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## 1 Connecting to the Coral AHRSTM

To connect to the Coral AHRSTM unit, select ‘Connect’ from the ‘File’ menu. Either select your serial port device from the drop-down list presented, or type it in manually. Select the device’s baud rate. If you choose ‘Automatic’, the Coral AHRSTM Utility will attempt to determine the correct baud rate for the module. This process may take several seconds. An option is provided to automatically switch the AHRSTM into full output mode. If this option is deselected, the Coral AHRSTM will remain in its current output mode. If that mode does not include orientation information, the display will remain static even though the utility will still be receiving data. Once you click ‘Ok’, the utility will attempt to connect to the unit. Once the unit is connected, the display should update to reflect the data received from the unit.

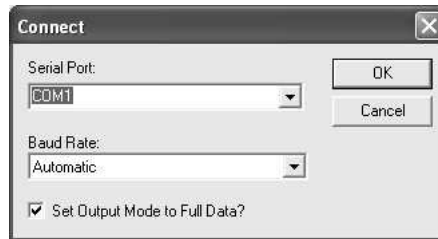


Figure 1: Connection Dialog Box

## 2 Logging Data

The Coral AHRSTM Utility features basic data logging capability. The utility logs orientation and sensor data in a basic comma-separated values (CSV) format that is compatible with most major spreadsheet packages.

To begin logging, select ‘Start’ from the ‘Log’ menu. Enter the name of the file to which data should be saved and select which pieces of data you would like to log. Once you click ‘Ok’, data will begin to be saved to that file. Choose ‘Stop’ from the ‘Log’ menu to end data logging.

## 3 Coral AHRSTM Configuration

The Coral AHRSTM Utility allows you to adjust the module’s baud rate, output mode, and output divisor. Choose ‘Edit’ from the ‘Configuration’ menu

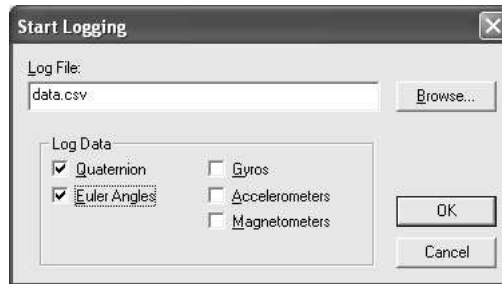


Figure 2: Log Options Dialog Box

to modify these options. You can also save the current configuration and calibration settings to file by choosing 'Save to File' from the 'Configuration' menu. You can later load the settings by choosing 'Load from File' from the 'Configuration' menu. Choosing 'Save to EEPROM' saves the current configuration and calibration settings to the user settings section in the unit's EEPROM. These settings will be loaded on unit startup. You may also reset the unit's configuration and calibration settings to the factory defaults or the most recently saved user settings by choosing the appropriate option from the 'Reset' submenu.

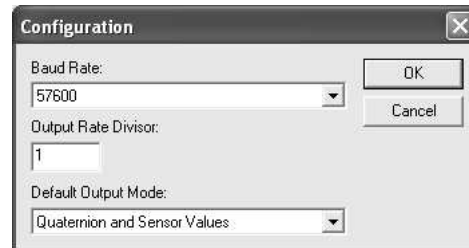


Figure 3: Configuration Dialog Box

## 4 Adjusting Calibration

The Coral AHRSTM Utility allows you to adjust the current calibration settings directly by choosing the 'Recalibrate' option from the 'Tools' menu. Any changes made are applied to the unit upon clicking 'Ok'. Changes may be reversed by choosing the options from the 'Reset' submenu in the 'Configuration' menu.

**Sensor Calibration**

**Gyros**

Calibration Matrix:

4.2342	-0.002	-0.004
-0.003	4.1123	0.0052
.05221	0.0423	.42232

Biases:

-0.001	0.0039	-0.000
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**Accelerometers**

Calibration Matrix:

5.1469	-0.095	-0.077
-0.070	-5.301	0.0058
0.0517	-0.054	5.1967

Biases:

-0.007	-0.015	0.0019
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**Magnetometers**

Calibration Matrix:

2.3459	0.0378	-0.049
0.0988	2.5878	-0.039
0.0168	0.0639	-2.225

Biases:

-0.041	-0.065	-0.046
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Note that any changes to the calibration data made here will be lost unless you choose "Save Settings to EEPROM" from the Configuration menu.

OK Cancel

Figure 4: Calibration Dialog Box

## 5 Hard Iron Calibration

The Coral AHRST<sup>TM</sup> Utility provides a routine for calibrating out hard iron magnetic effects in your system. To use this routine, install the Coral AHRST<sup>TM</sup> in your system, then choose 'Hard Iron Calibration' from the 'Tools' menu. Rotate your unit several times around all axes until the numbers displayed on the screen stop changing. Once you click 'Ok', the updated information will be transmitted to the unit.

**Hard Iron Calibration**

Rotate the AHRST unit around all three axes several times, to allow the unit to register the full extents of measurement on each axis.

OK Cancel

**X Axis**

Max:	1444
Min:	-1820

**Y Axis**

Max:	-1196
Min:	-1644

**Z Axis**

Max:	1378
Min:	-1696

Figure 5: Hard Iron Calibration Dialog Box

## 6 Gyro Bias Capturing

At any time when the unit is stationary, any non-zero reading on a gyro is due to bias errors. The Coral AHRSTM filter actively tracks gyro bias but still benefits from an accurate measurement of bias taken when the unit is stationary. The Coral AHRSTM Utility provides a simple interface for instructing the module to sample its gyros for a measurement of bias. To use this functionality, choose ‘Gyro Bias Capture’ from the ‘Tools’ menu. Make sure the unit is stationary, then select ‘Ok’. The unit will take a measurement of gyro bias.

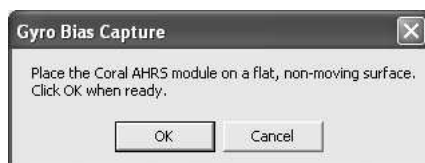


Figure 6: Gyro Bias Capture Dialog Box

## 7 Magnetometer Declination Adjustment

In any given location, the Earth’s magnetic field does not point directly north. The deviation in heading between true north and the direction of the magnetic field is known as declination. Many complex variables determine the declination at any given point, however, the United States National Oceanographic and Atmospheric Organization maintains a public geomagnetism model which can be used to determine magnetic declination for a given latitude, longitude, and elevation.

The Coral AHRSTM Utility provides the capability to retrieve and set the declination setting for a Coral AHRSTM unit. To access this utility, select ‘Magnetometer Declination Adjustment’ from the ‘Tools’ menu. Enter the desired declination value in the dialog box and choose ‘Ok’ to set the value on the unit.

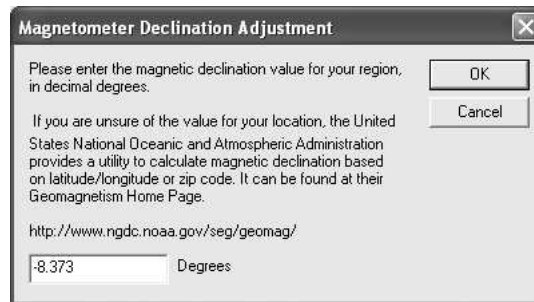


Figure 7: Magnetometer Declination Dialog Box

## 8 License

The Coral AHRST<sup>TM</sup> Utility is distributed under the terms of the GNU General Public License. The text of the license follows:

Version 2, June 1991

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