Ellipse-E

External Novatel GNSS integration

Operating handbook

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SBG SYSTEMS

This brief document guides you in the process of connecting an external Novatel GNSS receiver to your Ellipse-E.

Step 1: GNSS and Ellipse-E connections

1. Connect GPS Tx signal(s) to one of the following pins on Ellipse connectors: PORT B, C, D Rx pins. Please also connect Ellipse and GPS ground signals to each other.
2. Connect GPS PPS signal to Sync A, B, C or D input.

Step 2: GNSS module configuration

Basic operation

In addition to set a proper baudrate according to the Ellipse configuration, the following messages configuration should be done. Any other message should be disabled as the Ellipse expects only binary protocol as input.

```
LOG COM1 BESTPOSB ONTIME 0.2
LOG COM1 PSRXYZB ONTIME 0.2
LOG COM1 HEADINGB ONNEW
LOG COM1 TIMEB ONTIME 1.0
SAVECONFIG
```

Adding Post-processing capability

The following message configuration is required for post-processing.

```
LOG COM1 RANGECMPB ONTIME 1
LOG COM1 RAWEPHEMB ONCHANGED
LOG COM1 GLOEPHEMERISB ONCHANGED
SAVECONFIG
```

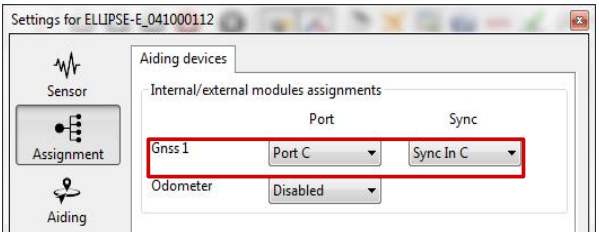
Note: The Novatel Binary protocol must be used as it provides the fastest transfer rate and lowest CPU consumption for data handling.

In order to configure the Ellipse-E, you need to use the sbgCenter and open the configuration window. Simply follow those instructions:

Set Aiding Assignment

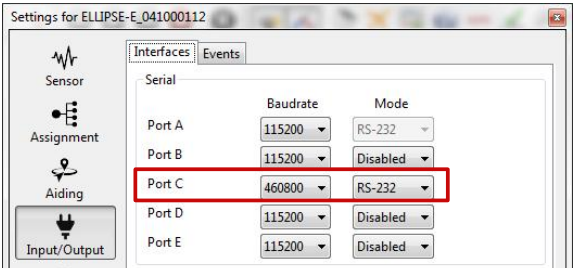
In this window, you just indicate where you connected your GNSS receiver.

Both communication port **and** Sync In pin must be set.



Set correct baudrate and mode for serial port

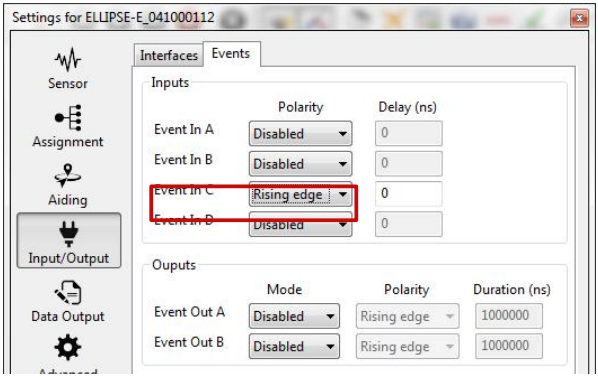
In our example we configured the GPS to be connected on PORT C in RS-232 mode.



Set Logic input configuration for PPS signal

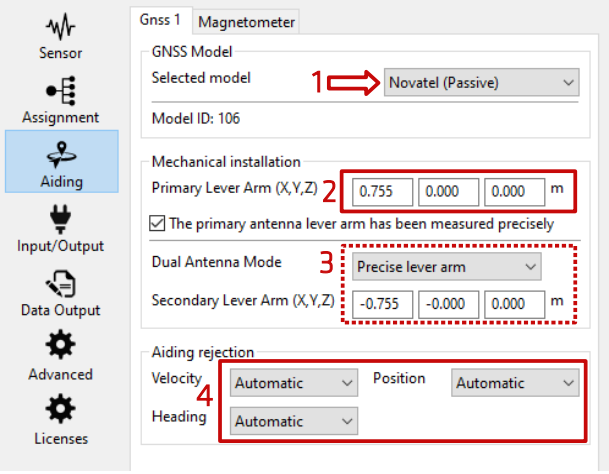
In order to use correctly PPS signal information, you must enable the corresponding logic input. Here we configured PPS on Sync C.

Polarity should be set accordingly with the actual GPS signal.



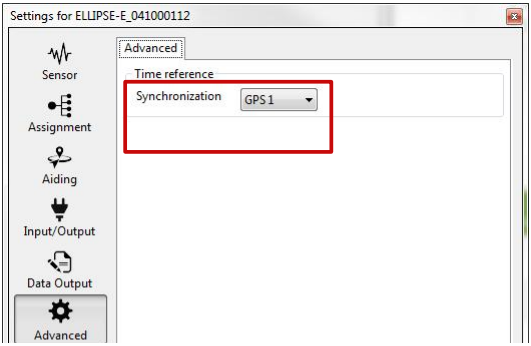
Set correct GPS model and configuration

1. GPS model should be set to Novatel – External.
2. GPS lever arm is measured within 5 cm FROM the Ellipse, TO the antenna. If the option "The primary antenna lever arm has been measured precisely" is ticked, then the Kalman filter will take these values for granted and not calculate any bias for this Primary antenna lever arm. It should help the system to align faster, but Primary antenna lever arm has to be correct.
3. In case of Dual antenna system, the alignment offset must also be entered. The antenna separation can be entered as well but is not mandatory.
4. Finally, each available measurement (position, velocity, course and true heading if available) should be configured to be used or not.



Check Clock alignment

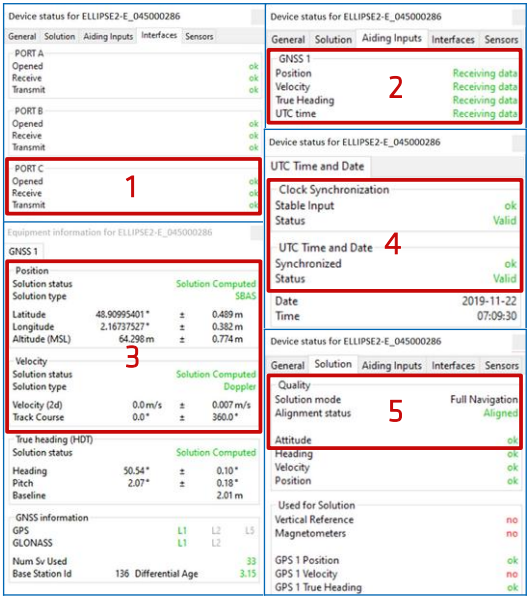
Finally, you check that the time syncronization reference is set to GPS 1 (default configuration).



Step 4: Checking status

The status and GPS windows should be checked carefully before going further. These status indicators will give essential hints in case of troubles to get a correct fix.

1. Corresponding COM port must be OK.
2. GNSS 1 frame in “Aiding Inputs” tab must show active data. Not seeing this would mostly imply baudrate or cabling issue.
3. After that, you can check if the GPS solution has been calculated and is consistent.
4. Then you can check at the Clock section. Input clock must be OK and UTC time should be set to valid after a few minutes in steering mode.
5. Once the GPS acquired a solution, the Kalman filter should pass in Full Navigation mode and show active items in the “Used for Solution” field.



Note: The Kalman filter will run into navigation mode once a correct heading is estimated (requires magnetometers, true heading or some accelerations).