

WinFrog Device Group:	TIMEBASE
Device Name/Model:	Trimble 1PPS
Device Manufacturer:	Trimble Navigation Limited 645 North Mary Avenue Sunnyvale, CA 94086 Tel: 1 (408) 481-8000 Technical Support Tel: 1-800-767-4822 Email: Trimble_Support@Trimble.com
Device Data String(s) Output to WinFrog:	
WinFrog Data String(s) Output to Device:	
WinFrog Data Item(s) and their RAW record:	TIME DATE 999

DEVICE DESCRIPTION:

This device allows you to synchronize WinFrog's virtual time to the highly accurate GPS time output by the Trimble receivers. The computer's system time is not affected, only the time displayed in WinFrog and the time stamp used in WinFrog's data recording are set to the GPS time.

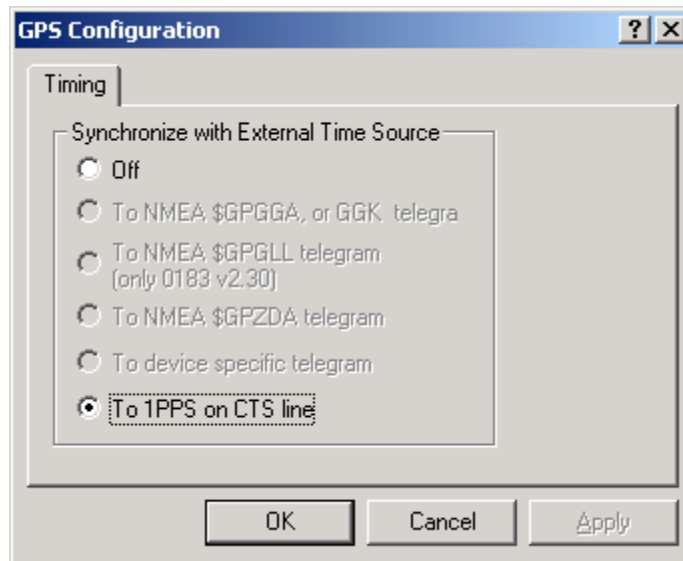
DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Serial
Configurable Parameters

WINFROG I/O DEVICES > CONFIGURE DEVICE:

This device must be configured at the I/O Device window level. In the I/O Devices window, click the device name to select it, then right-click and select Configure Device. The GPS Configuration dialog box appears, as seen below.



Select the **To 1 PPS on CTS Line** option to enable the time synchronization or select the **Off** option to disable the time synchronization.

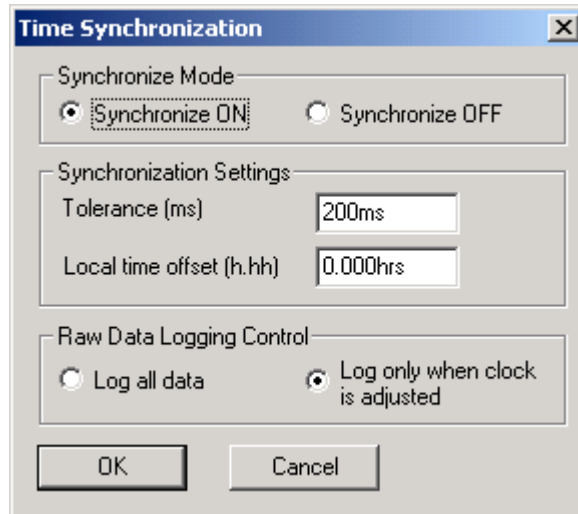
Note that the TIMEDATE data item, discussed below, must also be configured before WinFrog will synchronize it's virtual time with the time from the Trimble 1PPS telegram.

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the Trimble 1PPS device creates the TIMEDATE data item. Once the data item has been added to the vehicle, it must be edited to suit the application.

Data item: TIMEBASE, TRIMBLE 1PPS, TIMEDATE

Highlight the TIMEBASE, TRIMBLE 1PPS, TIMEDATE data item and click the Edit button to open the Time Synchronization dialog box as seen below.



Synchronize Mode

The synchronization mode defaults to Synchronize Off. Synchronize On must be selected if time synchronization is to occur. Note that multiple TIMEDATE data items can be added to the same or other vehicles, but WinFrog will only allow one to be set to On and actually be used to synchronize the WinFrog clock. The others can only be compared to the WinFrog clock.

Synchronization Settings

The tolerance setting controls the maximum limit of the deviation of the WinFrog clock from the timing device before WinFrog resets its clock. This should not be set too small, or the clock will constantly be re-setting. A tolerance of 50 ms for a 1PPS (1 Pulse Per Second) results in the resetting of the clock approximately every 5-6 minutes.

WinFrog monitors the variation between the UTC time and the WinFrog clock using a fading history of the last 20 samples of the variation between the WinFrog clock synchronization time stamp and the associated UTC time. This is filtered using a Central Tendency algorithm. When the filter result exceeds the tolerance, the clock is reset.

Local time offsets can be entered to allow synchronization to UTC while working in a local time zone. The offset is entered in +/-hours.

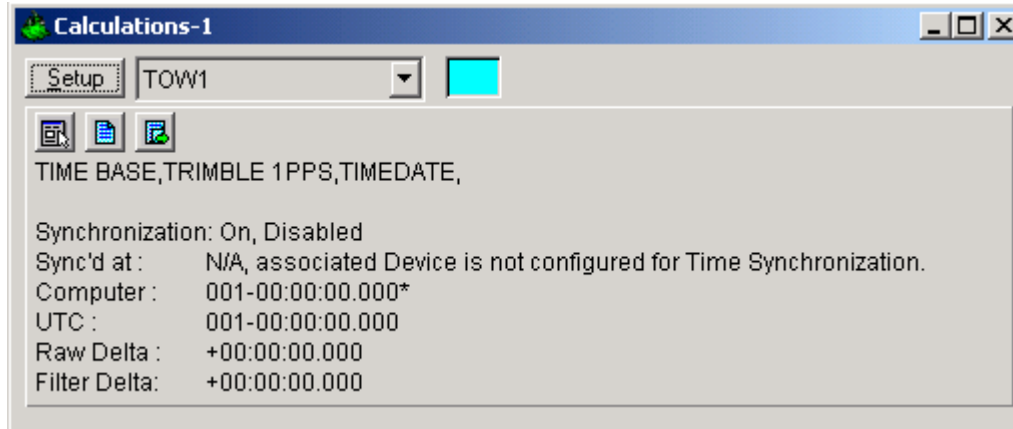
Raw Data Logging Control

You can control the logging of the TIMEDATE raw data records. Every time synchronization data reception update can be logged, i.e., a raw record every second. Alternatively, the data is only logged to the raw file when the clock is reset. The data logged includes the time of the clock adjustment and the amount it was adjusted.

Note that this is only in affect if Raw Data recording is turned on.

Monitoring the synchronization

The synchronization of the WinFrog clock can be monitored from the Calculation window using the Data Item Text and Time Series options as seen below. Refer to chapter 5 of the WinFrog User's Guide for more details on configuring Calculations windows.

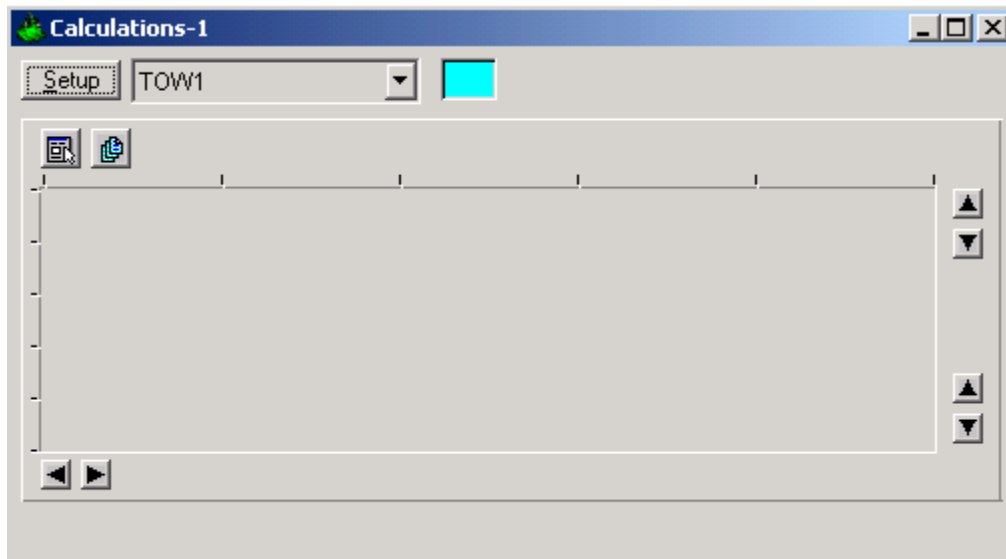


In the Data Item Text panel, shown above, the following information is displayed:

- Status
Displays the data type status (On/Off) and the associated device status
- Sync'd at
Displays the time the WinFrog clock was last adjusted
- Computer time
WinFrog clock time stamp of last synchronization data input
- UTC time
UTC time (from device) of last synchronization data input
- Raw Delta
The difference between the UTC and associated WinFrog time stamp (UTC – WinFrog) for the last epoch
- Filter Delta
The difference between the UTC and filtered WinFrog time for the last epoch

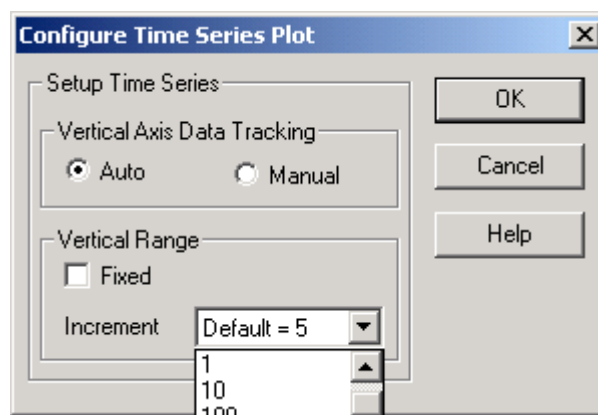
The  button can be used as a short cut to the Time Synchronization window discussed above.

In the Time Series panel, shown below, the difference between the UTC time and the raw and filtered WinFrog times are plotted.



The Up/Down arrows can be used to change the upper and lower limits of the Time series display. The Left/Right arrows can be used to increase or decrease the amount of time for which the data is to be displayed.

The Time Series display can be configured from the Configure Time Series Plot dialog window, as seen below, by clicking on the  button in the top left hand corner of the Time Series window.



You can allow WinFrog to automatically set the vertical axis for the data or it can be controlled manually via the Up/Down arrows. Similarly the vertical range can be fixed by selecting the Fixed option and a range from the drop down menu.