

WinFrog Device Group:	GPS
Device Name/Model:	MultiFix UKOOA
Device Manufacturer:	
Device Data String(s) Output to WinFrog:	
WinFrog Data String(s) Output to Device:	
WinFrog Data Item(s) and their RAW record:	POSITION 303 TIMEDATE 999

DEVICE DESCRIPTION:

MultiFix is a program that includes tools and utilities with a user interface and layout structure, such as static and dynamic position comparison programs, a correction monitors program, a terminal program and a replay utility.

MultiFix takes in Almanac, Ephemeris and Raw Code and Carrier measurements from a single or dual frequency GPS receiver (or, for replay, from logged files). It takes in RTCM SC104 Version 2 differential correction messages from one or more RTCM Correction delivery systems. It takes in RTCM Type 15 or Thales Proprietary RTCM Type 55 Ionospheric range corrections generated at selected SkyFix Premier reference stations and broadcast via the Thales global network of high and low power L-Band beams.

MultiFix 3 has been designed in a modular fashion such that data is passed between modules as if over a computer network. The core module MultiFix 3 performs the computation of position. Additional modules are available and more will be made available in the future. While a single computer can be used, the various modules will equally be able to be run on different computers, provided there is a network interconnection.

MultiFix 3 uses the EGM96 geoid/spheroid separation model.

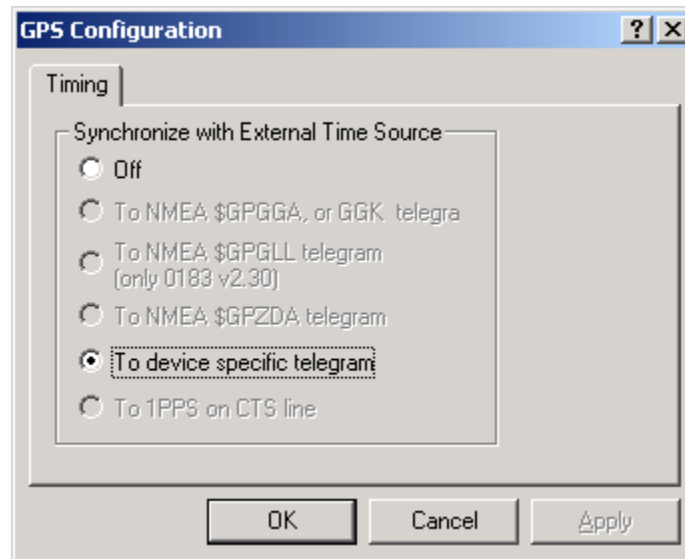
DEVICE CONFIGURATION INSTRUCTIONS

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.



In order to derive an accurate position, GPS receivers must first resolve time very accurately. By utilizing a pseudorange to an “extra” GPS satellite, the receiver is able to synchronize its time to the highly accurate Cesium/Rubidium clocks used by the satellites themselves. At least four satellites are typically required, three satellites if the GPS antenna height is held fixed.

WinFrog is able to synchronize to external time sources, typically a GPS receiver, including the 1PPS pulse (new in v3.2). The time synchronization is done at the vehicle level using the TIMEDATE data item.

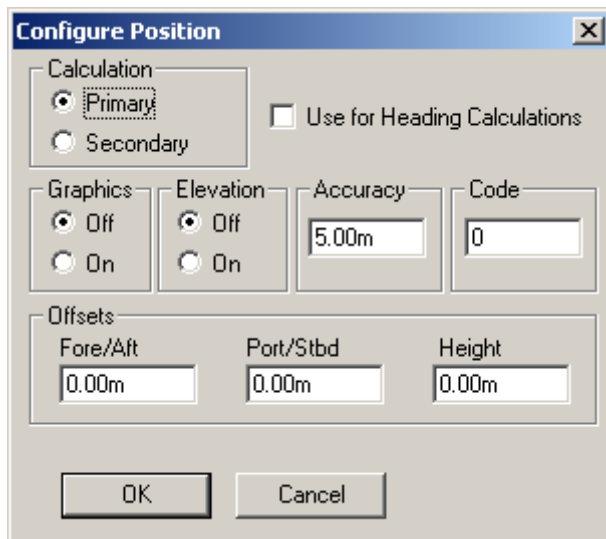
To enable time synchronization, select the ‘To device specific telegram’ option. Additional configuration is required at the vehicle device level (see below).

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

Adding the MultiFix UKOOA device creates two data items: POSITION and TIMEDATE. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: GPS, MultiFix UKOOA, POSITION

The POSITION data item must be edited once it is added to a vehicle's device list. Highlight the data item in the vehicle's device list and click the Edit button. The Configure Position dialog box appears as seen below.

The image shows a 'Configure Position' dialog box with a blue title bar and a close button. It contains several sections: 'Calculation' with 'Primary' selected and 'Secondary' unselected, and a 'Use for Heading Calculations' checkbox; 'Graphics' with 'Off' selected and 'On' unselected; 'Elevation' with 'Off' selected and 'On' unselected; 'Accuracy' with a text field containing '5.00m'; 'Code' with a text field containing '0'; and 'Offsets' with three text fields: 'Fore/Aft' (0.00m), 'Port/Stbd' (0.00m), and 'Height' (0.00m). At the bottom are 'OK' and 'Cancel' buttons.

Calculation:

Set the Calculation selection to Primary or Secondary. Devices set to Primary calculation are used to provide a vessel position. Note that more than one Primary positioning device can be added to a vehicle's device list; data from these devices will be combined in a weighted mean solution. (See the paragraph on Accuracy below for more on the weighting of Primary calculation device data).

If the Calculation type is set to Secondary, WinFrog will simply monitor the device's data. WinFrog will not use the position data from the device in the final solution of the vehicles' position.

Note: In the case of Primary device failure, WinFrog will not automatically use the Secondary devices for the vessel's position computation. Instead, the vehicle's positioning will go to dead reckoning (if dead reckoning is turned on). You must manually change a Secondary device to Primary in order for the data to be utilized.

Use For Heading Calculations:

Select this checkbox if the device is to be used in conjunction with another GPS device for determination of the heading of the vessel. The vessel's heading will be derived by the inverse of the GPS antenna coordinates.

Graphics:

Select the On radio button to display a labeled square showing the raw (offset but unfiltered) location of the GPS antenna in the Graphics and Bird's Eye windows. This provides a means of comparing raw device and filtered vehicle positions.

Elevation:

Setting the Elevation option to “On” will result in the elevation determined by the GPS to be used as the elevation of the vessel’s CRP, referencing the GPS (WGS84) Ellipsoid. The height of the antenna above (below) the CRP must be entered. The sounder data recorded in WinFrog’s .RAW data files will not be affected.

This option is meant only for those applications where there is no fixed vertical reference (i.e., mean sea level), such as on a river. For acceptable results, this option requires the use of high accuracy “RTK” GPS data.

Accuracy:

The Accuracy value entered provides WinFrog with the expected accuracy of the position from this device. This value is used in the weighting of this device compared to other positioning devices that may be added to the vehicle’s device list. The smaller the value entered, the more accurate it is considered to be, and hence the more weight that will be applied to the device’s data.

The Accuracy parameter can be changed from the suggested values. Changes should be made with caution, however, as they will affect the final filtered position of the vehicle.

Code:

This field is used when the GPS data is being received by a remote GPS receiver connected via telemetry link. If this is the case, set the Code to coincide with the code parameters associated with the GPS unit being used. For all other applications, the Code entry must be set to 0.

Offsets:

Offsets are required to associate the GPS antenna position with the vessel’s Common Reference Point (CRP). The offsets are applied *from* CRP (of the vehicle) *to* the GPS antenna location.

Forward Offsets are entered as positive values.

Aft Offsets are entered as negative values.

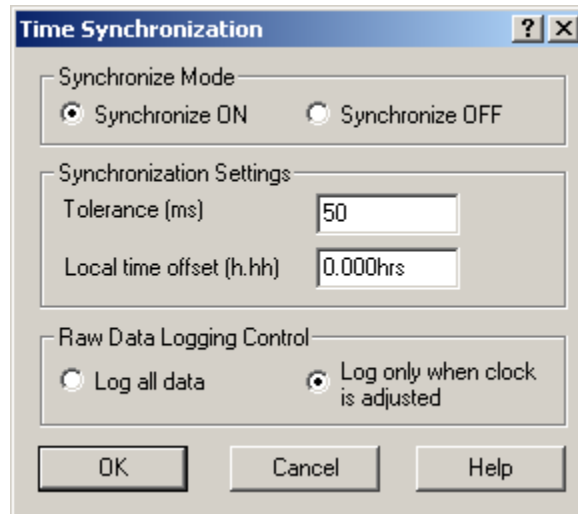
Starboard Offsets are entered as positive values.

Port Offsets are entered as negative values.

Height Offsets are positive upwards. (It is suggested that the vessel’s Height origin should be at the water line).

Data item: GPS, MultiFix UKOOA, TIMEDATE

The TIMEDATE data item must be edited once it is added to a vehicle’s device list. Highlight the data item in the vehicle’s device list and click the Edit button. The Time Synchronization dialog box appears as seen below.



Synchronize Mode

The synchronization can be turned On or Off. 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 pulse 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.

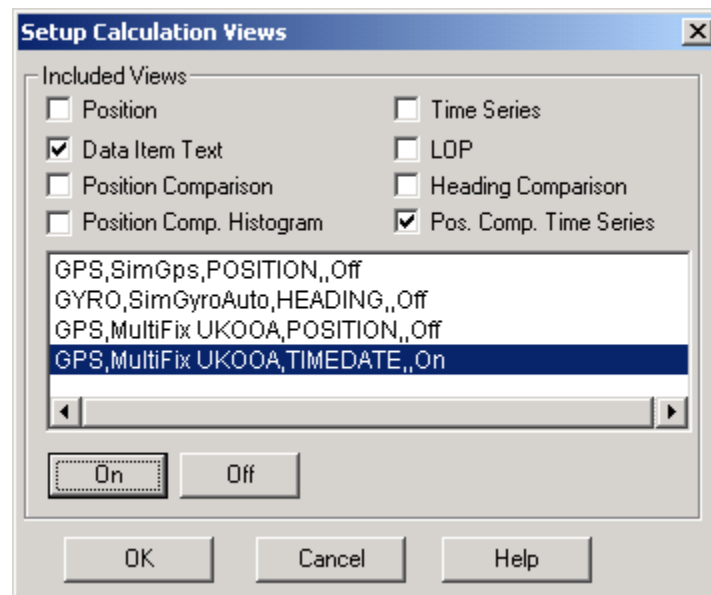
Raw Data Logging Control

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.

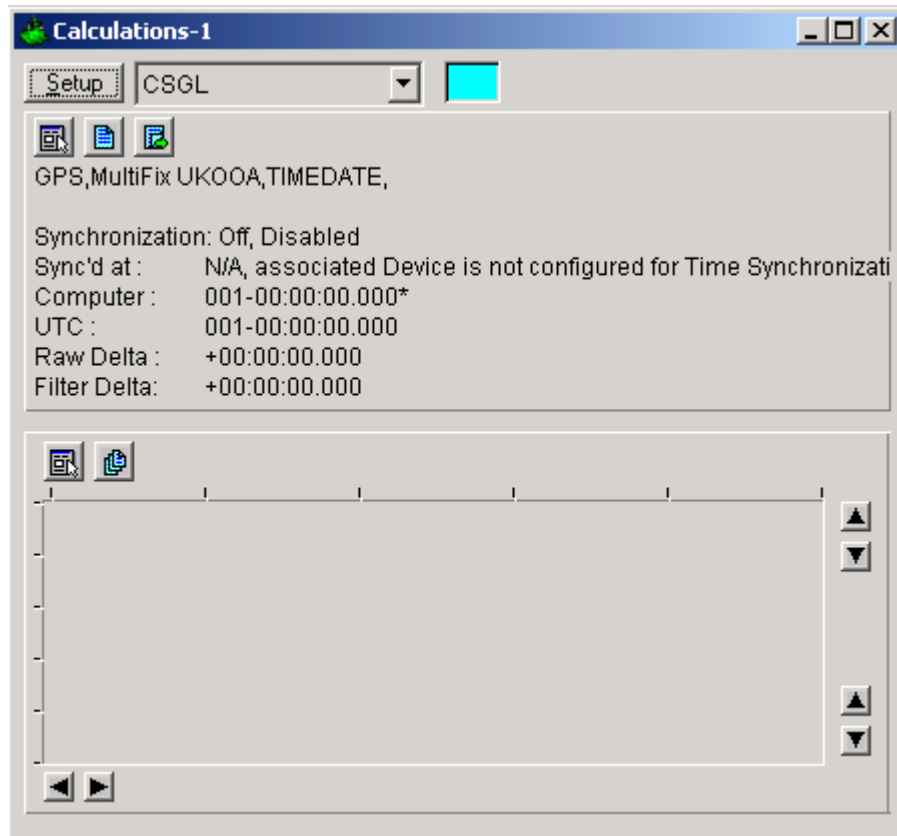
Note that this is only in affect if Raw Data recording is turned on.

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.



Exiting this window with OK opens the Calculations window as seen below.



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

- Status
Displays the data type status (Synchronization 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

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