

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

**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.

This device can provide time synchronization using a proprietary telegram. See chapter 8.

***DEVICE CONFIGURATION INSTRUCTIONS***

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**WINFROG I/O DEVICES > EDIT I/O:**

Serial  
Configurable Parameters

## WINFROG I/O DEVICES > CONFIGURE DEVICE:

This device does not require any configuration.

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

Adding the MultiFix UKOOA device creates one data item: POSITION. Once the data item has been added to the vehicle, it 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 screenshot shows the 'Configure Position' dialog box. The 'Calculation' section has 'Primary' selected. The 'Use for Heading Calculations' checkbox is unchecked. The 'Graphics' section has 'Off' selected. The 'Elevation' section has 'Off' selected. The 'Accuracy' text box contains '5.00m'. The 'Code' text box contains '0'. The 'Multiple Position Source Options' section has 'Disable Auto Switching of Primary' selected, and the 'Age of prime data when switch is to occur' text box contains '20sec'. The 'Offsets' section has three text boxes: 'Fore/Aft' containing '0.00m', 'Port/Stbd' containing '0.00m', and 'Height' containing '0.00m'. The 'OK' and 'Cancel' buttons are at the bottom.

### 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 data from a secondary device in the final solution of the vehicle's position.

If auto switching is enabled (see below) a secondary may automatically become a primary should all the primaries fail.

**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.

**Graphics:**

If On is selected, a labeled square will show 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 GPS to be used as the elevation of the vessel referencing the GPS (WGS84) Ellipsoid. 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 entry window 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.

**Multiple Position Source Options:**

This group box allows you to enable automatic switching of a secondary to primary should the data from all POSITION and PSEUDORANGE data items set to primary timeout. The **Age** entered is the length of time that the secondary will wait in the absence of data from all primaries, before taking over as primary. This age is only entered for the secondary.

For example, if the POSITION or PSEUDORANGE data items associated with two GPS receivers were set to primary and the POSITION or PSEUDORANGE data

item of a third GPS receiver was set to secondary, both primary GPS receivers must time out before the secondary will become the primary. Upon the recovery of either of the original primary data items, the original primary will be reset to primary and the original secondary will be reset to secondary.

Note for the auto switching feature to work, there must be at least one primary and one secondary enabled. For example, given two data items, one set to primary with the auto switching disabled and the other set to secondary with the auto switching enabled, if the primary fails the secondary is not set to primary and the vehicle positioning stops until the primary data item recovers.

**Disable Auto Switching of Primary:**

If this data item is not to be involved in the auto switching process, check this box. As stated above, this data item is then not involved in the auto switching process in any way.

**Enable Auto Switching of Primary:**

If this data item is to be involved in the auto switching process, either as a primary or a secondary, check this box. If set to secondary, enter the Age of data the primary data items must reach before this secondary is switched to act as the primary.

In order for this option to be effective you must have at least one primary and one secondary. If there are multiple secondary data items that are enabled for switching, the first one to receive data will become primary.

Note: This option is not enabled unless WinFrog determines that there is more than one POSITION and/or PSEUDORANGE data item associated with the respective vehicle. The exception to this is the case of a WinFrog with the Remote module operating as a Controlled Remote being configured remotely from the Controller. In this case, the option is always enabled even though it may not be applicable. The operator must be aware of what is available on the Remote and configure the data item accordingly.

Note: This option is not available in the WinFrog Remote package.

Note: This option is not available for USBL based POSITION data items.

**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.

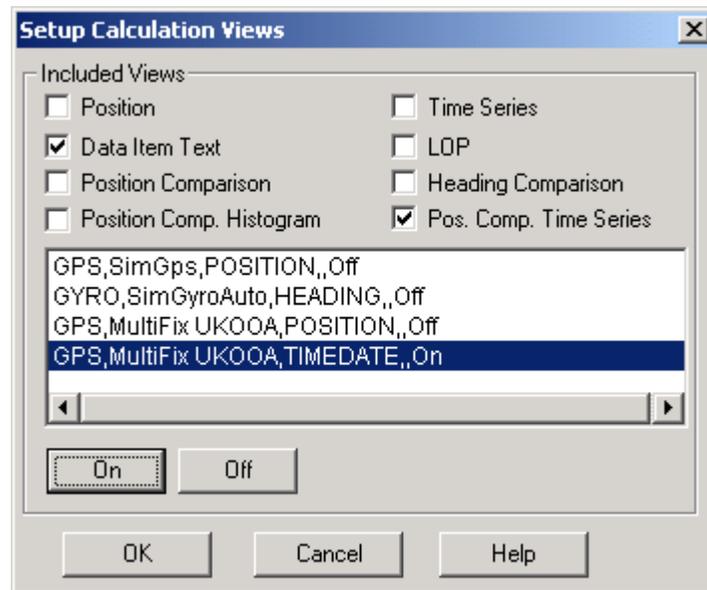
### Raw Data Logging Control

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.

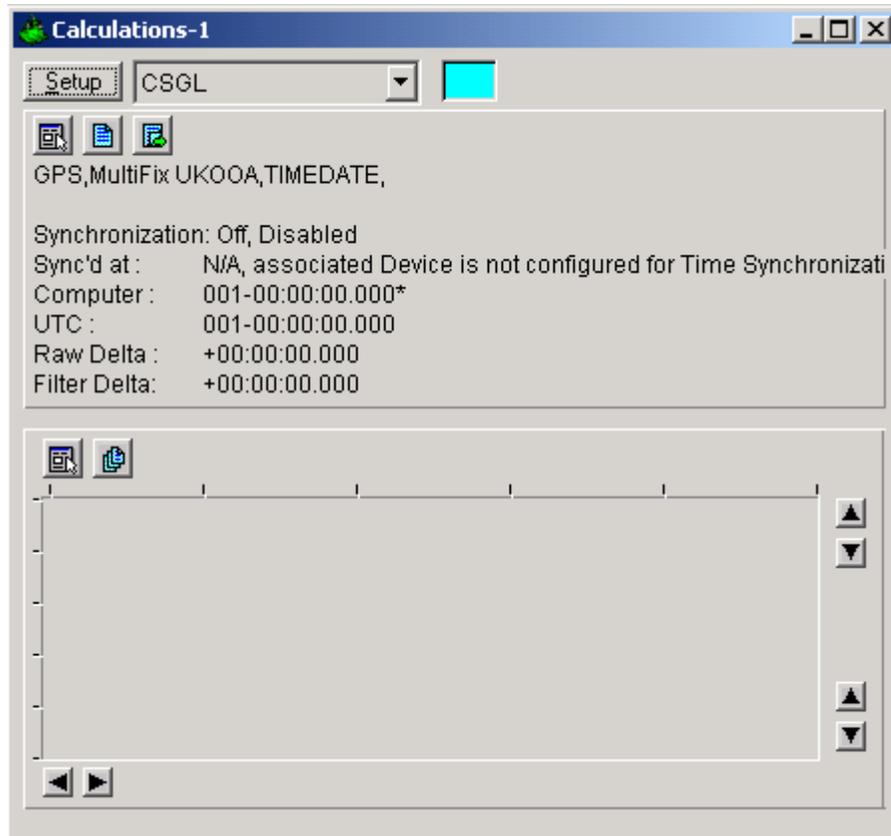
Note that this is only in affect if Raw Data recording is turned on.

### 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.