

MIDG Series INS/GPS Magnetic Declination Calibration Instructions

NOTE: This instruction assumes that the MIDG II Software has previously been installed on the computer. This software needs to be installed prior to performing this operation.

Note: Magnetic variations are unpredictable in certain areas, especially where large quantities of ferric metals are present.

1 Introduction. This instruction is designed to guide the user on how to perform the magnetic declination calibration of the MIDG Series INS/GPS for a specific geographical area.

2 Prerequisites. The following prerequisites will be needed to perform this operation: MIDG Series INS/GPS mounted in the vehicle; portable computer with the MIDG Display Utility installed; MIDG Series INS/GPS Interface cable (MBI#SLC2JUSB, SLC2J09SF, or user supplied); and this instruction.

*****WARNING*****

WARNING: DO NOT apply power to unit prior to connecting the interface cable. DO NOT use voltages higher than stated in the MIDG Series INS/GPS specifications sheet. DO NOT connect the GPS antenna to the unit while powered. Doing any of these actions may damage the unit. THESE DAMAGES ARE NOT COVERED BY WARRANTY.

*****WARNING*****

3 Set Up. Prior to performing the magnetic declination calibration, the MIDG Series INS/GPS must be mounted in the vehicle and interfaced with the computer. Refer to the MIDG Series INS/GPS User Manual for instruction on how to properly mount and interface the MIDG Series INS/GPS.

1. **Open an instance of the MIDG Display Utility and Select the desired COM from the "Port" option on the menu bar.**
2. **Select "Options" from the Menu Bar then Select "MIDG Config" (Figure 1).**
3. **Select the "Heading" tab and Press the "Query" button (Figure 2). This will display the current magnetometer biases.**
4. **Reset all bias values to zero (0) and press the "Set" button (Figure 2).**
5. **Verify that the "Enable in INS mode," "Enable in VG mode," and "Use velocity vector for heading measurements" are all checked and Press the "Set" button (Figure 2).**
6. **Select the "Messages" tab (Figure 3).**

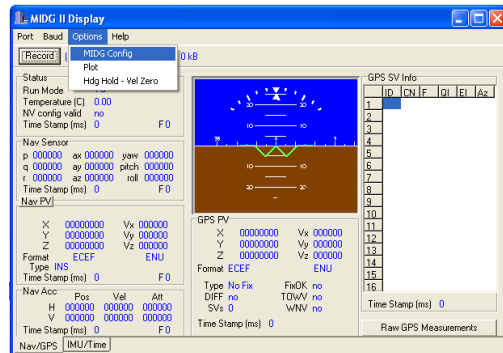


Figure 1. MIDG Display Utility with "MIDG Config" option selected.

7. **From the Messages drop-down box Select "IMU_MAG" and Enter a one (1) into the "Divisor" field (Figure 3). This will enable the IMU_MAG message to be outputted by the unit at fifty hertz (50 Hz).**
8. **Press the "Set" button.**

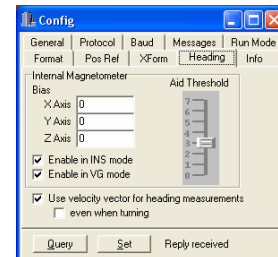


Figure 2. Heading tab

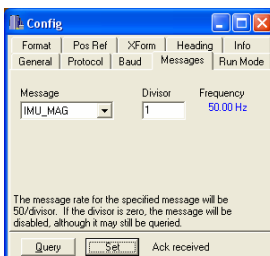


Figure 3. Messages tab

9. **Select the "General" tab and Press "Save Configuration" button** (Figure 4). This will save the configuration which was just entered.

The unit is now ready for magnetic declination calibration. Alternately, if the calibration is to be done at another time and/or location this configuration will be save when the unit is powered down.

Note: Magnetic variations are unpredictable in certain areas, especially where large quantities of ferric metals are present.



Figure 4. General tab

*****WARNING*****

DO NOT PROCEED WITH THE MAGNETIC DECLINATION CALIBRATION UNTIL THE FIRST SECTION HAS BEEN COMPLETED. FAILURE TO DO SO WILL RESULT IN CALIBRATION ERRORS.

*****WARNING*****

4 Performing the Magnetic Declination Calibration. The magnetic declination calibration can only be performed after the unit has been configured specifically for such. The following steps will instruct the user on how to perform this operation.

1. **Open an instance of the MIDG Display Utility and Select the "Options" drop-down menu.**
2. **Select the "Plot" option.** This will open the Plotter (Plot) utility (Figure 5).
3. **Select the "Mag" radio button and the Press the "Center" button.** This will display all three (3) axis of the magnetometer.
4. **Drive the course, starting forward and begin a full circular turn.** The Plotter should look similar to Figure 6.
5. **After turning 360 degrees, "Pause" the Plot utility by selecting the "Pause" checkbox.**
6. **Left-click and hold the slider tabs at the bottom of the plotter screen while dragging the slider toward the left side of the pane.** This will bring the full turn on to the plotter screen. The screen should look similar to Figure 6.

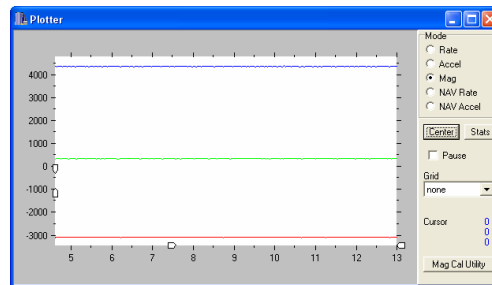


Figure 5. Plotter Utility

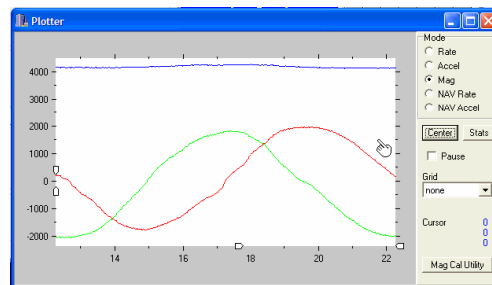


Figure 6. Magnetometer readings of 360°.

Note: The Plot utility only considers the viewable area when calculating a diagram of the Magnetic route trace.

7. **Press the "Mag Cal Utility" button at the bottom right of the "Plot" utility** to display the "Magnetometer Bias Estimation Utility (Figure 7).

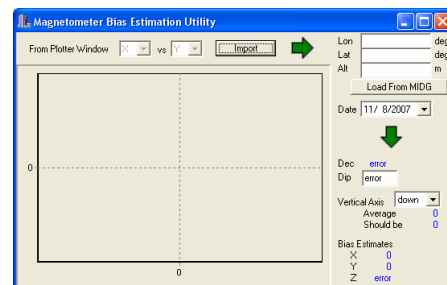


Figure 7. Magnetometer Bias Estimation Utility.

8. **Press the "Import" button to import the "Plot" data.** The imported data should look similar to Figure 8. The red represents the actual plot and the blue dots represent the estimated magnetic planar curve; however, the utility has not consider the "z" axis.

Note: The software calculates the "x" and "y" axis bias estimates, but there is an "error" on the "z" axis.

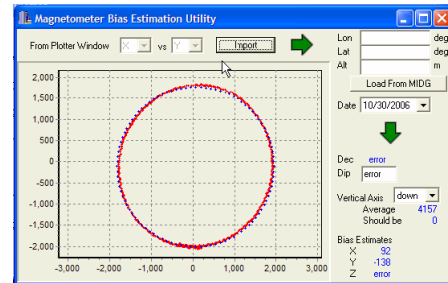


Figure 8. Magnetometer data imported

9. **Enter the latitude, longitude and altitude in the provided boxes at the top right of the "Magnetometer Bias Estimation Utility" or Press the "Load from MIDG" button** (must have GPS connectivity with 3D fix). After entering the altitude, the software calculates the magnetic data from software tables.

10. **Select "Options" from the Menu Bar then Select "MIDG Config"** (Figure 9).

11. **Select the "Heading" tab and enter the "x," "y," and "z" bias estimates.** This data is found in the bottom left corner of the "Magnetometer Bias Estimation Utility."

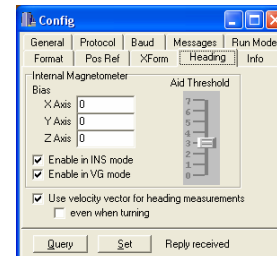


Figure 9. Heading tab

12. **Press the "Set" button and wait for an "Ack" message.** This sends the magnetometer bias estimates to the unit.
13. **Select the "General" tab and Press the "Save Configuration" button.** This saves the bias estimates to the current configuration profile.

This completes the Magnetic Declination Calibration. The MIDG II INS is now properly calibrated for magnetic variations.

5 Help and Support. Microbotics, Inc. is dedicated to supporting the missions of our clients and offers free thirty (30) days of support for all of our products.

Contact Microbotics, Inc. for pricing and availability. Specific technical questions should be sent to support@microboticsinc.com