NAVMAN WIRELESS

Jupiter-F²

User's Manual

No: SW1.12_4.0.2 V.1.0.0 11.09.10F

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Preparing for the Jupiter-F^2 1

Always follow ESD safety precautions when utilizing the Jupiter-F^2 evaluation kit. For additional information on the Jupiter-F^2, ask your sales representative for additional manuals, datasheets, support, etc.

What is Necessary

To use the Jupiter-F^2 Evaluation kit, you will need:

- FTDI USB Drivers
- SiRFLive2.0 and above or
- SiRFDemo
- 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).
- A programmed/flashed Jupiter-F^2 evaluation device.
    - SiRFlash_402 and above if needed to flash the Jupiter-F^2 device.
    - GSD4e v4.0.2-P1 firmware to be flashed on the Jupiter-F^2 device if needed.

Installing the USB Drivers

Before connecting the Jupiter-F^2 Evaluation Kit, install the necessary USB drivers.

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

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

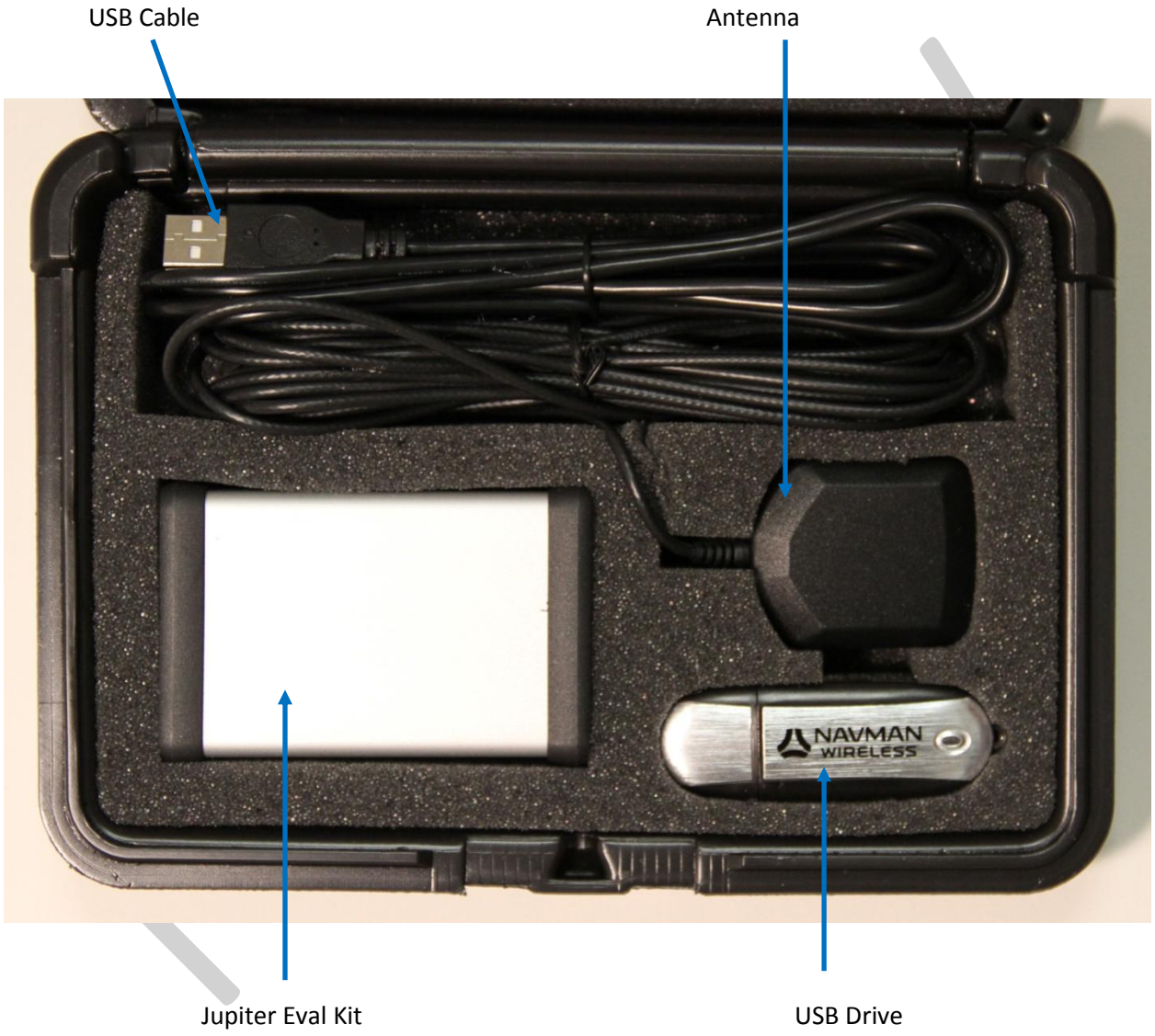
- 2 GB of RAM
- 1280 x 1024 screen resolution

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.

Jupiter-F^2 Evaluation Kit

What's in the Box



Jupiter Evaluation Board

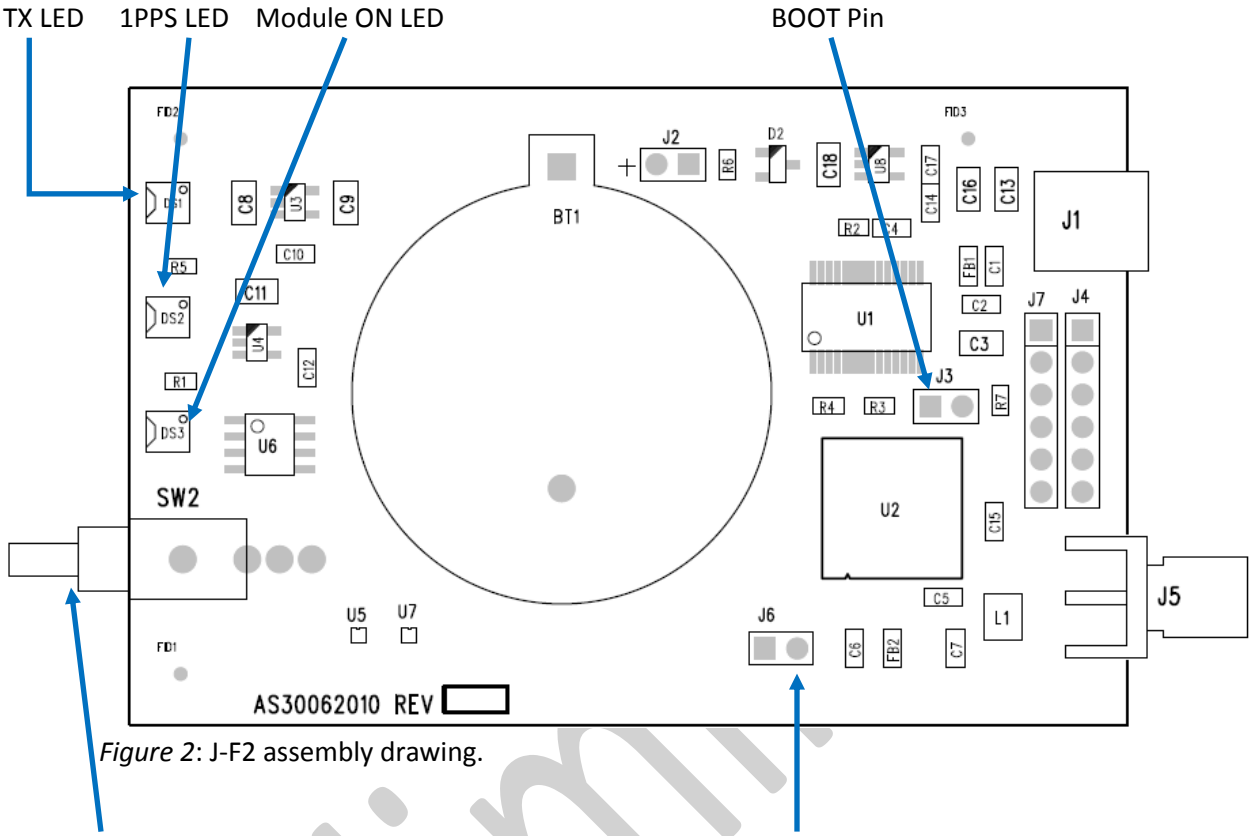


Figure 2: J-F2 assembly drawing.

Item	Function
TX LED	LED that is tied to the USB to UART bridge TX line. The LED blinks whenever there is activity on the TX line.
1PPS LED	LED that pulses ON at ¼ a second and OFF at ¾ a second, indicating a fix with the receiver.
Module ON LED	LED indicating that the module is on. Led is tied to the SYSTEM_ON pin out of the Jupiter-F^2.
ON_OFF Pulse	Pushbutton that sends a 1.8V voltage pulse to the ON_OFF input of the Jupiter-F^2 module.
3.3V Antenna Supply	A jumper on J6 provides a 3.3V output to an active antenna (remove jumper if connecting a passive antenna).
BOOT Pin	A jumper on J3 will pull the BOOT_0 high, putting the module into internal BOOT mode for firmware flashing.

Step-by-Step: First Time Running the Jupiter-F^2 Evaluation Board

The Jupiter-F^2 evaluation board defaults to *hibernate mode* as soon as the USB is connected. It is important to understand the different power states in order to be in the correct mode for the desired operation.

Step-by-Step: First Time Connection

1. Before connecting the evaluation board, 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.

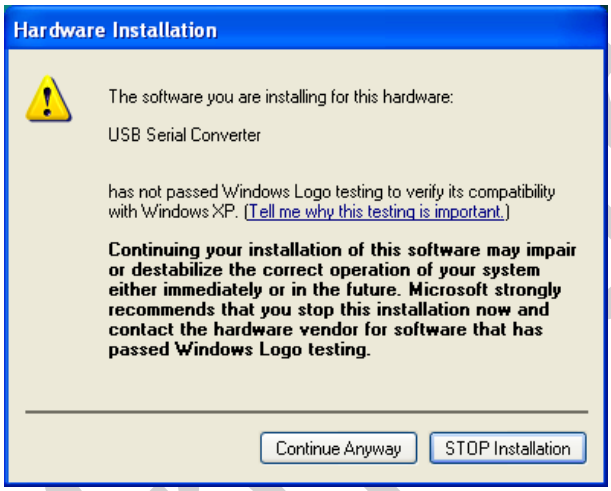


Figure 3: USB installation, select "Continue Anyway" to proceed.

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.

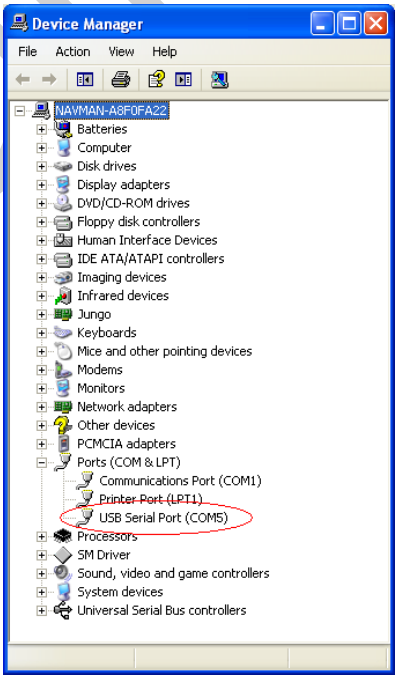


Figure 4: In this case, the COM port is assigned as COM5

4. At first application of power (connecting of USB), the evaluation board should default to *hibernate mode*. The **Module ON LED** should be unlit.
5. Remove any jumper installed on J3 (**BOOT Pin**).
6. Press the **ON/OFF** pulse button to bring the unit into *Full Power Mode*.
7. The *Full Power Mode* will be indicated by the **Module ON LED**.
8. Connect the provided GPS Active Antenna. NOTE: The evaluation kit is outputting 3.3V to the antenna, the jumper on J6 needs to be removed.
9. Place the GPS Active Antenna to where it has a clear view of open sky.
10. The evaluation board can now be manipulated with the provided GPS tools (SiRFLive or SiRFDemo).
11. Refer to Chapter 5: Jupiter-F^2 on SiRFLive for using the J-F^2 on SiRFLive.

Jupiter-F² on SiRFLive

Launch the SiRFLive application.

Main Interface

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

Figure 5: Main Menu Bar

Figure 6: Main Tool Bar

Connecting To the Jupiter-F²

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

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.

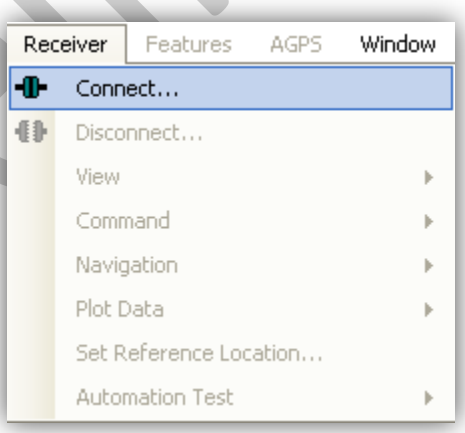


Figure 7: Connect to Receiver

Main Tool Bar

Select the “Receiver Settings” button

Or the “Connect” button

Rx Port Settings

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

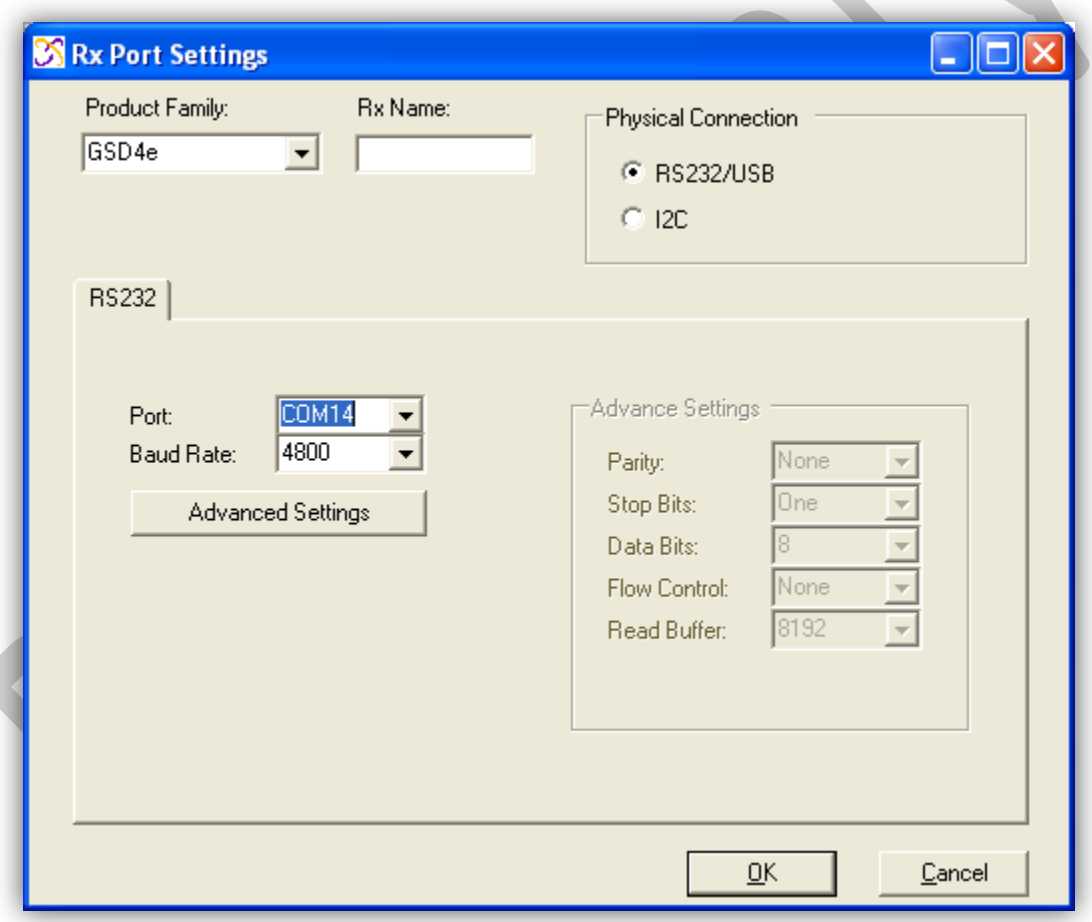


Figure 8: The Rx Port Connection Window

Default Baud rate for NMEA is 4800, and 115200 for OSP. SiRFLive uses AUTODETECT to synchronize the protocol and baud rate.

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."

Signal View

(main tool bar icon)

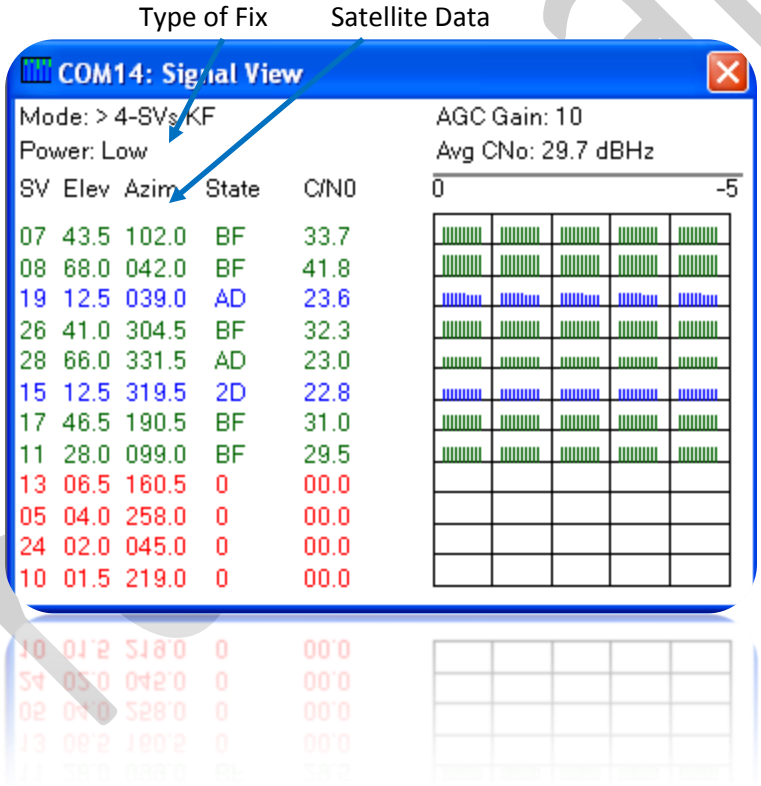


Figure 9 Shows the satellite signal levels.

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 10: Displays the satellites by azimuth and elevation.

Debug View


(main tool bar icon)

Shows the communication messages with the receiver.

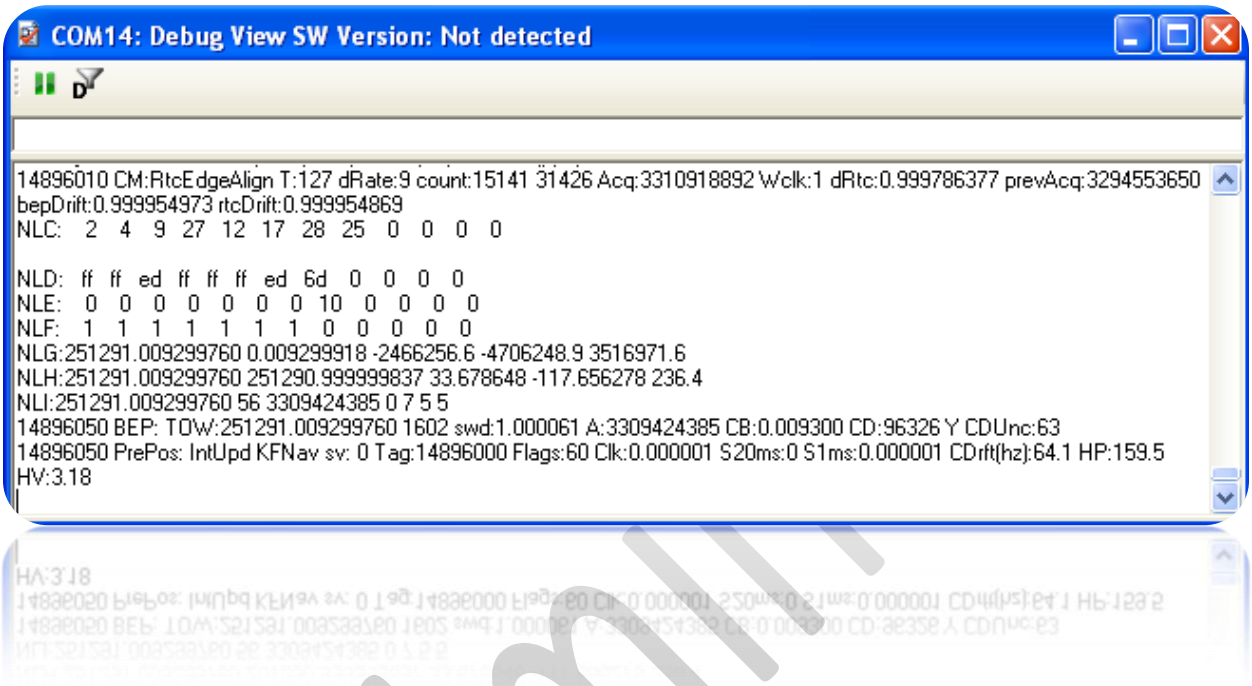


Figure 11: Debug view with One Socket Protocol messages.

Location View

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

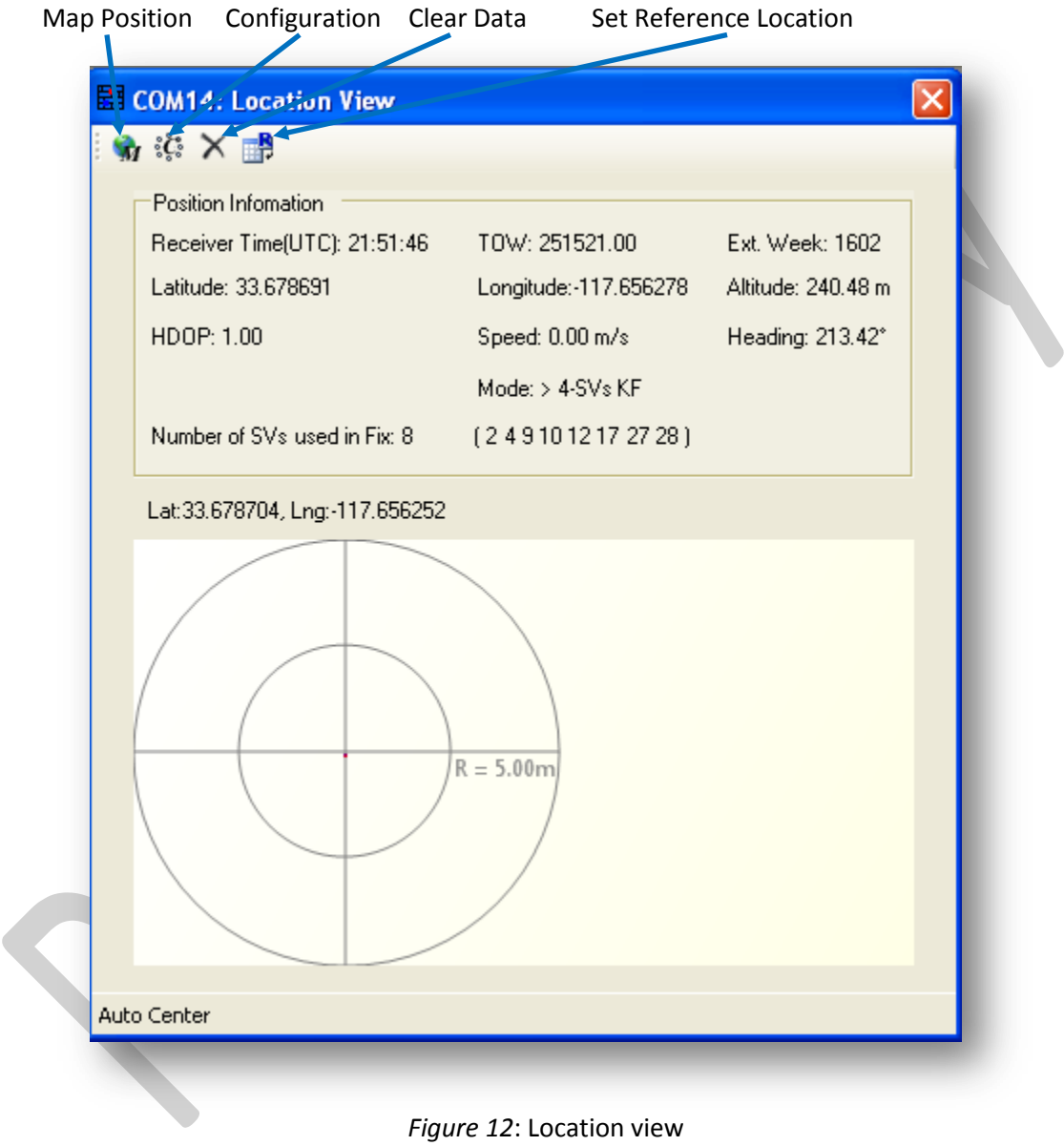


Figure 12: Location view

Map position button requires Internet access to work.

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.

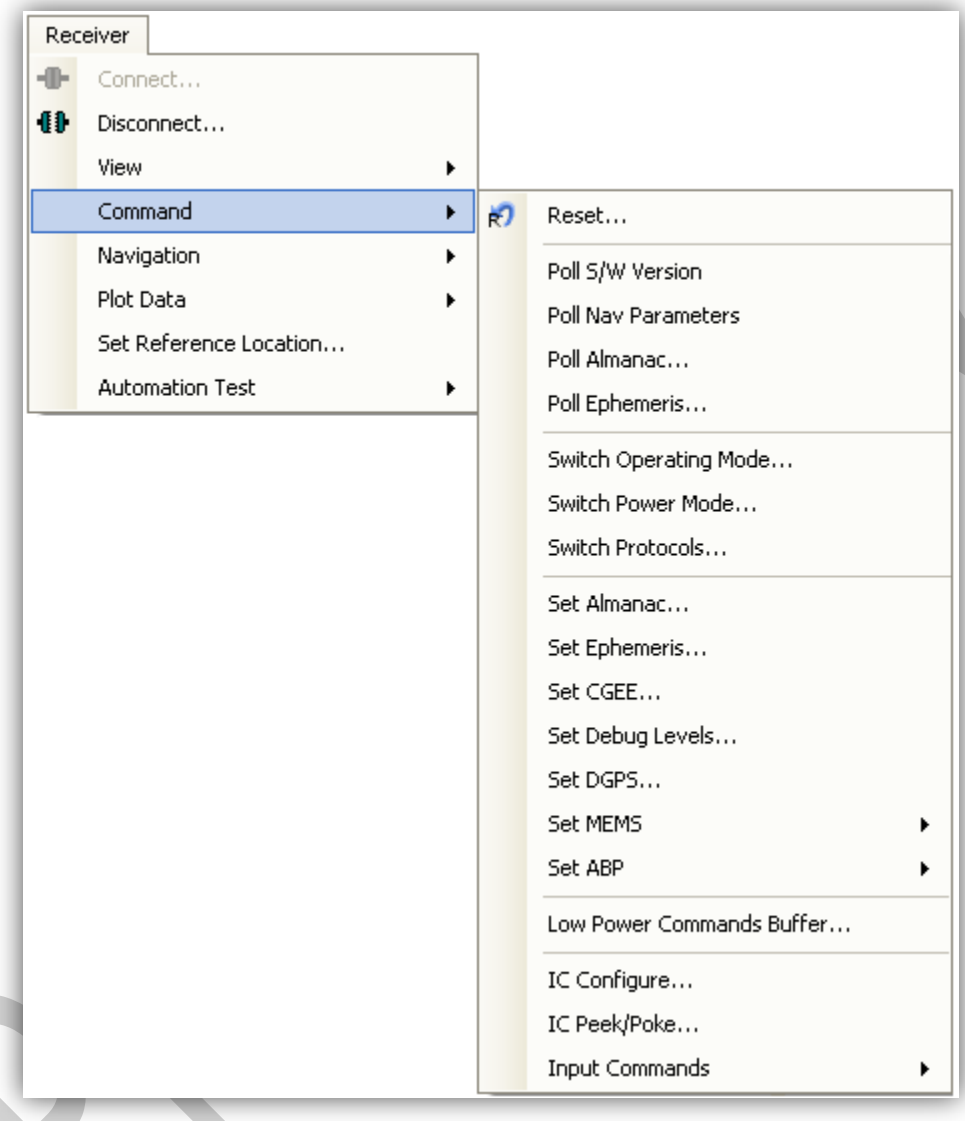


Figure 13: All the commands for the receiver.

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

Sending Resets

Select “Reset. . .” under the *Main Menu Bar* “Receiver” > “Command” > “Reset. . .”
Or
Select the Reset icon on the *Main Tool Bar*.
The “Reset” window should open.
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.

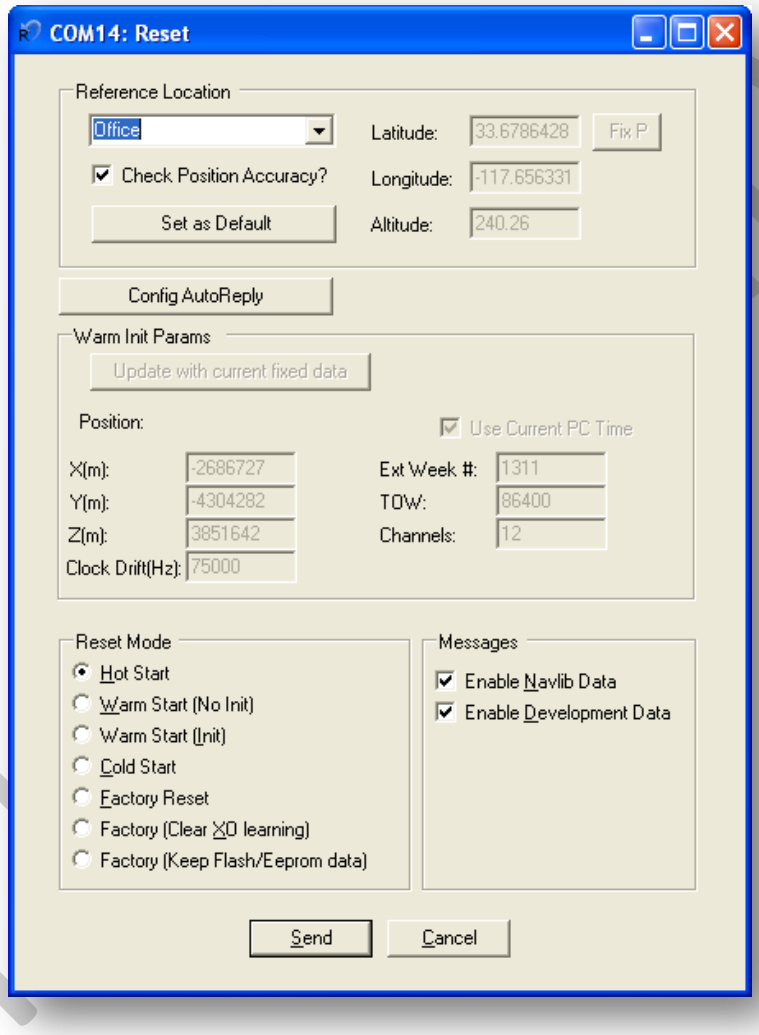


Figure 14: Reset window.

Resets are used to measure the TTFF of the receiver. The TTFF/Nav Accuracy window conveniently displays the TTFF in seconds and Navigation accuracy based on the Reference Location.

Switch Protocol

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

On the *Main Menu Bar*, select "Receiver" > "Command" > "Switch Protocols. . ."

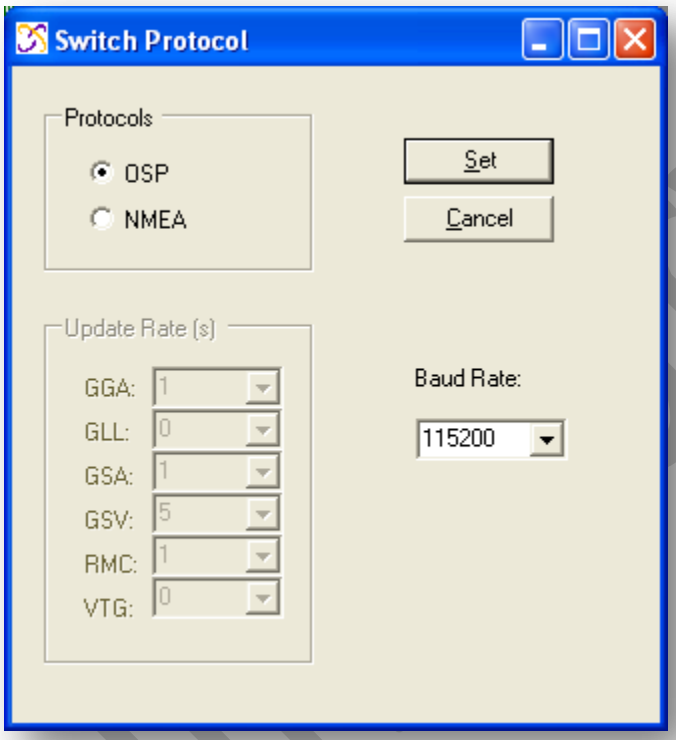


Figure 15: Switching to OSP protocol with its default 115200 baud rate

Click "Set" to apply settings.

Switching to NMEA should be similar.

Setting the IC Configuration

The Jupiter-F^2 module has two LNA modes, a high gain mode, and a low gain mode. The high gain mode is ideal for passive antenna applications, while the low gain mode is ideal for active antenna applications.

LNA Gain Setting	Gain (dB)	Noise Figure (dB)	Recommended External Gain Range
Low	6.0–10.0	8.5–9.5	16–30
High	16.0–20.0	1.2–2.0	8–18

Table 1: LNA information and antenna gain requirements

The development kit hardware is set up to use an active antenna. The antenna feed is outputting 3.3V for the antenna. To ensure that no cross-correlation occurs, ensure that the correct LNA gain setting is selected for the chosen GPS antenna for use. In this case, the provided GPS antenna, the M820B-S, has ~18dB typical gain.

On the *Main Menu Bar*, select "Receiver" > "Command" > "IC Configure. . ."

Click on "Advanced. . ." to open the IC Configuration fields.

A message will pop up warning about incorrectly configuring the IC parameters. Ensure that you are aware of the correct parameter changes so as not to render your receiver non-operational.

Click "Yes" to proceed.

Under the selection "LNA Gain Mode:" choose "Low" from the drop down menu. Choosing Low will configure the internal LNA to its low gain mode. This will make the Evaluation Kit better fitted to work with an active antenna. *Figure 14* displays the IC Configuration window.

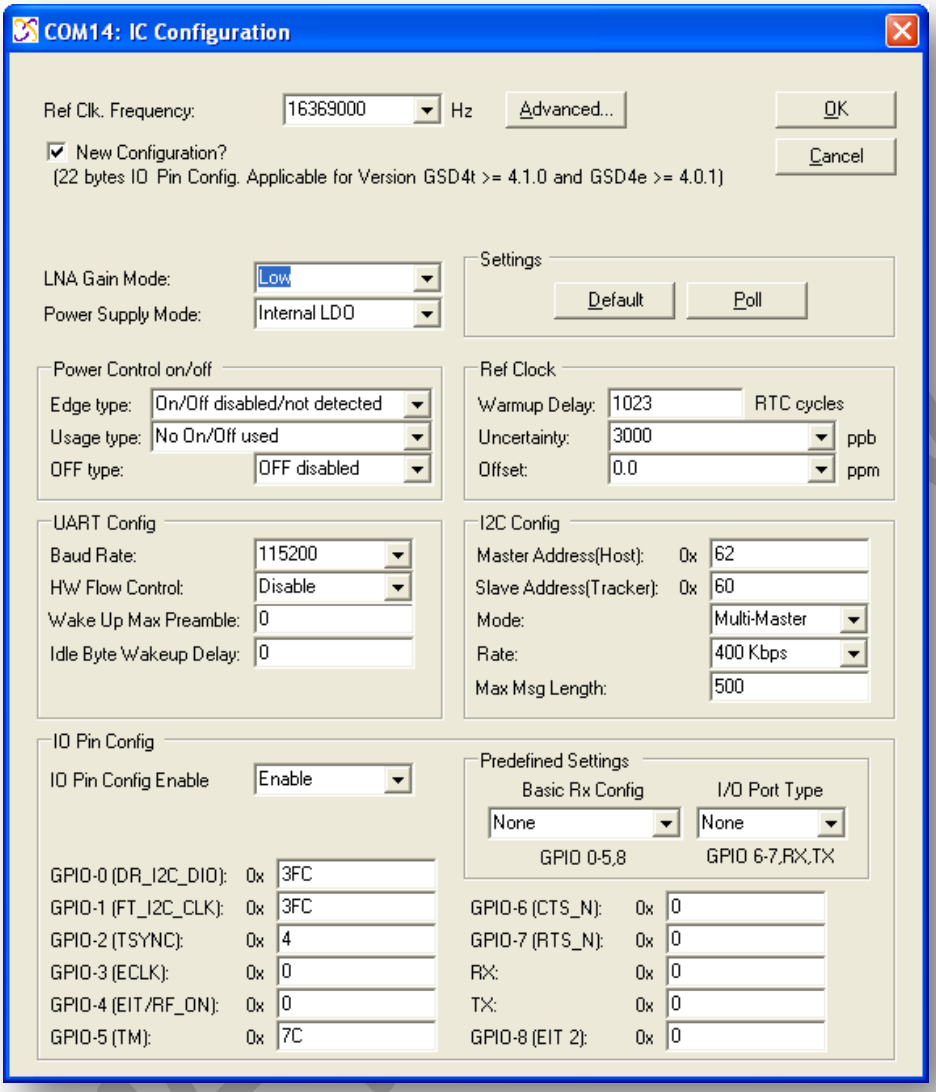


Figure 16: Configuring the IC parameters.

Click "OK" after all necessary changes.

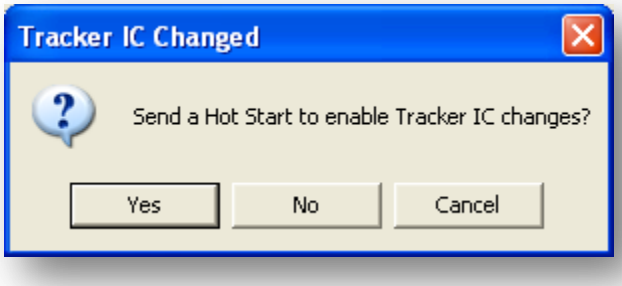


Figure 17: Click "Yes" in order for new changes to be applied.

APPENDIX A: Flashing The Jupiter-F^2

Flashing the Jupiter-F2

It is usually not necessary for users to keep re-flashing the evaluation kit. New firmware will only be provided if necessary.

1 From *Hibernate Mode*, (**Module ON LED** unlit), place a jumper across J3 and apply the **ON_OFF pulse** in order to go into Internal Boot mode. Fig. 2.

2 Double click the SiRFlash.exe icon to open the program.

3 Select Program, Internal Boot mode, Erase whole chip, and browse for the device firmware.

4 Select Execute.

5 After successful programming, apply the **ON_OFF pulse** in order to return to *Hibernate Mode*. Remove the jumper across J3, reapply the **ON_OFF pulse** and the unit will be in *Full-Power Mode* ready to communicate.

The evaluation Jupiter-F^2 device needs to be in *BOOT mode* in order to flash. A jumper across J3 needs to be placed. Refer to Figure 2 for placement location.

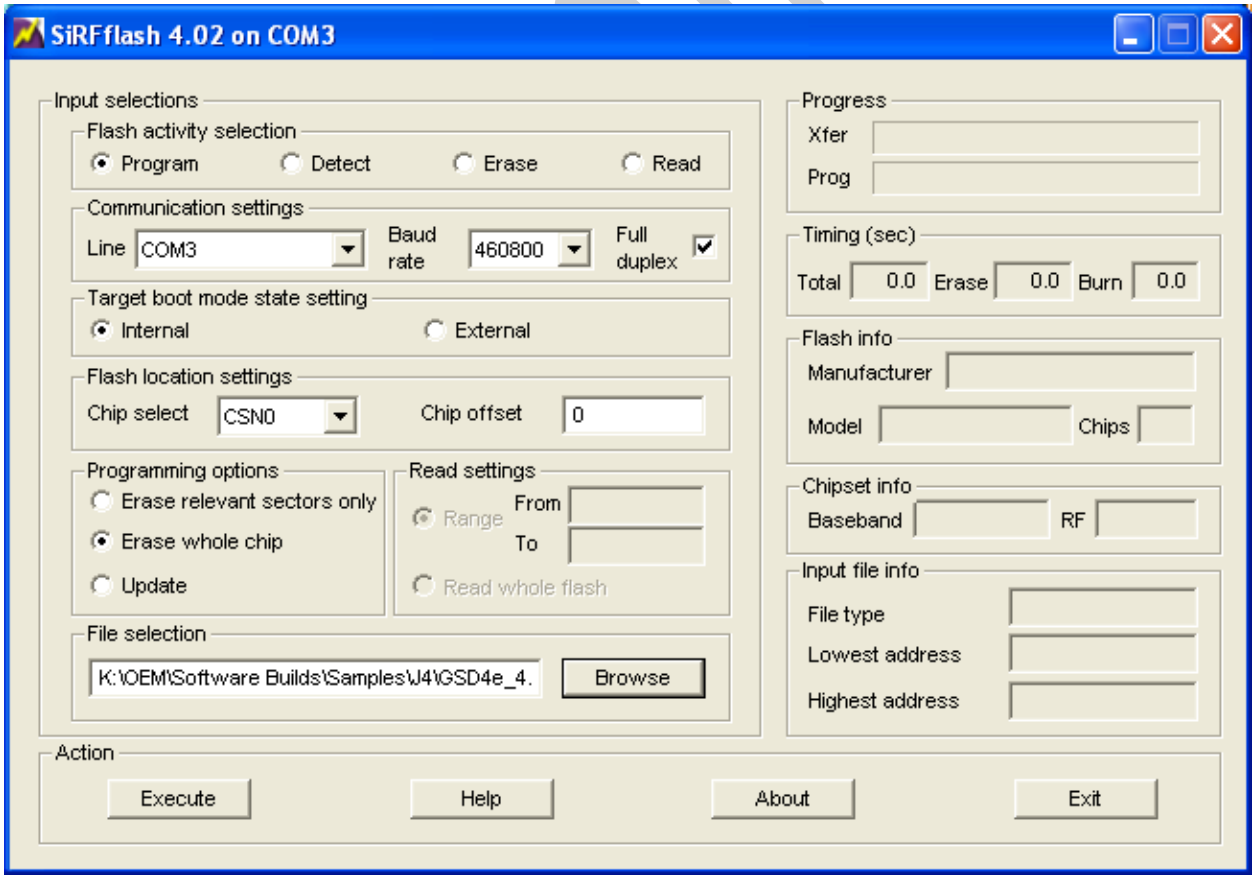


Figure 1: SiRFflash tool setting.

APPENDIX B: Going into Boot Mode and Hibernate Mode

Going into Boot Mode and Hibernate Mode

The Jupiter-F^2 Evaluation Board's main power comes from its USB port. Upon connection to a USB port, the evaluation kit defaults to its *hibernate mode*.

Hibernate mode is an ultra low power state that has both the RF and baseband turned off, leaving only the RTC and battery-backed RAM powered.

Going into Boot Mode

1. From hibernate mode (**Module ON LED** off), place a jumper on the **BOOT Pin** J3.
2. Wake up the Jupiter-F^2 module by pressing the **ON_OFF Pulse** pushbutton once.
3. Wait for the **Module ON LED** to turn on, indicating that the module has left *hibernate mode*.
4. It is now in Boot mode and ready to be flashed with firmware.

Going into Full Power Mode

1. From hibernate mode (Module ON LED off), ensure that there is no jumper on the **BOOT Pin** J3.
2. Wake up the Jupiter-F^2 module by pressing the **ON_OFF Pulse** pushbutton once.
3. Wait for the **Module ON LED** to turn on, indicating that the module has left *hibernate mode*.
4. It is now ready to communicate with software GPS tools.

Internal LNA and Antenna

The Internal LNA has two modes, each are specific to the amount of gain that a connected antenna will have.

Usually, in high gain internal LNA mode, the antenna connected will be a passive antenna, while the low gain internal LNA mode will require an active antenna or an external LNA.

It is recommended for the AGC to be in mid-range(between 1 and 62). If the total system gain is too high, the AGC will be high, therefore it will not be able to compensate as well if the receiver is in a noisy environment.

The Jupiter-F^2 evaluation is bundled with an Active Antenna, providing an amplifier gain of 16dB typical.

Active Antenna

The bundled M820B antenna requires a DC voltage between 2.7V to 6.0V. The Evaluation Kit can provide 3.3V to the active antenna by adding a jumper on J6. The active antenna should be low gain variety.

For passive antenna connection, ensure that jumper J6 is not installed in order to prevent damage.

Passive Antenna

Open the box and ensure that there are no jumpers installed on J6.