WinFrog Device Group:	**GYRO**
Device Name/Model:	**KVH**
Device Manufacturer:	KVH Industries, Inc. 50 Enterprise Center, Middletown, RI 02842 U.S.A Phone: +1 401 847-3327 Fax: +1 401 849-0045 E-Mail: info@kvh.com Internet: http://www.kvh.com
Device Data String(s) Output to WinFrog:	Choice of 5 data strings can be simultaneously output from the KVH, however only the $--HDM (Heading, Magnetic) output is accepted by WinFrog. See CONFIGURATION DETAILS below for HDM sentence information.
WinFrog Data String(s) Output to Device:	Nil
WinFrog .raw Data Record Type(s):	910

DEVICE DESCRIPTION:
The KVH Gyro combines a digital magnetic compass with a patented three-axis gyro sensor. This system, combined with the internal gyro calibration, provides a stable, anomaly-free magnetic heading source.

Some features of the newer GyroTrac system include 3-axis gyro stabilization, Auto-calibration, interfacing to all essential on-board electronics, and three display options (analog, digital, and rotating card).

Refer to the KVH manual for instructions on unit calibration. This calibration is required to model the magnetic anomalies before the data can be correctly utilized by Winfrog.

DEVICE CONFIGURATION INSTRUCTIONS (configurable)**:**
Baud Rate: 4800
Data Bits: 8
Stop Bits: 1
Parity: None

WINFROG I/O DEVICES > CONFIG OPTIONS:
The KVH is added to WinFrog from the Gyro device category. When adding the KVH Gyro to the I/O devices, the appropriate Comm Data must be set as per the required configuration described above.

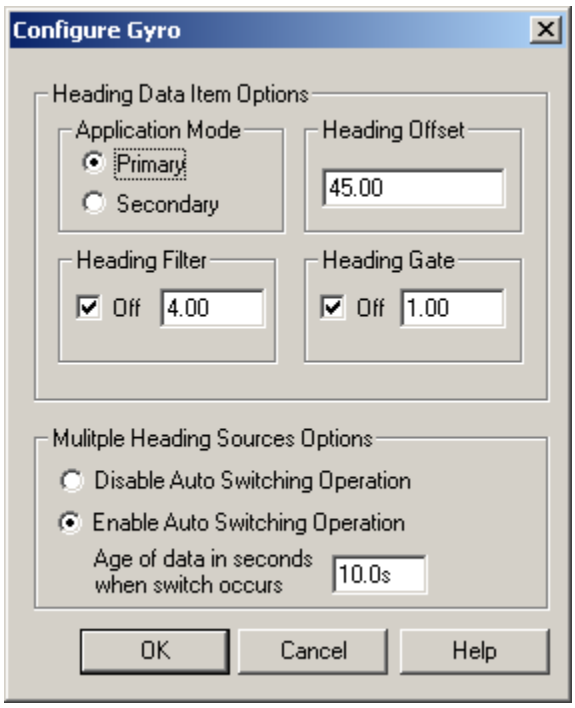
Adding the KVH Gyro device adds the Heading Data Item to WinFrog.

No configuration is required or available at the I/O Device window level.

WINFROG VEHICLE - DEVICE > EDIT OPTIONS:

As mentioned above, the KVH device creates a Heading Data item. This Data Item must be added to a vehicle's device list in order for data to be applied to that vehicle. In the Configure Vehicles- Devices dialog box, click the Add button, then select the Gyro, KVH1, Heading data item.

Once the KVH Gyro device has been added to the vehicle, it must be configured to suit the vehicle and application. Highlight the Gyro, KVH1, Heading device and click the Edit button. The Configure Gyro dialog box appears, as seen below.



Heading Data Item Options:
Application Mode (Primary/Secondary):
Set the type of calculation to Primary or Secondary by selecting the appropriate radio button. Devices set to Primary are used to provide the vehicle heading information. Devices set to Secondary are simply monitored, and are not used in the vehicle's calculations.

Note that WinFrog supports automatic switching from a designated Primary to a Secondary in the case that data from the Primary fails (see Multiple Heading Sources Options).

Heading Offset:
A correction value can be input in the Heading Offset Box. This value is added to the heading value from the KVH to provide a corrected heading to the vehicle. This value may correct for magnetic declination or for device misalignment, as determined by a gyro calibration.

Heading Filter/Heading Gate:
The Heading Filter is used to smooth jumpiness in received heading data. The default value of 4 instructs WinFrog to utilize the last 4 heading observations to predict the next heading value. Entering a larger value will cause the predicted heading to be less affected by the latest headings, and hence "smooth" the heading used by the vehicle. As the vehicle's position can already be smoothed by using the Kalman filter, you should be cautious to not over-filter received heading data.

The Heading Gate is used to reject heading readings that fall outside a user-specified difference from the last observed heading. A value of 10, for example, would instruct WinFrog to not use data that is 10 degrees different (greater or less than) from the last observed heading.

Multiple Heading Sources Options:
WinFrog supports automatic switching from a designated Primary source to an alternate Secondary source in the event that the Primary fails. The first Secondary source to receive data after the Primary has failed becomes the alternate Primary providing the heading for the vehicle. When the designated Primary is detected as active again, the alternate Primary source reverts to Secondary and the designated Primary provides the heading data to the vehicle.

If an alternate Secondary fails and there are additional Secondary sources, it in turn is detected by the first of the remaining operational Secondary sources to receive data after the failure at which time this Secondary becomes the alternate Primary.

Note that this option is only available if more than 1 HEADING source is associated with the respective vehicle. Changes made to the Auto Switching options for any one of the HEADING data items are automatically assigned to the others upon exiting this dialog with OK. If the Auto Switching option is enabled and the respective HEADING source has been set to Primary, all others are automatically set to Secondary. The exception to this is when configuring a WinFrog Controlled Remote (WinFrog with a Remote module) from a Controller. In this case, changes made to one HEADING source are not automatically made to other HEADING sources. The operator must explicitly make them for each HEADING source.

This option is not available in the WinFrog Remote package.

Disable/Enable Auto Switching Operation:
Select the mode you wish to operate WinFrog.

Age of data in seconds when switch occurs:
Enter the age of data that is permitted before the source is considered to have failed.

CONFIGURATION DETAILS:

Technical Specifications:

Sensor Box Dimensions:	Variable
Power Input:	12-32 VDC Nominal
Consumption:	330 mA

Performance

Reference:	Magnetic North True North (Requires input from GPS and is not supported by WinFrog).
Warm-up Time:	Milliseconds
Deviation Compensation:	Automatic
Accuracy:	±1.0° typical
Repeatability/Resolution:	±0.25° / 0.1°
Recovery Time:	Milliseconds
Gyro Drift:	None (auto-corrected)
Pitch & Roll Range:	±45°
Max. Ang. Velocity:	45° /sec
Linearity:	1% of full scale
Max. Acceleration:	0.5°g
Zero Point Stability:	±0.8°

Standard RS422 Outputs supported by the KVH:

Update Rate:	1Hz - 20Hz
Sentence Types:	NMEA1: $HCHDM NMEA2: $HCHDG NMEA3: $HCHDT 3-Axis Proprietary Sin/Cos, field configurable Cetrek Furuno AD10S B&G Sin/Cos

Interface Options:

Optional Stepper Interface Input:	NMEA 0183 (GPS or Gyrocompass)
Stepper Output:	3,6,12,24 steps/degree, User Selectable
Stepper Output Voltages:	5V Standard

$HCHDM Sentence Structure:

$HCHDM,x.x,M*hh<CR><LF>

Where:

- x.x Heading in degrees
- M Magnetic

Quick Reference Wiring Guide (for the GyroTrac):