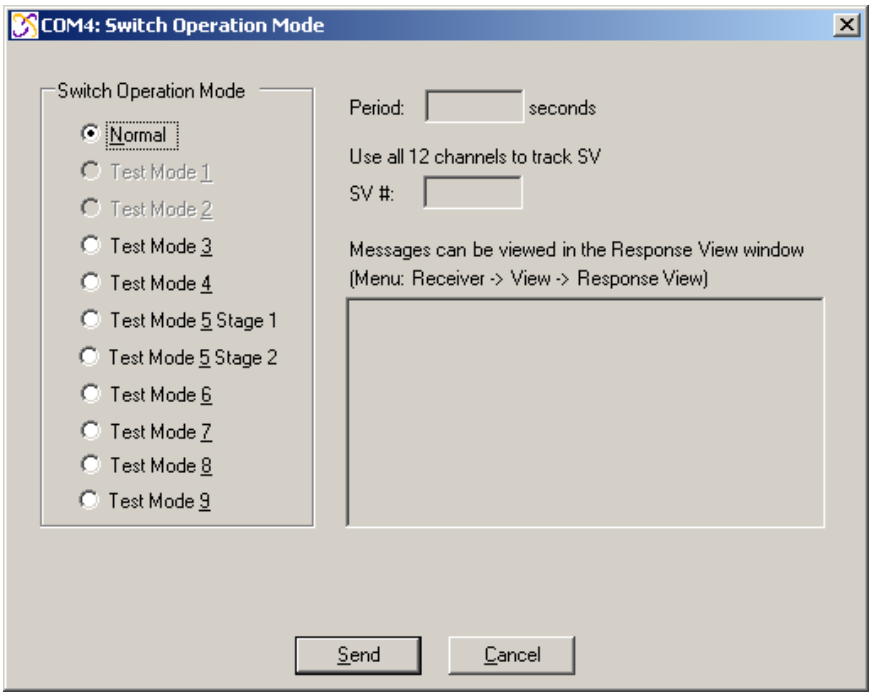
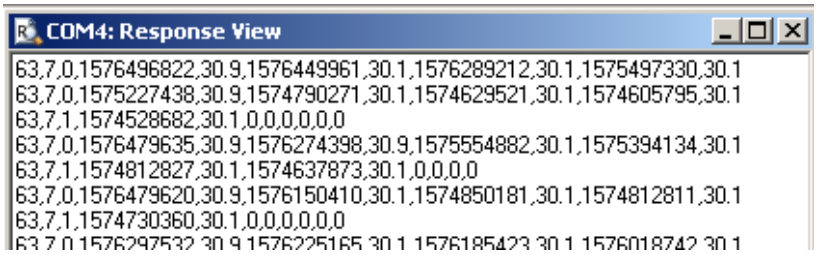
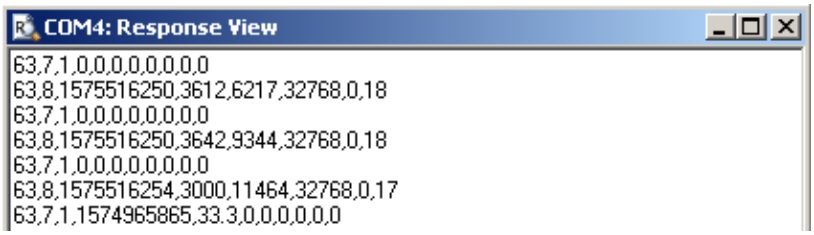


Figure 7.9: Example Switch Operation Mode

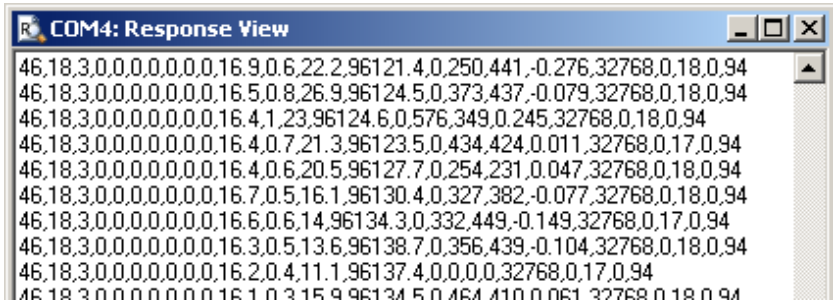
After enabling the selected Test Mode the **Response View** window shows message 63 for Test Mode 7:



And Test Mode 8:



And message 46 for the other Test Modes:



The second value, `18`, is the SV number entered. The third value, `3`, is the period in seconds.

- To get the receiver out of Test Mode, select the **Normal** button and click **Send**.

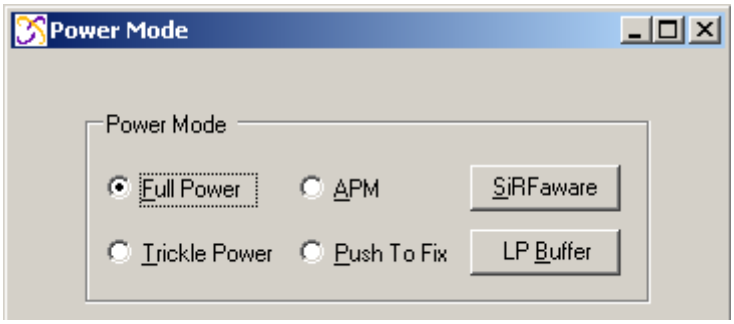


Figure 7.10: Switch Power Mode

Full Power	Normal state of the receiver
APM	Advanced Power Management state. By default, when APM is selected, the AutoReply settings are set to the required parameters and a hot start is sent in order for APM to be enabled on the Rx. See Figure 7.11. To turn off APM, select the **Full Power** radio button and click **OK**.
Trickle Power	Enables the Rx to be in various power modes to save power. See Figure 7.12.
Push to Fix	Push to Fix is a low power state where the receiver goes into a sleep mode for a predefined period of time, then wakes up until a position is calculated, then goes back to sleep. See Figure 7.13.
SiRFaware	See section 8.4.
LP Buffer	See section 7.4.16.

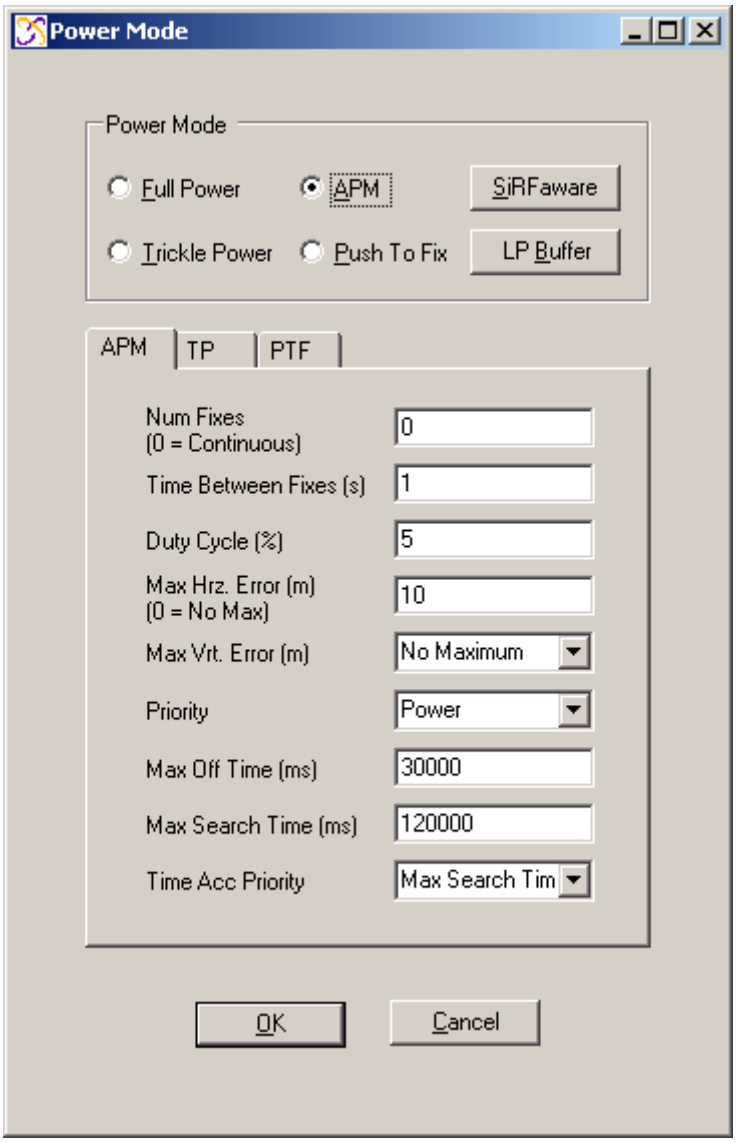


Figure 7.11: APM Power Mode

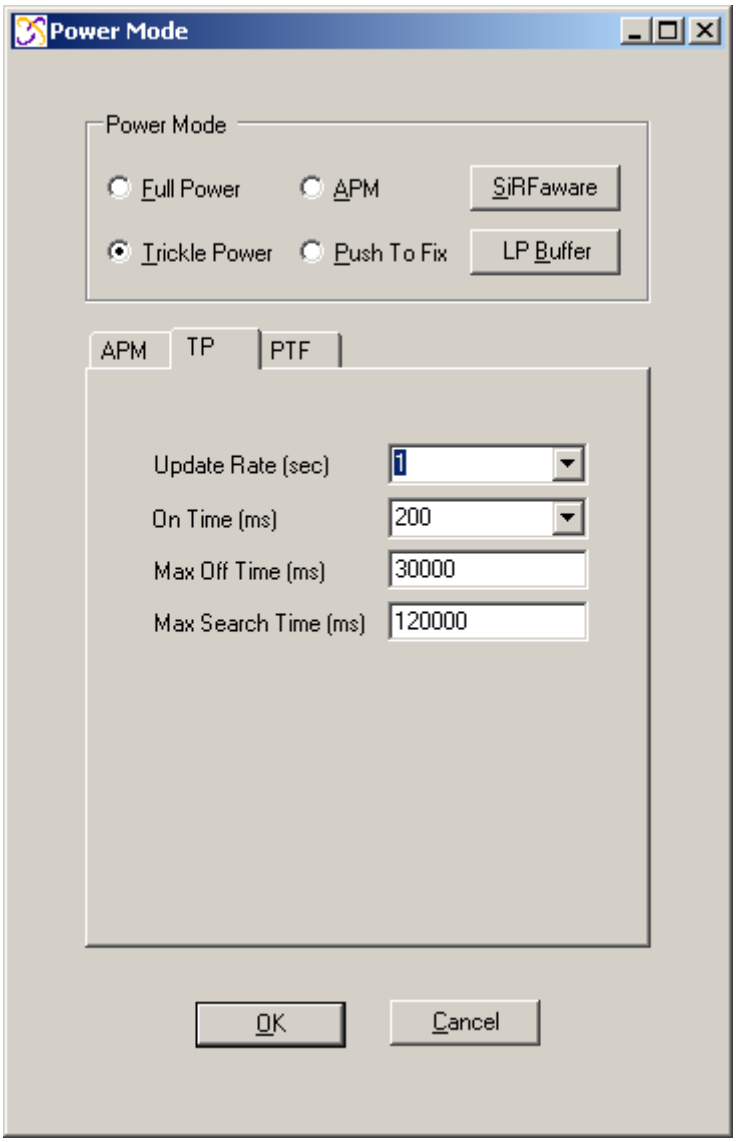


Figure 7.12: Trickle Power Mode

Update Rate (sec) The frequency with which the receiver updates its status

On Time (ms) How long the receiver has to update its status

Max Off Time (ms) Maximum time for sleep mode. When the Rx is unable to acquire satellites for a TP cycle, it returns to sleep mode for this period of time before it tries again.

Max Search Time (ms) When the receiver is unable to reacquire at the start of a cycle, this parameter determines how long it tries to reacquire for. After this time expires, the unit returns to sleep mode for the value set in the **Max Off Time (ms)** field. Entering a value of 0 for this field makes max search time disabled such that the receiver attempts to reacquire continuously. When a value of 0 is entered for the **Max Search Time (ms)**, the value entered in the **Max Off Time (ms)** field is N/A and ignored.

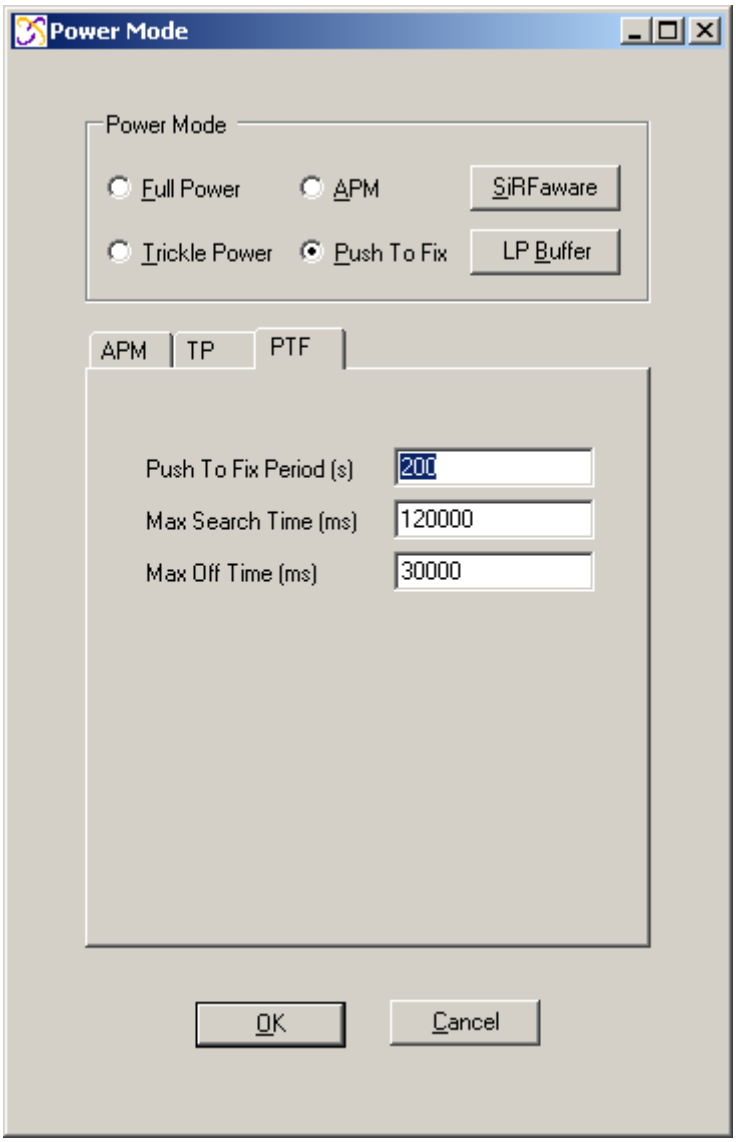


Figure 7.13: Push to Fix Power Mode

Push to Fix Period (s) Cycle time in seconds. Value range: 10 – 7200 seconds.

Max Off Time (ms) Maximum time for sleep mode. When the receiver is unable to acquire satellites for a TP cycle, it returns to sleep mode for this period of time before it tries again.

Max Search Time (ms) When the receiver is unable to reacquire at the start of a cycle, this parameter determines how long it tries to reacquire for. After this time expires, the unit returns to sleep mode for the value set in the **Max Off Time (ms)** field.

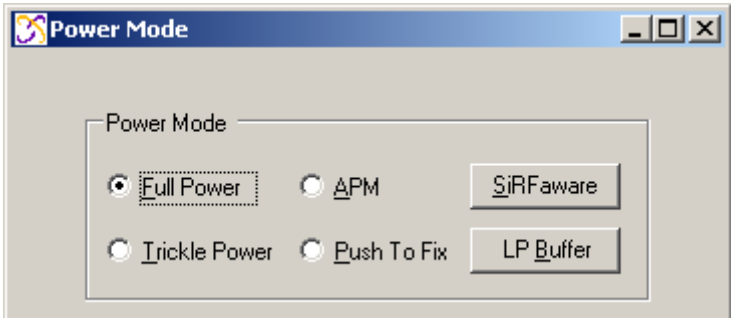
Enter a value of 0 to disable max search time so that the receiver attempts to reacquire continuously. In this case, the value entered in the **Max Off Time (ms)** field is ignored.

7.4.8. Switch Power Mode

- Select **Receiver / Command / Switch Power Mode...** to enable the receiver to be put into different low power states and to return the receiver to normal or full power.

7.4.8.1. Full Power

Full Power is the normal state of the receiver:



7.4.8.2. APM

APM is the Advanced Power Management state:

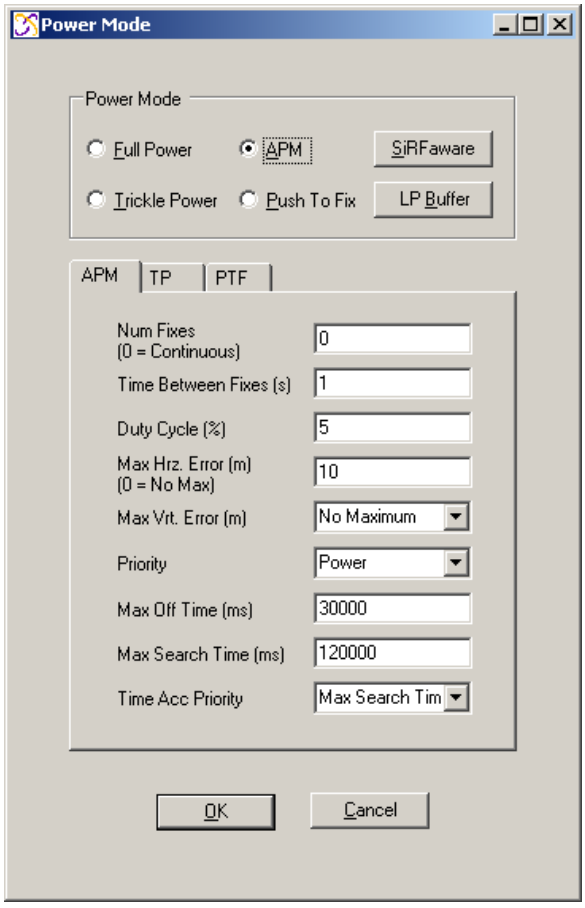
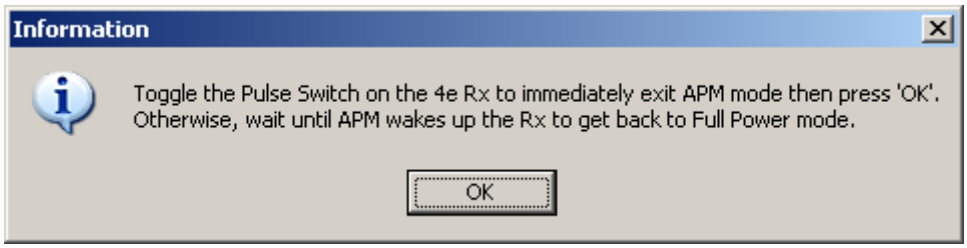


Figure 7.14: APM Power Mode

By default, when **APM** is selected, the AutoReply settings are set to the required parameters and a hot start is sent so that APM is enabled on the Rx.

- To turn off APM, select the **Full Power** radio button and press **OK**. The following dialog appears:



7.4.8.3. Trickle Power

Trickle Power allows the Rx to be in various power modes to save power:

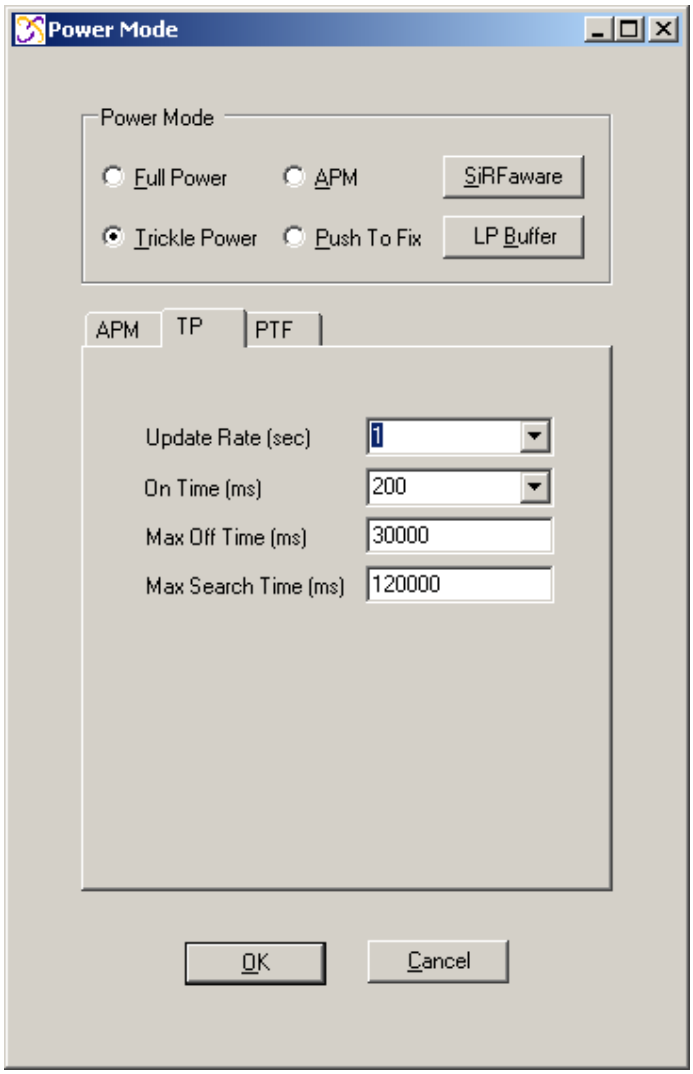


Figure 7.15: Trickle Power Mode

Update Rate (sec)	How often the receiver updates its status
On Time (ms)	How long the receiver has to update its status
Max Off Time (ms)	Maximum time for sleep mode. When the Rx is unable to acquire satellites for a TP cycle, it returns to sleep mode for this period of time before it tries again.
Max Search Time (ms)	When the receiver is unable to reacquire at the start of a cycle, this parameter determines how long it will try to reacquire for. After this time expires, the unit returns to sleep mode for the value set in the Max Off Time field. Entering a value of 0 for this field makes max search time disabled such that the receiver attempts to reacquire continuously. When a value of 0 is entered for the MAX_SEARCH_TIME, the value entered in the MAX_OFF_TIME field is N/A and ignored.

7.4.8.4. Push to Fix

Push to Fix is a low power state where the receiver goes into a sleep mode for a predefined period of time, then wakes up until a position is calculated, then goes back to sleep.

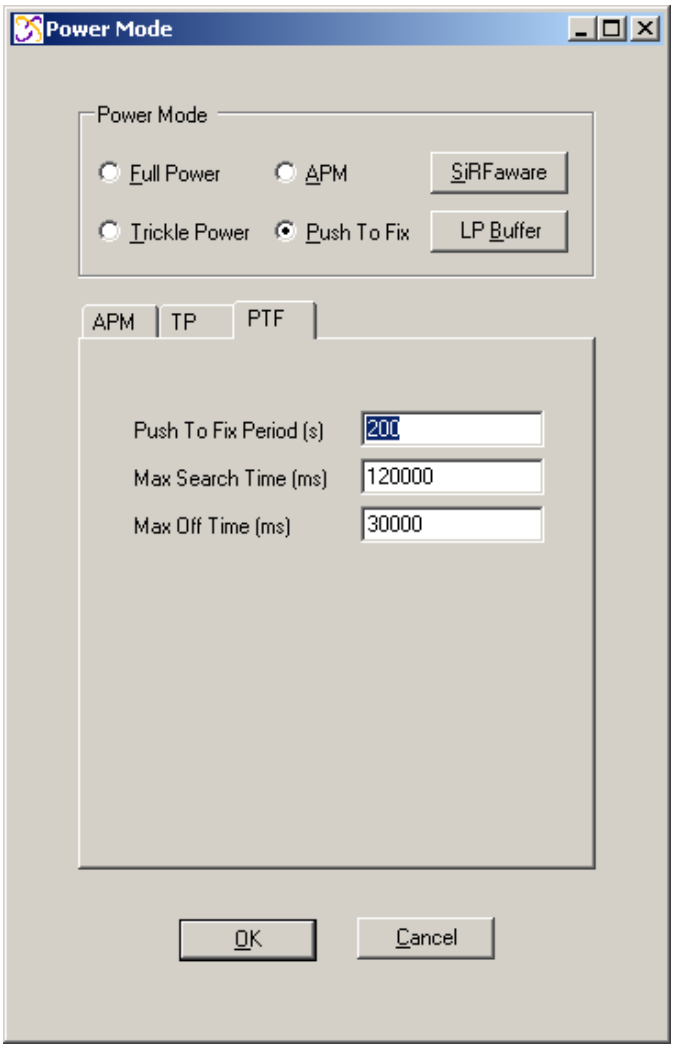


Figure 7.16: Push to Fix Mode

Push to Fix Period (s)	Cycle time in seconds. Value range: 10 – 7200 seconds.
Max Off Time (ms)	Maximum time for sleep mode. When the Rx is unable to acquire satellites for a TP cycle, it returns to sleep mode for this period of time before it tries again.
Max Search Time (ms)	When the receiver is unable to reacquire at the start of a cycle, this parameter determines how long it will try to reacquire for. After this time expires, the unit returns to sleep mode for the value set in the Max Off Time field. Entering a value of 0 for this field makes max search time disabled such that the receiver attempts to reacquire continuously. When a value of 0 is entered for the MAX_SEARCH_TIME, the value entered in the MAX_OFF_TIME field is N/A and ignored.

7.4.8.5. Low Power Buffer

See Section 7.4.16 for more information.

7.4.9. Set GPS Almanac

1. Select **Receiver / Command / Set GPS Almanac...** to load different almanacs onto the receiver as required.

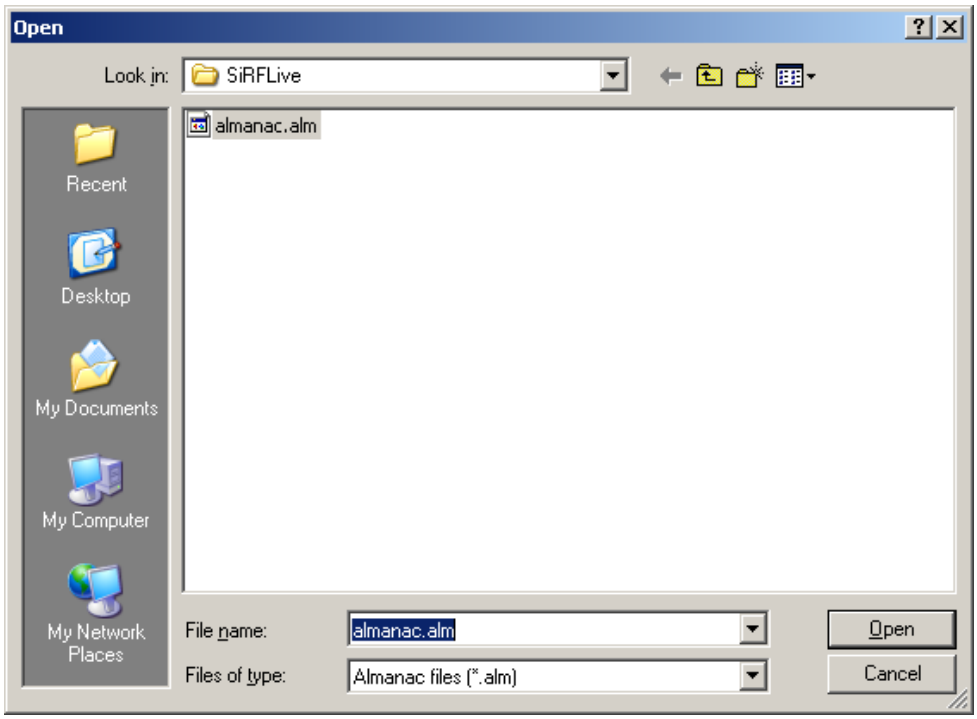


Figure 7.17: Set Almanac Window

2. Locate and select the almanac.
3. Click **Open**.

   The output in the **Debug** window shows the almanac being sent to the receiver with the input command:

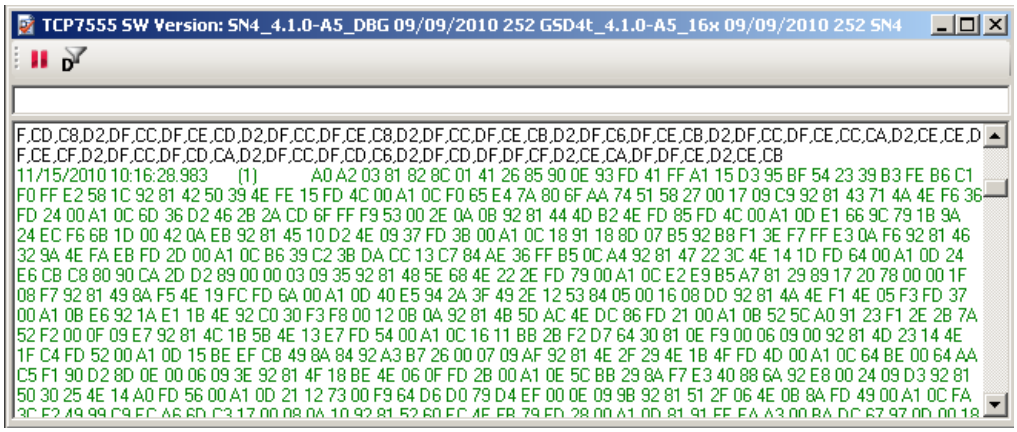


Figure 7.18: Example Almanac Output

Then the output shows the message being mirrored back out (255).

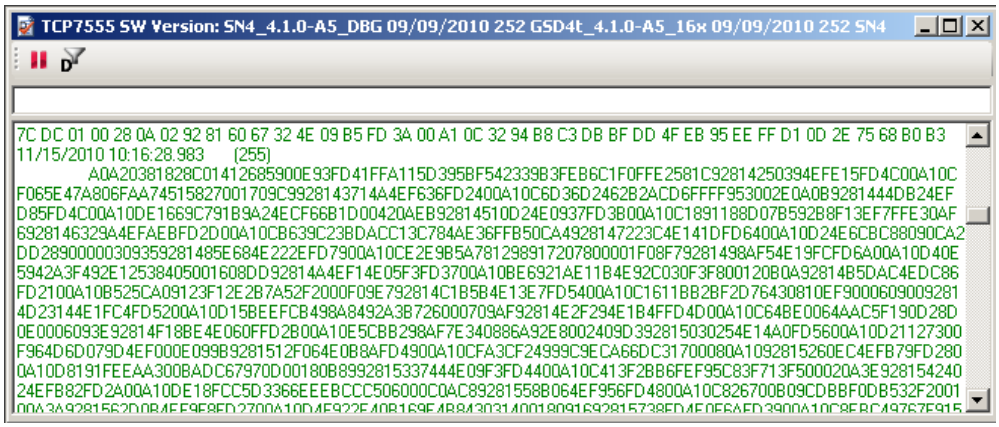


Figure 7.19: Example Almanac Output with Message Mirrored Back Out

7.4.10. Set GPS Ephemeris

1. Select **Receiver / Command / Set GPS Ephemeris...** to load different ephemerides onto the receiver as required.

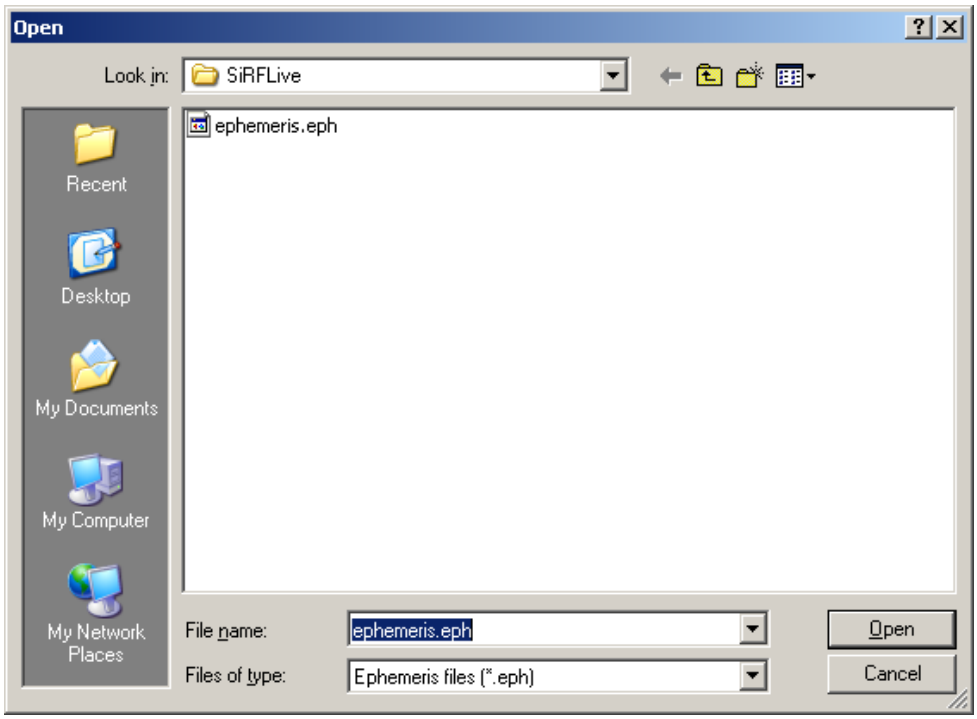


Figure 7.20: Set Ephemeris Window

2. Locate and select the ephemeris.
3. Click **Open**.

   The output in the **Debug** window shows the results. The same input (1) and mirror output (255) are shown for each ephemerid.

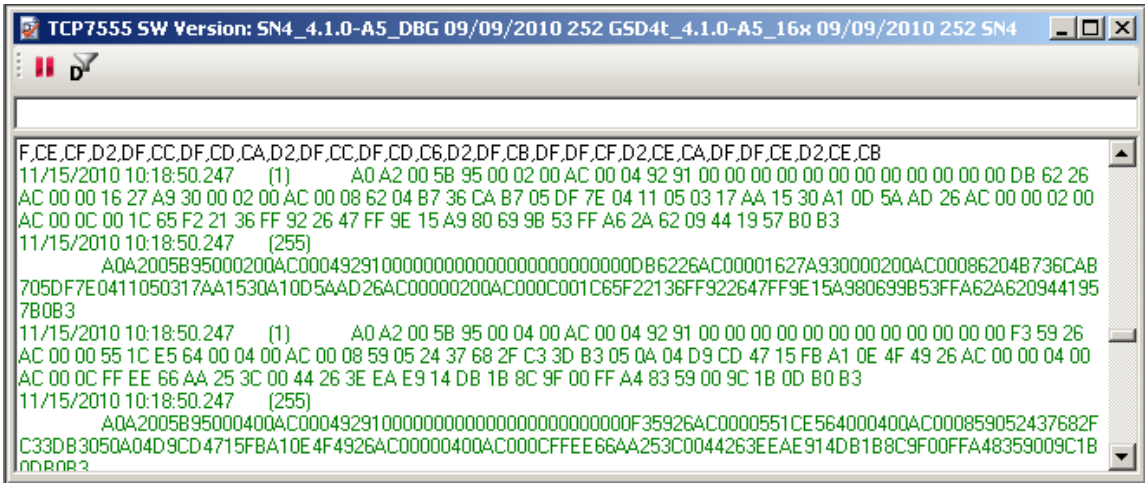


Figure 7.21: Example Ephemerid Output

7.4.11. Set EE

- Select **Receiver / Command / Set EE...**

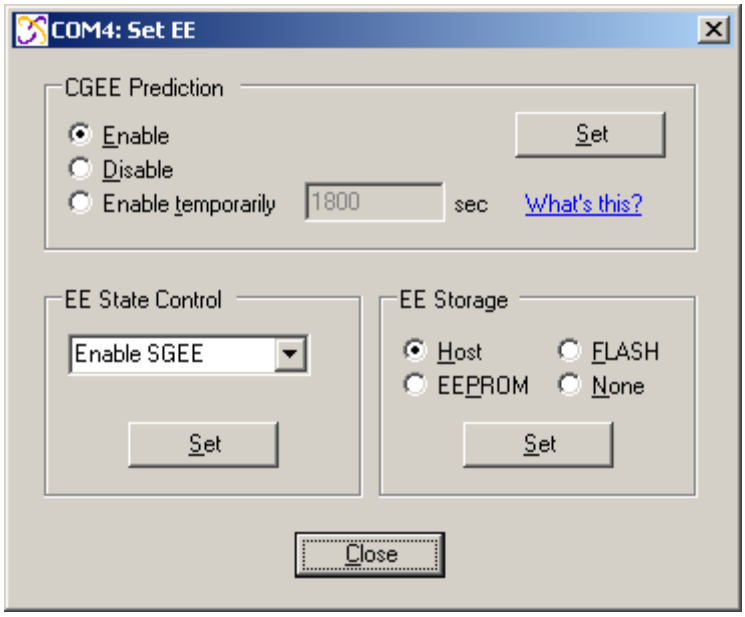
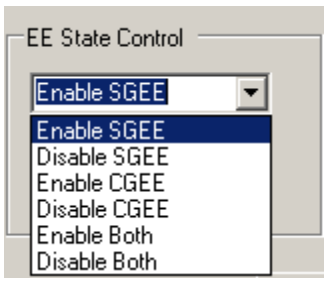


Figure 7.22: Set EE Window

CGEE Prediction	Enable, disable or enable temporarily (for the set time in seconds)
What's this?	Gives detailed information about the seconds window for the **Enable temporarily** button. Click **OK** to continue.
Set	Activate the selected item
EE State Control (GSD4e)	Enable/disable selection of client and/or server-generated EE:  Click **Set** to activate selection.
EE Storage (GSD4e)	Determines where the EE is stored on the receiver. Click **Set** to activate selection.

7.4.12. Set Debug Levels

1. Select **Receiver / Command / Set Debug Levels...** to display a data grid with options for all the debug values that can be collected in the data. The default is all fields selected at the Level1 setting.

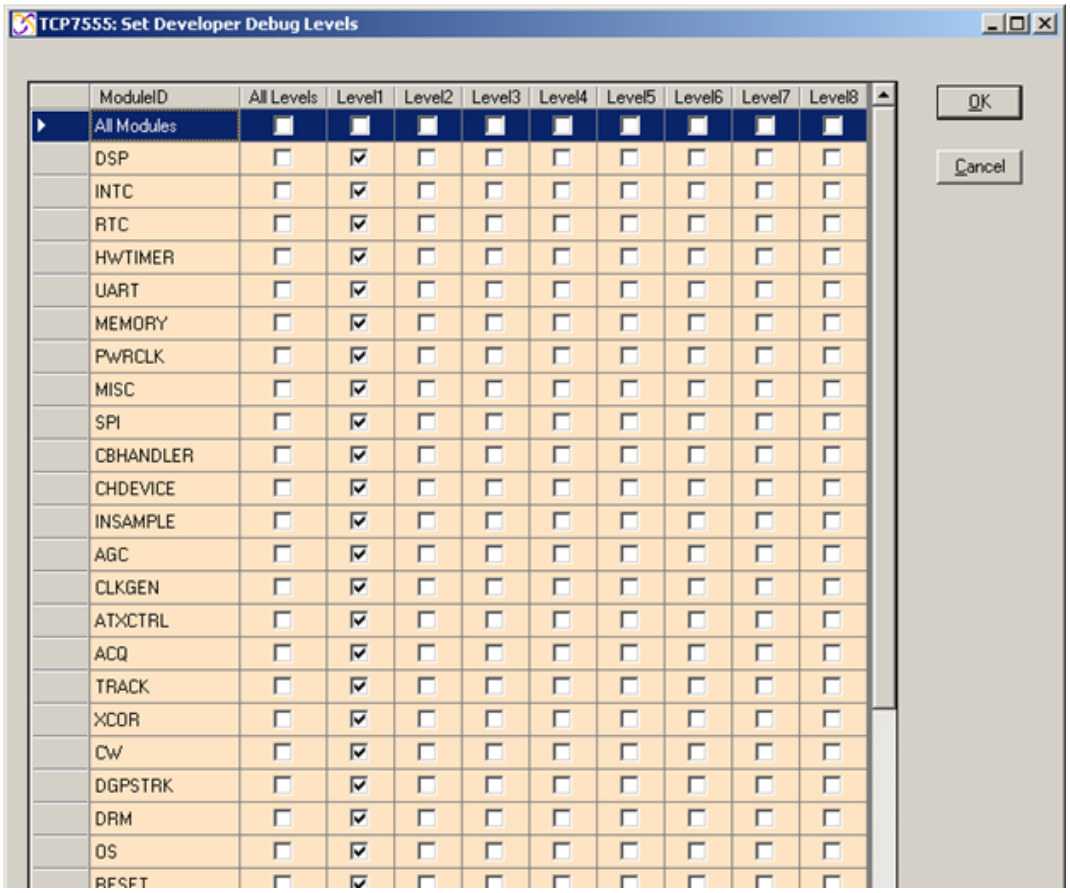


Figure 7.23: Set Developer Debug Levels

7.4.13. Set DGPS

- Select **Receiver / Command / Set DGPS...** to display the **DGPS Settings** window.

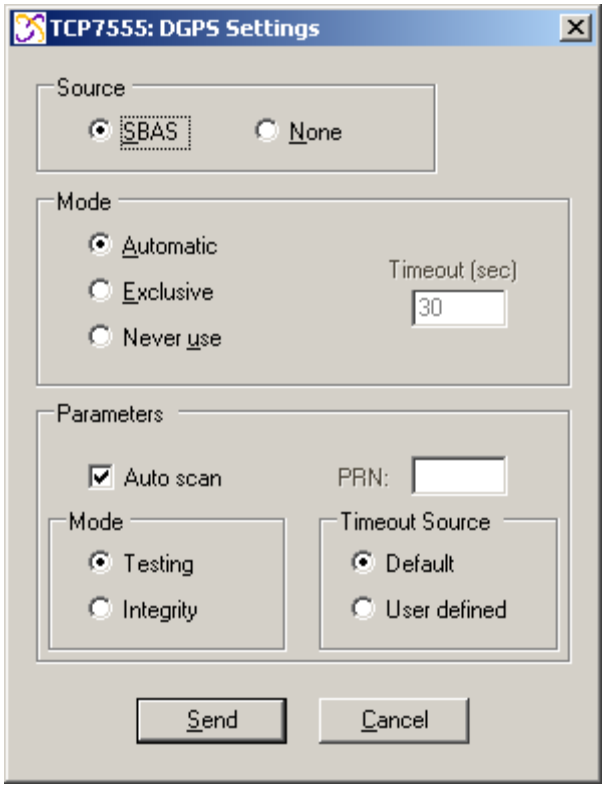


Figure 7.24: DGPS Settings

7.4.14. Set MEMS

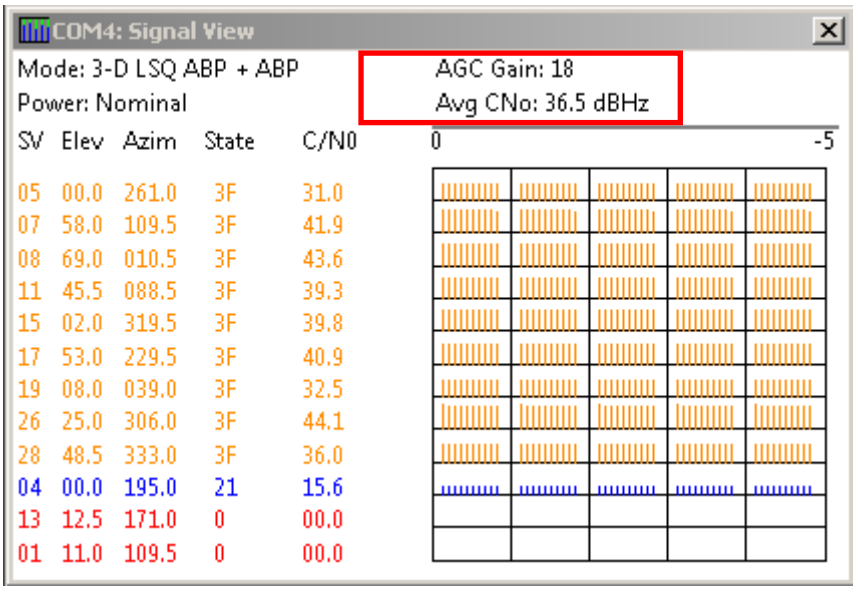
- Select **Receiver / Command / Set MEMS / Enable MEMS** to enable the MEMS function on the Rx.
- Select **Receiver** / **Command** / **Set MEMS** / **Disable MEMS** to disable MEMS on the Rx.

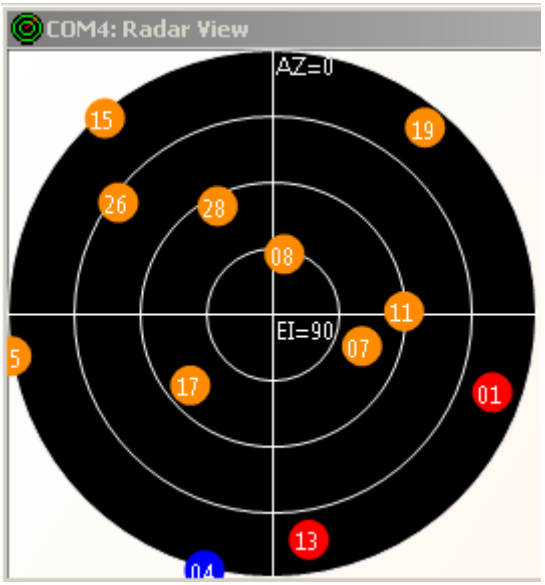
7.4.15. Set ABP: GSD4e

Almanac Based Positioning assists the Rx by obtaining a fix faster through the use of the almanac. By default, ABP is disabled.

- Select **Receiver** / **Command** / **Set ABP** / **Enable ABP** to enable ABP.
- Select **Receiver** / **Command** / **Set ABP** / **Disable ABP** to disable ABP.

When enabled, the ABP fix for warm and cold starts in the **Signal View** and **Radar View** window is shown in orange and ABP in the Mode value.





With ABP Mode enabled, the fix has a good TTFF time with a trade-off with the position error. In Figure 7.25, Cold Reset #3 is with ABP disabled and Cold Reset #4 is with ABP enabled.

Reset#	TTFF-Reset (s) (avg: 29.53)	TTFF-Aiding (s) (avg: 29.53)	TTFF-First Nav (s) (avg: 29.53)	Horz Acc. (m) (avg: 85.64)	Vert Acc. (m) (avg: 35.41)
3	36.3	36.3	36.3	2.52	5.18
4	22.2	22.2	22.2	162.24	69.35

Figure 7.25: ABP Enabled Example

7.4.16. Low Power Commands Buffer

The Low Power Command Buffer enables you to view any commands that are not sent to the Rx but are stored in a buffer during periods of low power (Trickle Power, Push-to-Fix, or APM).

- Select **Receiver / Command / Low Power Commands Buffer** to enable.

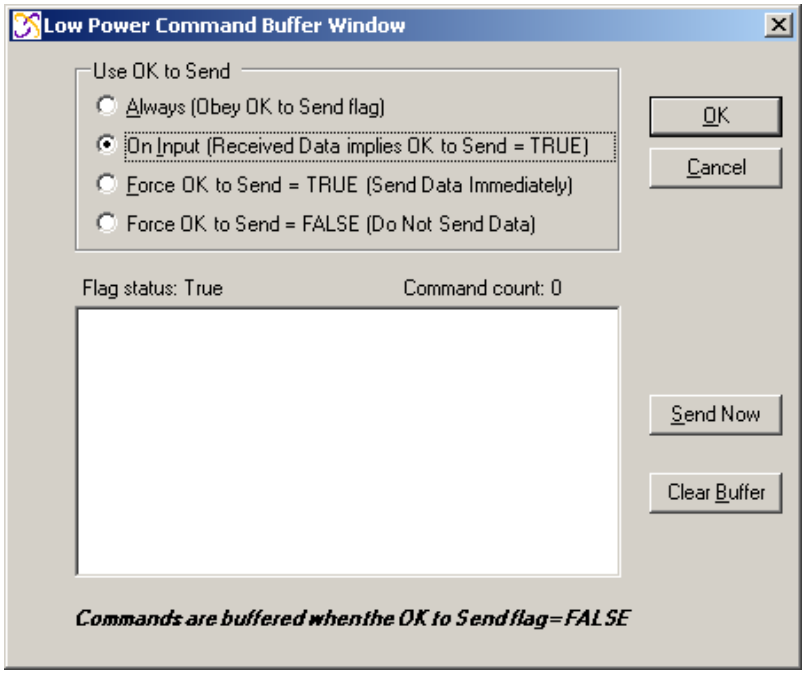


Figure 7.26: Low Power Command Buffer Window

If a command is selected to be sent to the receiver but the receiver is in a low power state, the **OK to Send** flag is set to false and the commands are buffered until the receiver wakes up and can accept new commands. Figure 7.27 shows an example where the Trickle Power mode (`0xda`) and the Poll S/W Version (`0x02`) commands are selected but not sent. When the **OK to Send** flag equals true then the buffered commands are sent to the receiver.

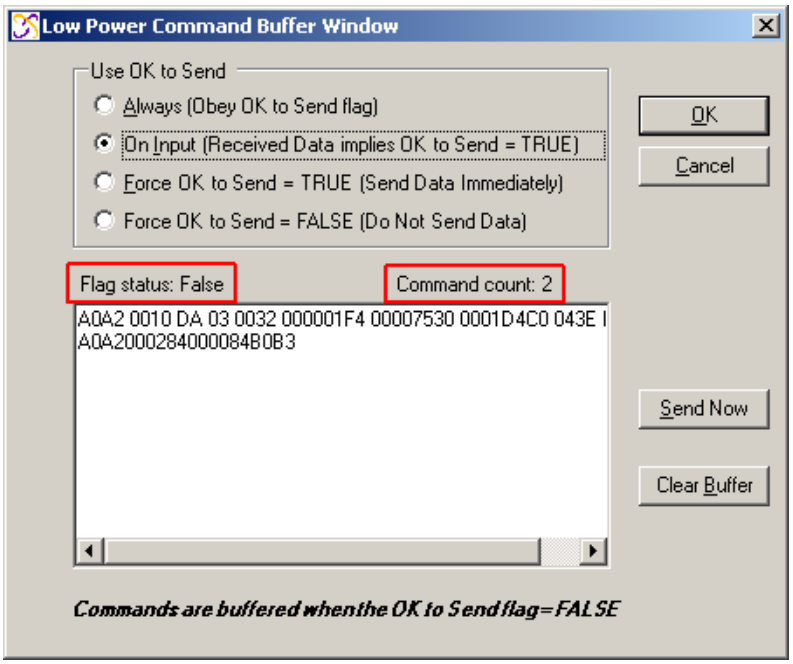


Figure 7.27: Low Power Command Buffer Window

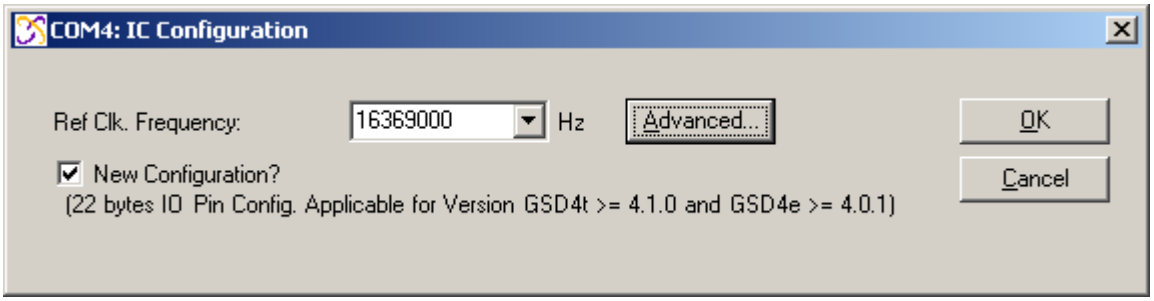
7.4.17. IC Configure

The IC configuration is an advanced configuration tool to assist developers.

Warning:

Modifying any of these settings can make the EVK non-operational. Take great care when attempting any changes.

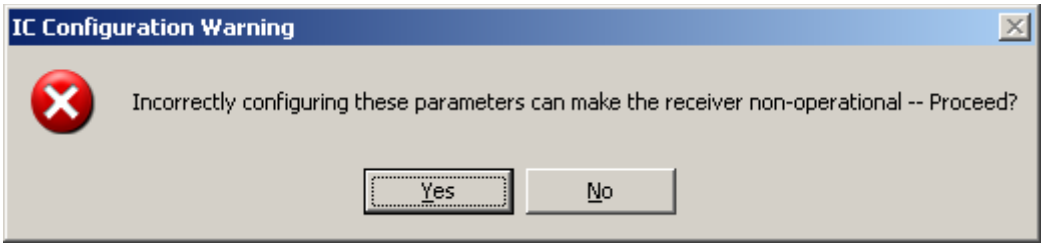
- Select **Receiver / Command / IC Configure...**



The reference clock frequency is the main item you can modify.

- Click **Advanced** to configure other values.

The **IC Configuration Warning** window appears:



If you select **Yes** the IC Configuration window appears. Figure 7.28 shows all the parameters that can be configured.

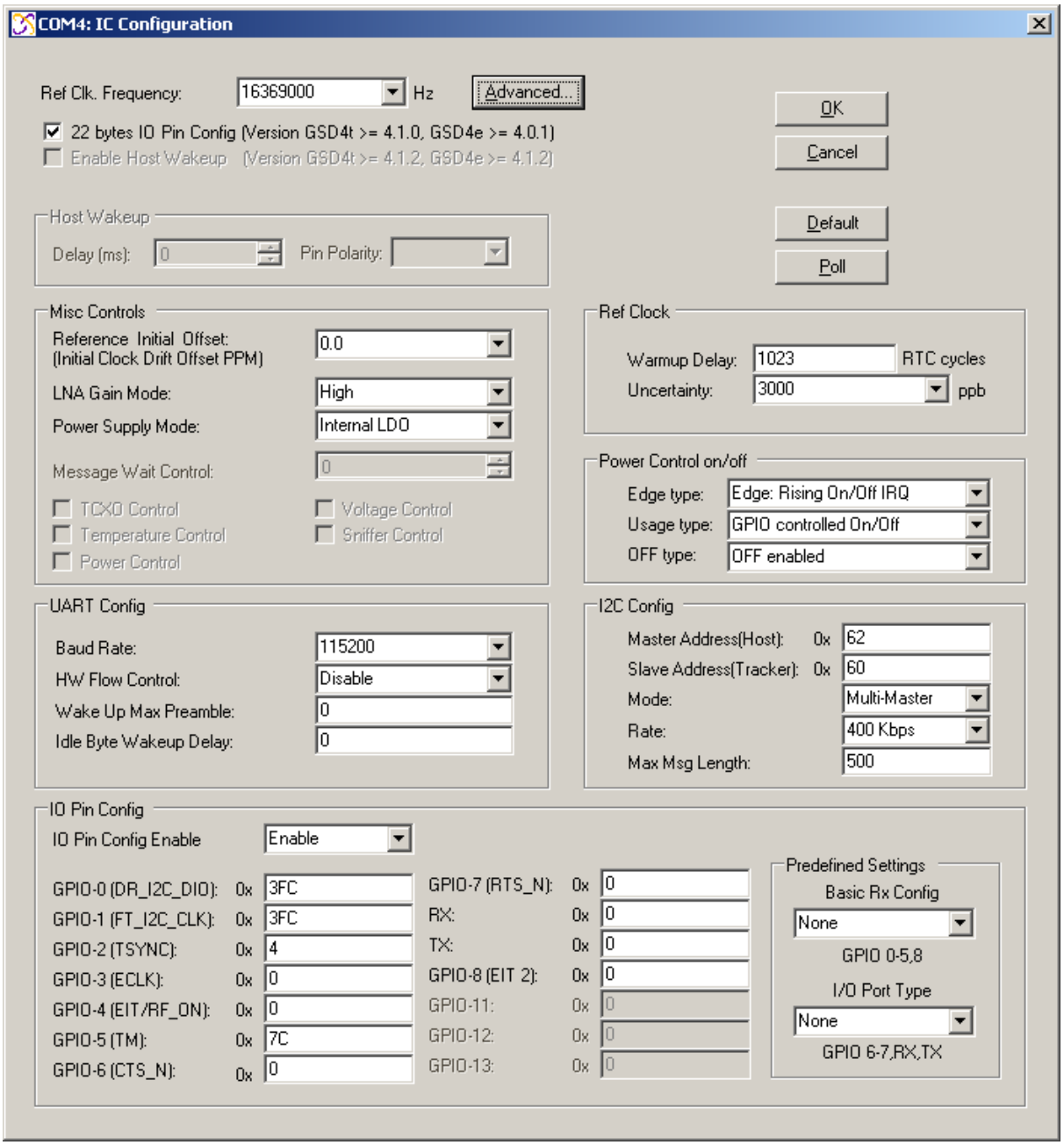
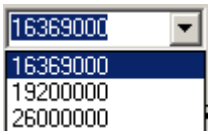


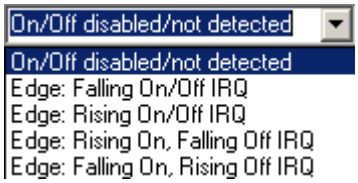
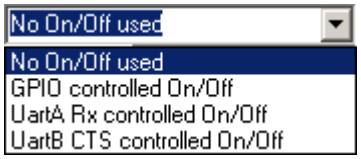
Figure 7.28: IC Configuration Example

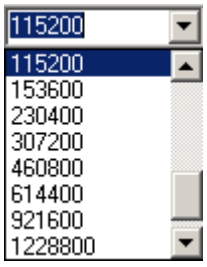
All fields can be modified and therefore should be approached cautiously since incorrect input can make the EVK non-operational.

Ref Clk Frequency



Selection should match your EVK TCXO.

22 bytes IO Pin Config.		The message length has changed for GSD4t 4.1.0 and later, and GSD4e 4.0.1 and later. Click the checkbox to enable GPIO-8(EIT 2) in the IO Pin Config section of the window for newer versions of GSD4t/4e.
Enable Host Wakeup		Selectable when you click the **Advanced** button. Toggle the **22 bytes IO Pin Config** checkbox.
Default Settings		Sets all fields to a default state. It does not guarantee that these settings work correctly for the Rx being used.
Poll Settings		Sends a command to the Rx to ask for the current IC Config settings. On receiving the message fields are populated with the current values.
Host Wakeup (GSD4t)	**Delay**	The time delay is 0 to 26 milliseconds.
	Pin Polarity	High or low.
Misc Controls	**Reference Initial Offset**	Initial TCXO offset in ppm.
	LNA Gain Mode	High or Low
	Power Supply Mode	Internal LDO or Switching regulator
	Message Wait Control (5xp)	TBD
		You can also select **TCXO**, **Temperature**, **Power**, **Voltage**, and **Sniffer**.
Ref Clock	**Warmup Delay**	The delay on the TCXO power up in RTC clock cycles
	Uncertainty	The initial TCXO uncertainty in ppb
Power Control on/off	**Edge type**	
	Usage type	
	OFF type	
UART Config	**Baud Rate**	Baud rates range from 900 to 1843200, including:



	HW Flow Control	Enable or Disable
	Wake Up Max Preamble	The number of preamble byte pattern transmissions.
	Idle Byte Wakeup Delay	The number of bytes worth of delay between preamble transmissions.
Ref Clock	**Warmup Delay**	The delay on TCXO power up in RTC clock cycles: Warmup Delay: 1023 RTC cycles
	Uncertainty	The initial TCXO uncertainty in ppb: 3000 Unknown - use default
	Offset	The initial TCXO offset in ppm: 0.0 Unknown - use default
I2C Config	**Master Address (Host)**	The I^2C address for the master: Master Address(Host): 0x 62
	Slave Address (Tracker)	2. The I2C address for the slave: Slave Address(Tracker): 0x 60
	Mode	3. Multi-Master and Slave
	Rate	4. Note: only 100 and 400 Kbps selections work: 400 Kbps 100 Kbps 400 Kbps 1 Mbps (not availabl 3.4 Mbps (not availa 5.
	Max Msg Length	6. Maximum message length in I^2C mode: 7. Max Msg Length: 500

Figure 7.29 shows IO Pin configuration options.

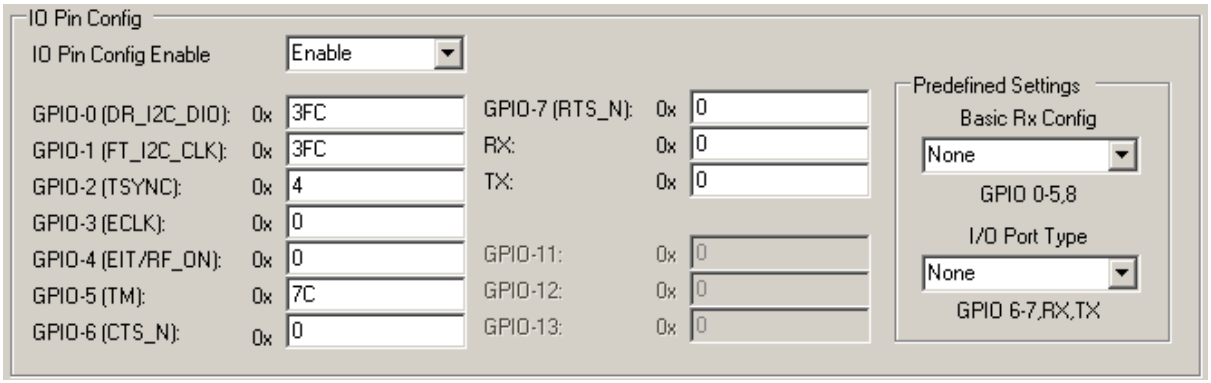
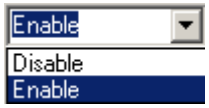


Figure 7.29: IO Pin Configuration Options

- Click Enable to enable the **IO Pin Config** fields:

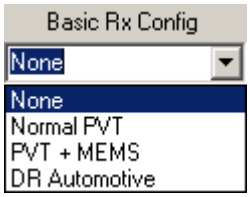


- If you click Disable the fields are greyed out and you cannot use them.

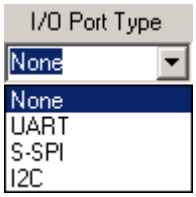
The predefined settings modify the GPIO and RX and TX fields.

Predefined Settings

Basic Rx Config



I/O Port Type



7.4.18. Input Commands

- Select **Receiver / Command / Input Commands** to send specific commands to the Rx.

7.4.18.1. User Defined Message

1. Select **Receiver / Command / Input Commands / User Defined Message...** to enter specific messages directly to the receiver using one of the different protocol wrappers available; OSP, NMEA, or Raw.

   Figure 7.30 shows the beginning and ending wrapper that is added to the message (shown at the bottom of the window).

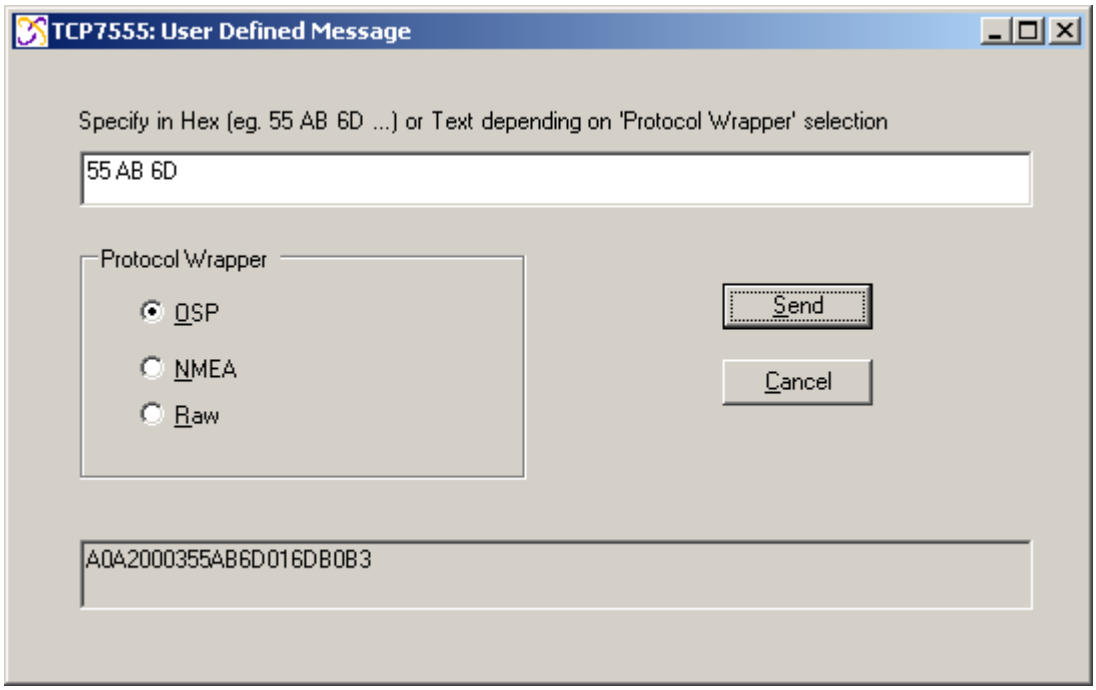


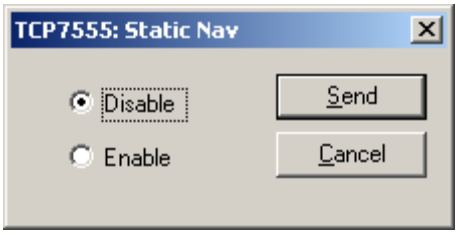
Figure 7.30: User Defined Message Example

7.5. Navigation

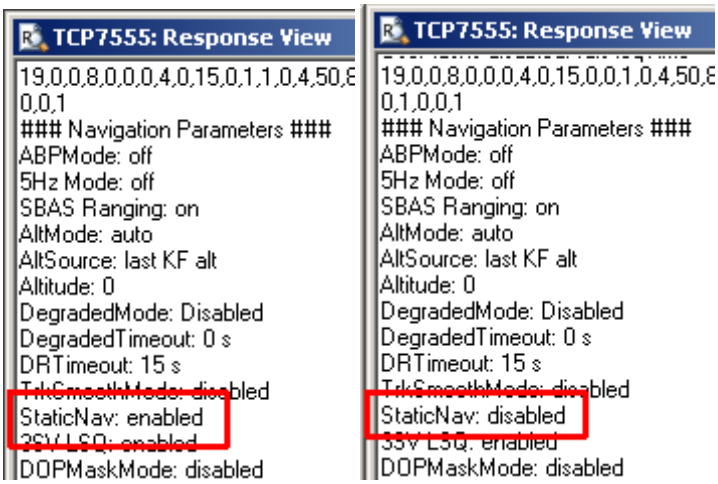
- Select **Receiver / Navigation** to set the Navigation Parameters of the Rx.

7.5.1. Static Nav

1. Select **Receiver / Navigation / Static Nav...** to enable or disable static navigation to the receiver.



You can see the state the Rx is in using Poll Nav Parameters, see section 7.4.3, and viewing the results in the **Response View** window.

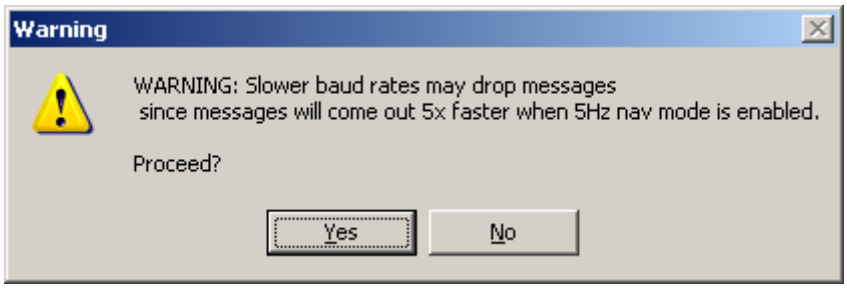


7.5.2. Set 5 Hz Nav

- Select **Receiver / Navigation / Set 5 Hz Nav** (GSD4e only) to set the Nav output rate.

7.5.2.1. Enable 5 Hz Nav

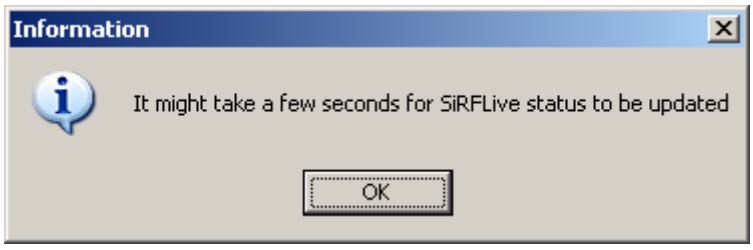
1. Select **Receiver / Navigation / Set 5 Hz Nav / Enable 5Hz Nav** to enable the 5 Hz Nav mode. A warning appears.
2. Click **Yes** to confirm that you want to proceed.



The output, seen in the **Debug View,** speeds up 5x the normal rate.

7.5.2.2. Disable 5 Hz Nav

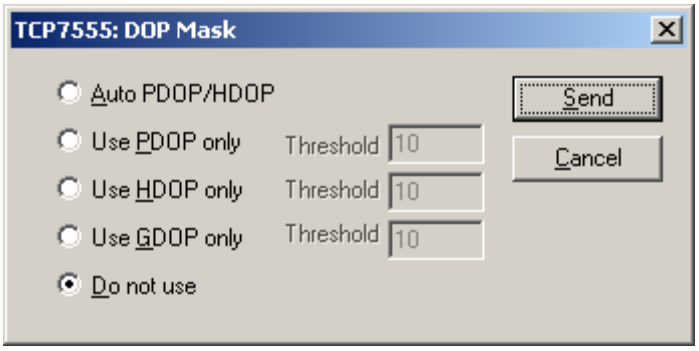
1. Select **Receiver / Navigation / Set 5 Hz Nav / Disable 5Hz Nav** to disable the 5 Hz Nav mode and set the Nav output to the default 1 Hz rate. A warning appears.



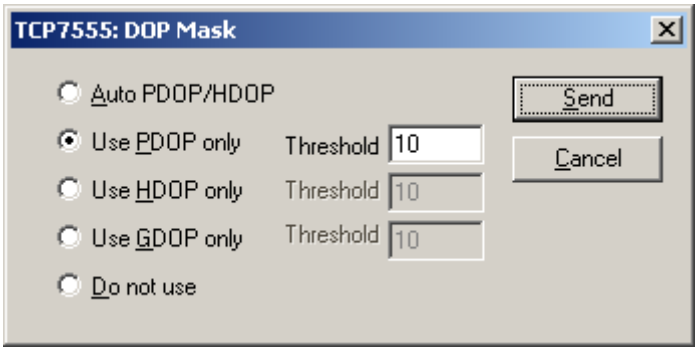
Any messages that may still be in the buffer need to be output to the **Debug View** before the 1 Hz rate can take effect. The **Debug View** then outputs at the normal rate again.

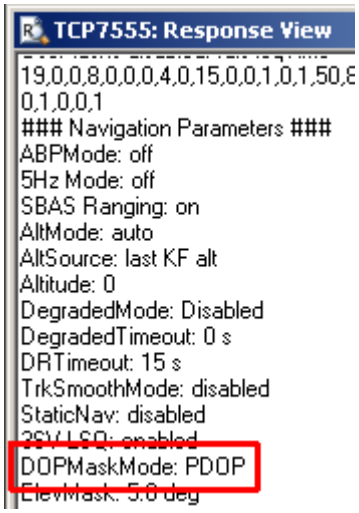
7.5.3. DOP Mask

- Select **Receiver / Navigation / DOP Mask...** to restrict use of solutions when the DOP is too high.



When the DOP mask is enabled, solutions with a DOP higher than the set limit are marked invalid. The default setting is **Do not use**. You can see the state the Rx is in using Poll Nav Parameters, see section 7.4.3, and viewing the results in the **Response View** window.

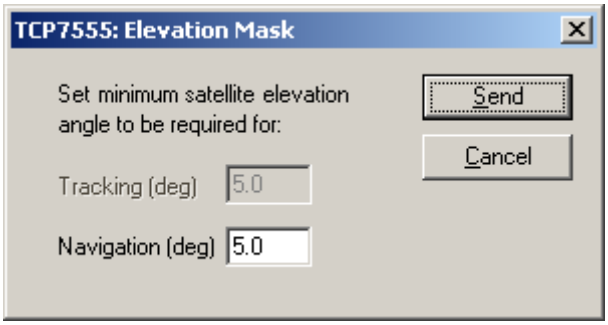




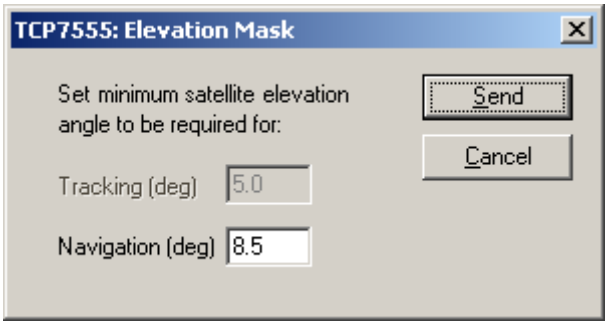
7.5.4. Elevation Mask

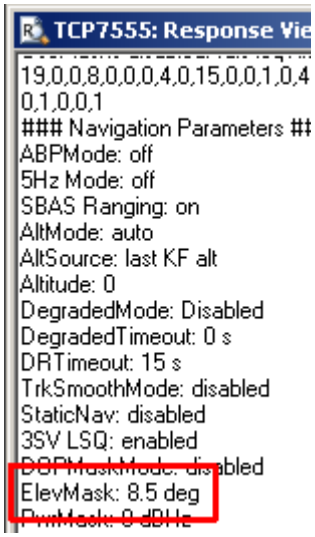
Elevation mask is an angle above the horizon. Unless a satellite's elevation is greater than the mask, it is not used in the solutions. The default value is 5 degrees.

- Select **Receiver / Navigation / Elevation Mask...** to permit the receiver to avoid using the low-elevation-angle satellites most likely to have multipath problems.



The tracking mask is not implemented at this time. You can see the state the Rx is in using Poll Nav Parameters, see section 7.4.3, and viewing the results in the **Response View** window.





7.5.5. Mode Mask

- Select **Receiver / Navigation / Mode Mask...** to select ABP (GSD4e only) or Enable Track Smoothing.

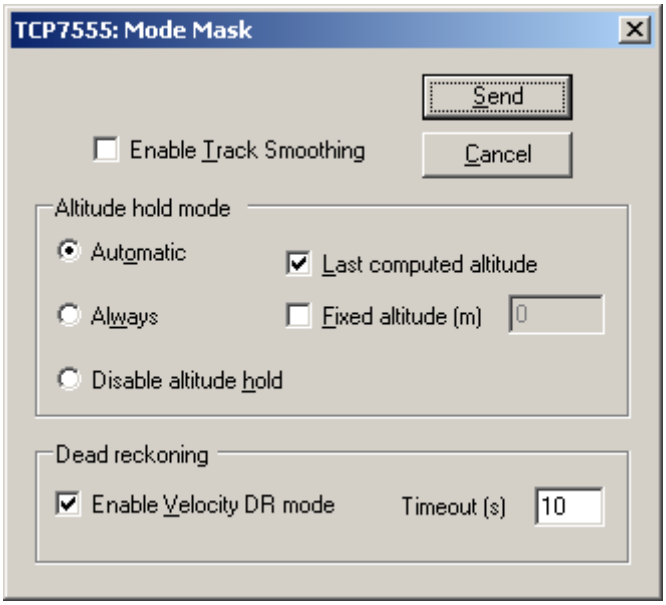


Figure 7.31: Mode Mask

Check and send the command to enable it.

Altitude hold mode	**Automatic**, **Always** or **Disable altitude hold** with either the last computed altitude or a fixed altitude implemented.
Dead reckoning	Enabled or disabled, with a timeout limit range of 1 to 120 seconds.

You can see the state the Rx is in using Poll Nav Parameters, see section 7.4.3, and viewing the results in the **Response View** window.

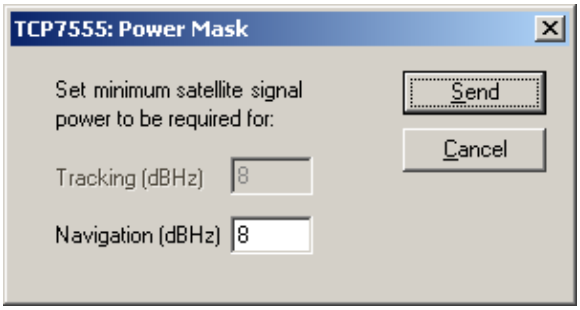
7.5.6. Power Mask

The power mask is a limit on which satellites are used in navigation solutions. Satellites with signals lower than the mask are not used. The default value is 8 dBHz.

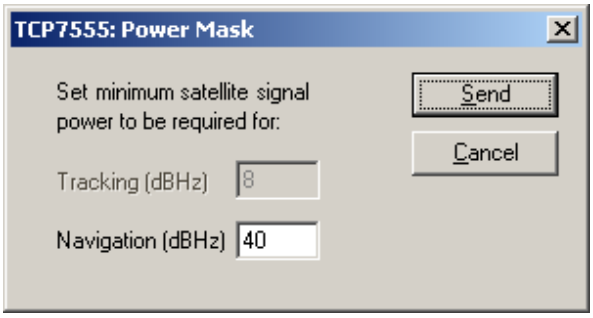
Note:

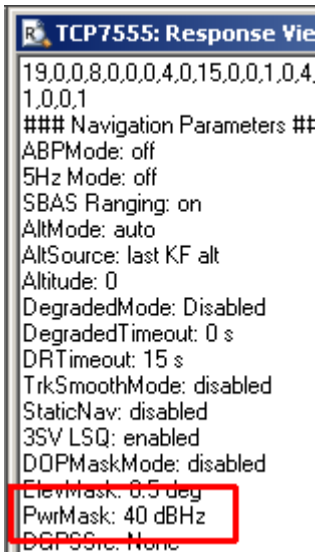
The tracking mask is not currently implemented.

- Select **Receiver / Navigation / Power Mask...** to set Navigation.

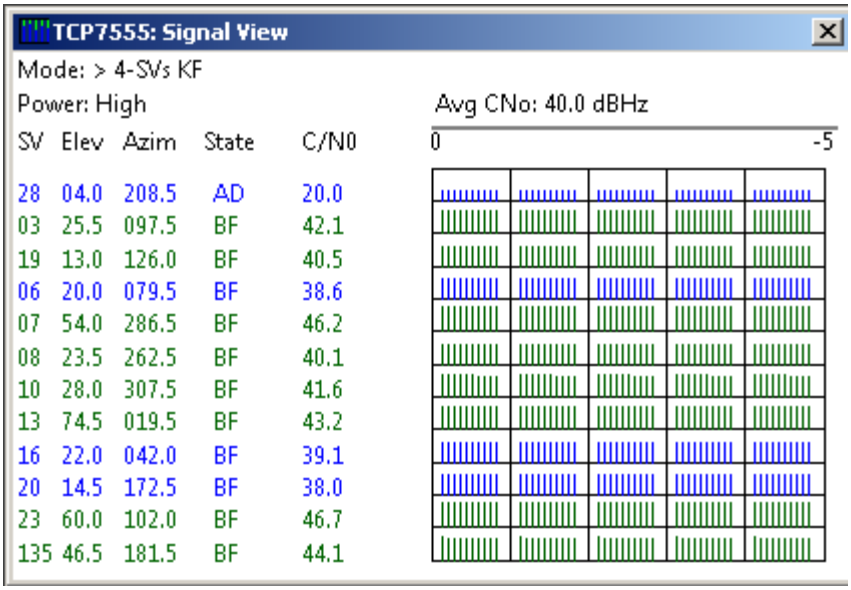


You can see the state the Rx is in using Poll Nav Parameters, see section 7.4.3, and viewing the results in the **Response View** window.





All SVs below 40 dBHz are not used in the solution:



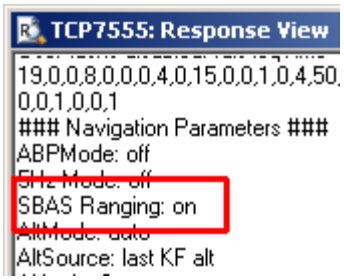
7.5.7. SBAS Ranging

- Select **Receiver / Navigation / SBAS Ranging** to enable you to use the SBAS PRN in the solution. It is mutually exclusive of DGPS settings.

7.5.7.1. Enable SBAS Ranging

1. Select **Receiver / Navigation / SBAS Ranging / Enable SBAS Ranging** to enable.

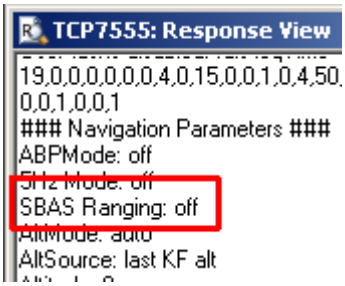
You can see the mode in the **Response View** whenever you select the Poll Nav Parameters command under **Receiver / Commands**.



7.5.7.2. Disable SBAS Ranging

1. Select **Receiver / Navigation / SBAS Ranging / Disable SBAS Ranging** to disable.

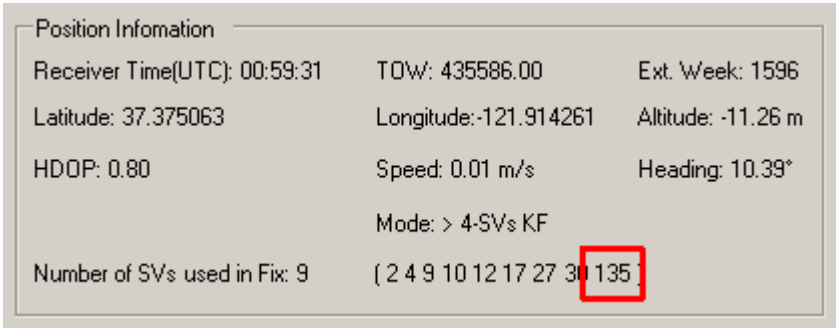
You can see the mode in the **Response View** whenever you select the Poll Nav Parameters command under **Receiver / Commands**.

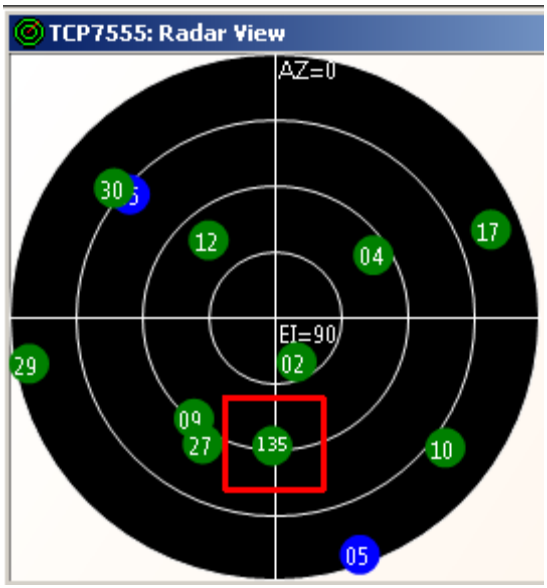


The **Radar View** shows that the DGPS SV is Green, as used in the solution, not Sky Blue (which shows when DGPS is enabled and SBAS Ranging is disabled).

The **Location View** also shows the differences when SBAS Ranging and/or DGPS is enabled:

- SBAS Ranging enabled – DGPS disabled: The DGPS PRN is used in the solution. Mode is 4 SVs KF (Kalman Filter). DGPS SV is Green in the **Radar View**.



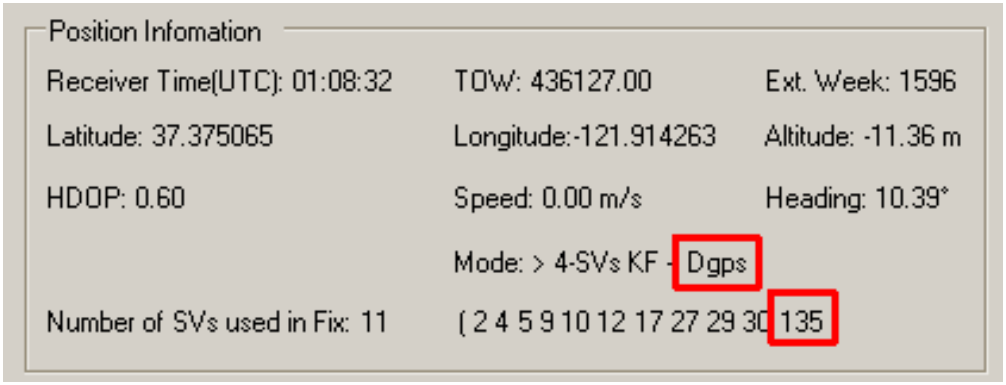


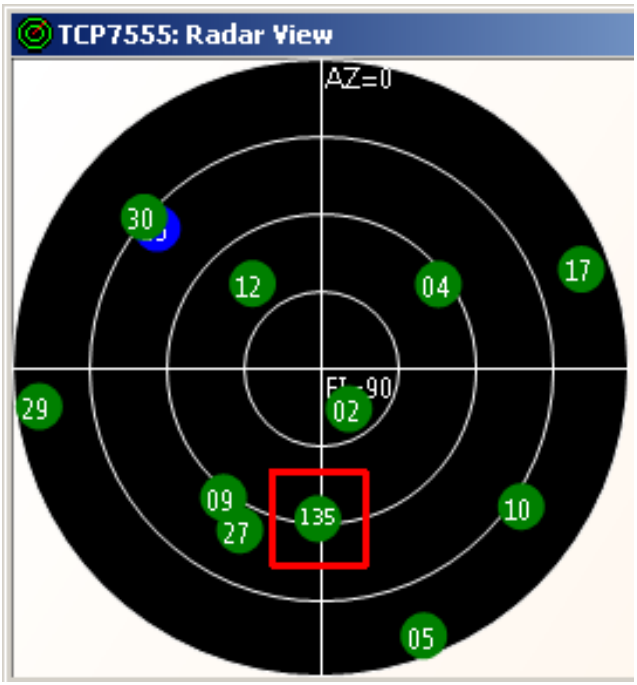
- SBAS Ranging disabled – DGPS disabled: no DGPS PRN visible or used in solution.

Position Infomation

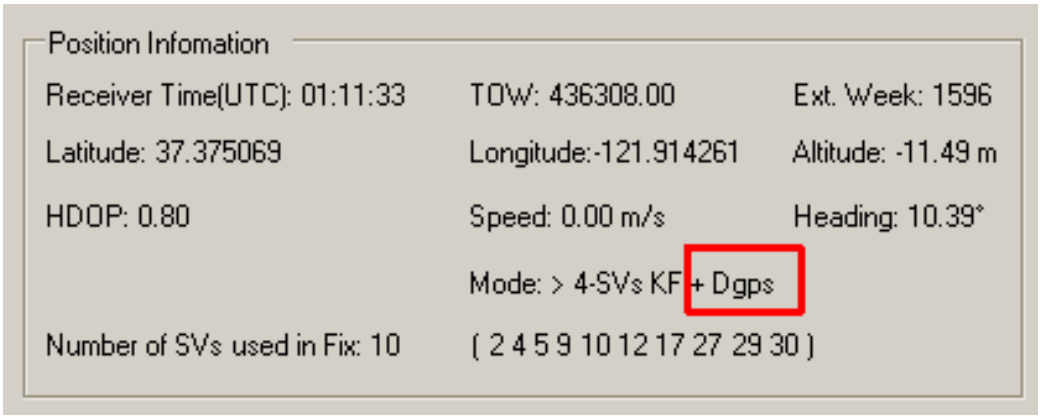
Receiver Time(UTC): 01:02:39	TOW: 435774.00	Ext. Week: 1596
Latitude: 37.375063	Longitude:-121.914263	Altitude: -11.24 m
HDOP: 0.80	Speed: 0.00 m/s	Heading: 10.39°
	Mode: > 4-SVs KF	
Number of SVs used in Fix: 9	(2 4 9 10 12 17 27 29 30)	

- SBAS Ranging enabled – DGPS enabled: DGPS used in solution; Mode includes DGPS; DGPS SV is Green in the **Radar View**.





- SBAS Ranging disabled – DGPS enabled: DGPS set in the Mode; DGPS SV is Sky Blue in the **Radar View**.



7.6. Plot Data

There are multiple plot views available to display current data.

7.6.1. Nav Accuracy vs Time

- Select **Receiver / Plot Data / Nav Accuracy vs Time** to display the navigation accuracy versus time view.

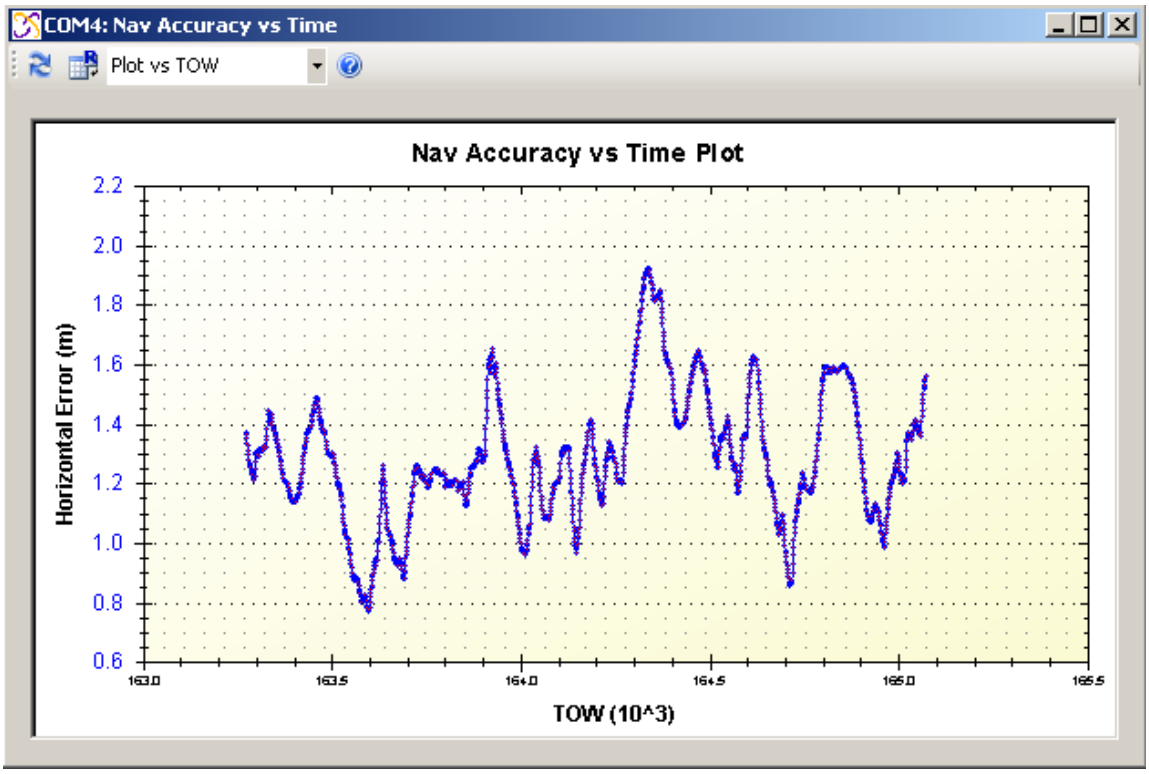
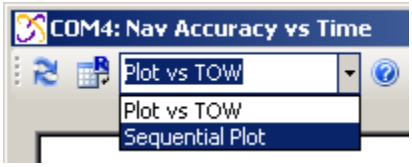


Figure 7.32: Nav Accuracy vs Time Plot

- Click the **Refresh** button  to update any new data for the plot.
- Click the **Set Reference Location** button  to change the position used as the reference location. See section 5.12.4.7 for more information.
- Click the drop-down menu to show the horizontal error in meters versus either TOW or sequentially:



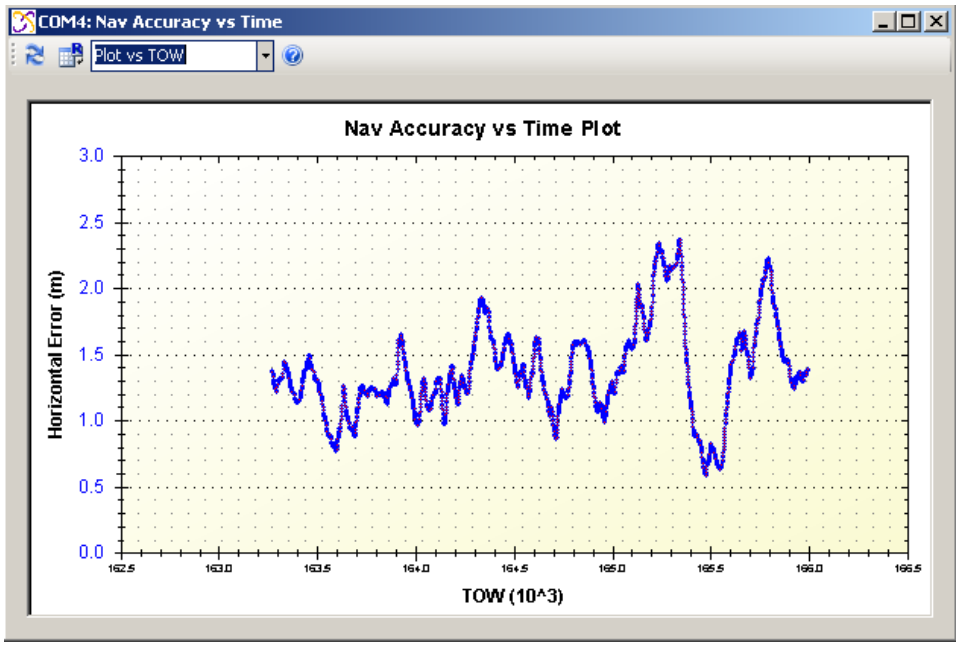


Figure 7.33: Nav Accuracy vs Time Plot, TOW

- Click the **Help** button  to see how to manipulate the graph area.

7.6.2. SV Average CNo

- Select **Receiver / Plot Data / SV Average CNo** to display the **SV Average CNo View**, see Figure 7.34.

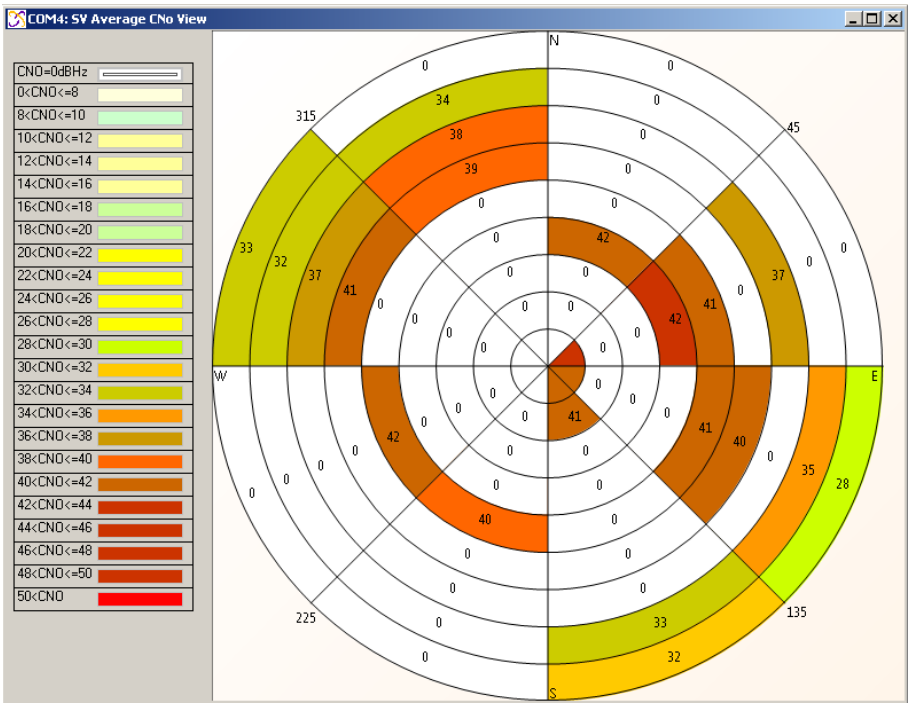


Figure 7.34: SV Average CNo View

7.6.3. SV Tracked vs Time

- Select **Receiver / Plot Data / SV Tracked vs Time** to display the satellite ID tracked over time, see Figure 7.35.

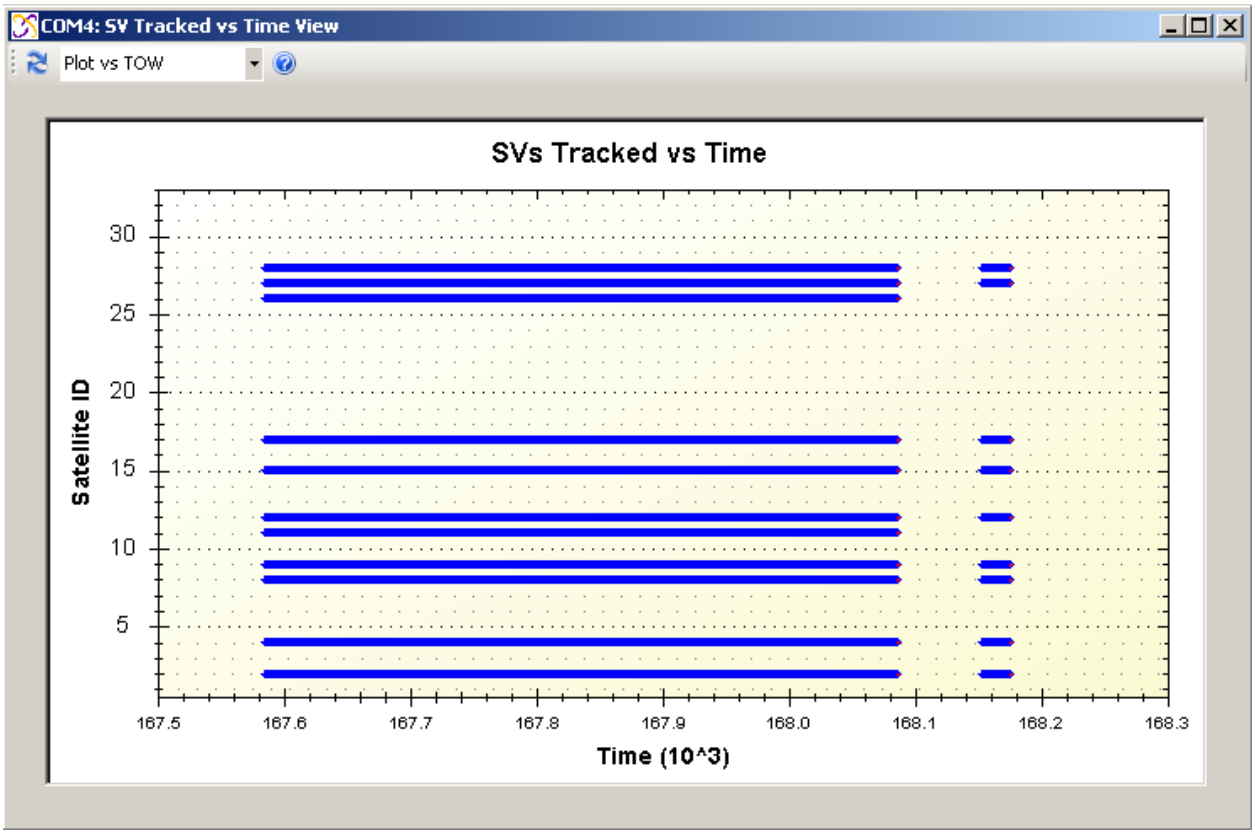


Figure 7.35: Satellite ID Tracked Over Time

- Click the **Refresh** button  to update any new data for the plot.
- Click the drop-down menu to show the satellite ID versus either TOW or sequentially.

- Click the **Help** button  to see how to manipulate the graph area.

7.6.4. SV Trajectory

- Select **Receiver / Plot Data / SV Trajectory** to show the satellite trajectory over time.

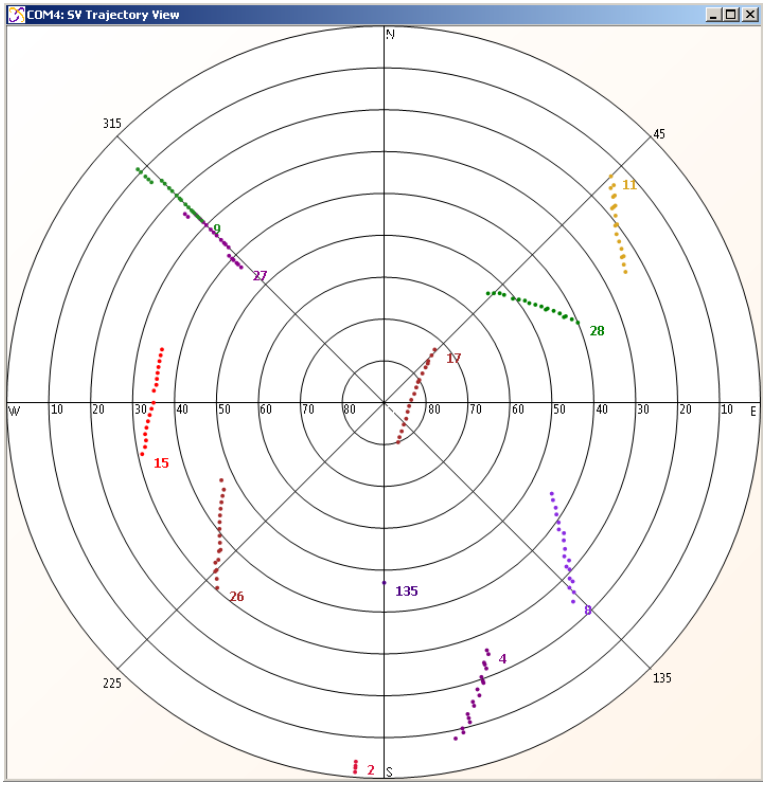


Figure 7.36: SV Trajectory Example

7.7. Set Reference Location

You can change the position used as the reference location.

2. Click the **Set Reference Location** button 
3. See section 5.11.1 for more information.

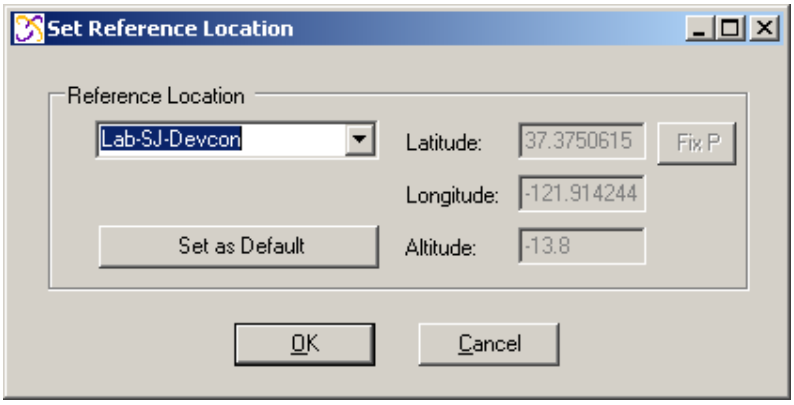


Figure 7.37: Set Reference Location Dialog

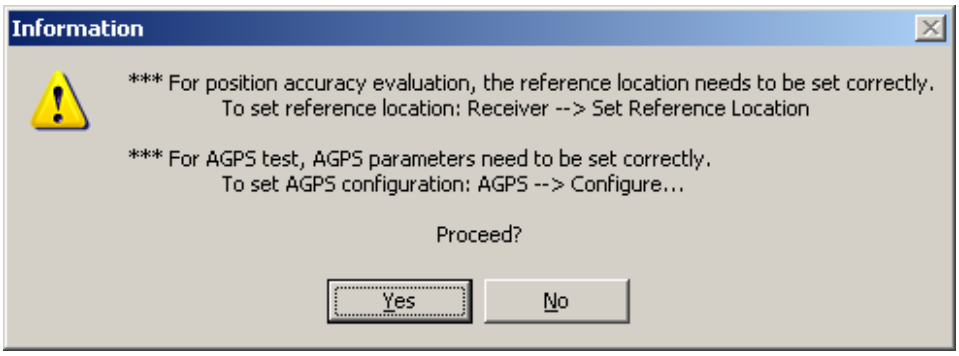
7.8. Automation Test

- Select **Receiver / Automation Test** to run tests automatically.

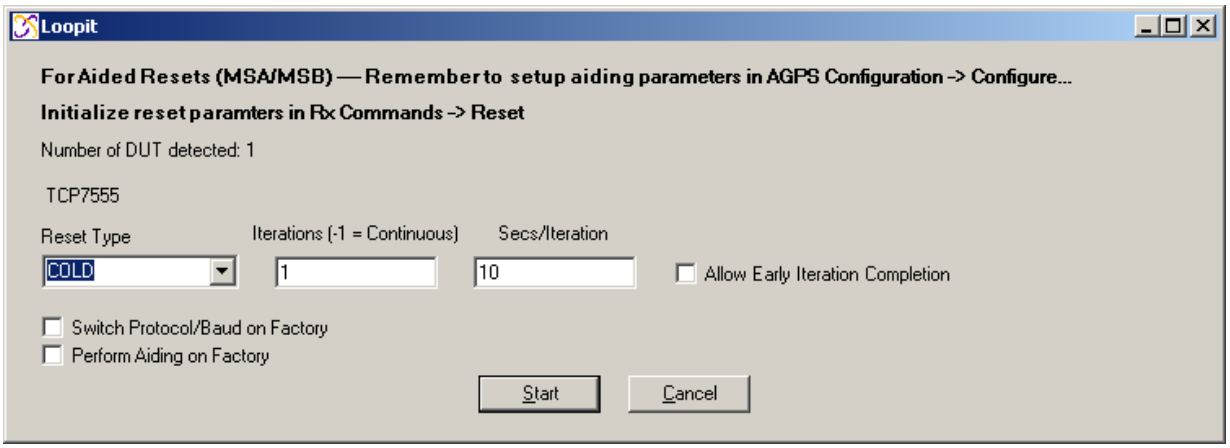
7.8.1. Loopit

You can specify the number of resets to be sent.

1. Select **Receiver / Automation Test / Loopit...** to run predefined resets:



2. Click **Yes** to open the **Loopit** window:

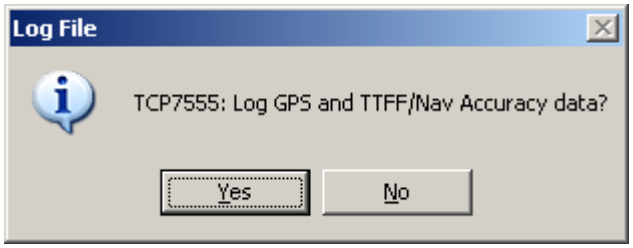


3. Configure the settings.

Reset Type	**COLD**	Clears all data currently stored in the internal memory of the GPS receiver including position, almanac, ephemeris, and time. However, stored clock drift is retained.
	HOT	The GPS receiver restarts by using the values stored in the internal memory of the GPS receiver; validated ephemeris and almanac.
	WARM_INIT	Clears all initialization data in the GPS receiver and subsequently reloads the data currently displayed in the Receiver Initialization Setup screen. The almanac is retained but the ephemeris is cleared.
	WARM_NO_INIT	Same functionality as **Hot** start except that it clears the ephemeris data and retains all other data.

	FACTORY	Clears all data including position, almanac, ephemeris, time, as well as the stored clock drift. All GPS receiver parameters are also set back to the factory defaults.
Iterations		Number of resets to be performed. `-1` runs resets continuously until manually stopped.
Secs/Iteration		Number of seconds between each software commanded reset.
Allow Early Iteration Completion		Enables the next reset to be sent immediately after the previous reset navigates. I.e. if Secs/Iteration is set to 60 seconds but it only takes 28 seconds for the Rx to navigate, then the next reset does not wait the full sixty seconds but is performed after 28 seconds.
SwitchProtocol/Baud on Factory		(GSD4e) Automatically switches the protocol and baud rate to OSP if it is in OSP before the reset. If the Rx is in NMEA mode, then it stays in NMEA mode after the reset.
Perform Aiding on Factory		Sends aiding parameters to the Rx after a factory reset to expedite the reset.

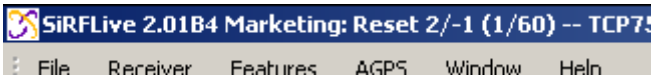
4. Click **Start** button for Loopit. A window appears asking if you would like to log the data.



5. Click **Yes** to start logging the Loopit test. The log file path is shown in the main **COM** window.

The display shows which reset the test is on (1 of 10) and how much time into the session (11 of 60 seconds).

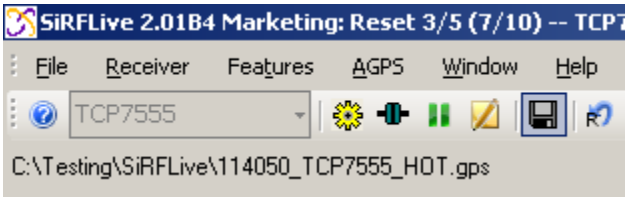
6. Track the progress of Loopit using the title bar of the COM port selected. For example, if Loopit is run in continuous mode, the title bar looks similar to:



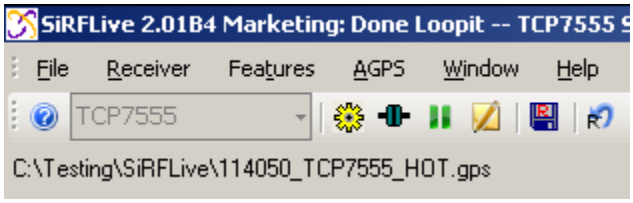
This shows SiRFLive is on the second reset of infinite resets and 1 second into the 60 second reset.

During Loopit, the number of current resets over the number of total resets fills the title bar. In parenthesis is the current number of seconds over the total number of seconds for the reset.

The title bar now shows that Loopit is on the third reset of a total of five, and that it is seven seconds into a ten-second interval.



When Loopit is complete the title bar shows that it is finished:



On subsequent runs of Loopit, if the same reset type is selected, you are prompted with the **Log File** window shown in Figure 7.38. Click **Yes** to log the file.

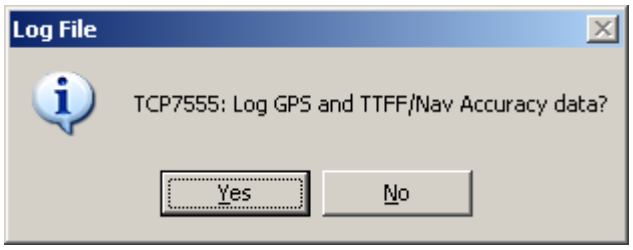


Figure 7.38: Log File Window

For the GPS file a **Log Message** window similar to that shown in Figure 7.39 appears:

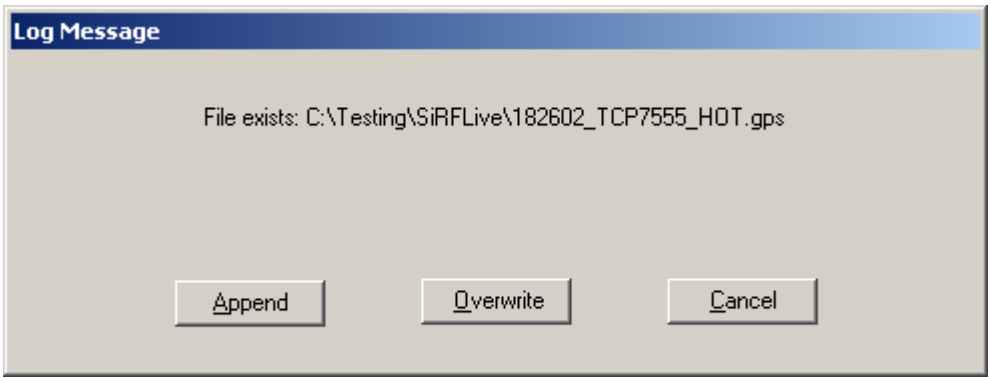


Figure 7.39: GPS Log Message

For the TTFF file a **Log Message** window similar to Figure 7.40 appears:

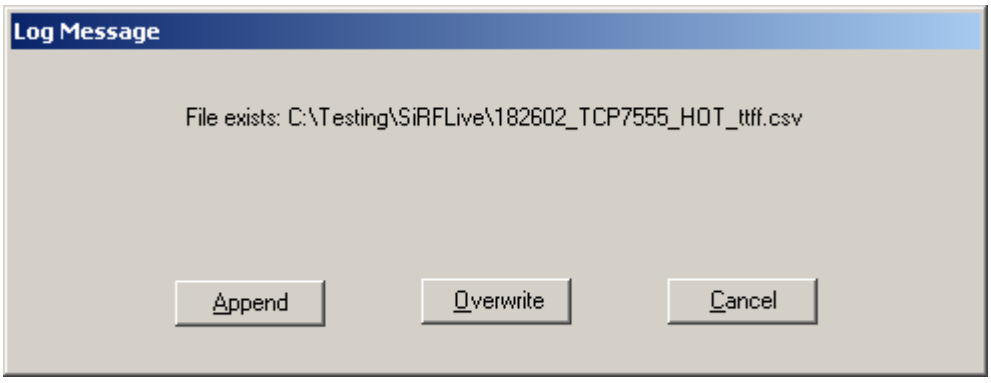
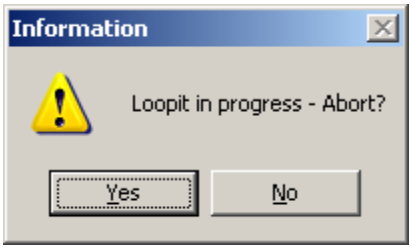


Figure 7.40: TTFF Log Message

- Click **Append** to append the log file
- Click **Overwrite** to write over the existing log file
- Click **Cancel** to exit the request and select a new filename for the log

You can also select the path and filename as long as they are valid, otherwise an error message appears.

7. Select **Receiver / Automation Test / Stop Loopit...** to terminate Loopit. A warning appears:



8. Click **Yes** to end the Loopit session and any logging associated with Loopit:

7.8.2. Test Cases

- Select **Receiver / Automation Test / Test Cases** to use predefined tests.

7.8.2.1. 3GPP

Note:

If you work with 3GPP test automation, CSR assumes that you have a Spirent STR4500 or GSS6700 simulator with appropriate Spirent software to run the simulator.

Scenarios needed to run the following 3GPP tests are available. They are self-extracting executables that install the scenarios and their associated files to the correct location on the PC that controls the simulator. Contact your CSR representative for more information.

These scenarios are located in the directory:

```
C:\Program Files\Spirent Communications\SimPLEX\Scenarios\3GPP
```

1. Select **Receiver / Automation Test / Test Cases / 3GPP**.
2. When you run the 3GPP test automation for the first time the following window appears:

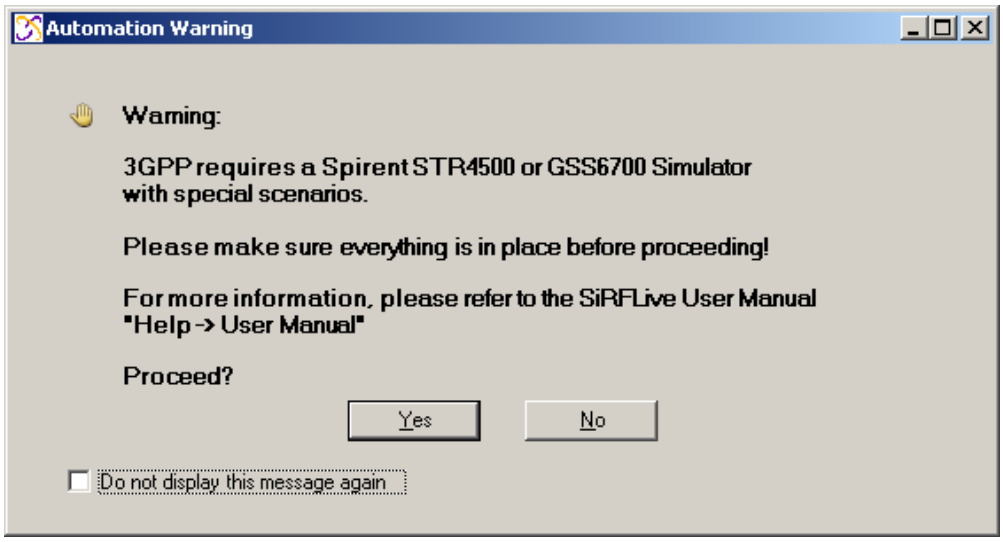


Figure 7.41: 3GPP Warning Window

This is just a warning that the scenarios and simulator need to be in place before attempting to run the 3GPP tests.

3. Select the **Do not display this message again** checkbox to hide this window on subsequent attempts.
4. Click **Yes** to proceed. The following window appears:

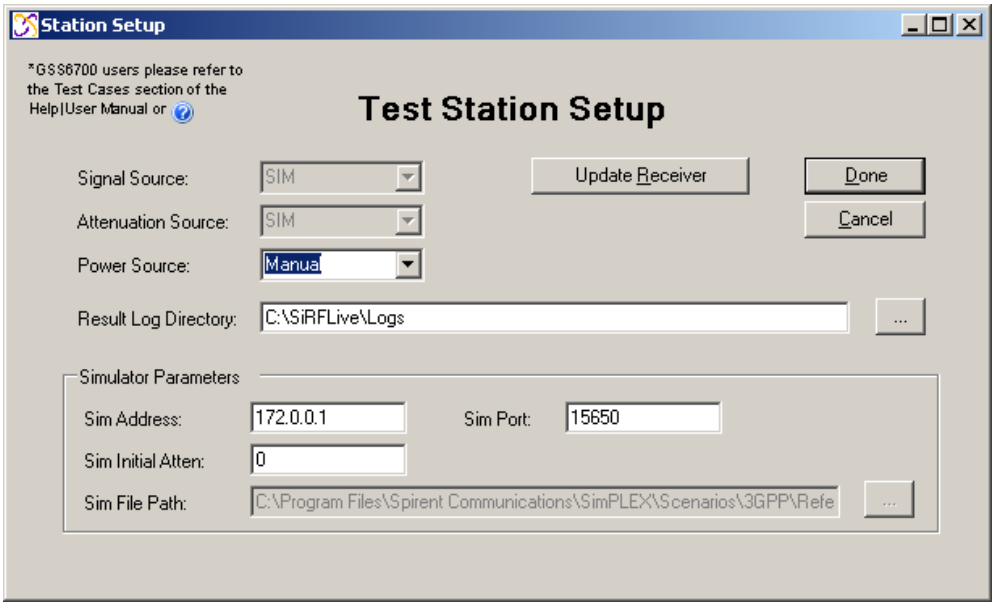


Figure 7.42: Test Station Setup Window

Signal Source	Default (SIM) is used for 3GPP tests and cannot be changed.
Attenuation Source	Default (SIM) is used for 3GPP tests and cannot be changed.
Power Source	Should be left at the default of Manual (a SPAz unit or Testrack system are internal devices).

Result Log Directory	Location of recorded log files. Default is **C:\SiRFLive\Logs**.
Sim Address	The IP address of the machine running the Spirent STR4500/GSS6700 simulator.
Sim Port	Default (15650) is used for the Spirent STR4500/GSS6700.
Sim Initial Atten	Default (0) is used for 3GPP tests.
Sim File Path	Location of simulated scenario to be used for the test. Cannot be changed for 3GPP tests.

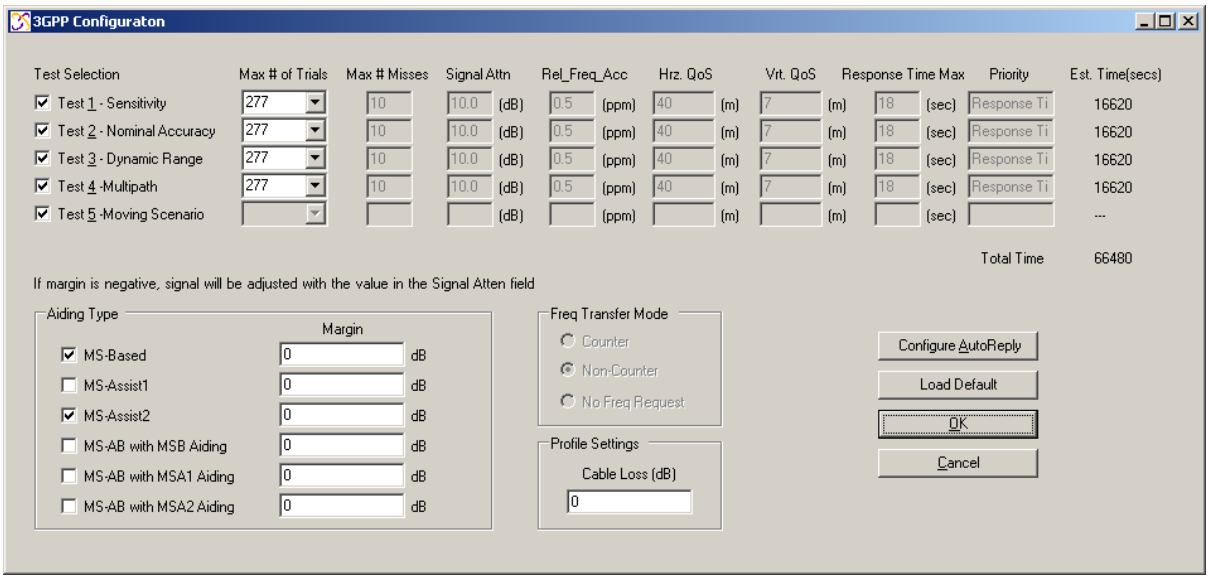
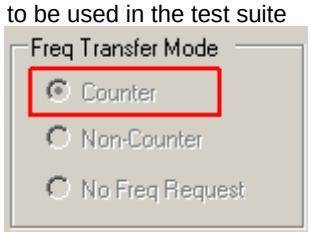


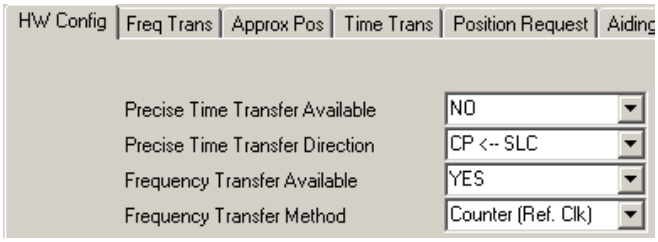
Figure 7.43: 3GPP Configuration Window

Test Selection	Select the tests to be performed. Tests are set up to run in a consecutive manner. I.e. if you select Test 1 and Test 3 for a certain number of cycles, the automation runs Test 1 first, completes the total number of selected cycles, and moves on to running Test 3 and its total number of selected cycles.
Max # of Trials	Number of cycles to be run for the selected test. Number of cycles selectable per test is defined in compliance with TS 34.171 Annex F: General Test Conditions and Declarations in section F6.1.4.1 Numerical Definition of the Pass Fail Limits. Note: The moving scenario is a tracking test and so the entire scenario is run. Only one cycle of this test runs in SiRFLive.
Max # Misses	Number of failed resets that can occur and still pass 3GPP tests based on the number of trials done.
Signal Attn	This is not a requirement in the 3GPP standards. This is a special request to attenuate overall scenario signals to assess how much signal loss is available to the system when the CSR chipset is integrated with the target platform. Because the power level range between the highest and lowest signal satellites for the Dynamic Range test is 18 dB, signal attenuation cannot be automated because of a clipping of 3 dB when the relative signal levels are set. Therefore, any attenuation must be performed manually for the Dynamic Range test. Note: If there is a value in the **Signal Attn** field and the **Cable Loss in the Profile Settings** text box is blank, then the **Signal Attn** value is used. If there is any value in the **Cable Loss** field ≥ 0 then the **Signal Attn** value is ignored.

Rel_Freq_Acc	Relative Frequency Accuracy: the frequency uncertainty in ppm that is set. Default is set to the 3GPP standard of 0.5 ppm.	
Hrz QoS	The horizontal Quality of Service errors are set and default to 3GPP standards for each of the prescribed tests.	
Vrt QoS	The vertical Quality of Service errors are set and default to 3GPP standards for each of the prescribed tests.	
Response Time Max	The maximum time to wait for a response: settings are No Limit (0) and 1 to 255 seconds.	
Priority	Determines what takes priority when figuring the position: the Response Time, Position Error, or No Priority (default).	
Est. Time	Estimated time: Dependent on selection of total number of cycles to be performed, SiRFLive calculates an estimated total time to assist in anticipation of the timeframe to complete the tests.	
Aiding Type	MS-Based	Includes Time, Position, Frequency, and Ephemeris
	MS-Assist1	Includes Time, Position, Frequency, and Acquisition Assistance
	MS-Assist2	Includes Time, Position, and Frequency
	MS-AB with MSB Aiding	Includes the position and measurement response messages as well as MS-Based aiding
	MS-AB with MSA1 Aiding	Includes the position and measurement response messages as well as MS-Assist1 aiding
	MS-AB with MSA2 Aiding	Includes the position and measurement response messages as well as MS-Assist2 aiding
Margin (dBHz)	Amount of signal that you want to change from the standard level. This attenuates the simulated signal through the use of the User Actions File (UAF) in Spirent's SimPLEX software. The value is in the range 9.9 to -9.9 in .1 dBHz increments. You can enter multiple margin values and the tests run back-to-back. So if you enter 3, 4, and 5 in the **MSBased Margin** field and 2 in the **MSAssist2 Margin** field, and Test1 and Test2 are selected as the tests to run, then both tests run with a 3 dBHz margin, and then both tests run with a 4 dBHz margin, and then both again with a 5 dBHz margin in MSBased mode before starting the MSAssist2 tests at 2 dBHz.	
Freq Transfer Mode	Determines if Frequency Transfer is to be used in the test suite	



Counter Counter method is selected when the AutoReply settings are configured as follows:



- **HW Config** settings as in Figure 7.44.

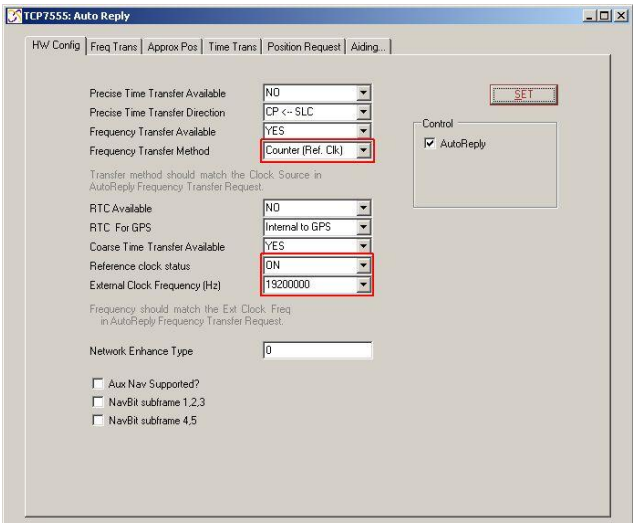


Figure 7.44: Counter: HW Config

- **Frequency Transfer** set as in Figure 7.45.

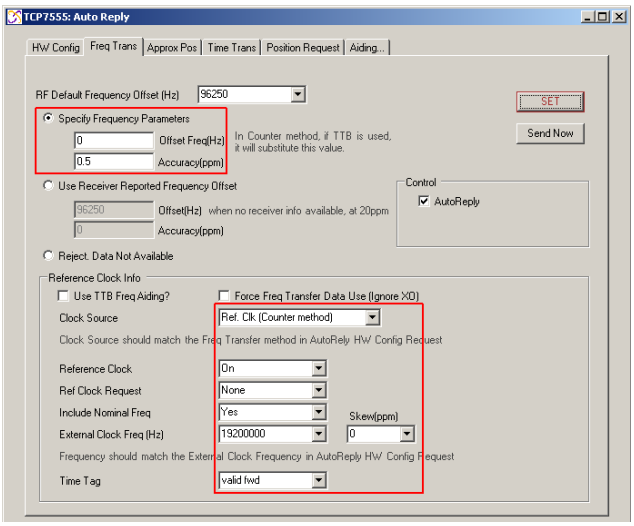
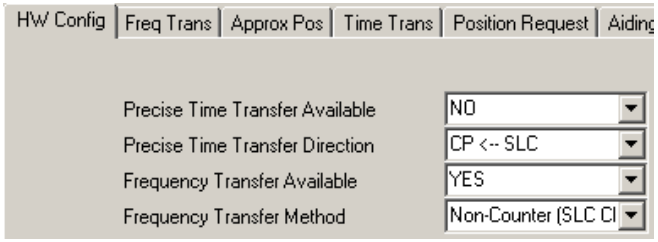


Figure 7.45: Counter: Frequency Transfer Settings

Non-Counter Counter method is selected when the AutoReply settings are configured as follows:



- **HW Config** settings as in Figure 7.46.

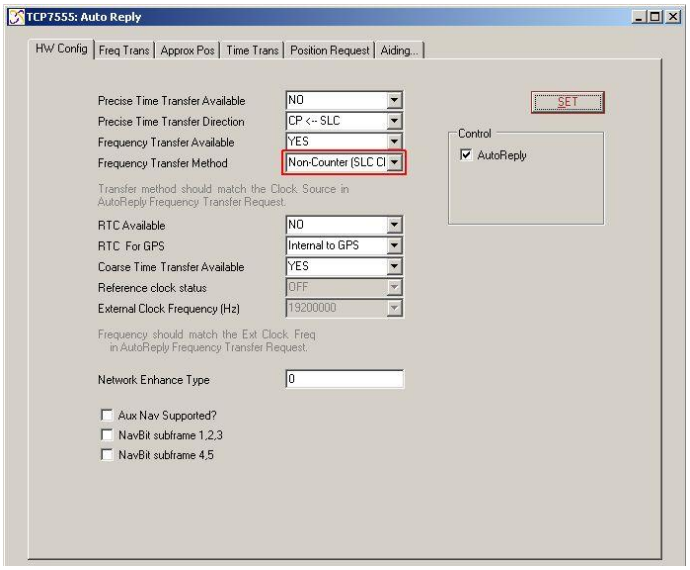


Figure 7.46: Non-Counter: HW Config Settings

- **Frequency Transfer** set as in Figure 7.47.

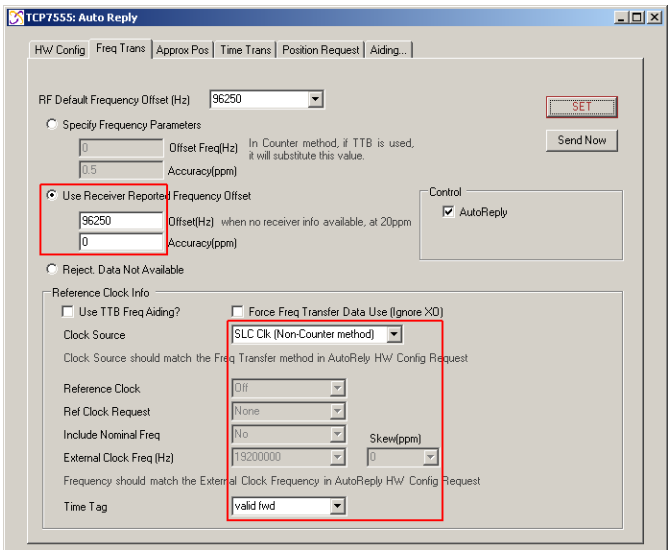
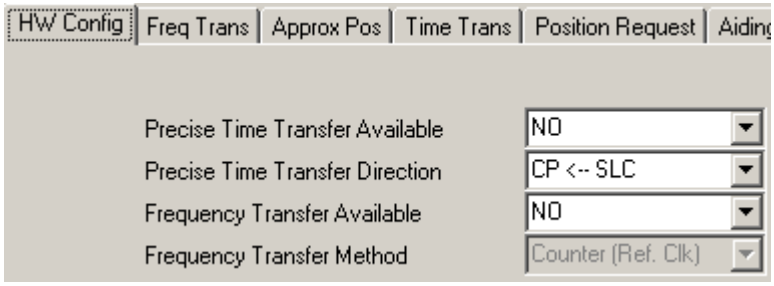


Figure 7.47: Non-Counter: Frequency Transfer Settings

No Freq Request Counter method is selected when the AutoReply settings are configured as follows:



Profile Settings

Cable Loss (dB): This is the amount of cable loss that was calculated during calibration. This is included to take the trouble of determining the cable loss and then subtracting from the total attenuation and configure any manual attenuation by modifying the scenario power level automatically (i.e. if a 5 dBHz margin was entered for the Margin and the Cable Loss entered was 2.3 dBHz, then the scenario's UAF is attenuated 2.7 dBHz [5 - 2.3 = 2.7]).
Note: If there is a value in the **Signal Attn** field and the **Cable Loss in the Profile Settings** is blank, then the **Signal Attn** value is used. If there is any value in the **Cable Loss** field ≥ 0 then the **Signal Attn** value is ignored.

Configure AutoReply

The **Configure AutoReply** button enables you to select specific settings available for 3GPP tests only. It opens a new **AutoReply** tabbed window:

Enter your intended values. Click the **SET** button to set parameters on each tabbed window. If you select the **AutoReply** checkbox the **SET** button turns red to confirm that the values were set and saved.

The following default settings are based on an MS-Based 3GPP test using the Non-Counter method. You should not need to set them as they should run from the predefined configuration file. They are shown for information purposes only.

- **HW Config** settings

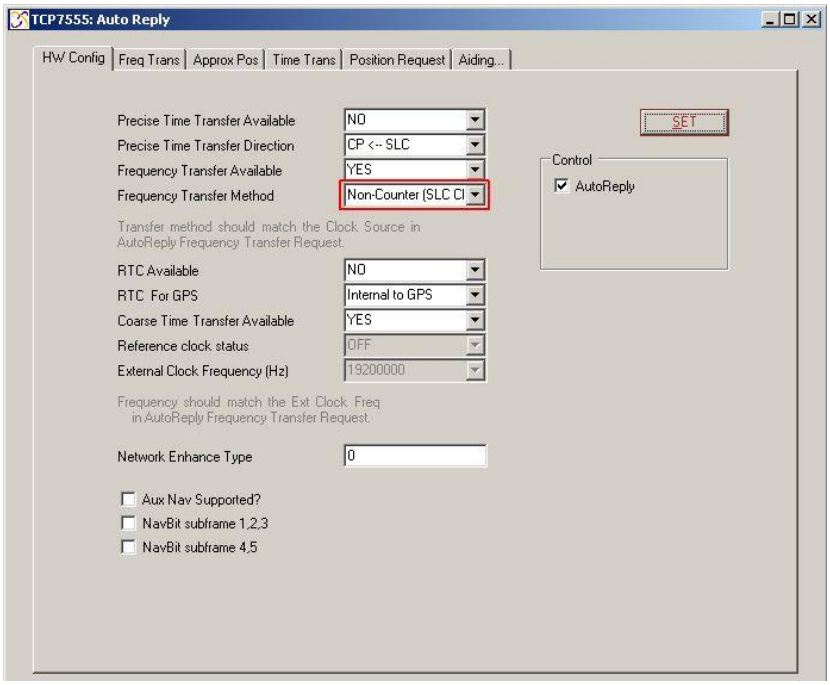


Figure 7.48: No Freq Request: HW Config Settings

- **Freq Trans** settings

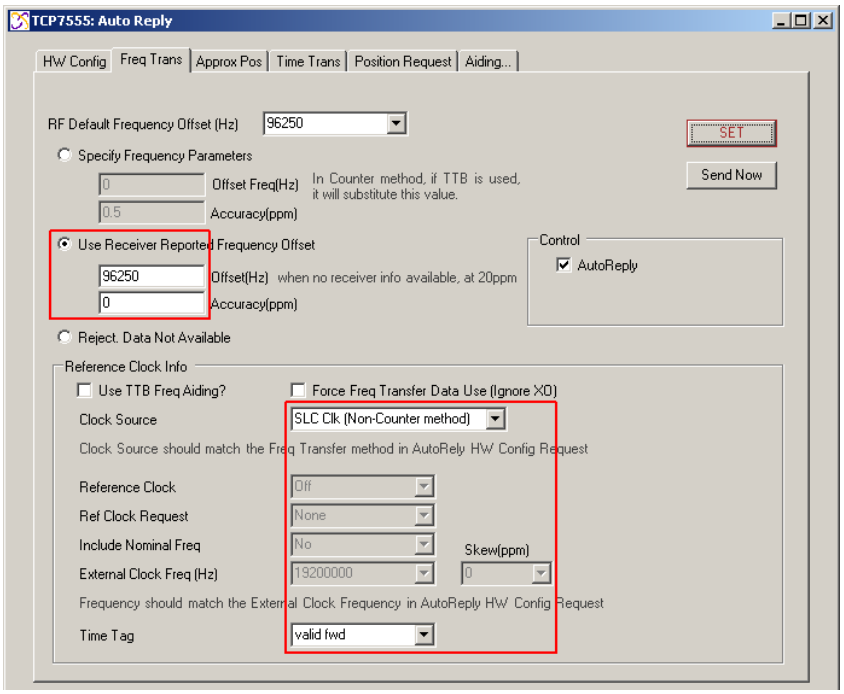


Figure 7.49: No Freq Request: Freq Trans Settings

- **Approx Pos** settings

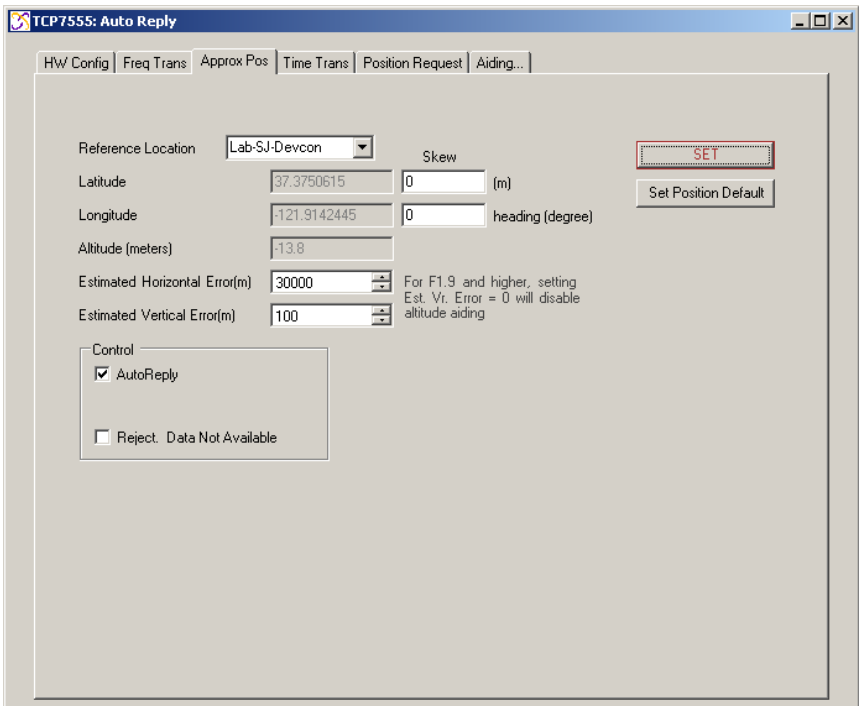


Figure 7.50: No Freq Request Approx Pos Settings

- **Time Trans** settings

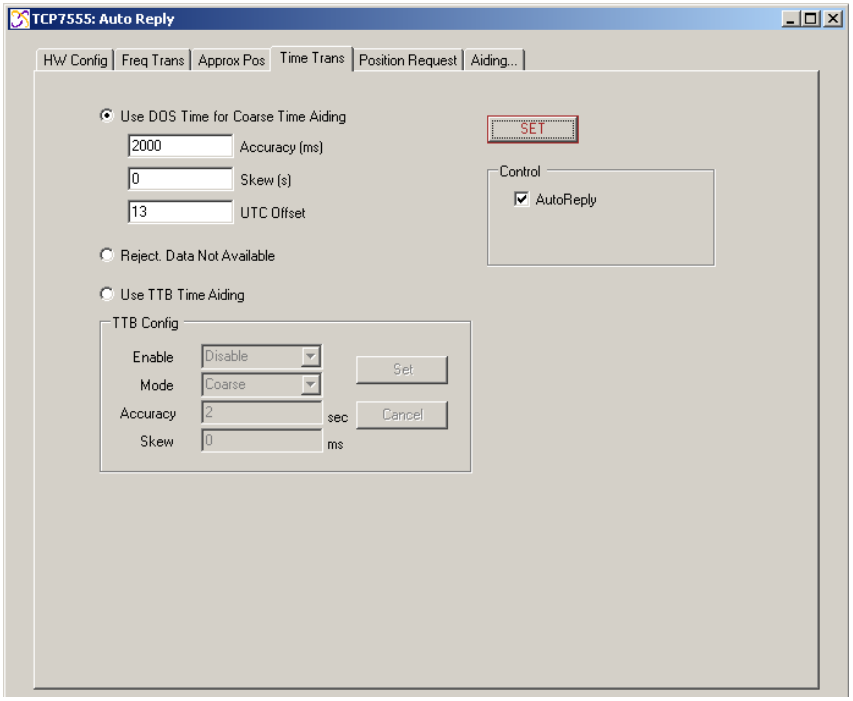


Figure 7.51: No Freq Reqeust Time Trans Settings

- **Position Request** settings

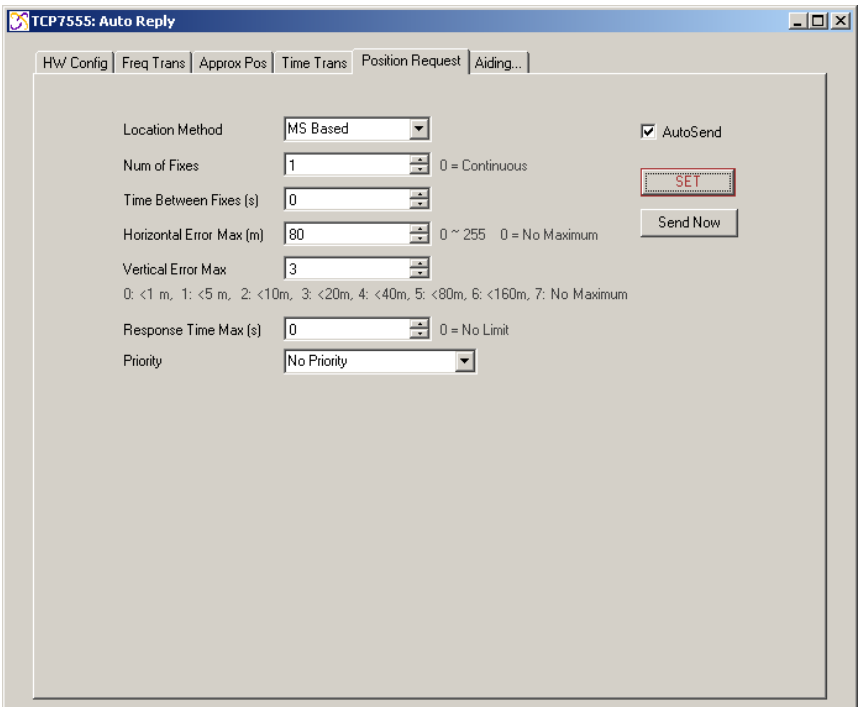


Figure 7.52: No Freq Request: Position Request Settings

- **Aiding...** settings

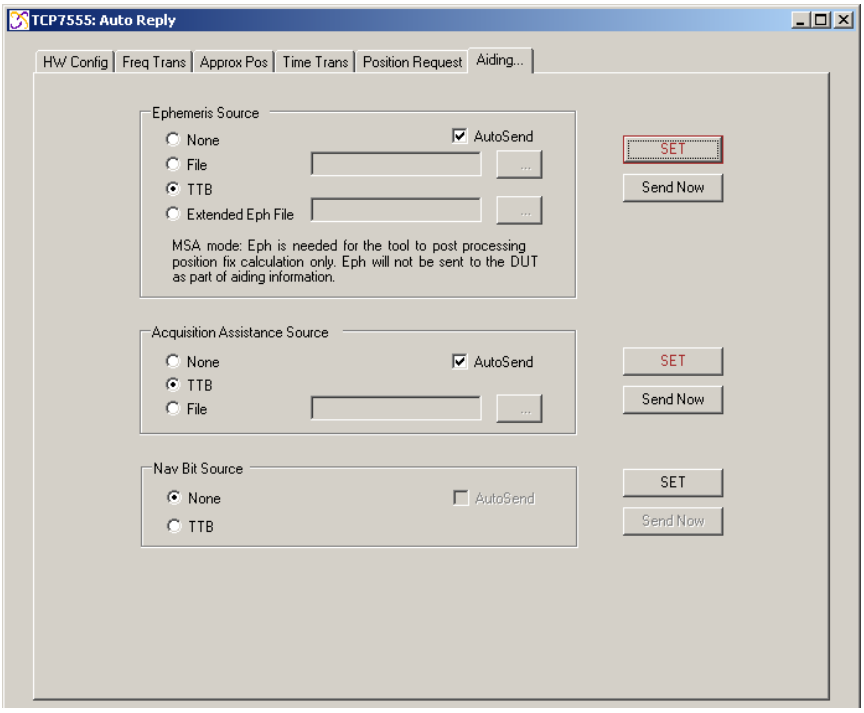


Figure 7.53: No Freq Request: Aiding Settings

Load Default Automatically sets the values for all of the 3GPP tests, selecting all five tests, setting the first four to run up to 277 trials if needed.

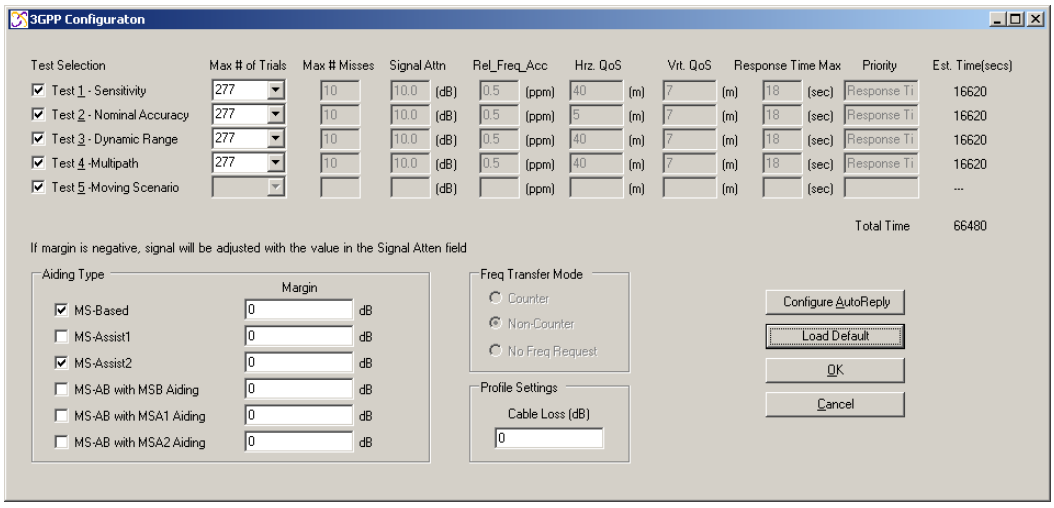


Figure 7.54: Load Default Settings

The Load Default button changes the Hrz QoS for Test 2 from 40 m to 5 m and sets the Cable Loss to 0.2 dB.

You can also select and load the default settings under AutoReply, see Figure 7.55.

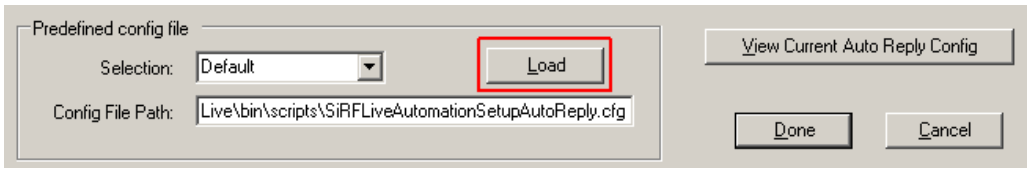


Figure 7.55: Using AutoReply to Load Default Settings

7.8.2.2. Status

This displays the total number of tests to be run, the current test that is being run, and the number of tests that have been completed.

- Select **Receiver / Automation Test / Test Cases / Status** to monitor the status of the automation tests being run.

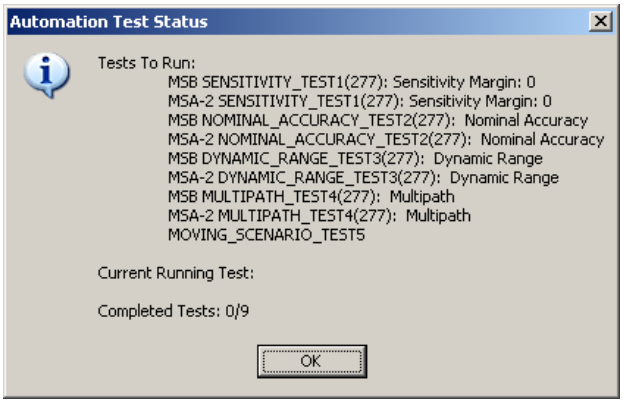
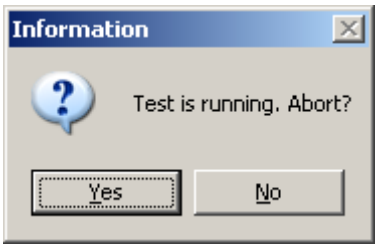


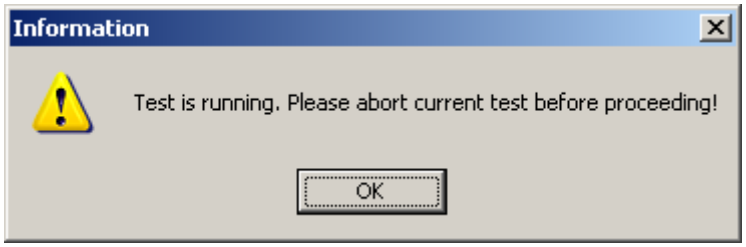
Figure 7.56: Automation Tests Status

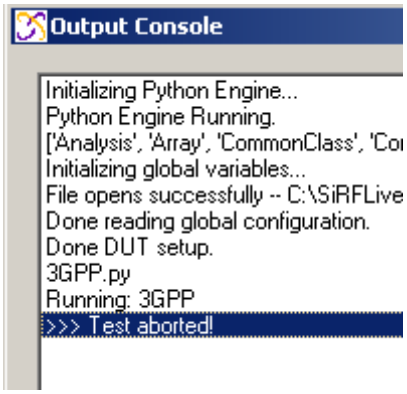
7.8.2.3. Abort

1. Select **Receiver / Automation Test / Test Cases / Abort** to terminate a test early:



2. Click **Yes** to display output in the console window when the Python script that is running gets aborted.





The **Automation Test** "`Test Aborted!`" window appears:

3. Click **OK** to continue.

7.8.3. Console

- Select **Receiver / Automation Test / Console** to open an Iron Python **Output Console** window:

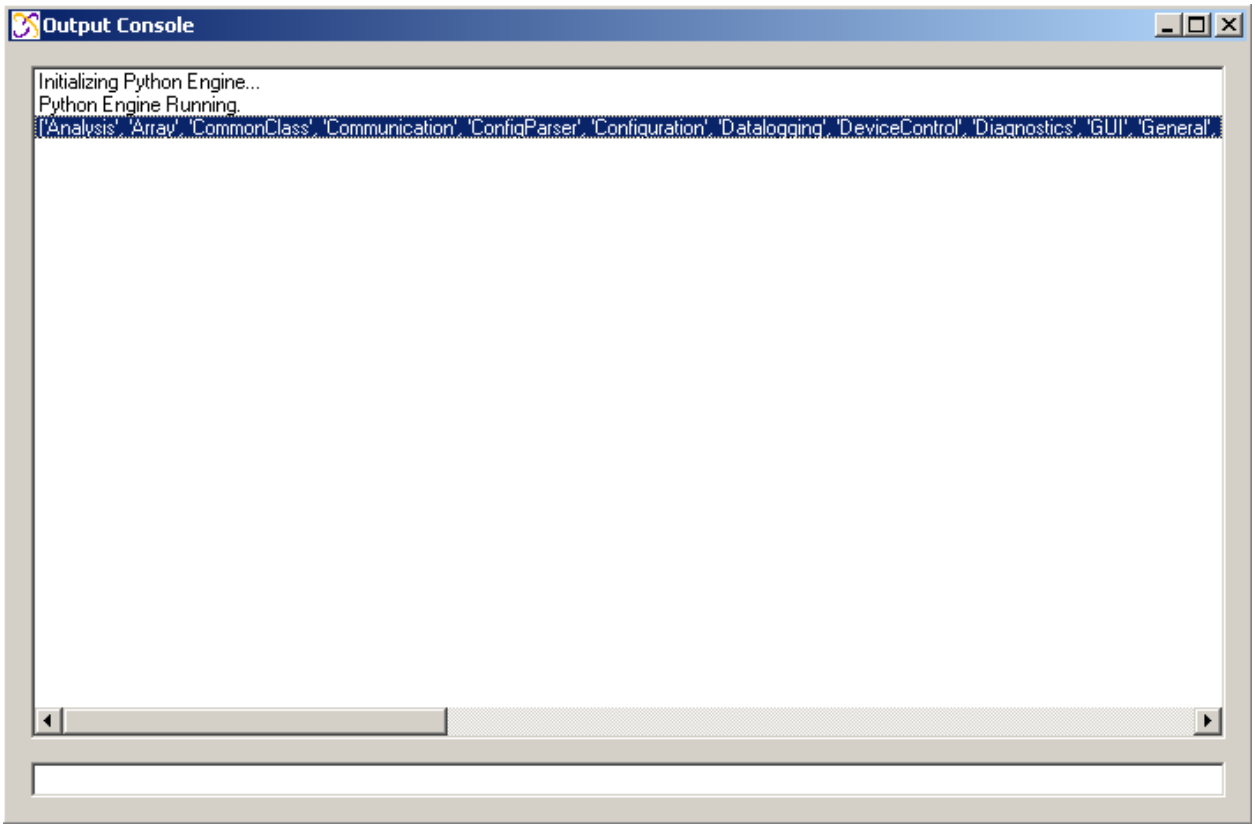


Figure 7.57: Python Console Window

The console enables you to run Python scripts or enter commands directly into the lower edit box.

8. Features Menu

This section lists SiRFLive's main features available from the Features tab 

. They are described elsewhere in this manual.

8.1. CW Detection

- Select **Features / CW Detection...**

See section 7.3.11 for more information.

8.2. Power Mode

- Select **Features / Power Mode...**

See section 7.4.8 for more information.

8.3. MEMS

- Select **Features / MEMS** to open both the **MEMS View** and **Compass View** windows if they are not already opened.

See the sections 7.3.9 and 7.3.10 for more information.

8.4. SiRFaware

SiRFaware seeks to minimize position, time and frequency uncertainty on a best-effort basis, subject to an average power consumption constraint. SiRFaware is particularly targeted to maintaining internal aiding in difficult indoor environments.

- Select **Features / SiRFaware...**

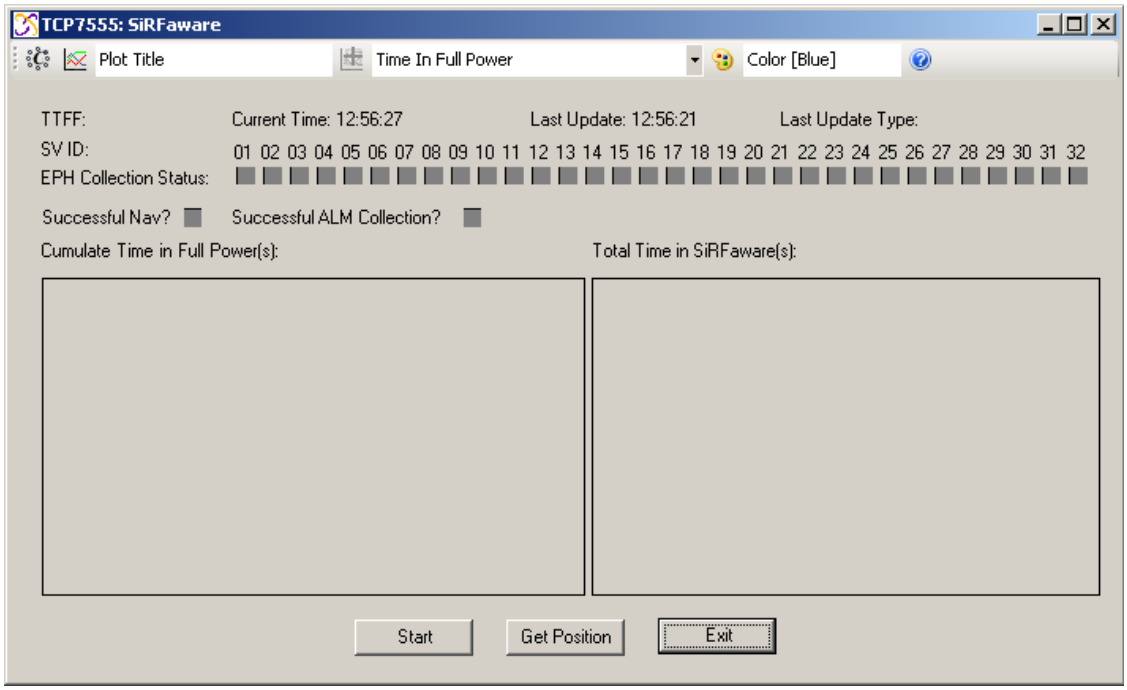


Figure 8.1: SiRFaware Window

8.4.1. Configuration

- Click the **Configuration** button  to open the SiRFaware Configuration window:

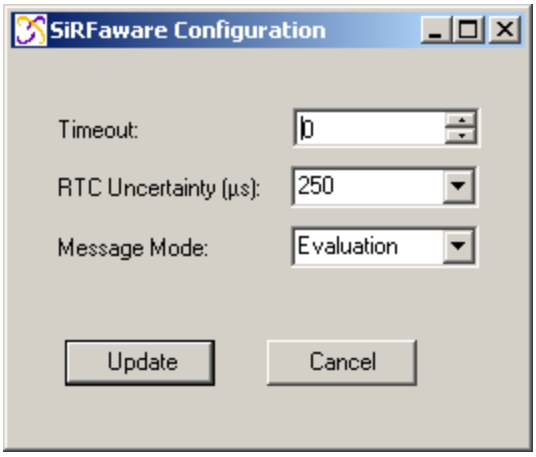


Figure 8.2: SiRFaware Configuration Window

Timeout	Range is from 0 (default) to 255
RTC Uncertainty (µs)	▪ 250 (default) or 125
Message Mode	Production or Evaluation (default)

8.4.2. Plot

- Click the **Plot** button  to display the latest known data from SiRFaware into a graph.

If the **Plot Title** section is left blank then the title is the text in the plot list (e.g. Time in Full Power) with the suffix vs TOW in the color selected in the palette section (Blue) as shown in Figure 8.3.

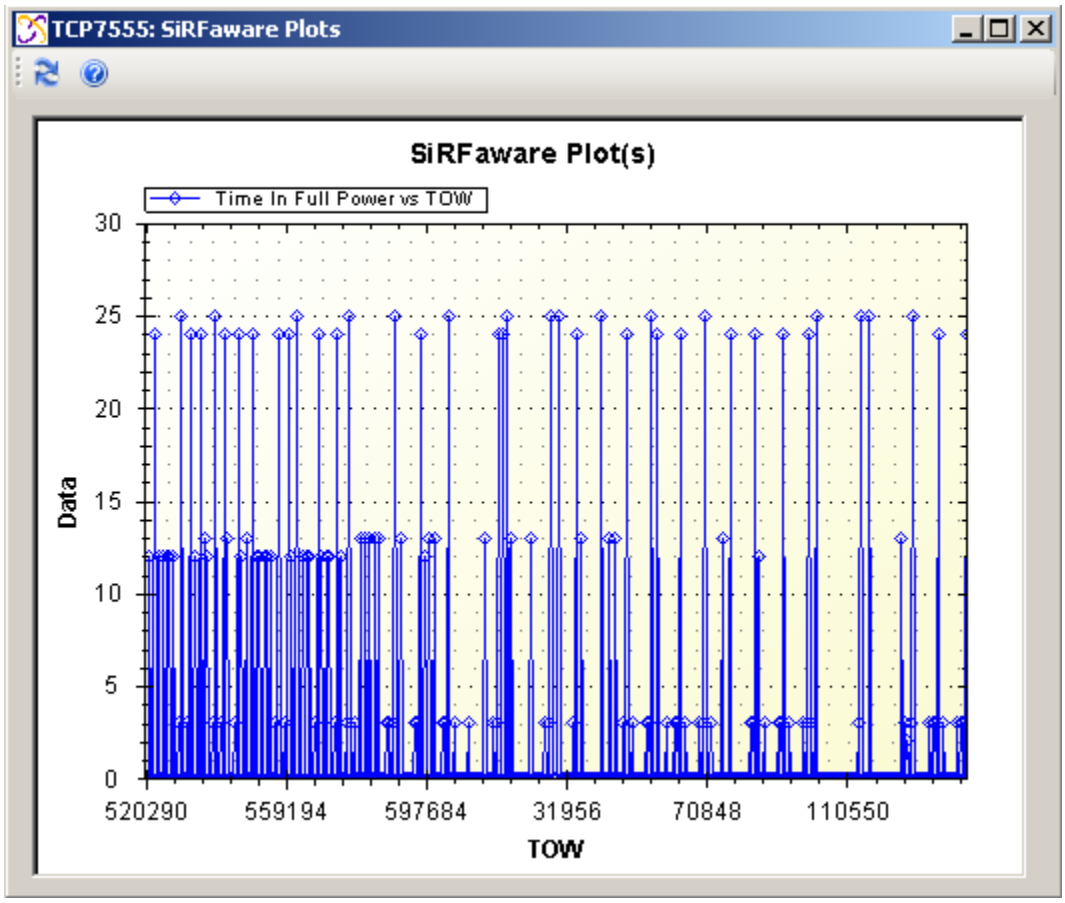
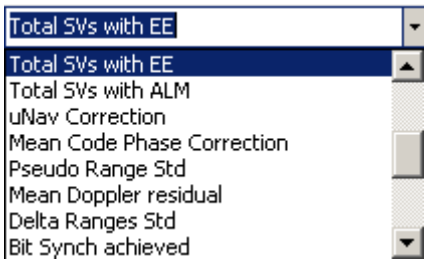


Figure 8.3: SiRFaware Plots

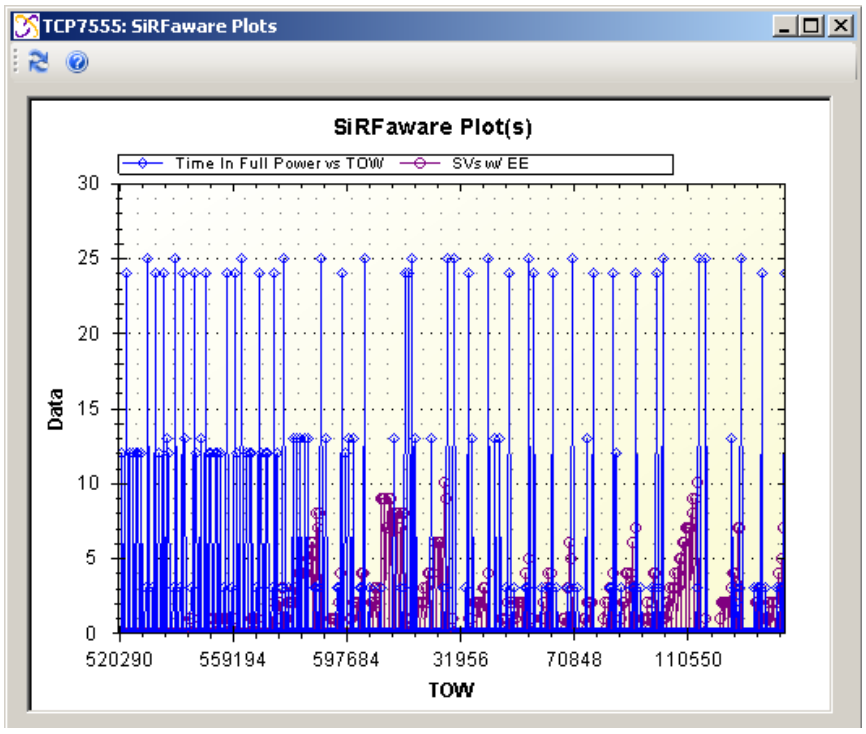
8.4.3. Add Plot

1. To add an overlay into the current plot, select one of the types from the drop-down list:

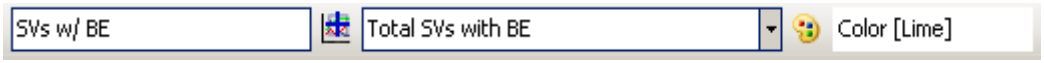


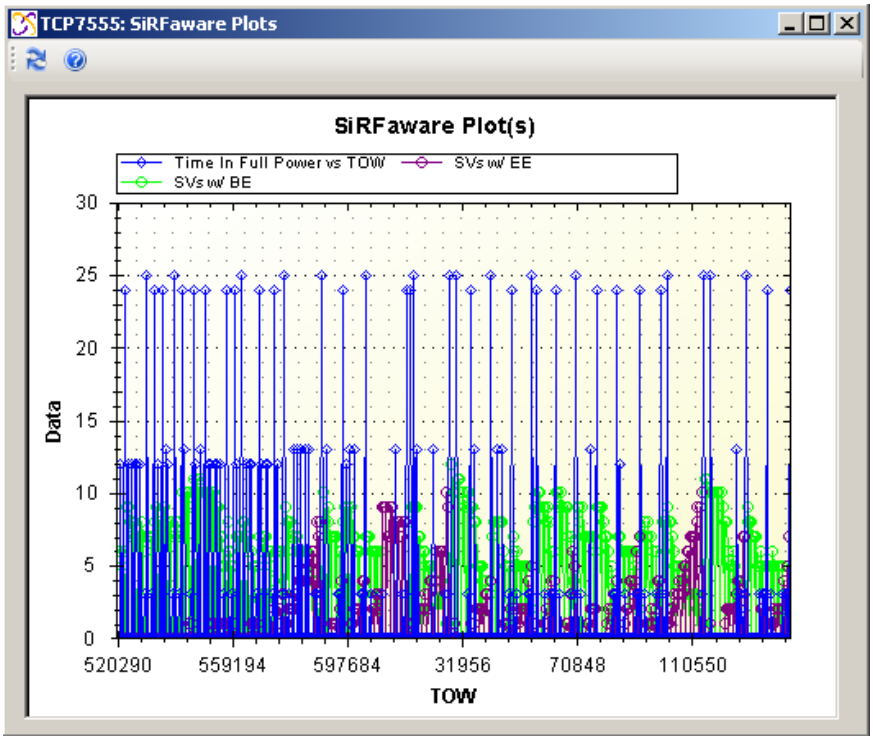
2. Select a color to distinguish the new overlay from the existing plot color. See section 5.12.4.6 for more information.
3. Either name the title section or use the default. The example shown below was named SVs w/ EE.

4. Click the **Add Plot**  button. This updates the existing plot with the new data:

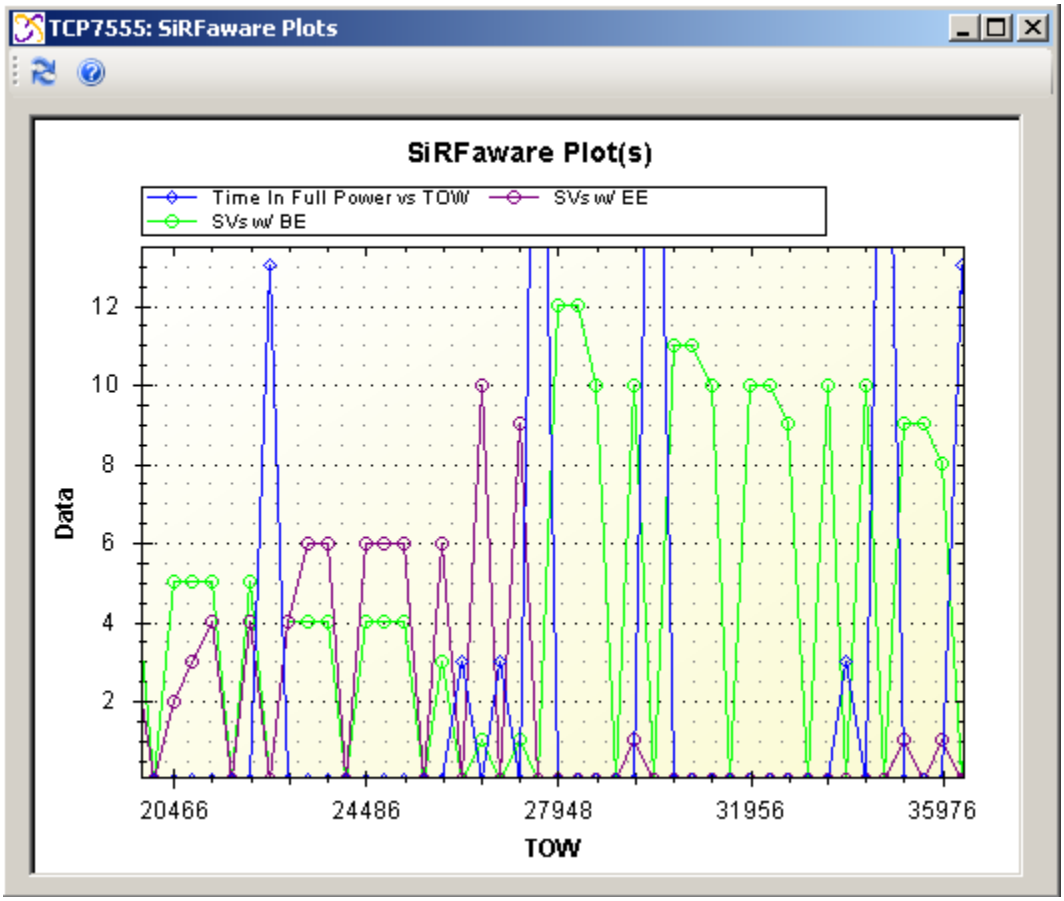


5. Do this for each subsequent plot overlay required:





You can then zoom in on the plot to view a section of the data with more clarity.



Refresh and Help

- Click the **Refresh** button  to update any new data for the plot.
- Click the **Help** button  to see how to manipulate the graph area:

8.4.3.2. Color Palette

- Click the **Color Palette** button  to open the **Color** window which allows you to select curve colors.

Figure 8.4: SiRFaware Color Palette

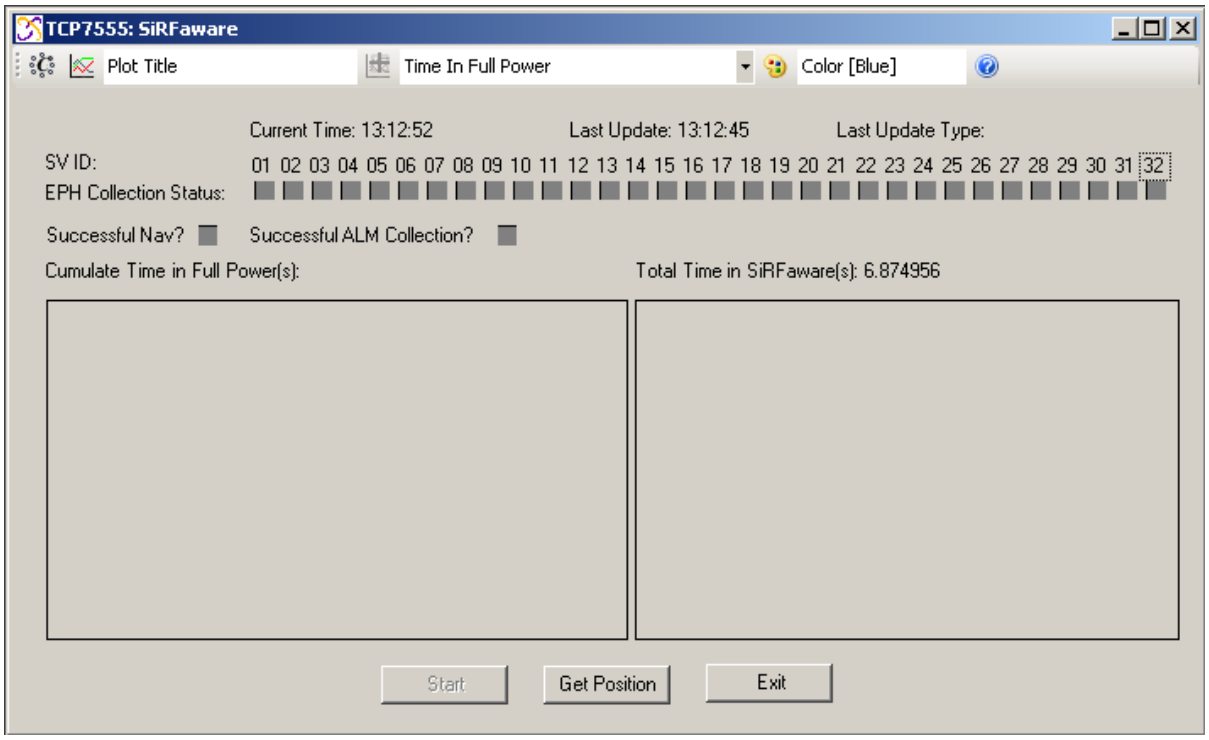
8.4.3.3. Help (window)

- Click the **Help** button  to show the color values in the **SiRFaware** window:

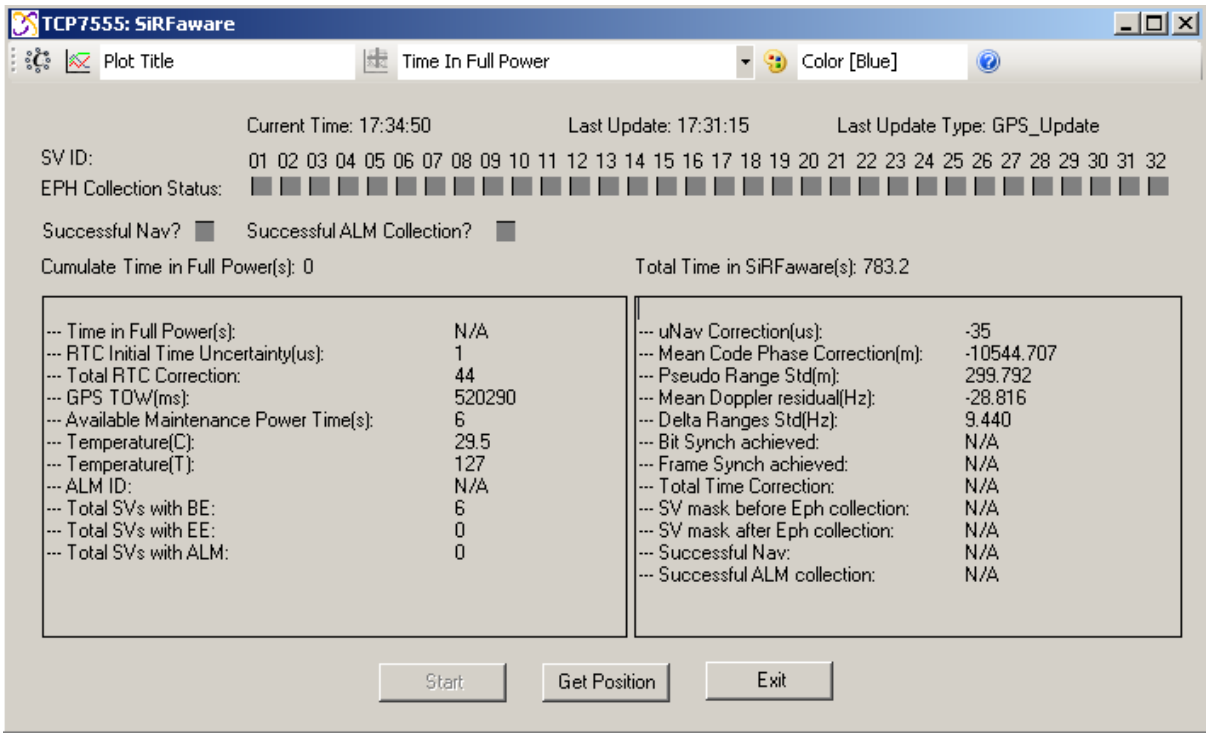
Figure 8.5: SiRFaware Help

8.4.3.4. Start

- Click the **Start** button to begin the timer and set the Rx into MPM.



Data is reported when it is available and collected:



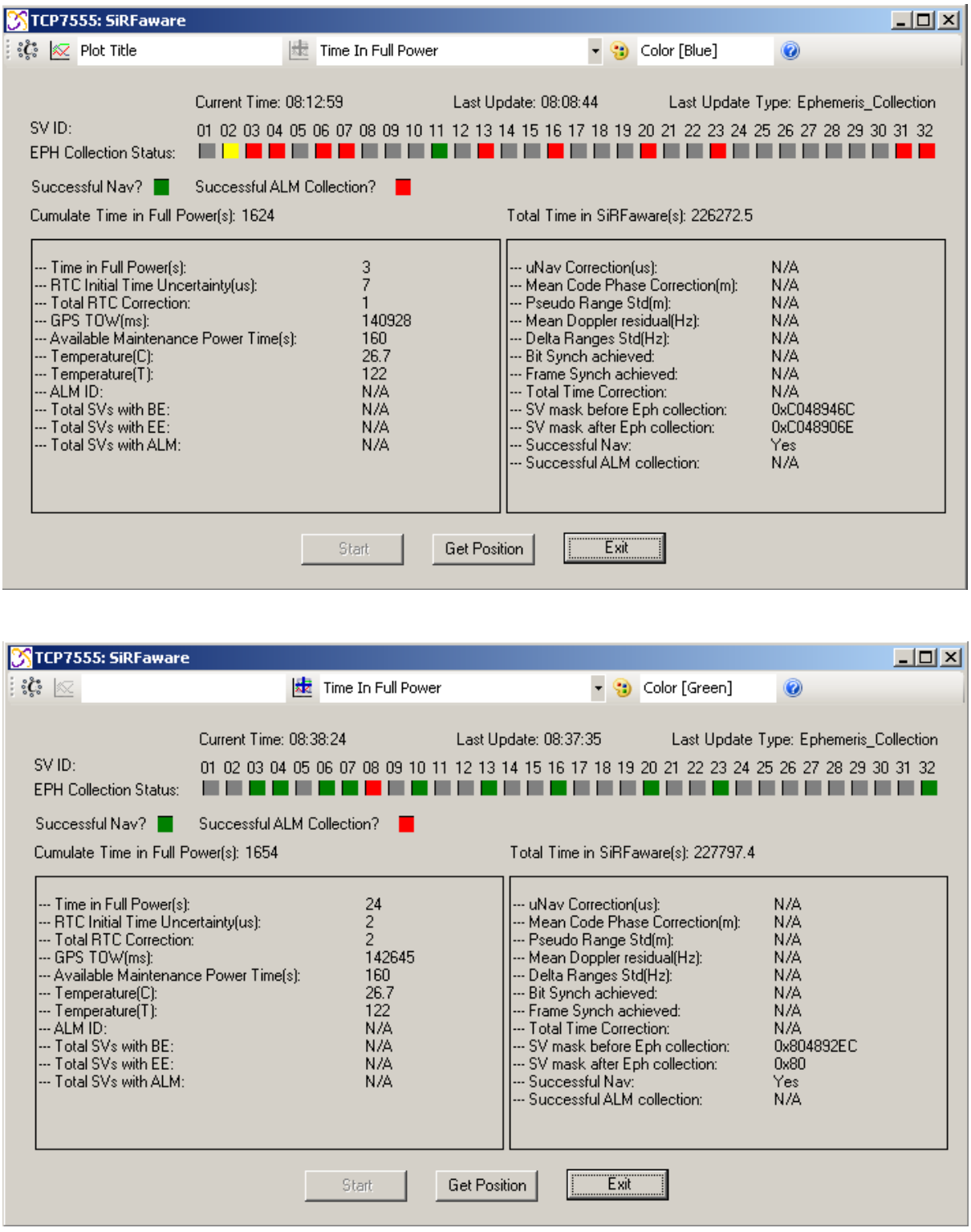


Figure 8.6: SiRFaware Data

8.4.3.5. Get Position

- Click the **Get Position** button to take the Rx out of SiRFaware mode and clear the fields in the window. The TTFF in seconds is also displayed, see Figure 8.7.

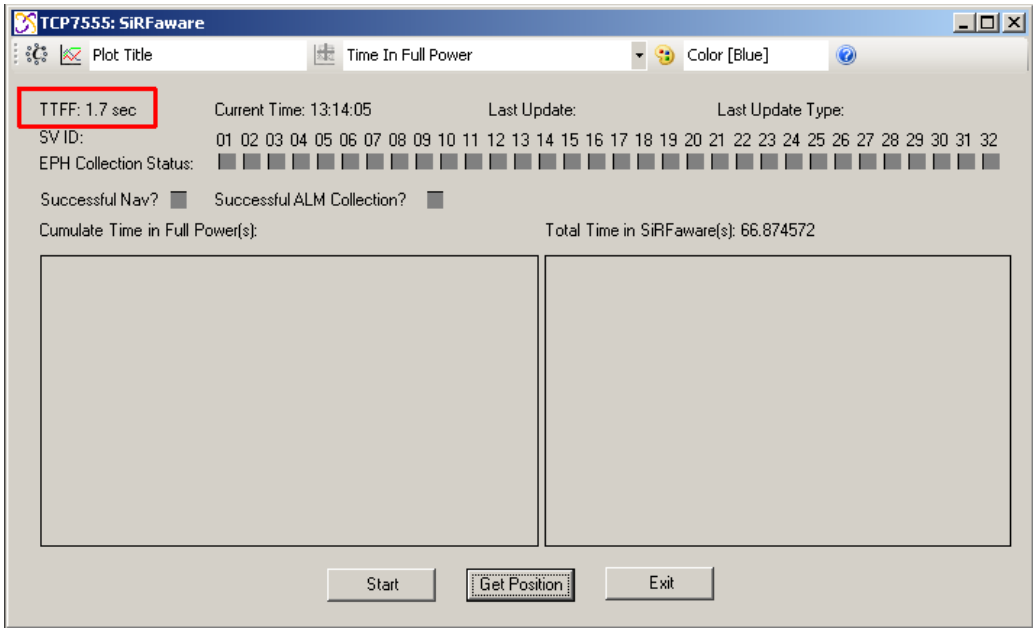


Figure 8.7: TTFF Display

Note:

When using a GSD4e receiver, after clicking the **Get Position** button the **Switching from SiRFaware to Full Power Mode on 4e** window appears, see Figure 8.8.

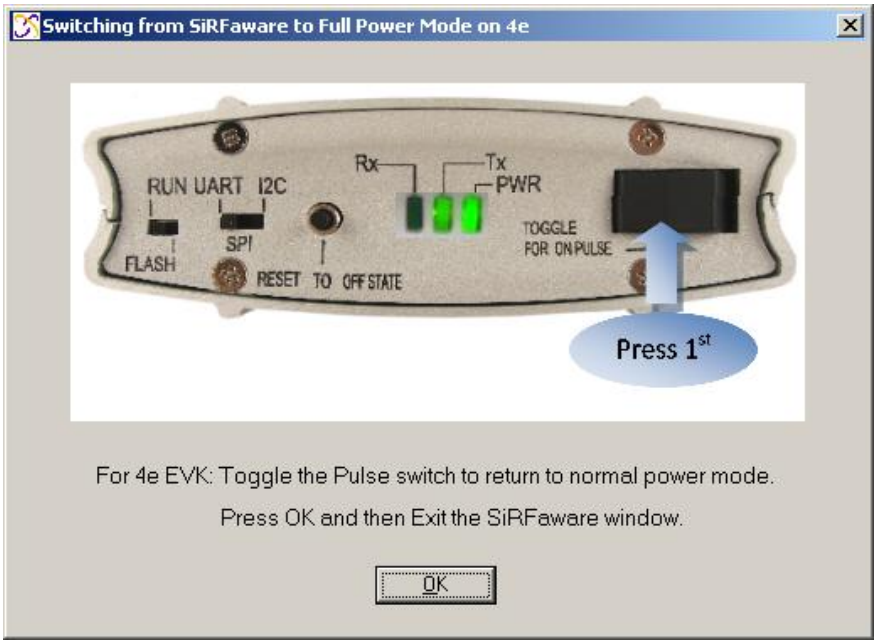


Figure 8.8: Switching from SiRFaware to Full Power Mode on 4e

After the Pulse switch on the 4e Rx is toggled, the SiRFaware window displays the TTFF.

8.4.3.6. Exit

Click the **Exit** button to close the **SiRFaware** window.

8.5. Flash Log

The Flash Log controls the state of the data logger allowing it to be started, stopped, cleared, retrieve logged data, and retrieve general status.

- Select **Features / Flash Log...** to control the data logger.

Note:

This feature is only valid for specific GSD4e software patches. If you have any questions, contact your CSR representative.

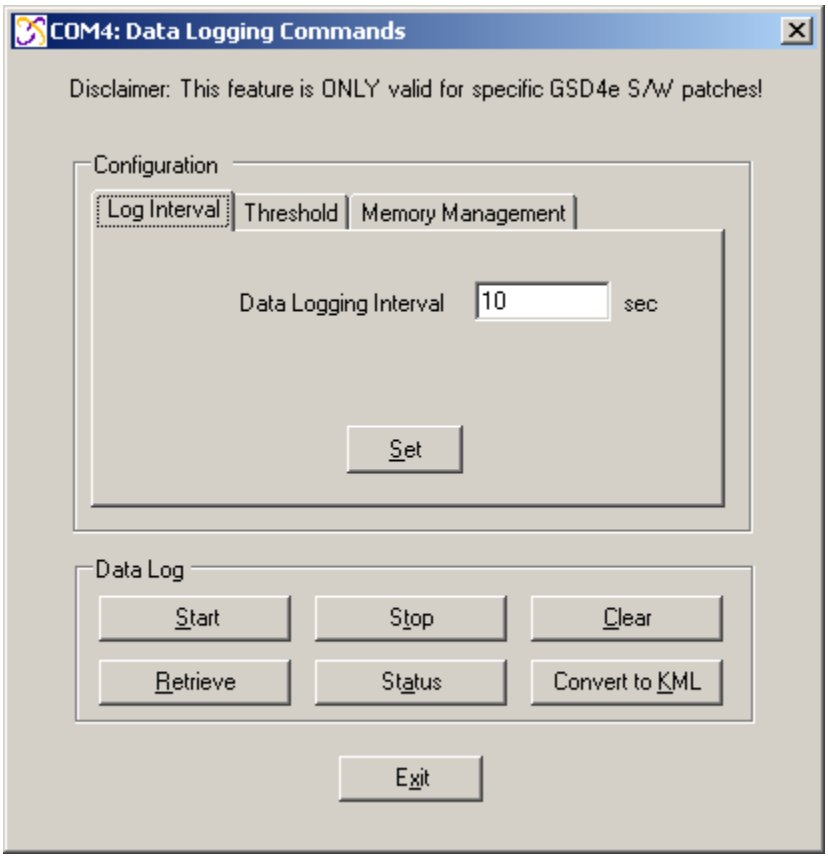
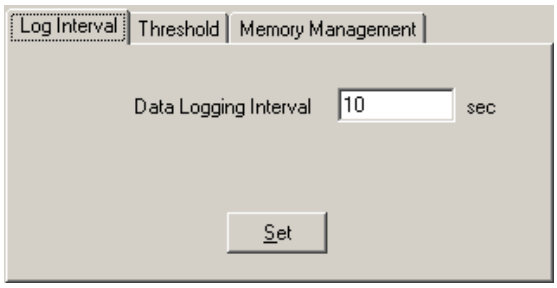


Figure 8.9: Data Logging Commands Window

The minimum logging interval is specified as a parameter of the start command. Current position data is logged if the interval and other threshold criteria are met.

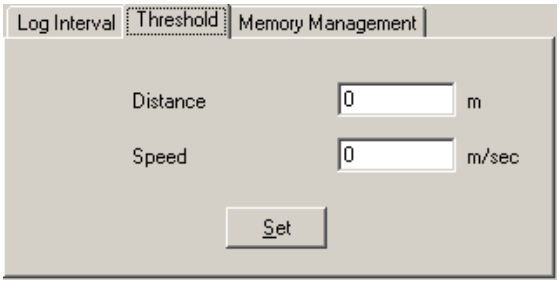
8.5.1.1. Configuration

- Click the **Log Interval** tab to set the **Data Logging Interval**:



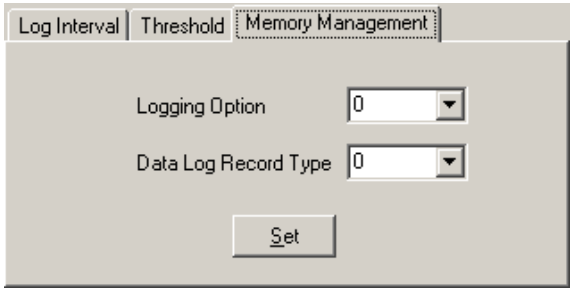
Data Logging Interval	1 - 65535	Seconds between logging intervals

- Click the **Threshold** tab to set the **Distance** and **Speed**:



Distance	0 - 65535	Distance, in meters, between the current record and the previously logged record that must be exceeded to log the current record. Default is 0.
Speed	0 - 65535	Speed, in milliseconds, the current record must exceed to be logged. Default is 0.

- Click the **Memory Management** tab to set the **Logging Option** and **Data Log Record Type**:



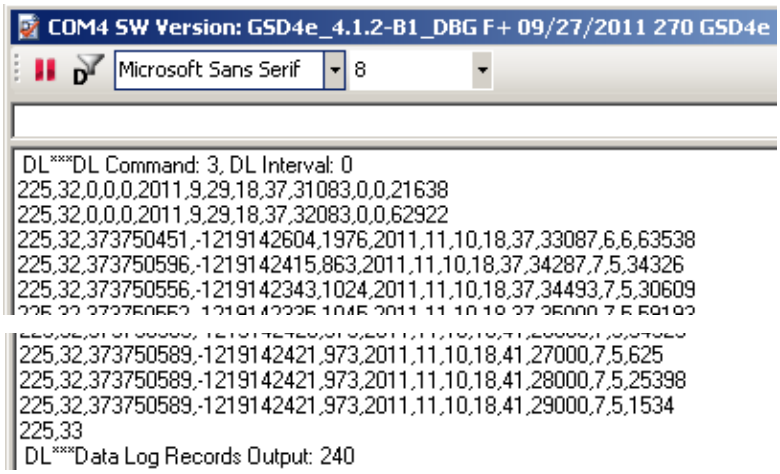
Logging Option	0	Circular buffering (default)
	1	Stop on full (one pass)
Data Log Record Type	0	Compatibility format (default)
	1	Position
	2	Position+Altitude

3	Position+Altitude+Speed
4	Position+Altitude+Speed+Accuracy

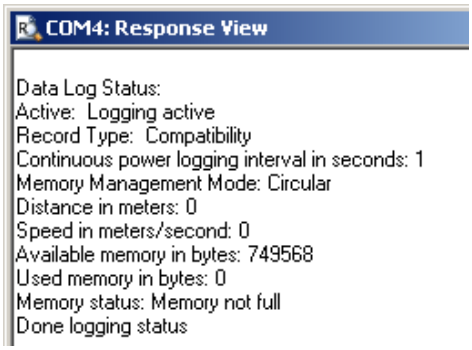
8.5.1.2. Data Log

Start	Starts the data logging
Stop	Stops the data logging
Clear	Clears the logged data
Retrieve	Saves the data to a .osp file as well as outputs to the Debug View window (see image below)
Status	Displays the current data logging information in the Response View window (see image below)
Convert to KML	Converts the .osp files of the selected directory into .kml files that can be viewed in Google Earth

- Click the **Retrieve** button:



- Click the **Status** button:



9. AGPS Menu

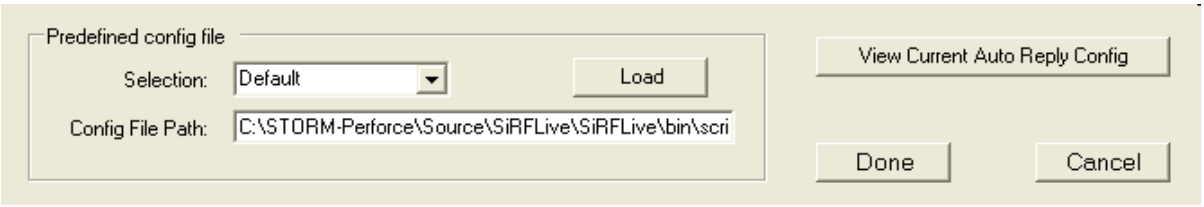
This Rx Session section pertains to aiding and the parameters to define for the receiver.

9.1. Configure

- Select **AGPS / Configure...**

See section 5.11.2 for more information.

1. To load predefined configurations for AGPS settings, select one of the items from the drop-down list at the bottom of the page:



2. Click the **Load** button for the predefined configuration to set the Auto Reply values.
3. Click the **View Current Auto Reply Config** to see the changes or view the settings by looking at the Auto Reply Summary page.

9.2. Summary

- Select **AGPS / Summary** to displays the currently selected options from all of the aiding settings available for review by you.

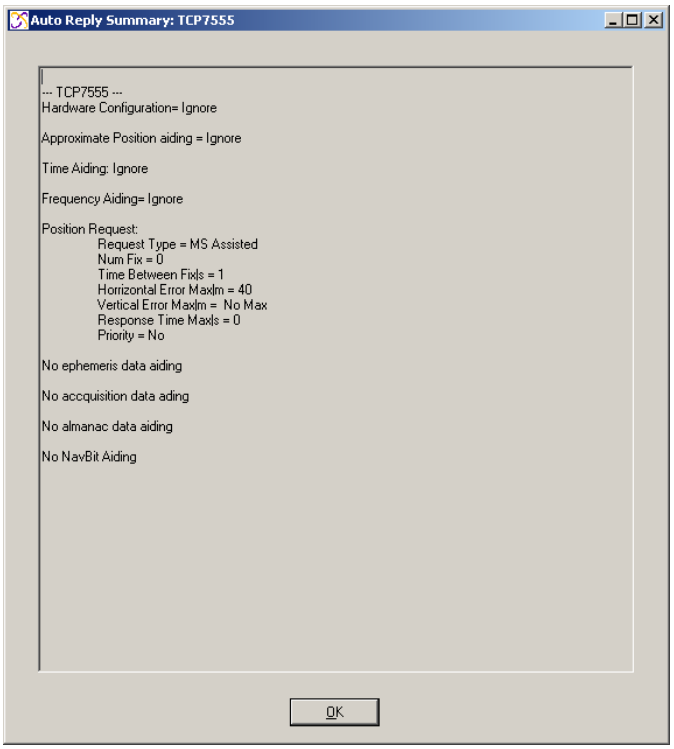


Figure 9.1: Autonomous Example

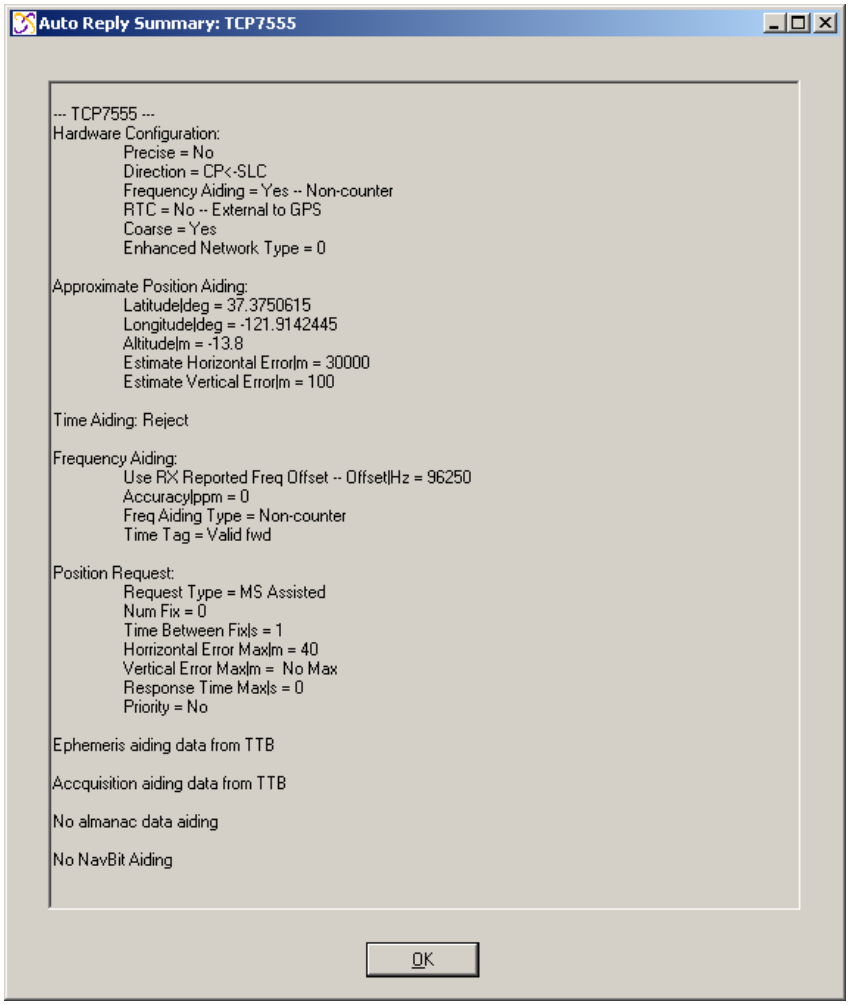


Figure 9.2: MSA-1 Coarse Example

9.3. TTB

- Select **AGPS / TTB**

9.3.1. Connect TTB

1. Select **AGPS / TTB / Connect TTB...** to modify and check the TTB settings:

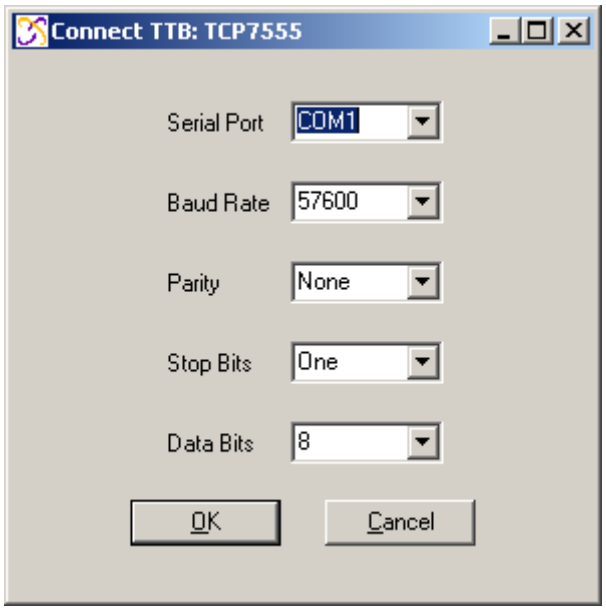
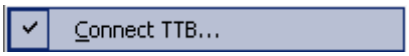
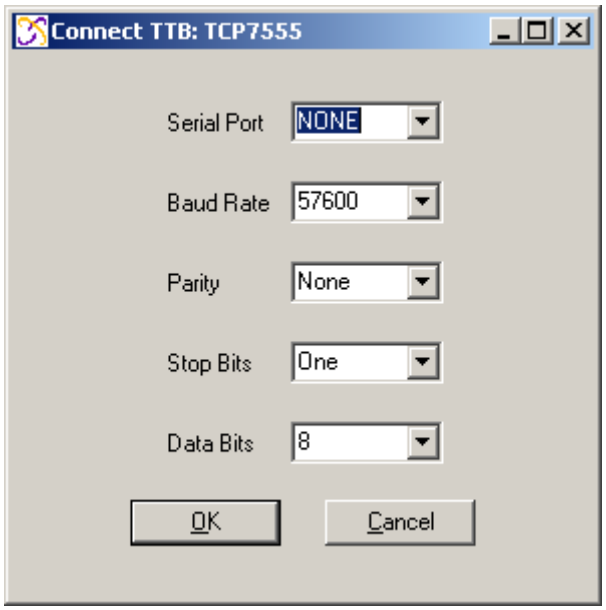


Figure 9.3: TTB Settings

Serial Port	Port connection for the TTB
Baud Rate	Baud rate to run the TTB, Default is 57600
Parity	Default is None
Stop Bits	Default is One
Data Bits	Default is 8

When the TTB is connected the **Connect TTB...** is ticked: 

2. To disconnect the TTB set the **Serial Port** field to **None**:



The check mark next to Connect TTB is removed: 

9.3.2. Configure Time Aiding

- Select **AGPS / TTB / Configure Time Aiding...** to configure the TTB for **Precise** or **Coarse** aiding:

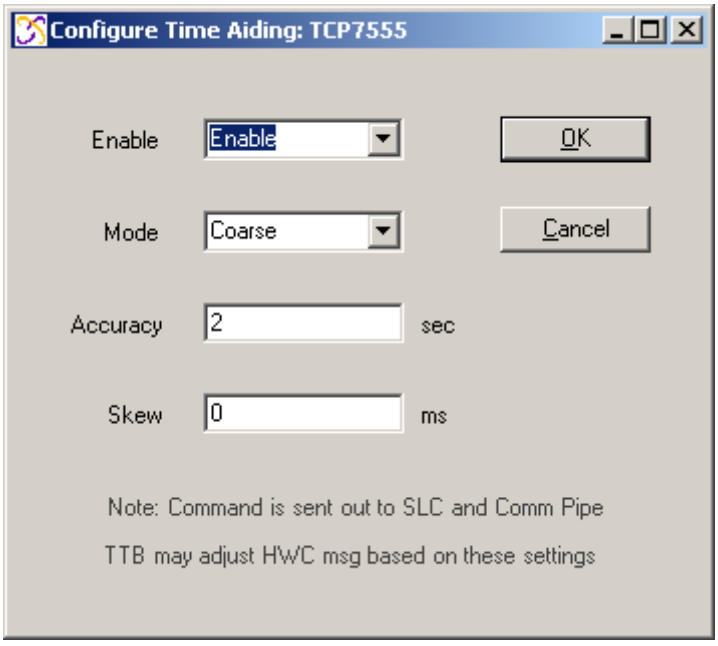


Figure 9.4: Configure Time Aiding Window

9.3.3. View

- Select **AGPS / TTB / View...** to see how the TTB is functioning. This opens a new **COM** window for the TTB and a separate **Signal View** window. The Views available are a subset of the views described in section 5.12. Figure 9.5 shows the TTB connected to COM 1 with the **Radar View** and **Response View** windows open as well:

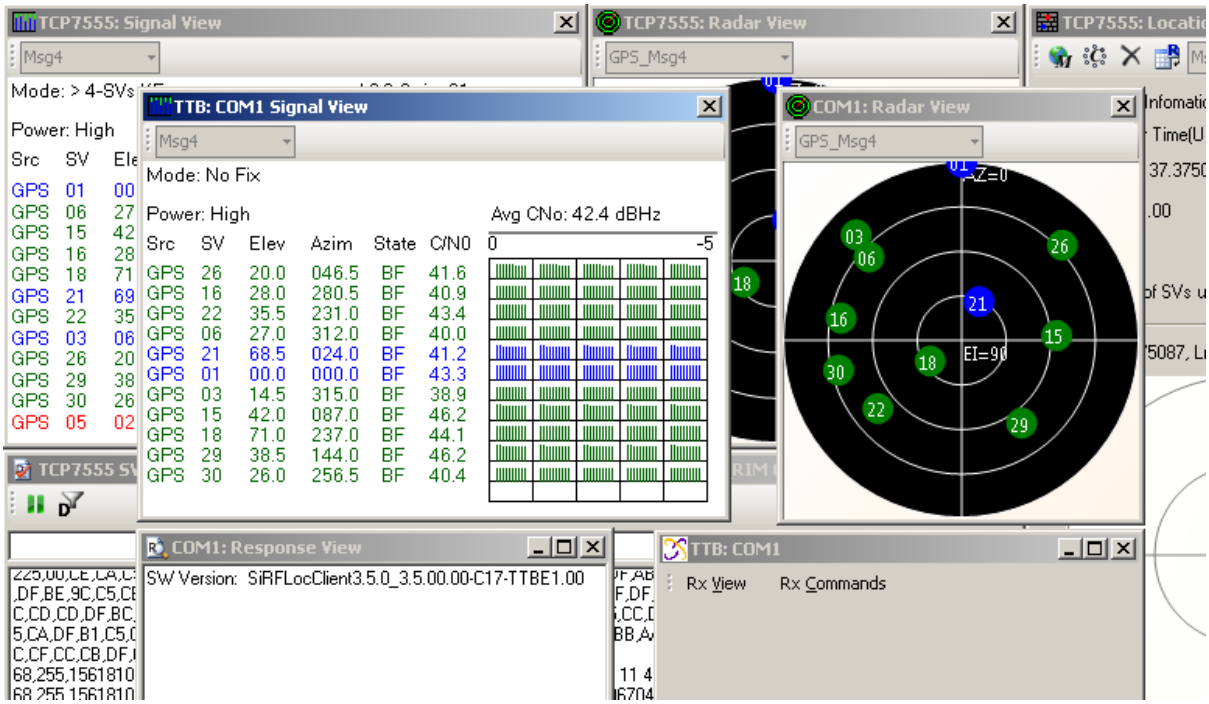
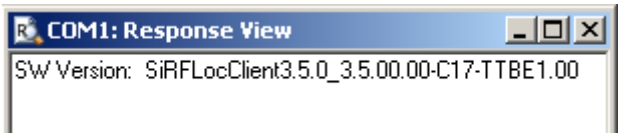


Figure 9.5: TTB Example Windows

If there is no TTB connected, then the following error message appears:

9.3.3.1. Rx View

- Select the **Rx View** tab.
- Select **Rx View / Response** for response view:



See section 5.12.5 for more information.

- Select **Rx View / Error** for error view.

See section 5.12.7 for more information.

9.3.3.2. Rx Commands

- Select Rx Commands 

9.3.3.3. Reset

- Select **Rx Commands / Reset**

See section 7.4.1 for more information.

9.3.3.4. Poll S/W Version

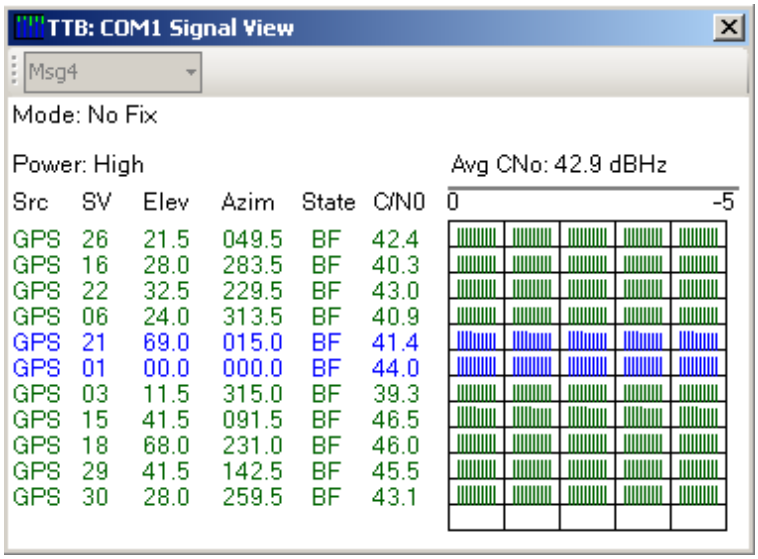
- Select **Rx Commands / Poll S/W Version**

See section 7.4.2 for more information.

-

9.3.3.5. Signal View

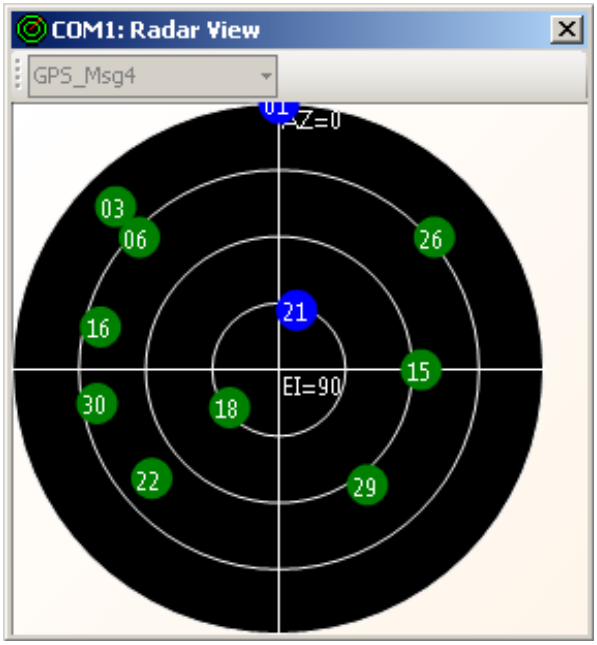
- Select **Rx View / Signal**:



See section 5.12.1 for more information.

9.3.3.6. Radar View

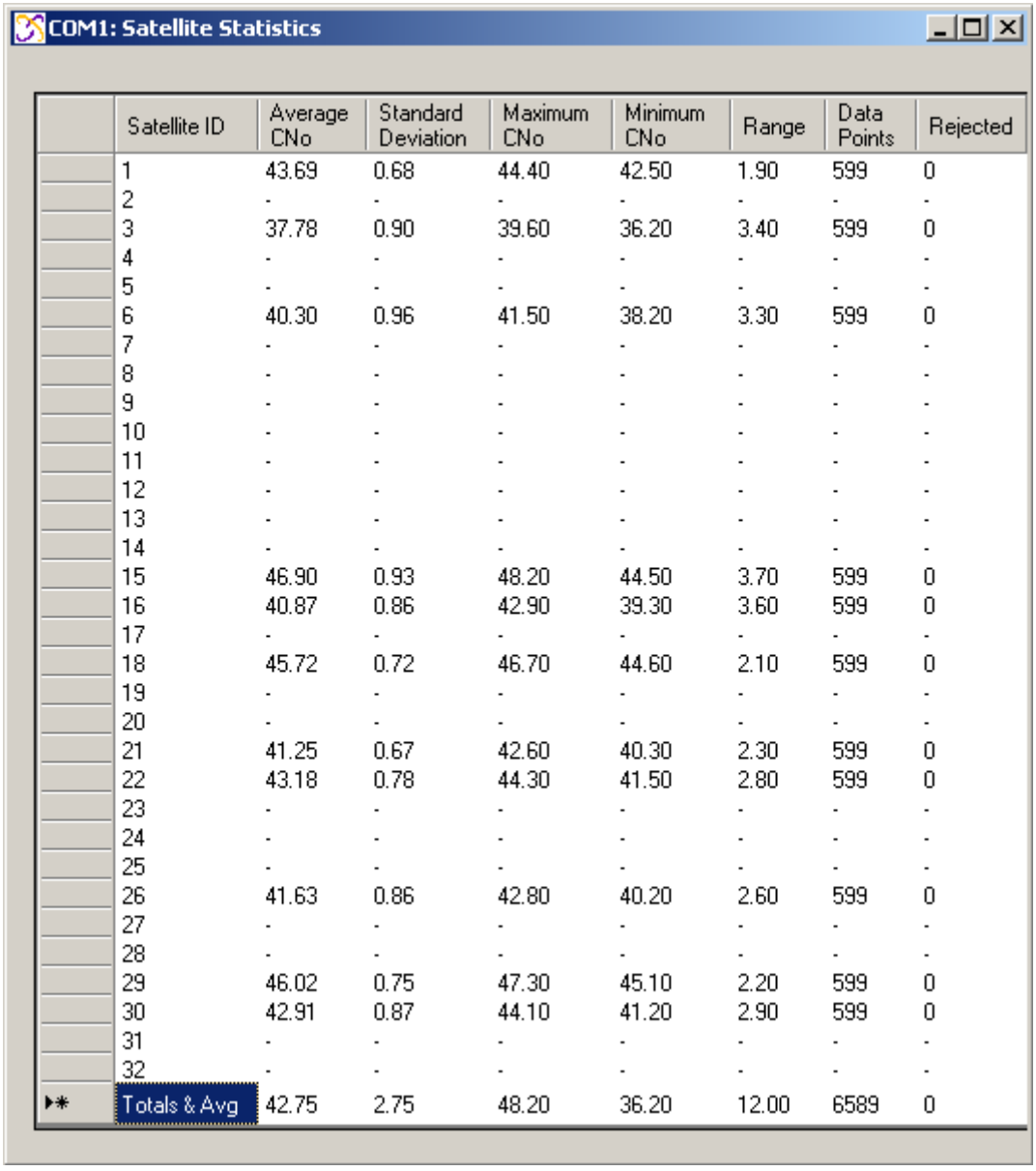
- Select **Rx View / Radar**:



See section 5.12.2 for more information.

9.3.3.7. Satellite Statistics

- Select **Rx View / Satellite Statistics**:



	Satellite ID	Average CNo	Standard Deviation	Maximum CNo	Minimum CNo	Range	Data Points	Rejected
	1	43.69	0.68	44.40	42.50	1.90	599	0
	2	-	-	-	-	-	-	-
	3	37.78	0.90	39.60	36.20	3.40	599	0
	4	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-
	6	40.30	0.96	41.50	38.20	3.30	599	0
	7	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-
	9	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-
	15	46.90	0.93	48.20	44.50	3.70	599	0
	16	40.87	0.86	42.90	39.30	3.60	599	0
	17	-	-	-	-	-	-	-
	18	45.72	0.72	46.70	44.60	2.10	599	0
	19	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-
	21	41.25	0.67	42.60	40.30	2.30	599	0
	22	43.18	0.78	44.30	41.50	2.80	599	0
	23	-	-	-	-	-	-	-
	24	-	-	-	-	-	-	-
	25	-	-	-	-	-	-	-
	26	41.63	0.86	42.80	40.20	2.60	599	0
	27	-	-	-	-	-	-	-
	28	-	-	-	-	-	-	-
	29	46.02	0.75	47.30	45.10	2.20	599	0
	30	42.91	0.87	44.10	41.20	2.90	599	0
	31	-	-	-	-	-	-	-
	32	-	-	-	-	-	-	-
▶*	Totals & Avg	42.75	2.75	48.20	36.20	12.00	6589	0

Figure 9.6: Satellite Statistics Example

10. Report Menu

10.1. Log(gps/gp2)...

The Log(gps/gp2) report generates a report based on the parameters set in the dialog window.

1. Select **Report / Log(gps/gp2)...** to generate a Log Report.

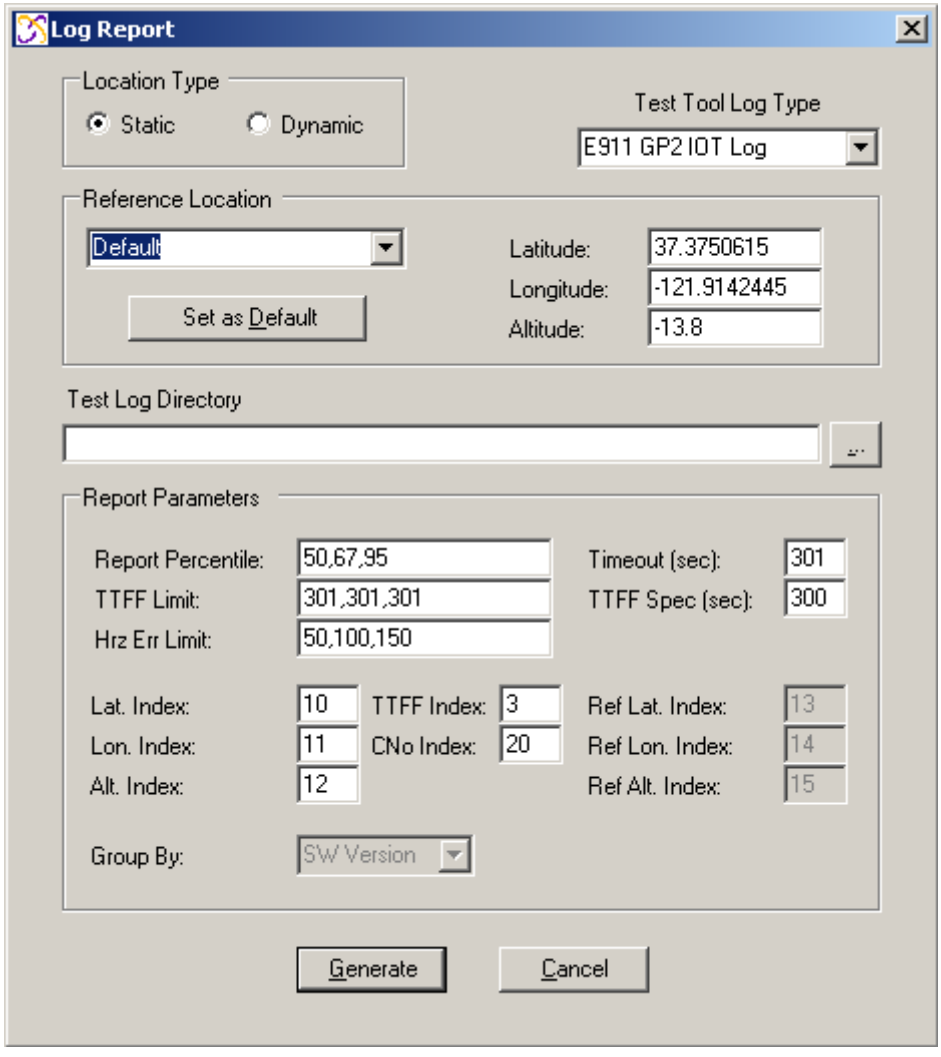
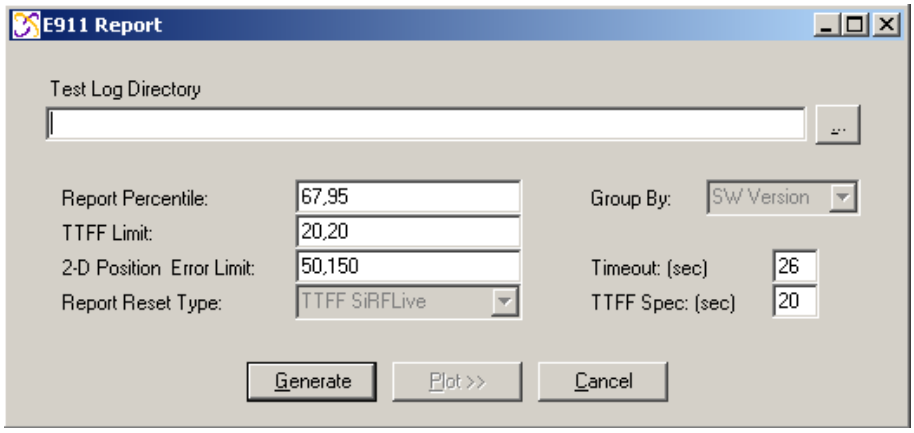


Figure 10.1: Log(gps/gp2) Window

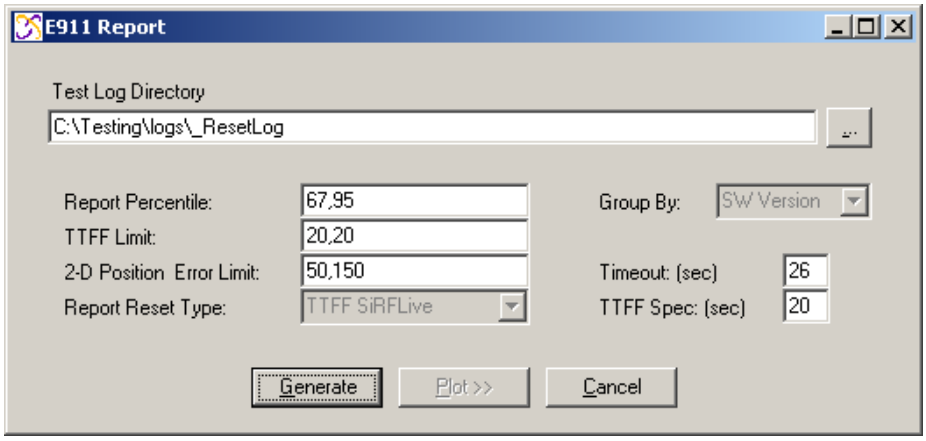
2. Select the appropriate settings correctly so that the report is accurate.

10.2. E911(csv)

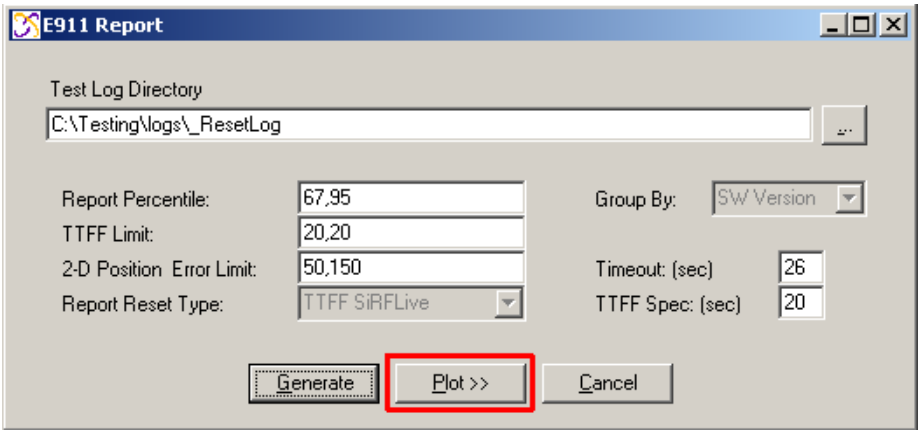
1. Select **Report / E911(csv)...** to generate an E911 Report.
2. This example E911 Report generates a `summary_e911.xml` file from the corresponding `.gp2` file and then enables the **Plot** button.



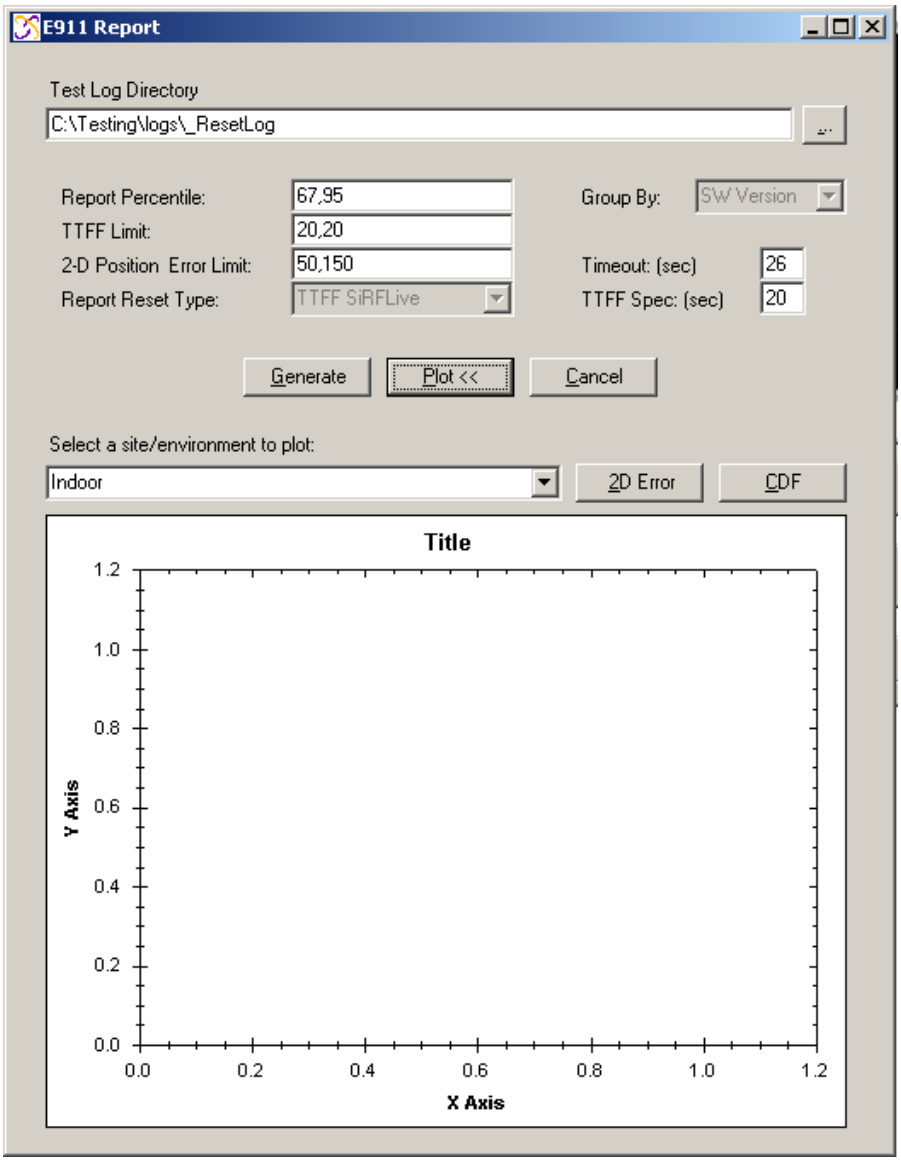
3. Click the ellipsis **...** button to browse to a directory.



4. Click Plot to expand the window to display the 2D Error graph.



5. Initially there is no data available.



6. Select the site/environment and then press the **2D Error** button.

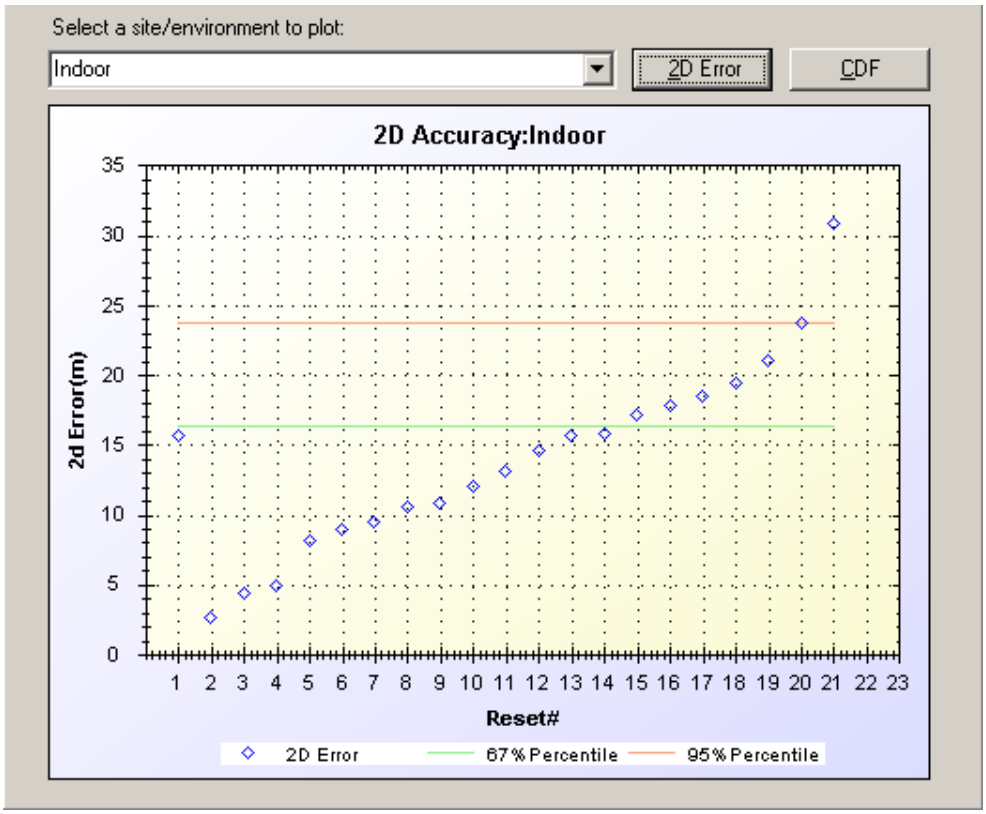


Figure 10.2: E911(csv) 2D Error Plot Example

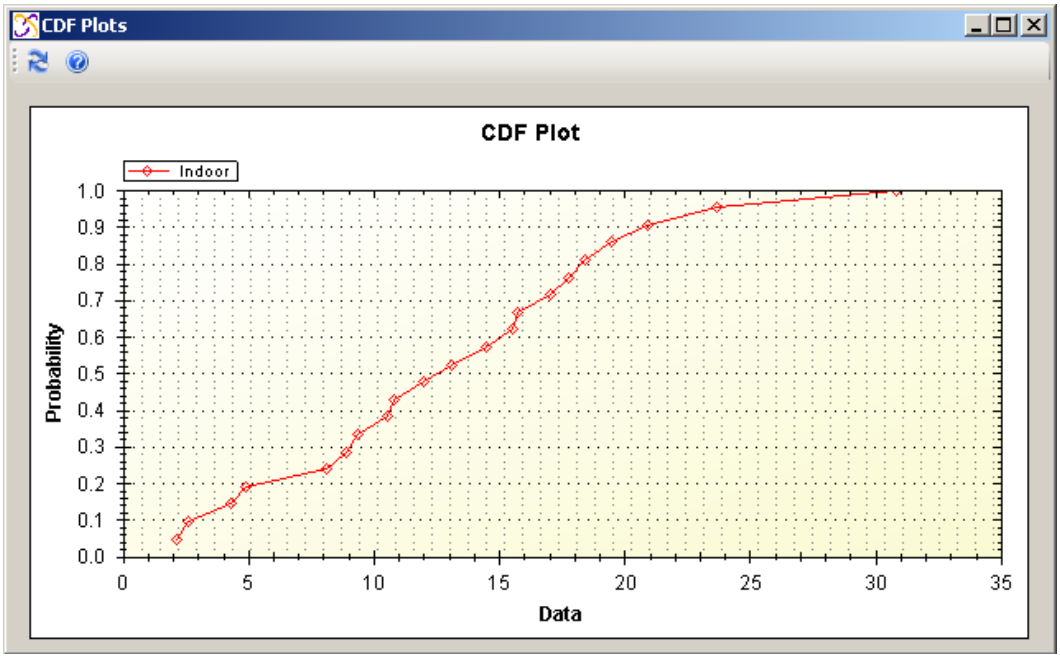


Figure 10.3: E9119(csv) CDF Plot Example

11. Window Menu

- Select the **Window** tab: 

11.1. Cascade

- Select **Window / Cascade**: **a**ll visible windows are fanned out across the window with the title bar of each window showing.

11.2. Tile Vertical

- Select **Window / Tile Vertical**: the window with focus is positioned on the left-most side of the screen with subsequent visible windows following left to right.

11.3. Tile Horizontal

- Select **Window / Tile Horizontal**: the window with focus is positioned at the top of the screen with subsequent visible windows following top to bottom.

11.4. Restore Layout

- Select **Window / Restore Layout**

11.4.1. Default

- Select **Window / Restore Layout / Default** to set all of the open windows into the default layout.

11.4.2. Previous Settings

- Select **Window / Restore Layout / Previous Settings** to open and arrange the windows that were last set in SiRFLive.

11.4.3. User Settings

- Select **Window / Restore Layout / User Settings** to open saved window arrangements.

  Figure 11.1 shows file `NoTTFFWindow.xml` as an example.

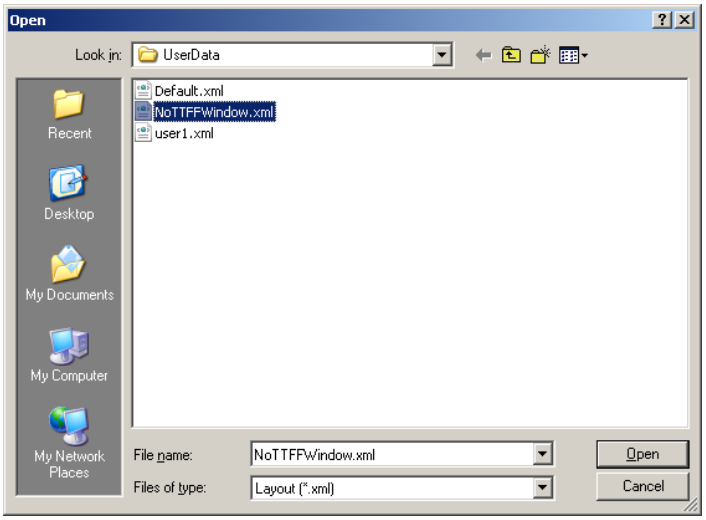
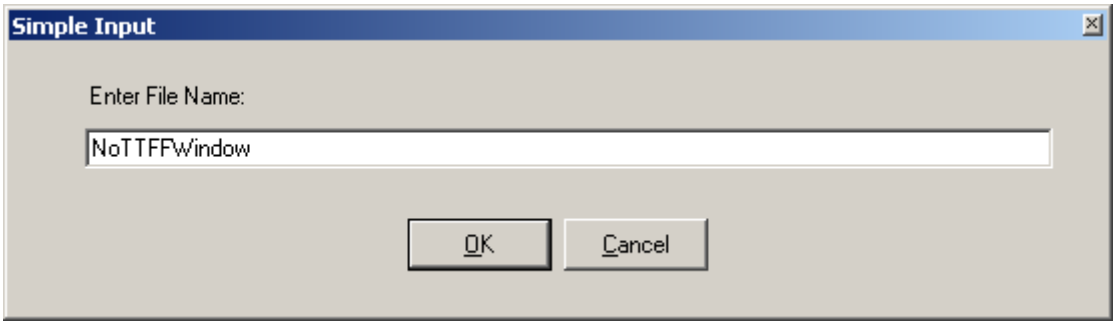


Figure 11.1: User Settings Example

11.5. Save Layout

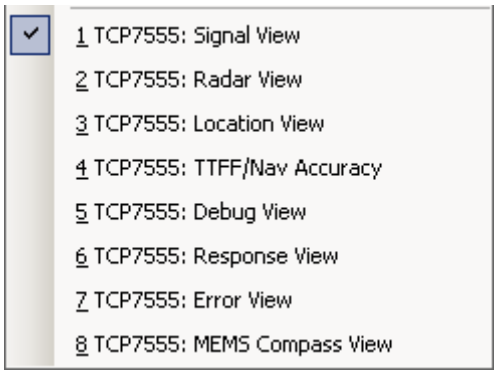
- Select **Window / Save Layout** to save preferences to use later:



11.6. Close All

- Select **Window / Save Layout** to close all of the open windows in SiRFLive.

11.7. Open Windows



Any window that is open is displayed at the bottom of the **Window** menu list. The checkmark signifies the window that is highlighted or has focus.

12. Help Menu

The **Help** menu lists the **About** and **Help** items. See sections 12.1 and 12.1.1.

12.1. About

- Select **Help / About** to display the version and copyright information for SiRFLive:

Figure 12.1: About SiRFLive

12.1.1. User Manual

- Select **Help / User Manual** to display the User Manual help file, see Figure 12.2.

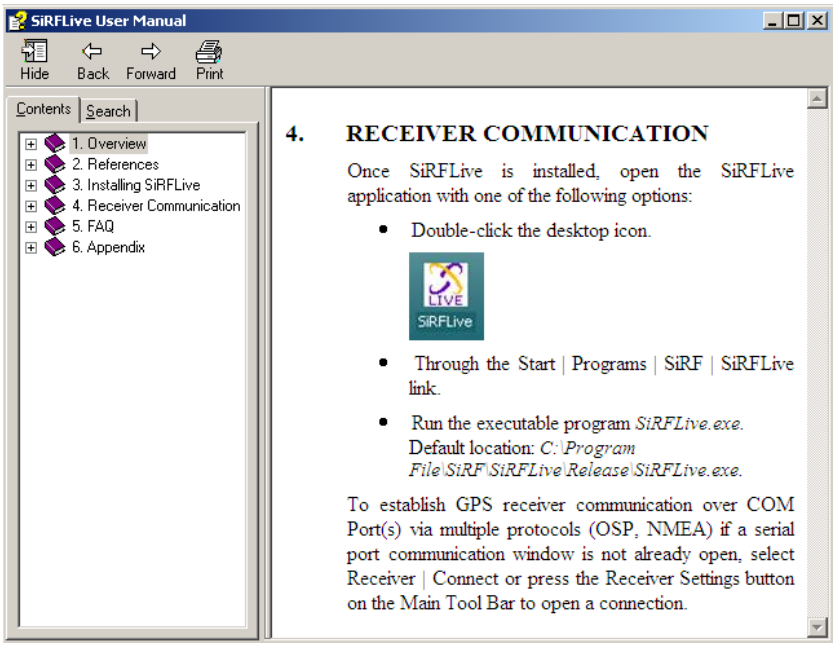


Figure 12.2: User Manual Help File

13. FAQ

This section gives frequently asked questions and their answers.

13.1. Features

Q. Why does my MEMS window not update?

A. Confirm that MEMS is enabled by going to **Receiver | Command Set MEMS** and check the **Enable MEMS** option. If it is enabled, check your hardware configuration documentation to ascertain which sensors are available for your EVK. Contact your CSR representative for more information.

Q. Why do the 3GPP Automation tests not work on my system?

A. The SiRFLive application does not include the scenarios by default. If you have a Spirent STR4500 or GSS6700 simulator then contact your CSR representative to obtain the scenarios.

13.2. Performance

Q. SiRFLive seems to be a bit sluggish.

A. One thing that can make a difference in how the PC is running is to ensure **Adjust for best performance** option is selected in the **Advanced** tab of the **System Properties** window, see Figure 13.1.

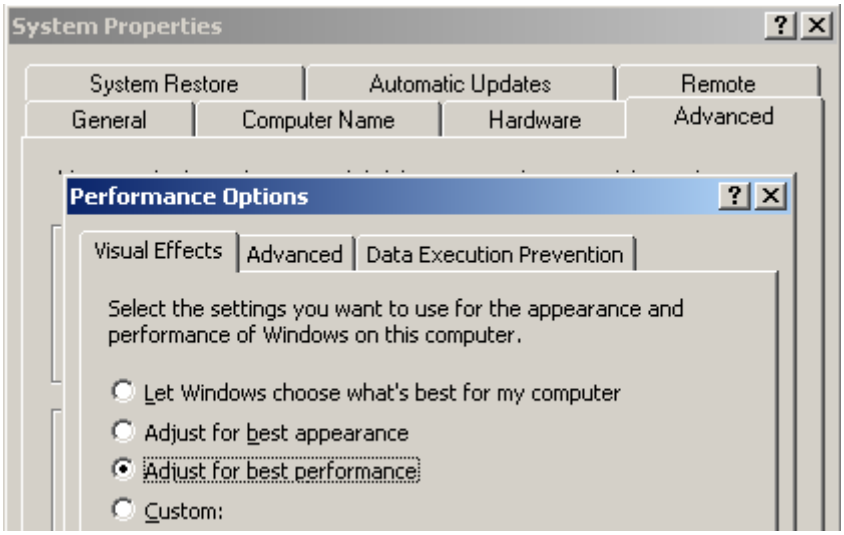


Figure 13.1: Adjust For Best Performance Option

This helps those systems that are on the edge regarding the minimum system requirements.

13.3. General

Q. The documentation states that all debug messages are disabled when sending a Factory reset. When I send a Factory reset through SiRFLive I notice that debug messages still come out.

Q. Why do debug messages come out when I put the EVK into SiRFaware mode when I shut them (debug messages) off just prior to sending the command?

A. For troubleshooting reasons, SiRFLive automatically enables debug messages after a Factory reset, when enabling SiRFaware, and when switching protocols from NMEA to OSP. If a file is logged then this enables the capture of all possible issues that may occur over resets or other transitional modes.

13.4. GUI

Q. The **Debug View** title bar and the SiRFLive title bar show the software version, but under the Windows menu list the **Debug View** window does not. Why?

A. This is a known issue where the title bars do not always get updated immediately. Click the **Debug View** window to set focus on it, and then when you look under the **Window** menu list again you will see that the title bar is now updated.

Q. How can I clear the contents of a window, like the **Response View** window?

The **Error View**, **Response View**, and **Debug View** windows can all be cleared by double-clicking within each individual window.

Q. I do not like the default window layout provided. How can I customize the layout?

A. Open or close the windows that you want and then resize them to your preference. When you have everything where you want it go to the **Window** menu list and select **Save Layout**. In the window that appears give the layout a unique name and then click **OK**. If you ever need to reset your custom layout, just go to the **Window** menu and select **Restore Layout | User Settings** and select your specific layout.

Q. If there are no window views open in SiRFLive, is there an easy way to display them?

A. Yes, select **Window | Restore Layout Default** to open the seven standard window views all at once.

13.5. Installation

Q. The installation of the latest version of SiRFLive has an old version of the **COM** window appear when first opened. The PC is Windows 7.

A. Not all of the compatibility issues with Windows Vista and Windows 7 have been completely addressed at this time. Uninstall all versions of SiRFLive through the **Add or Remove Programs** window and then confirm that there are no trace files left in the directory. Then reinstall the latest SiRFLive.

13.6. Playback

Q. How do you use the track bar slider that is displayed during playback?

A. The track bar displays the location within the file based on time. The user may adjust the slider by clicking the playback **Pause** button first. When the slider is moved to the required location click the **Pause** button again to start playing from the new slider location.

13.7. Protocol Detection Failure

Q. I get a connection error **The parameter is incorrect**. Why?

A. If you select the wrong product type (4e instead of 4t) for the type of EVK used this error appears. Ensure you select the correct product that matches the EVK being used.

Q. I get a connection error **Access to the port 'xxx' is denied**. Why?

A. The port selected may already be in use or is unavailable. Check to make sure the correct port is selected.

Q. The **Connect** icon shows that I have connected my receiver but there is no output. Why?

A. Check to make sure that the correct port number is selected. An available port may be selected but it might not be the one connected to your receiver.

Check to make sure that the Tx light on the EVK is blinking. For 4e, the EVK may need to have the pulse switch toggled. For 4t, the tracker may be loading on the EVK. The EVK may also be in hibernate mode.

Q. I get an error **Host SW does not exist**. Why?

A. The correct host software executable must be used if the 'Run Host' checkbox is selected for a GSD4t EVK. Confirm that the proper one is available and selected.

13.8. Resets

Q. What does the `-9999` that I sometimes see in the TTFF window mean?

A. The `-9999` is a placeholder for data that is not available at that time.

Q. I sent an aided cold reset and yet the TTFF time is the same as a regular cold reset. Why is that?

A. If incorrect aiding values are sent the resulting reset looks like a normal reset. Be sure to confirm the aiding settings are correct.

Q. I sent an autonomous cold reset and the resulting TTFF was very fast. Why would that happen?

A. If ABP or CGEE is enabled for the Rx then the reset can give very fast TTFF values. Check that these settings are turned off if required.

Q. My reset TTFF is fast as I expected but why would the position error be thousands of meters in size?

A. If ABP is enabled then the TTFF is quick but the horizontal accuracy can be quite large.

Q. The reset I sent was typical in the time to first fix but why would the position be way off from what I expected?

A. This can be caused by an incorrect reference location; the real antenna/signal location is not the same location selected as the reference. Check and set the proper reference location for your testing.

13.9. Rx Port Settings

Q. Why is there an **Rx Name** edit box?

A. This helps distinguish which Rx is being used for tests if you have multiple receivers. The user may use the serial number of the unit as one possible solution to control usage.

Q. For a 4t Rx, if the **Run Host** checkbox is selected as well as the **Extended Ephemeris** checkbox, what is the **Server Name** that should be used?

A. You may use the demo server, sirfgetee.sirf.com. Contact your CSR representative for more information.

Q. What is the Authentication Code that I need to enter to access the SGEE server?

A. Contact your CSR representative for this information.

Q. What does the TCP/IP open error, **…target machine actively refused connection on 127.0.0.1:7555…** mean?

A. This error means that you are attempting to connect to a 4t host app running at TCP/IP address 127.0.0.1:7555 but that the host application is not running on this address/port. To resolve this problem you need to correct the 4t host application settings in the **Rx Setup** window. Verify that the com port numbers for tracker/reset are valid, verify that the run host option is checked and verify that the host app `.exe` file selected is correct.

Appendix A MEMS Calibration

The calibration of the MEMS sensors is a two-part process:

7. For heading characteristics
8. For pitch and roll characteristics.

The procedure encompasses all six planes/sides of the Rx.

A.1 Heading Calibration

Looking at the front of the Rx and holding it level in your hands:

9. Rotate the unit 360° to the left, then
10. Rotate the unit 360° to the right, then
11. Rotate the unit 360° backwards, then
12. Rotate the unit 360° forwards
13. Bring back to start position

A.2 Pitch and Roll Calibration

Looking at the front of the Rx and holding it level in your hands:

14. Rotate the unit 90° to the left from center and hold for 3-5 seconds, then
15. Bring back to start position
16. Rotate the unit 90° to the right from center and hold for 3-5 seconds, then
17. Bring back to start position
18. Rotate the unit 90° forward from center and hold for 3-5 seconds, then
19. Bring back to start position
20. Rotate the unit 90° rearward from center and hold for 3-5 seconds, then
21. Rotate the unit 90° rearward again, now 180° from start, and hold for 3-5 seconds, then
22. Bring back to start position

The Rx should now register green in the **Compass View** window. If it does not, repeat the above steps.

Terms and Definitions

3GPP	3rd Generation Partnership Project
ABP	Almanac Based Position
AGPS	Assisted GPS
APM	Advanced Power Management
ASCII	American Standard Code for Information Interchange
CDF	Cumulative Distribution Function
CDM	Combined Driver Model
COM	Communication
CPU	Central Processing Unit
CSV	Comma Separated Value
Ctrl	Control
DGPS	Differential GPS
DOP	Dilution of Precision
e.g.	exempli gratia, for example
EE	Extended Ephemeris
EEPROM	Electrically Erasable Programmable Read Only Memory
etc	et cetera and the rest, and so forth
EVK	Evaluation Kit
FAQ	Frequently Asked Question
GPS	Global Positioning System
GUI	Graphic User Interface
HW	Hardware
I2C	Inter-Integrated Circuit
IC	Integrated Circuit
ID	Identifier
i.e.	Id est, that is
IP	Internet Protocol
LLA	Latitude, Longitude, Altitude
MEMS	Micro Electrical Mechanical Systems
MSA	Mobile Station Assisted
MSB	Mobile Station Based
NMEA	National Marine Electronics Association
OSP	One Socket Protocol
PC	Personal Computer
PPM	Parts Per Million
PRN	Pseudo Range Number
RAM	Random Access memory

RF	Radio Frequency
RINEX	Receiver Independent Exchange Format
RS232	Recommended Standard 232, serial communication standard
Rx	Receiver
SBAS	Satellite Based Augmentation System
SoC	System on a Chip
SRS	Software Requirements Specification
SV	Space Vehicle
TCP/IP	Transmission Control Protocol/Internet Protocol
TCXO	Temperature Controlled Crystal Oscillator
TOW	Time of Week (displayed in seconds)
TTB	Time Transfer Board
TTFF	Time To First Fix
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
UTC	Universal Time, Coordinated
XML	Extended Markup Language