SE880 RDK User Manual

1VV0301047 – 2013-05-1

APPLICABILITY TABLE

PRODUCT
SE880

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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Contents

1. Introduction

1.1. Scope

Scope of this document is to give an overview of the SE880 reference design kit (or SE880 RDK) of the GPS standalone 3D-SiP SE880.

1.2. Audience

This document is intended for customers who are evaluating one or more products in the applicability table.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-EMEA@telit.com
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TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- SE880 HW User Guide
- SE880 Product Descritption
- NMEA Reference Manual (CS-129435-MA-3)
- GSD4e OSP Manual (CS-129291-DC-13)
- SiRF Live User Manual (CS-206217-UG-5)

NOTE:

- To prevent ESD and EOS damage, a properly grounded ESD wrist strap should be worn when working inside the RDK.
- Do not alter switch positions while USB power is applied.
- Do not short the RF signal to ground if the antenna voltage is installed. Damage to the RDK may result.

NOTE:

Always follow ESD safety precautions when utilizing the SE880 RDK. For additional information on the SE880, ask your sales representative for additional manuals, datasheets, support, etc.

2. Preparing for the SE880 RDK

What is Necessary

To use the SE880 RDK, you will need:

- FTDI USB Drivers
- SiRFLive2.0 and above or
- A PC with a USB port that fulfills the minimum software requirements:
    - Windows XP
    - .NET Framework 2.0
        - This will be automatically installed by the SiRFLive package if necessary (internet connection is required).

2.1. Installing the USB Drivers

Before connecting the SE880 RDK, install the necessary USB drivers.

1 Double-click the USB driver executable and follow the directions to install the USB drivers.

2.2. Installing SiRFLive

NOTE SiRFLive does not work on 64-bit OS machine at this time!
Minimum PC requirements:

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

Recommended

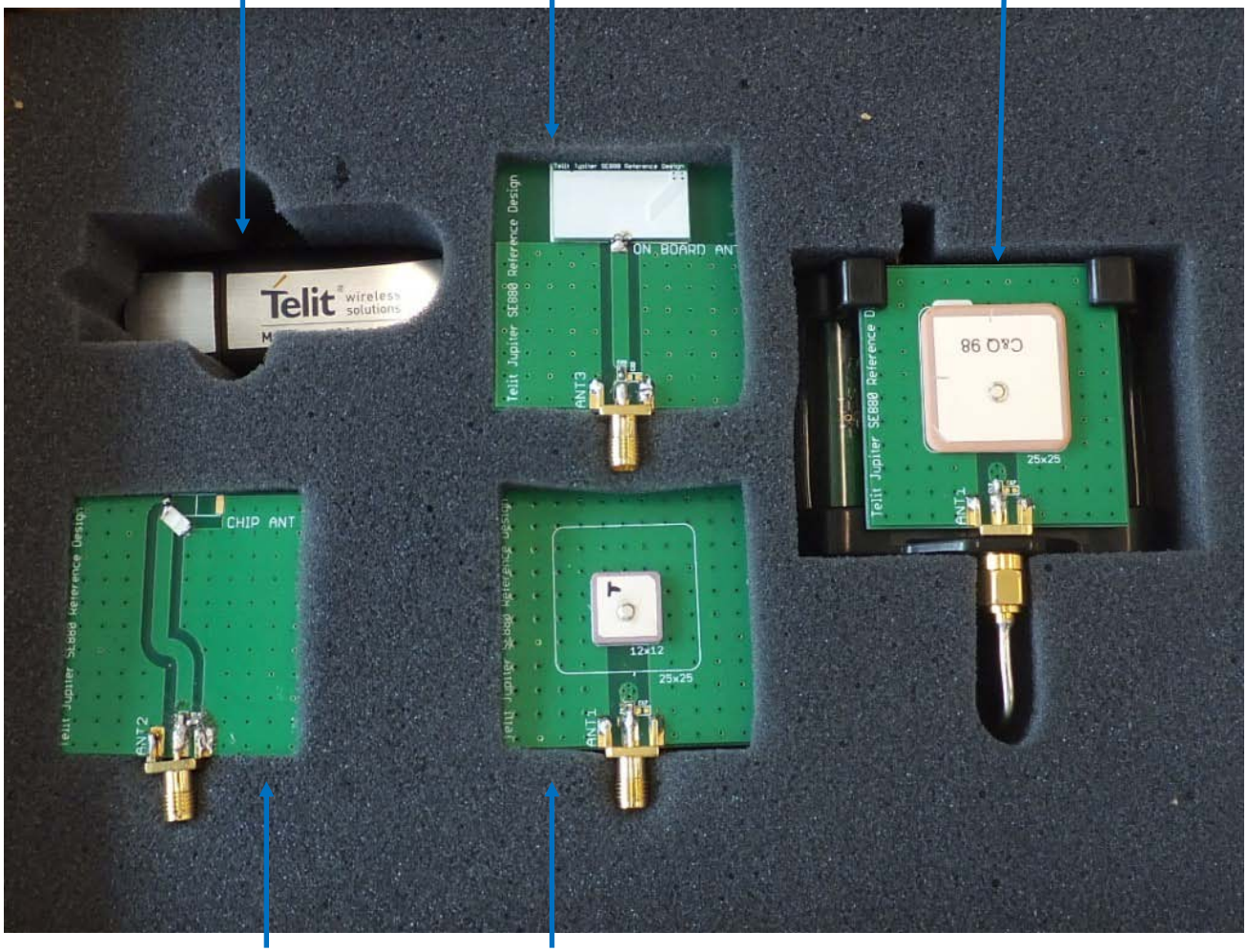
- 2 GB of RAM
- 1280 x 1024 screen resolution

Ensure that all previous installation versions of SiRFLive have been uninstalled before installing any newer versions!

Install the current SiRFLive with the attached installer. Follow the installer directions until finished. Users should allow SiRFLive to install to the default location – C:\Program Files\SiRF\SiRFLive, but it can be changed if necessary.

3. SE880 Reference Design Kit

3.1. What's in the Box



3.2. SE880 RDK Features

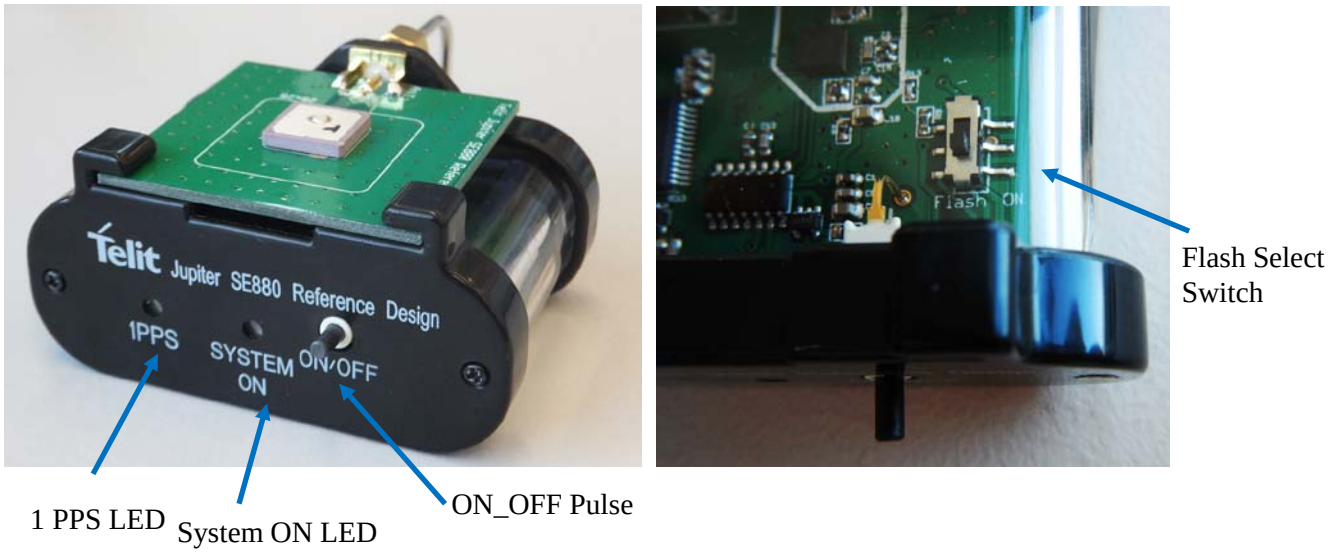


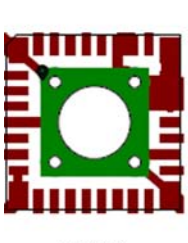
Figure 2: SE880 RDK assembly

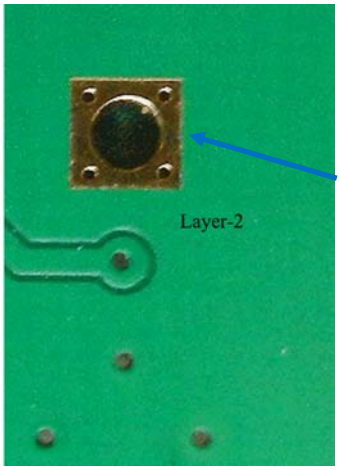
Item	Function
System ON LED	LED that indicates the SE880 is ready for GPS reception
1PPS LED	LED that pulses ON at 1/2 a second and OFF at 1/2 a second, indicating a fix with the receiver.
ON_OFF Pulse	Push button that sends a 1.8V voltage pulse to the ON_OFF input of the SE880 module toggling the module between Operating or Hibernate mode.
Flash Select Switch	Switch that selects the external 4Mbit SPI Flash connected to auxiliary port. Patch code “GSD4e_4.1.2-P1_RPATCH.03-Telit-F01” is preloaded in the Flash by using the ROM Patcher provided.

4. SE880 RDK Reference Layout

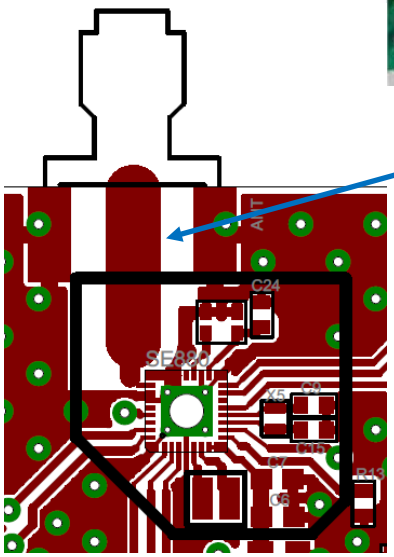
The reference schematic and PCB layout are provided in the USB memory which comes alone with the RDK. The performance of SE880 will be optimized with the following guidelines:

1. Use the bottom layer (layer-2) as the big ground plane for both RF and heat transfer.
2. The ground plane with via holes under the SE880 (shown in Figure 3) serves two purposes:
   a. Provide a good RF ground plane for the SE880.
   b. The big via hole dominates heat transfer from the SE880 to the big ground on layer-2. This enhances TCXO implementation by provide the TCXO a thermally stable environment. Heat transfer of copper is 1400 times fast than FR4.
3. Coplanar waveguide calculator should be used to determine the appropriate transmission line structure to achive 50 Ohm input trace for the antenna at 1.575GHz..





Good thermal transfer and RF grounding



2-layer FR4, 1.6mm thickness, 2oz copper

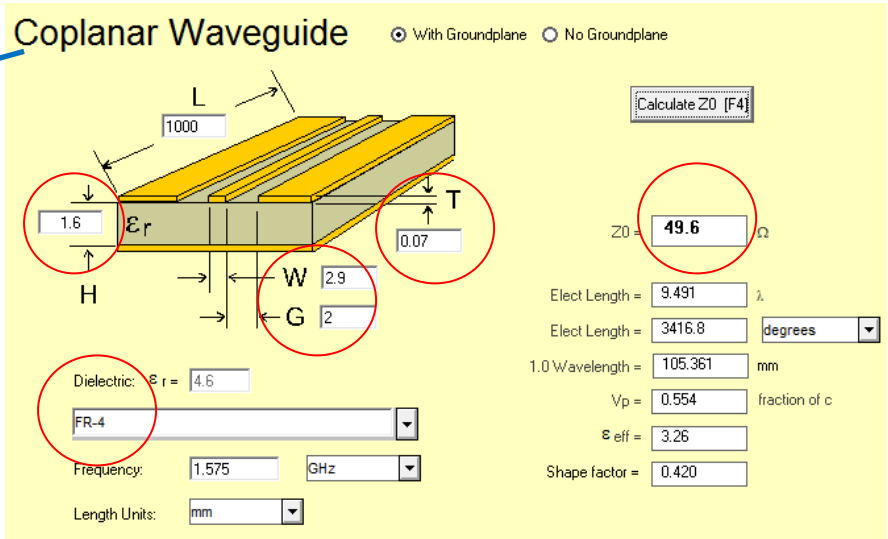


Figure 3: SE880 PCB Layout

5. Step-by-Step: Running the SE880 RDK

5.1. Step-by-Step: First Time Connection

1. Before connecting the RDK, ensure that the USB drivers have been installed.
2. As soon as the evaluation board is connected to the PC, it will be detected and installed.

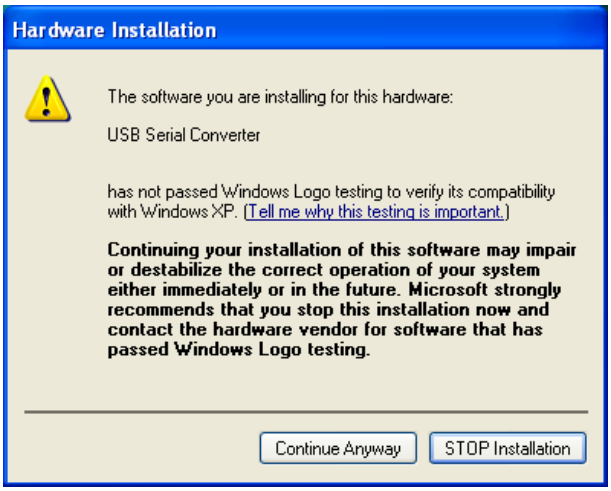


Figure 4: USB installation, select “Continue Anyway” to proceed.

3. After the evaluation board has been installed, check the “Device Manager” window for the evaluation board COM port number. This information is needed for use with the GPS tools.

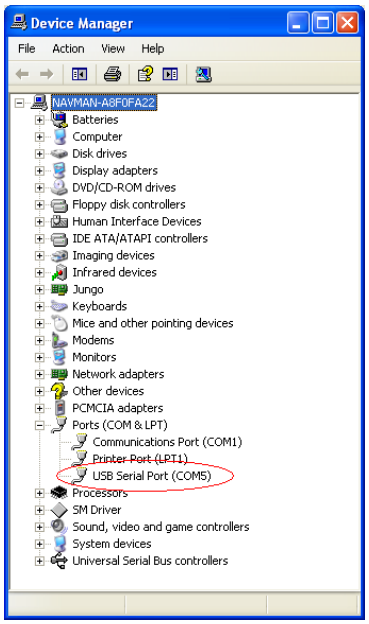


Figure 5: In this case, the COM port is assigned as COM5

5.2. Powering on the RDK

1. At first application of power (connecting of USB) , SE880 will be in *hibernate mode*.
2. Press the **ON/OFF** pulse button to bring the unit into *Full Power Mode*.
3. Connect one of the provided passive antennas to the RF connector of SE880 through the RF cable.
4. Place the Antenna to where it has a clear view of open sky.
5. The evaluation board can now be manipulated with the provided GPS tools (SiRFLive).
6. Refer to Chapter 5: SE880 on SiRFLive for using the SE880 on SiRFLive.

6. SE880 on SiRFLive

Launch the SiRFLive application.

6.1. Main Interface

After launching SiRFLive, first notice the application's main interface.

Figure 6: Main Menu Bar

Figure 7: Main Tool Bar

6.2. Connecting To the SE880

The user can utilize either the *Main Menu Bar* or the *Main Tool Bar*.

6.2.1. Main Menu Bar

Under the option "Receiver" on the *Main Menu Bar*, there is a selection "Connect. . ." This will open the Receiver settings for connection.

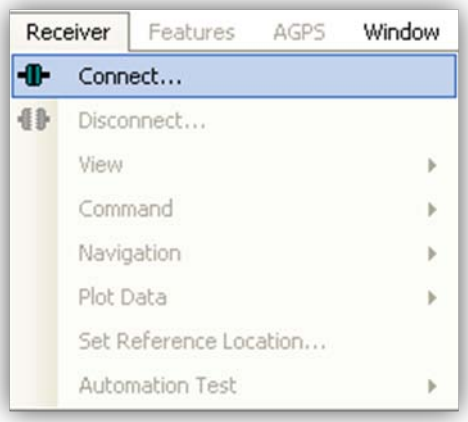


Figure 8: Connect to Receiver

6.2.2. Main Tool Bar

Select the “Receiver Settings” button

Or the “Connect” button

6.2.3. Rx Port Settings

Select the GSD4e Product Family, RS232/USB, and the Correct COM Port.

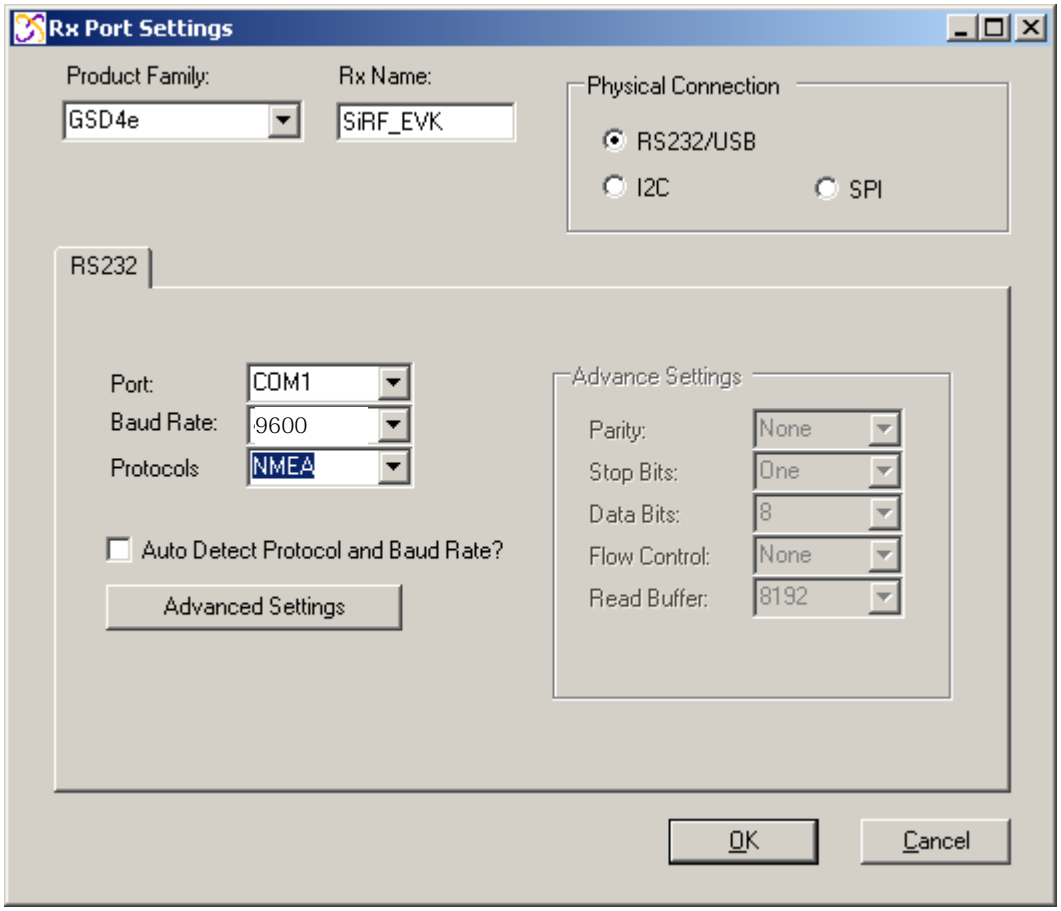


Figure 9: The Rx Port Connection Window

Default Baud rate for SE880 RDK is NMEA 9600 baud at power up.

6.3. SiRFLive Windows

After a successful connection with the receiver is established, the default SiRFLive windows should be arranged and become filled with data.

If not all the default windows are arranged or opened, under the *Main Menu Bar*, go to "Window" > "Restore Layout" > "Default."

6.3.1. Signal View

(main tool bar icon)

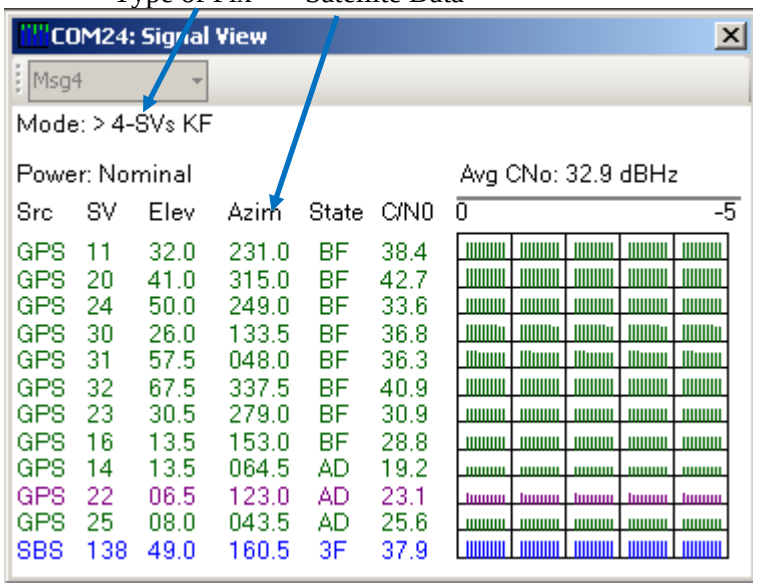


Figure 10 Shows the satellite signal levels.

6.3.2. Radar View

 (main tool bar icon)

Red satellites – 0 C/N0

Blue satellites – nonzero C/N0 but not being used in the navigation solution

Green satellites – nonzero C/N0 and are being used in the navigation solution

Skyblue satellites – SBAS satellites

Orange satellites – ABP is being used to acquire satellites

Magenta satellites – Extended Ephemeris is being used to acquire satellites.

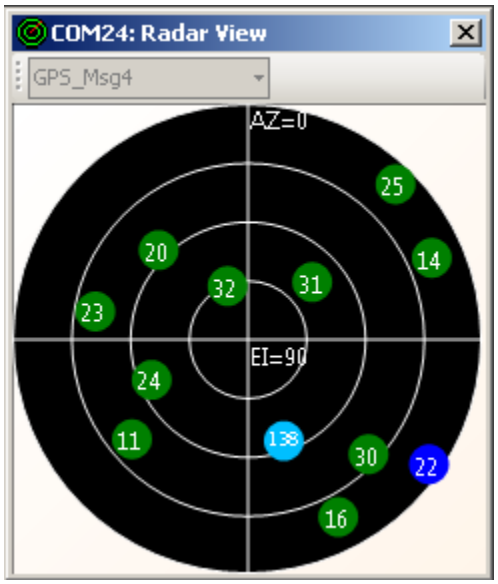


Figure 11: Displays the satellites by azimuth and elevation.

6.3.3. Debug View


(main tool bar icon)

Shows the communication messages with the receiver.

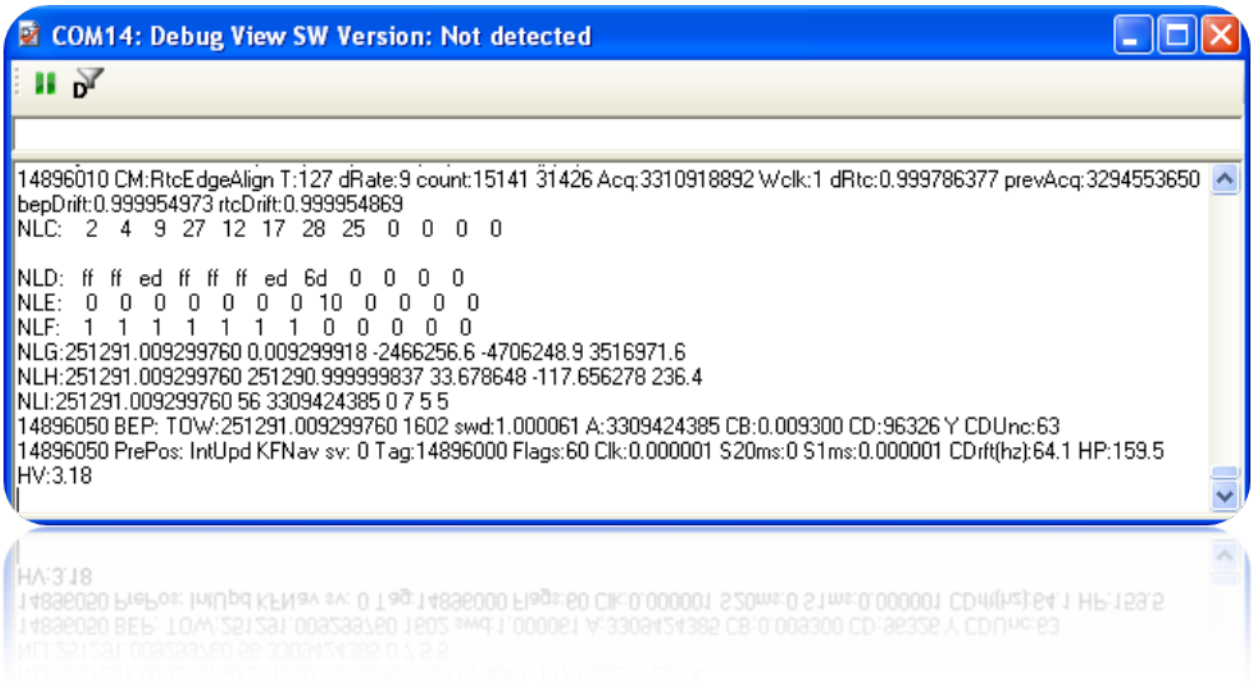
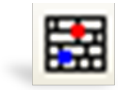


Figure 12: Debug view with One Socket Protocol messages.

6.3.4. Location View


(main tool bar icon)

Displays more detailed information regarding the UTC, TOW, Latitude, Longitude, Altitude, etc.

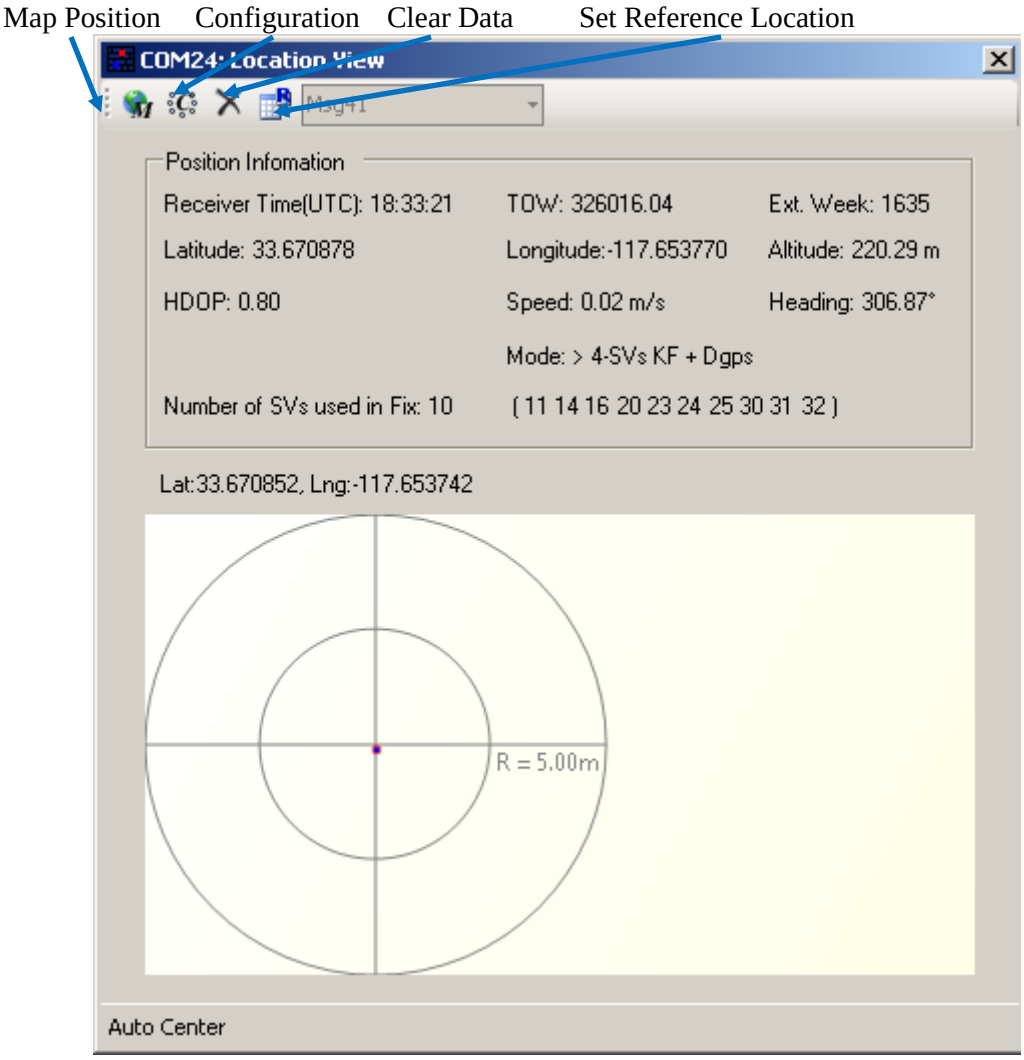


Figure 13: Location view

Map position button requires Internet access to work.

6.4. Receiver Commands

Most of the Receiver Commands can be accessed through the *Main Menu Bar* under "Receiver" > "Command." There are also shortcuts on the *Main Tool Bar* which will be covered in this section.

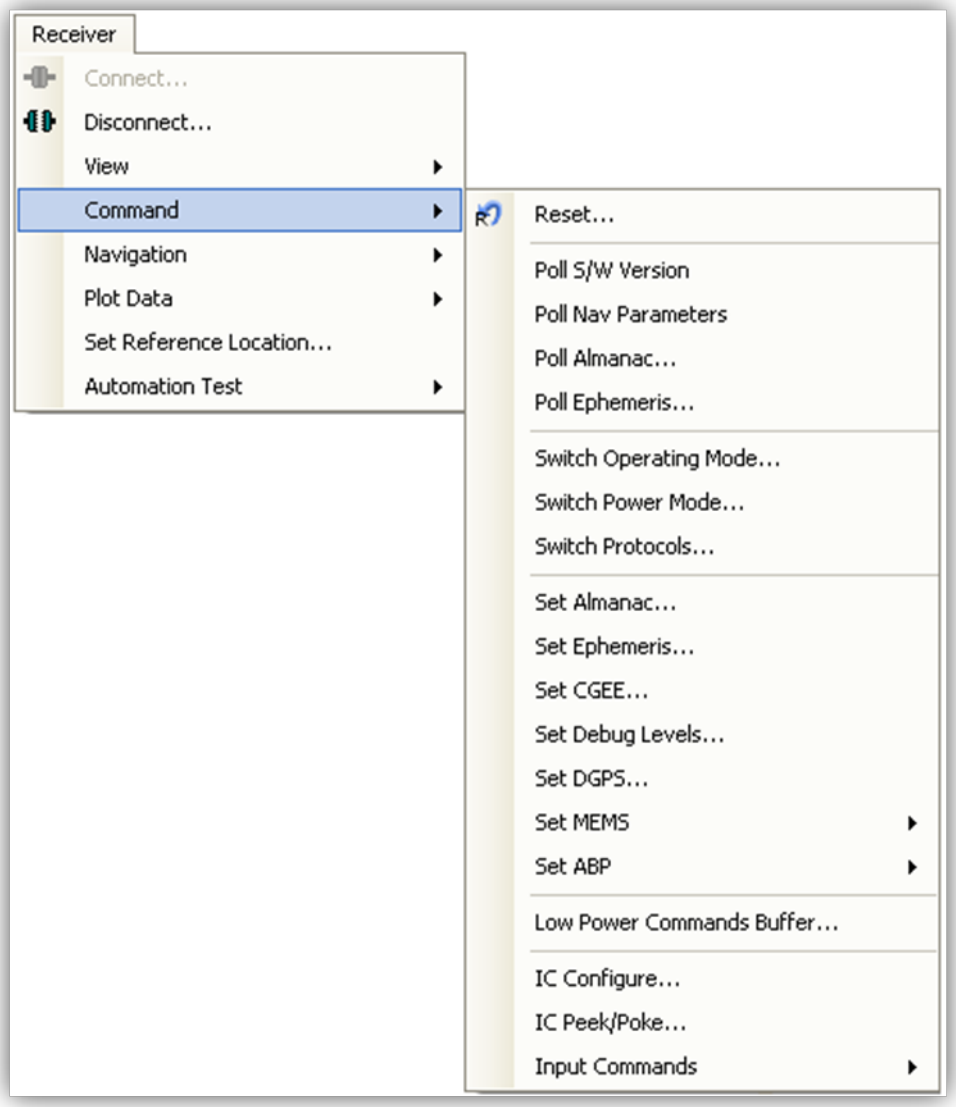


Figure 14: All the commands for the receiver.

All of the *Receiver Commands* become available in One Socket Protocol (OSP) only.

6.4.1. Sending Cold Start

 (main tool bar icon)

1. Select “Cold Start. . .” under the *Main Menu Bar* “Receiver” > “Command” > “Reset. . .”

   Or

   Select the Reset icon on the *Main Tool Bar*.

The “Reset” window should open.

Optional reference location allows the user to change the position used as the reference. This helps determine position accuracy in conjunction with Time-To-First-Fix values.

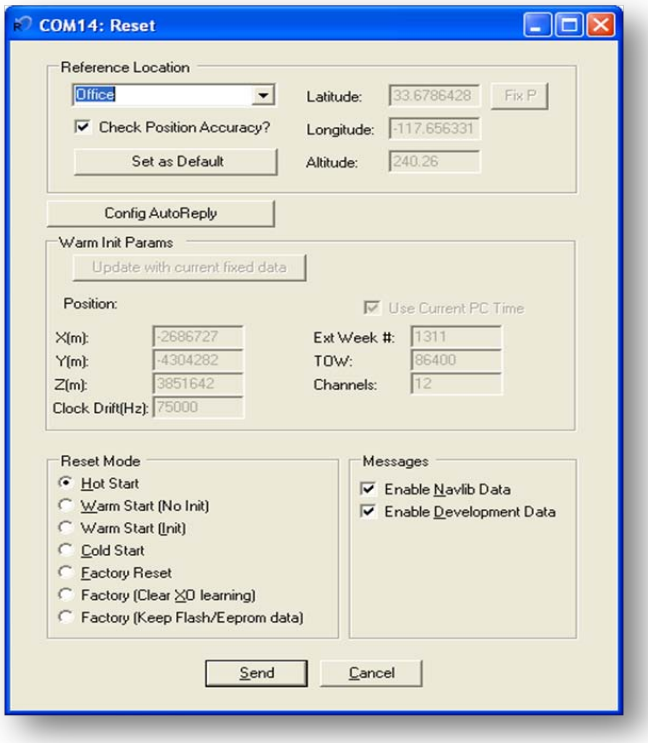


Figure 15: Reset window.

OSP protocol should be used to open the TTFF/Nav Accuracy window which conveniently displays the TTFF in seconds and Navigation accuracy based on the Reference Location. Refer to 5.4.2.

Factory Reset will remove the patch code stored in the RDK’s 4Mbit SPI Flash! Don’t attempt to perform Factory Reset unless the user has familiarized with the use of the ROM Patcher comes alone with the RDK.

6.4.2. Switch Protocol

The number of available commands in NMEA is limited compared to OSP. Switching to OSP for testing is recommended.

1. On the *Main Menu Bar*, select “Receiver” > “Command” > “Switch Protocols. . .”

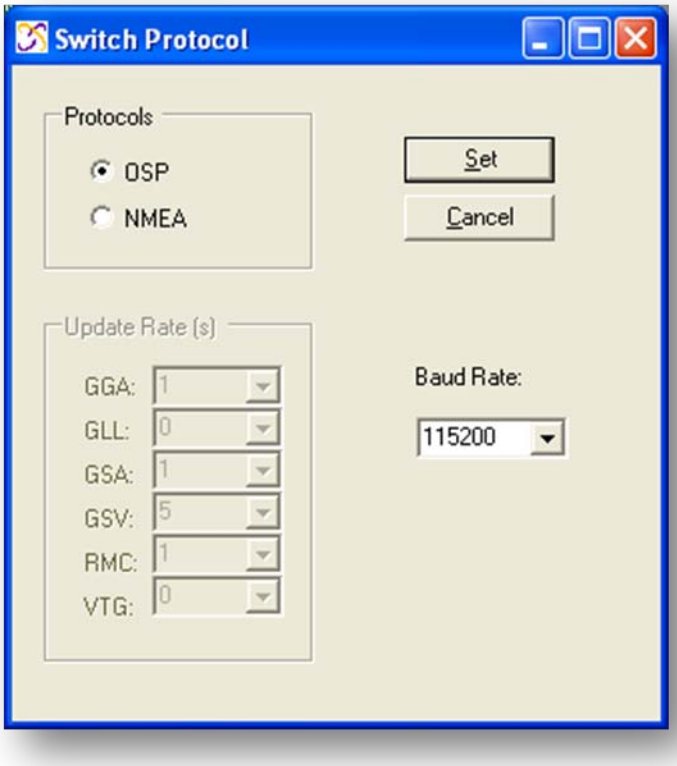


Figure 16: Switching to OSP protocol with its default 115200 baud rate

2. Click “Set” to apply settings.

Switching to NMEA should be similar.

6.4.3. Logging Data

 (main tool bar icon)

SiRFLive is capable of collecting either the OSP message stream or the NMEA message stream into a log file.

1. While the receiver is outputting messages to SiRFLive, click on the *Log File* icon on the *Main Tool Bar* or go through the *Main Menu Bar* under “Log File” then “Start. . .” shown in Fig 16.

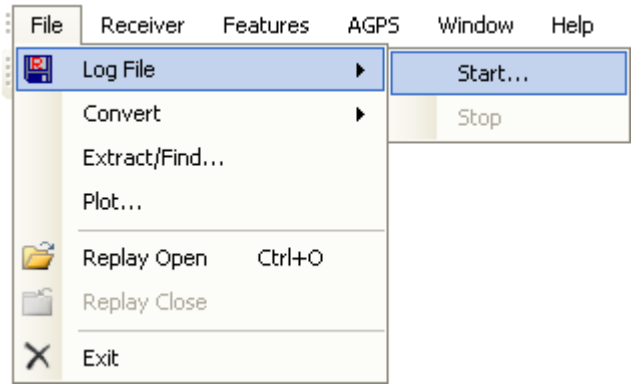


Fig 17: *Main Menu Bar* access to the Log File command.

i. The *Log File* window should open, which is shown in Fig 17. Click on the ". . ." button, as indicated by the arrow in Fig 19, to open a window where the user can specify the output folder and the output file name.

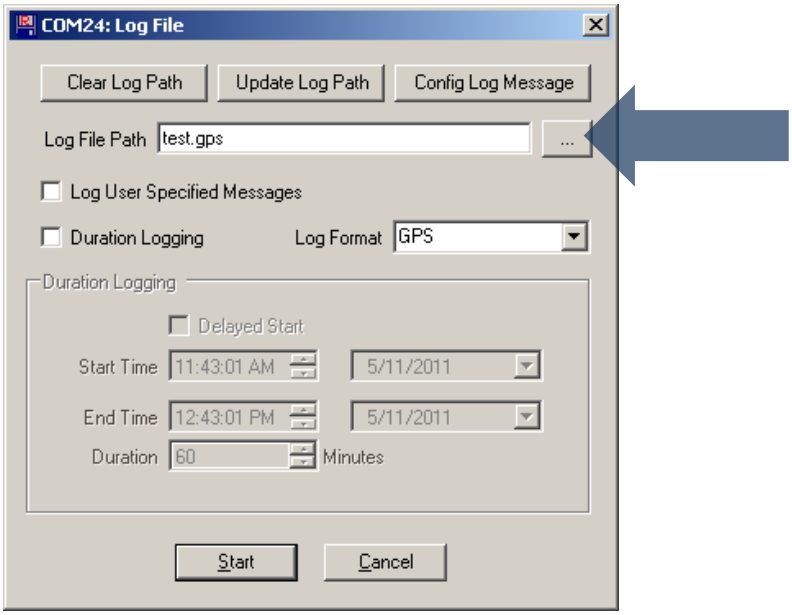


Fig 18: Clicking on the ". . ." button will give the user the control of the output folder and output name

ii. After specifying the output folder and output name, close the "Specify log file name:" window by clicking *Open* and the "Log File Path:" bar should be filled with the file path. Select the desired Log Format, and click "Start" in order to start logging.

7. Document History

Revision	Date	Changes
0	2013-01-16	First draft
1	2013-05-01	Revision 1