WinFrog Device Group:	**Elevation**
Device Name/Model:	**METS3** (Paroscientific refers to it as the MET3 Barometric Pressure, Temperature, Humidity)
Device Manufacturer:	Paroscientific Inc. 4500 148th Ave NE Redmond, WA, 98052 Tel: (425) 883-8700 Fax: (425) 867-5407 www.paroscientific.com
Device Data String(s) Output to WinFrog:	Status, Time, Unit ID, Raw Pressure, Relative Humidity, Temperature
WinFrog Data String(s) Output to Device:	Temperature and Relative Humidity queries every 5 minutes.
WinFrog .raw Data Record Type(s):	Type 372 record. See section *'WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS'* for raw record information

DEVICE DESCRIPTION:

The Digiquartz MET3 Measurement System incorporates the following meteorological instrumentation:

- Digiquartz Barometric Pressure Transducer (resolution<1microbar; accuracy=0.01% of reading),
- 1000 ohm RTD temperature Sensor (resolution=0,01^{o}C; accuracy=0.50^{o}C), and,
- Monolithic IC capacitance humidity sensor (accuracy < 2%).

The system is housed in a weatherproof enclosure as shown below. The application of this unit is as a pair of barometers to enable accurate barometric relative heighting. In its current implementation, it is unable to provide a standalone absolute elevation.

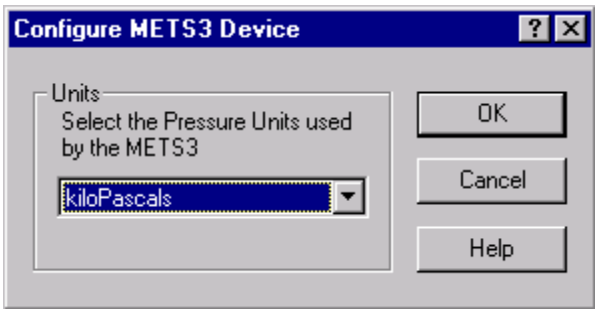
MET3 Measurement System

DEVICE CONFIGURATION INSTRUCTIONS:
Baud Rate: Configurable
Data Bits: 8
Stop Bits: 1
Parity : N

The MET3 comes with two-way RS-232 interface. Remote configuration of all operating parameters can be performed via the serial interface. The user may retrieve individual data parameters, or a complete data word containing all measurement parameters. PC based software for remote configuration is supplied with the unit.

It is important to note that any configuration of the METS3 units must be done prior to interfacing to WinFrog, including setting the pressure units, zeroing the barometer pair, etc. See the section on Configuration Details.

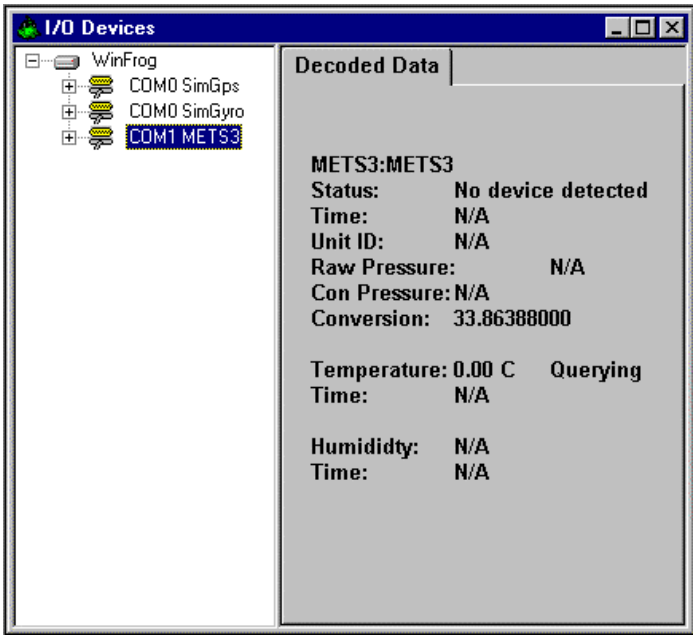
WINFROG I/O DEVICES > CONFIG OPTIONS:
The METS3 is accessed via the Elevation device types. The following configuration window can be initiated from the I/O Devices Window in WinFrog:



From the dropdown list box, the following pressure units can be selected:

- PSI (68.94757)
- inches Hg (33.86388)
- mm Hg (1.333224)
- Bars (1000.0)
- milliBars (1.0)
- grams/cm^2 (0.9806650)
- Pascals (0.01)
- KiloPascals (10.0)

From this selection, WinFrog determines the appropriate conversion factor to multiply the input by to convert to MilliBars, the units used within WinFrog as the standard barometric pressure units. The associated conversion factors are listed above with the respective units. It is suggested to configure the device to output MilliBars and select Millibars in WinFrog. Following is the I/O Device Window for the METS3:



Note: for the above, Inches Hg is chosen to show the conversion factor.

After the device is added to the computer, the status is not updated to *Normal* until an actual pressure data has been decoded. The responses to the temperature and relative humidity queries are not considered sufficient to change the status from *No Device Detected*.

When the METS3 is being queried for either a temperature or a relative humidity, this status is displayed across from the associated data. Pressure is output automatically.

WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:
The METS3 device does not provide an absolute elevation. If there is data being received from the METS3, a flag is passed to the assigned vehicle. This flag is checked and will prevent the use of the data for vehicle elevation. It also prevents the operator from setting the data item to *Primary*. The METS3 is used as a data source for barometric relative heighting, and this is performed at the device level. The device therefore does not need to be added to a vehicle.

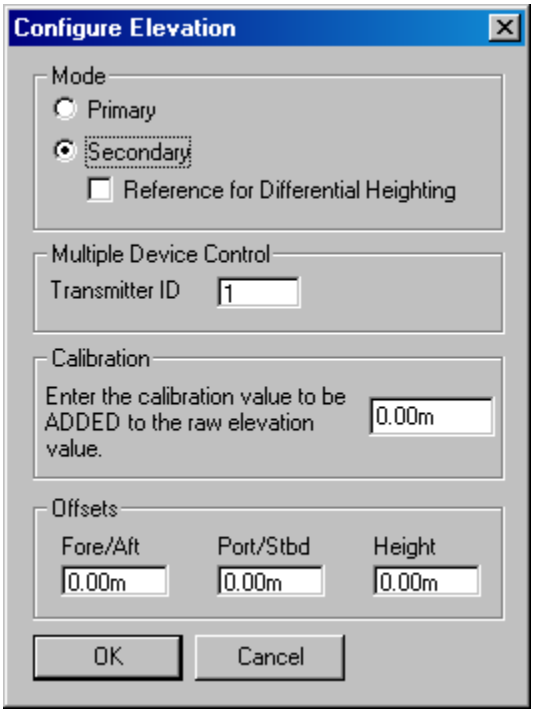
The **only** reason for adding the METS3 ELEVATION data item to a vehicle is the resulting logging of the data to the raw file as a 372 record. The format for this record is as follows:

372, name, time, elevation, status, center elevation, raw data, temperature, relative humidity *where:*

- *372* is the raw data record identifier for an ELEVATION data type
- *name* is the operator assigned device name
- *time* is the computer time for the data

- *elevation* is the elevation in metres, which in the case of the METS3 is always 0
- *status* is the status flag for the data, 1 = OK, 0 = Bad
- *center elevation* is the elevation reduced to the CRP, which in the case of the METS3 is always 0
- *raw data* is the raw elevation data, which in the case of the METS3 is the pressure in milliBars
- *temperature* is the temperature in Celsius
- *relative humidity* is the relative humidity in units of 0-1.0 (i.e. % * 100)

If the device is added to a vehicle, the following configuration dialog is available under the **CONFIGURE VEHICLE DEVICES > EDIT** (mets3):



As mentioned previously, the Mode should only be set to Secondary (unless no data is being received). Sensor offsets can be applied for the unit similar to other devices. Leave the Transmitter ID at 1. Only attach one instance of the ELEVATION data type to a vehicle.

CONFIGURATION DETAILS:
Configuration of the MET3 units must be done prior to interfacing to WinFrog. This includes setting the pressure units, zeroing the barometer pair, etc.

Initial Hardware Configuration

The device should be configured using the manufacturer's software. This includes the following settings:

- measurement span time,
- zeroing one barometer to another,
- output pressure units,
- output temperature units (set to Celsius),
- output pressure automatically (without being queried).

MET3 Interface Operation

The MET3 outputs pressure automatically without being queried. The MET3 unit is also able to provide temperature and relative humidity. These are required in subsequent barometric relative heighting algorithms. The MET3 must be specifically queried for these data. WinFrog queries the MET3 every 5 minutes for a temperature and then a relative humidity. The output from the MET3 for a pressure and a temperature and a relative humidity have no specific identifiers, therefore the first output immediately after a temperature or a relative humidity query are automatically accepted as responses to the query.

MET3 Interface Operation

The system utilizes a Gill Barometric Pressure Port to reduce dynamic pressure errors caused by wind. The Radiation Shield protects the temperature/humidity sensor for sunlight and precipitation. It is however best to set up the unit away from wind and sunlight.