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| **WinFrog Device Group:** | **GPS** |
| **Device Name/Model:** | **NOVATEL RS232** |
| **Device Manufacturer:** | **NOVATEL INC.**<br>1120 - 68th Avenue N.E.<br>Calgary, Alberta, Canada, T2E 8S5<br>Tel: U.S. & Canada: 1-800-NovAtel<br>Fax: (403) 295-4501<br>E-mail: gps@NovAtel.ca |
| **Device Data String(s) Output to WinFrog:** | Refer to Configuration Details section below |
| **WINFROG DATA STRING(S) Output to Device:** | Configuration/Control Telegrams<br>RTCM |
| **WinFrog .raw Data Record Type(s):** | Type 303.<br>i.e. 303, PR-NOVARSER1, for Pseudorange data.<br>303, NOVARSER1, for Position data |

**DEVICE DESCRIPTION:**
The NovAtel RS232 GPS device provides WinFrog with GPS position or Pseudorange data via an RS-232 format serial interface (as opposed to the NovAtel Console device which is internally configured).

The NovAtel RS232 device will only accept ASCII format NovAtel channel measurement data, a format also used by older NovAtel products.

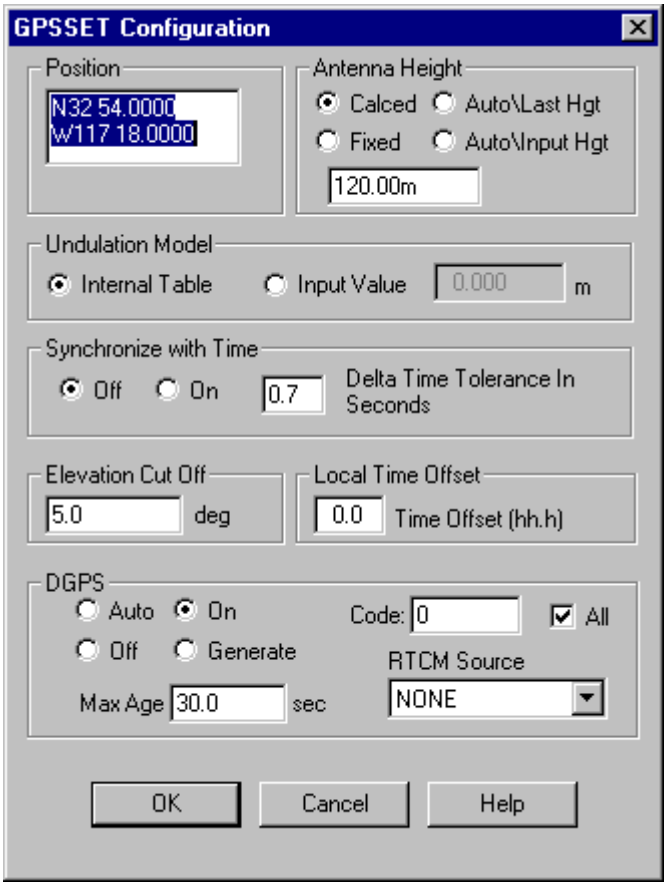
**DEVICE CONFIGURATION INSTRUCTIONS:**
Baud Rate: Configurable (9600 standard)
Data Bits: 8
Stop Bits: 1
Parity: none

**WINFROG I/O DEVICES > CONFIG OPTIONS:**
The NovAtel RS232 (NOVARSER1) device is added to WinFrog from the GPS device category. Adding the NovAtel RS232 device adds the Position and Pseudorange data items. The Position data sent from the NovAtel is in standard NMEA format.

Note that no ephemeris data is received from this device. If the Pseudorange data is to be utilized for positioning, ephemeris data must be obtained from another interfaced GPS device.

The NOVASER device must be configured at this generic level. Further configuration is required at the vehicle device list level. These configuration options are detailed later in this document.

In the I/O Devices window, highlight the NOVASER device, right-click and select Configure Device. The GPSSET Configuration dialog box will appear, as seen below.




**Position:**
An approximate initial position must be entered to provide the position calculations with a reasonable starting point. This position should be within approximately 5 minutes in both Latitude and Longitude. Ensure that the “quadrant” signifiers are correct: N/S or E/W.

**Antenna Height:**
Set the antenna height mode to one of the two provided options:

**Calculated** – Along with Latitude and Longitude, the NovAtel GPSCard will calculate the GPS antenna Geoidal Height (Mean Sea Level). A minimum of four satellites must be tracked in order to calculate both horizontal position and height.

**Fixed** – Fixes the GPS antenna height to the Geoidal Height (Mean Sea Level) value entered in the provided entry box. In this mode, the NovAtel is able to calculate horizontal positions using a minimum of three satellites.

**Auto\Last Height/ Auto\Input Height** – No Auto Height options are used by the GPScard.

Note**:** Heights entered in the provided entry box must refer to the geoid (Mean Sea level) and are entered in meters. In some other WinFrog dialog boxes, heights are displayed with respect to the vehicle's selected zero vertical reference point.

**Undulation Model:**
This option does not apply to this device. In other words, this option does not setup the GPS card for an undulation setting.

**Synchronize with Time:**
Click the On radio button to synchronize WinFrog's time with the NovAtel's GPS time. Note that this synchronizes WinFrog's "virtual" time, not the computer's system time. Once synchronized, WinFrog constantly compares its time to the received GPS time. If WinFrog's time differs from the GPS time by an amount greater than the defined time tolerance, WinFrog will reset its time. The default Delta Time Tolerance of 0.7 seconds is adequate for most applications.

**Local Time Offset:**
If the Synchronize with Time option is enabled, WinFrog System time will be the sum of the value entered in this dialog box and the time received from the NovAtel GPS receiver. The value can be entered as a negative value as required.

**Elevation Cut Off:**
Enter a mask angle value, in degrees. The GPSCard will not use measurements from any satellites with elevation angles below the angular value input in the Elevation (angle) Cut Off entry box.

**DGPS:**
This section of the dialog box allows you to set the mode by which the GPSCard will internally apply received differential GPS corrections.

There are four different DGPS modes: Auto, On, Off and Generate.

**Auto:** The GPSCard will automatically use differential corrections in its position calculations, when available. If no corrections are available, the GPSCard will compute a single point (autonomous) position solution.

**On:** The GPSCard will always attempt to use differential corrections. If no corrections are available, no position will be computed.

**Off:** The GPSCard will not use differential corrections in its position computations, even if they are available. Instead it will always compute a single point GPS solution.

**Generate:** The GPSCard will generate differential corrections based on a fixed reference position. This option is used for Base Stations only.

**Maximum Age (of Corrections):** If the GPS mode is set to Auto or On, the GPSCard will only apply the corrections if the received RTCM data is less than the specified Max. Age (entered in seconds).

**Code:** This portion of the DGPS section allows you to define which DGPS reference station will be used, as defined by its Code. If you don't know the code of the station being received, select All, in which case the GPSCard will use any received RTCM data.

**RTCM Source**: Use the dropdown list to select which RTCM receiving device will be used to provide the GPSCard with differential corrections. This RTCM receiver must be interfaced to WinFrog before it will be listed. The RTCM data is received via a serial connection, and is passed to the GPSCard via the ISA bus.

**WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:**

As mentioned above, adding the NovAtel RS232 device to WinFrog adds the Position and Pseudorange data items. WinFrog allows you to add one or both of these items to a vehicle's device list. Both of these items must be edited to suit the vehicle's application. See the NOVATEL CON(sole) device documentation for details on configuring both the Pseudorange and Position data items.

## CONFIGURATION DETAILS:

NovAtel devices are “black box” devices that have no user interface and so must be configured by command lines sent from an interfaced computer terminal. See NovAtel’s documentation for details on configuring a NovAtel receiver to output the following data strings.

**Device Data String(s)**
**Output to WinFrog:**

REPA: raw eph
RCCA: receiver config
ALMA: almanac, ion & utc data
SATA: sat specific data
RNGA: channel measurements old format
CTSA: channel-tracking status
GPGGA: GGA message
IONA: decoded ionospheric data
UTCA: decoded utc

Note: WinFrog’s NovAtel RS232 device uses ASCII messages (as opposed to Binary format). This can be seen in the last letter of the above codes.

I.E.:

- ALMB is a binary message, while
- ALMA is an ASCII message.