TCM Studio for TCM2/2.5/2.6

Windows Quick Start

Software Setup:

Launch the TCM Studio 2 Installer and follow the prompts.

Hardware Setup:

1. Connect the unit to a serial port of the PC via the cable included with the Developers Kit, or refer to the manual for pinouts. (A USB to Serial Adapter can be used; Keyspan USA-19QW was tested.)
2. Supply power
   - TCM2/2.5   6 – 18VDC
   - TCM2.6   5VDC

Connection Tab:

Initial Connection:

1. Select the serial port the unit is plugged into.
2. Select 9600 as the baud rate (default).
3. Click on the **<Connect>** button.
4. Once a connection is made the "Connected" light will turn green.

Change Baud Rate:

1. Select new baud rate for the module.
2. Select same baud rate for the computer.
3. Click on the **<Connect>** button.

Change Modules:

Once connection has been made, the TCM Studio will remember the last settings. Any time a module is switched out, clicking on the **<Connect>** button once the new module is attached will reestablish a connection as long as the module baud rate is the same as the previous unit.

Configuration Tab:

North Reference:

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Magnetic: When the <u>Magnetic</u> radio button is selected, heading will be relative to Magnetic North.

True: When the <u>True</u> radio button is selected, heading will be relative to True North. To use North Heading in 'True' mode, the declination needs to be set in the 'Declination' window.

Options:

Use to select halting continuous output by sending a single "h" command.

Damping:

Enabled: Use to select if the filter (damping) is to be used

Time Const: Use to select 4, 8, 16, or 32 samples and apply the values to a filter prior to calculating the heading. These filters allow for a much more stable reading, but can make the acquisition of the data by the program slower. The default setting is 8.

Reading Units:

Compass: Use to select either Degrees or Mils as the unit of measure.

Inclinometer: Use to select either Degrees or Mils as the unit of measure.

Temperature: Use to select either Celsius or Fahrenheit as the unit of measure.

Default:

This button will set the TCM2/2.5/2.6 module back to the factory default settings for the parameters shown on the screen.

Note: This is similar, but with less parameters, to the *factory* command.

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Calibration Tab:

Start (stop):

Toggle button to begin and end calibration

Calibration Procedure:

1. Click on the **<Start>** button to begin.
2. Begin rotating the TCM2.x in a circle while applying pitch and roll to the unit. The unit will have the appearance of a "wobbling top" as it is moved through the calibration routine.
3. Turn the TCM2/2.5/2.6 around at least twice changing the pitch and roll as much as possible.
4. Each turn should take longer than 1 minute. The turn does not need to be a perfect circle. In the calibration mode, the TCM2.x is trying to take as many different data points as possible to determine the magnetic anomalies. The more pitch and roll points you give it, the better it is able to determine the vertical magnetic fields. If possible, apply as close to a ± 90Û pitch and ± 90Û roll. Doing so will improve the quality of the calibration. Do not worry about exceeding the tilt range of the unit.
5. Once two complete rotations have been completed, click on the **<Stop>** button to finish the calibration.

Score:

The TCM2/2.5/2.6 provides feedback on calibration through the calibration score, which has the following format: "...HnVnMn.n...."

The first two numbers in the calibration score, HnVn, respectively describe the quality of the calibration for the horizontal component and vertical component of the host system's local magnetic field. Higher numbers reflect higher quality. The highest possible score is a "9". The factors that contribute to a good score for Hn and Vn are as follows:

- a good, magnetically quiet location was chosen for the user calibration procedure.
- the magnetic environment is stable; there are no large sources of changing fields.
- the calibration data points included a change in system inclinationto allow for proper measurement of the horizontal and vertical field vectors.
- there are no significant soft-iron distortion effects.

The last number in the score, Mn.n, describes the magnitude of local field. Larger numbers denote strong local fields. Small local fields are preferable, since less correction will be necessary, and they utilize less of the magnetometers' dynamic range. A magnitude score greater than 30 indicates strong magnetic fields at the TCM2/2.5/2.6 location; you should consider alternative mounting locations. Any score less than 10 is very good.

> **Note:** The calibration score values mostly provide a qualitative estimation. For example, a good score would be H9V9Mn.n. A poor score as anything less than H9V9Mn.n. A poor V score generally indicates that you need to tilt more during the calibration. A poor H score indicates you did not turn two full circles or that you turned too quickly.

6. If the calibration is not sufficient then click on the **<Start>** button and begin the calibration again.

Clear:

This button will clear the user calibration in the unit. Once selected, the unit will revert back to its factory calibration.

Test Tab:

Current Reading:

Once the **<GO>** button is selected the unit will begin outputting Heading, Pitch and Roll information. Selecting the **<Stop>** button or changing tabs will halt the output of the unit.

3D Model:

The helicopter will follow the movement of the attached module and give a clear representation of the module's orientation.

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Data Logger Tab:

1. Select the data to log in the Data window.
2. Use **Shift-Ctrl-Click** and **Ctrl-Click** to select multiple items.
3. Click on the **<GO>** button to start logging; click the **<STOP>** button to stop logging.
4. Click on the **<Export>** button to save the data to a file.
5. Click on the **<Clear>** button to clear the data from the window.

System Log:

Export:

Select the **<Export>** button to save the system log to a file.