WinFrog Device Group:	**Magnetometer**
Device Name/Model:	**GEOMETRICS 88x**
Device Manufacturer:	**GEOMETRICS** 2190 Fortune Dr. San Jose, Ca. 95131 U.S.A. Phone: (408) 954-0522; Fax: (408) 954-0902 www.geometrics.com
Device Data String(s) Output to WinFrog:	Refer to Configuration Details section for the three different data strings handled via this driver.
WinFrog Data String(s) Output to Device:	At time of Configuration in the I/O Devices window: 1. Cycle Time<CR><LF> (2 digits; i.e. 1sec=10) 2. Tuning Value<CR><LF>(3 digits; i.e. 50sec=500)
WinFrog Data Item(s) and their RAW record:	MAGNETOMETER 800 BOTTOMDEPTH 411 or 911

DEVICE DESCRIPTION:
A magnetometer is an instrument that measures magnetic Flux Density (in Tesla's). The Earth generates a relatively strong magnetic field, which produces flux densities, in air or water. The values of the earth's magnetic range is from a low of about 18 microTesla (μT) near South America, to a high of over 60 microTesla in the Arctic Circle.

Model G-886 is a (marine) Proton Procession Magnetometer offered as a stand alone, or as an upgrade for GEOMETRICS' models G-801, G-806, and G-866 magnetometers. A computer can be used to: record data using specialized logging software, generate system controls and commands, and display data via screen and printer. Some of these controls can be administered using the WinFrog Navigation Software.

The system can consist of the following components: tow fish, tow cable, deck lead, deck box, power/data lead-in, power supply and sometimes a winch.

Magnetometers are useful for the following marine applications:

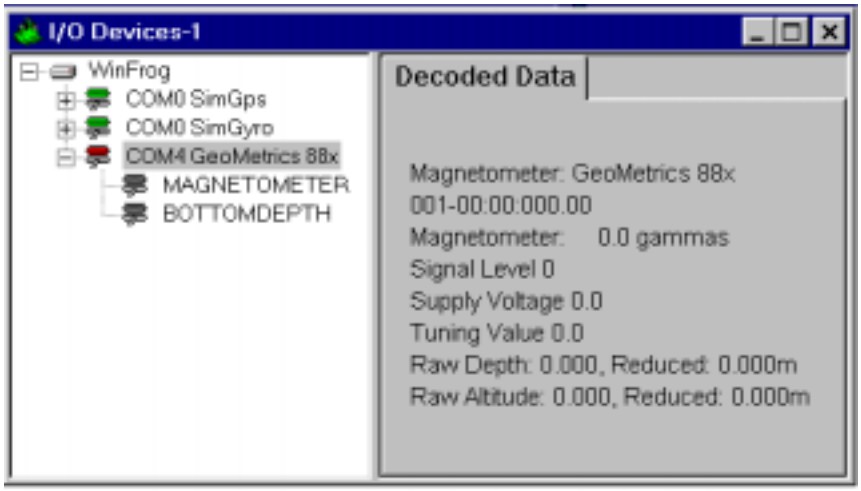
- pipeline location
- pipeline right-of-way survey
- archeological survey
- submarine cable location
- waste materials
- shipwrecks or any submerged ferrous object

DEVICE CONFIGURATION INSTRUCTIONS

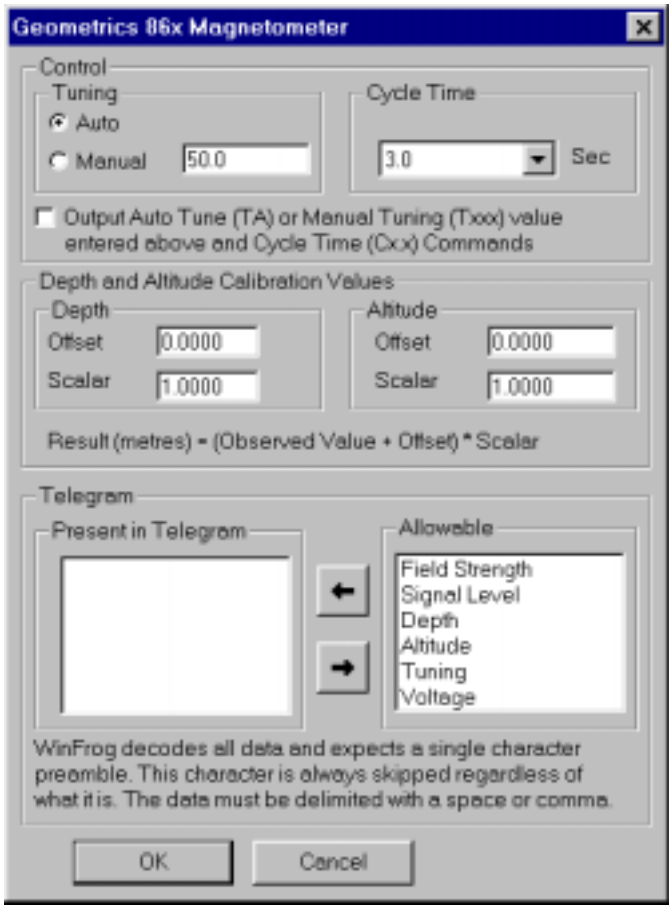
WINFROG I/O DEVICES > EDIT I/O:
Baud Rate: Configurable 300 to 9600
Data Bits: 8
Stop Bits: 1
Parity: None

Suggested Output: 1200-8-N-1 on a three-wire RS-232C serial communication line.

WINFROG I/O DEVICES > CONFIGURE DEVICE:
The GeoMetrics 886 is added to WinFrog from the Magnetometer device group. The MAGNETOMETER and BOTTOMDEPTH data items are added along with the GeoMetrics 886 device. Shown below is the I/O Device Window once the Geometrics 886 is added.



The following configuration dialog box is available at the I/O device level. This dialog box is opened via the *Configure* > *I/O Devices* > *Configuration* command, or under the *Configure Device* command that appears in the popup menu accessed by right-clicking in the I/O Devices window.



The Tuning method and Cycle Time can be set from this dialog box. These configuration values are sent to the 88x if you select “Output Auto Tune…” checkbox and click the ‘OK’ button.

Tuning:
The Tuning of the total magnetic field intensity (for the work area) can be set to fully automatic (Auto), or Manual. It is best to find the approximate value of magnetic field intensity for the survey location, and set this value during the initial tuning.

The default value for the Manual Tuning option is 50μT. This is a close approximation for many operational areas around the Globe, such as: North Sea, Gulf of Mexico, Northern Australlia, Nothern China and Japan. If you are not familiar with these settings is advisable to set the Tuning to Auto.

Cycle Time:
The Cycle Time of the instrument can be set to 2.0, 2.5 or 3.0 seconds. Refer to documentation on the GSM-19 Magnetometer for more information on cycling time of magnetometers.

Depth and Altitude Calibration values
Enter calibration values here to convert the observed depth and altitude found in the telegram to meters. If the data in the telegram is already calibrated then enter 1 for the scaler and 0 for the offset.

Telegram
The Geometrics 886 manual indicates you can change the output and place the data in whichever order you choose. You can also select what to output. Consequently, this bottom section allows you to select the correct order of the data.

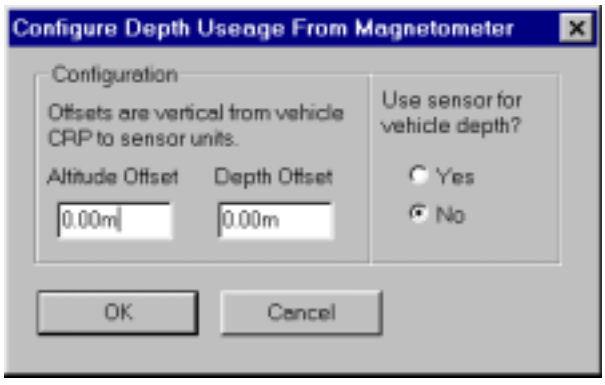
Select the data items found in the telegram on the right and place on the left by using the arrow buttons. The data items must appear in the same order on the left as they appear in the telegram. WinFrog expects a one character header from the Geometrics and each data item must be separated from the next by a comma or space.

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

As mentioned above, adding the GeoMetrics 88x device to WinFrog creates two separate data items: the MAGNETOMETER, GeoMetrics 88x, MAGNETOMETER and the MAGNETOMETER, GeoMetrics 88x, BOTTOMDEPTH. These two data items must be added to a vehicle for data recording and storage to occur. Adding the MAGNETOMETER data item to the vehicle will enable the raw 800 record to be stored. Adding the BOTTOMDEPTH data item will enable the raw 411 or 911 raw record.

MAGNETOMETER Data Item:

Editing this data item causes the following dialog to appear:



This dialog allows you to configure depth and altimeter offsets as well as enable the use of this device to assign depth to the vehicle. The offsets are used in the bottom depth determination.

The depth and altitude are corrected and converted to meters by applying the scaler and offsets entered in the “Geometrics 88x Magnetometer” dialog above. The offset entered in the “Geometrics 88x Magnetometer” dialog is intended to be an instrument reading offset. The offset in the dialog above, “Configure Depth Useage From Magnetometer” is a physical offset of the instrument on the ROV of fish.

BOTTOMDEPTH Data Item:

The configuration for the BOTTOMDEPTH data item, after it is added to a vehicle, is the same as for the NMEA BOTTOMDEPTH device. Refer to documentation on this device for utilizing the bottom depth information. Bottom depth is determined by adding the vehicle depth, altimeter and offsets as follows:
Bottom depth = vehicle depth + depth offset+ altitude – altimeter offset.

The vehicle depth and offset are from this device , reduced by the calibration values entered on the “Geometrics 88x Magnetometer” dialog. The offsets are those entered on the “Configure Depth Useage From Magnetometer” dialog.

Depth is stored in the 411 and 911 records in the *.RAW files.

CONFIGURATION DETAILS:

Sample Data Strings:
The first two data strings are taken from the Geometrics 886 Manual 24821 – Tm REV D. The third string is from Texas A&M University.

Data String #1:
= 74703.45 79.0 0.0 0.0 43.6 24.6
Field Value - Signal - depth - altitude - tuning - input voltage

Note: The Altitude is the height of the fish off the seabed, and this item is not used in WinFrog.

Data String #2:
= 74703.45 227 0.00 0 74.7 29.7
Field Value - Signal - depth - altitude - tuning - input voltage

Note: The Altitude is the height of the fish off the seabed, and this item is not used in WinFrog.

Data String #2:
= 45108.78 122 29.1 49.6
Field Value – Signal - input voltage - tuning

Geometrics 886 Specifications:

Power (AC or DC):	115/230 VAC 50-60 Hz to 22-32 VDC, 2 amps average, 4 amps peak (varies according to tow cable length)
Tow Cable:	Length as specified (typically 200 to 1000 ft); non-magnetic, shielded twisted pair, strain member, torque balanced Kevlar fiber with a breaking strength exceeding 8,000 lb.; weight: 10lb per 100 ft; diameter 0.6".
Environmental:	-20^{o}C to $+50^{o}$C.
Sensor:	Size: 5" diameter, 40" length with fin stabilizer attached.
Weight:	20lb in air, 5lb in water.
Operating Range:	17,000nT to 95,000nT (The unit accurately tracks field changes up to 2,000 nT per second).
Noise Level:	90% of readings are within selected sensitivity envelope
Operating Principle:	Proton Precession

Magnetometer Units:

1 gamma = 1nT where T stands for Tesla.
1000 gammas = 1μT = 1 Killogamma

Sensitivity of Instrument:

The sensitivity of the Geometrics 886 is as follows (for the specified cycle times):

- -1nT at 0.5 sec. cycle rate
- -0.4nT at 1 sec. cycle rate
- -0.2nT at 2 sec. cycle rate

Raw Data String:

800,name,time,magnetic field,signal strength,depth,quality,leakage,tuning, voltage,altitude