Using the NXIC-ADC with the TCM2.6 Option

INTRODUCTION:

The NXIC-ADC with integrated PNI Corporation TCM2.6 Tilt Compensated 3-axis Compass Module has been setup at Teledyne RD Instruments to work together. The output of the TCM2.6 (heading, pitch and roll) is displayed in the NXIC data string.

Figure 1

MOUNTING AND POSITIONING:

The proper mounting for the NXIC with the TCM2.6 installed is for the connector end cap to be up. (See Figure 1) Compass FORWARD is in the direction of the Cell opening, centered on the temperature probe. See *TCM2.5 & TCM 2.6 Manual_rev04 Oct-2005.pdf* page 9 for further mounting considerations.

NXIC DATA STRING:

The compass Heading. Pitch and Roll information will always appear at the end of the NXIC data string. Preceding the compass data are 4 channels of A/D data all of which will be about zero and cannot be turned off without turning off the compass data.

The following is an example of a string showing:

Conductivity, Temperature, Depth, Battery Voltage, 4 D/C options channels, Heading, Pitch, Roll

```
+0.0238, +23.1807, +0.2040, +5.67,  +0000, +0000, +0000, +0000, +270.300, -0.200, -1.700
+0.0240, +23.1815, +0.2042, +5.57,  +0000, +0000, +0000, +0000, +270.300, -0.200, -1.700
+0.0238, +23.1820, +0.2044, +5.57,  +0000, +0000, +0000, +0000, +270.300, -0.200, -1.700
```

There are times when the TCM2.6 will have an error condition. When this occurs, heading, pitch and roll will all be displayed as -999.000. The most likely cause of an error is inclinometer out of range. This will happen if the pitch or roll exceeds ±50°. An example of a data string with an error is below:

```
+0.0293, +23.3379, +0.0075,  +0000, +0000, +0000, +0000, +357.000, -0.800, -5.800
+0.0298, +23.3441, +0.1244,  +0000, +0000, +0000, +0000, -999.000, -999.000, -999.000
+0.0296, +23.3533, -0.1005,  +0000, +0000, +0000, +0000, -999.000, -999.000, -999.000
```


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CALIBRATION:

To compensate for magnetic anomalies present in the new mounting location, the TCM2.6 has a built in User Calibration Procedure. Read the procedure in *TCM2.5 & TCM 2.6 Manual_rev04 Oct-2005.pdf* page 17 for information about calibrating the TCM2.6.

In order to perform the calibration the user must pass data thru the NXIC directly to TCM2.6. To get to Serial Pass Thru mode use a terminal emulation program such as Windows HyperTerminal. Do not use the terminal window in CTDPro. To get to Serial Pass Thru Mode:

1. If the CTD data is being continuously output type a capital ***S*** to stop the data (no ***<return>*** needed).
2. The NXIC must first be in Open Mode (******O<return>***).
3. Type ***PTSER<return>*** to enter Serial Pass Thru mode.

At this point all commands are directly passed to the TCM2.6. Compass data will be continuously displayed. To halt the data type ***h<return>***. Note - the TCM2.6 will only respond to lowercase letters, so all commands must be lowercase. The TCM2.6 responds to commands with a colon (**:**). Use the following calibration procedure from the manual:

1. Clear any previous calibration by sending ***cc<return>***.
2. Enable multipoint calibration by sending ***mpcal=e<return>***.
3. Put the TCM2.6 into continuous mode by sending ***go<return>***.
4. Begin rotating the assembly 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.

- Turn the assembly around at least twice changing the pitch and roll as much as possible. Each turn should take longer than 30 seconds. The turn does not need to be a perfect circle.
- In the calibration mode, the TCM2.6 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.
- Apply as close to a ± 90 ° pitch and ± 90 ° roll as possible. Doing so will improve the quality of the calibration. Do not worry about exceeding the tilt range of the unit.

  1. Halt the TCM2.6 by sending ***h<return>***
  2. Finish the calibration by sending ***mpcal=d<return>***.

- If the calibration score is not satisfactory, repeat the calibration process.

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Once the calibration is complete the TCM2.6 must be returned to Continuous Sampling mode by sending ***go<return>***. Data should be seen once every second. Type ***<CTRL>C*** to exit serial pass thru mode***.*** The NXIC is now ready to use.

TROUBLESHOOTING:

The NXIC-CTD and TCM2.6 have been setup in the factory to work properly before shipping and should not need any changes. In case of problems check the following:

NXIC:

1. Trouble with Pass Thru mode:
    a. There are times when a timing problem may arise while entering Pass thru mode and communications are not possible. If this happens exit Pass Thru ***<CTRL>C*** and re-enter ***(PTSER<return>)***.
2. In Open Mode type ROP to see the operation parameters. CHID5 must be set to 11 for TCM2.6. Options must be ON.

TCM2.6:

To communicate with the TCM2.6 initiate Pass Thru mode, type ***PTSER<return>***. For more information on using the TCM2.6 reference the manual.

1. The TCM2.6 only responds to lowercase letters.
2. Type ***h<return>*** to stop the compass data.
3. Before exiting Pass Thru mode make sure the compass output is set to Continuous Sampling mode by typing ***go<return>***.
4. The TCM2.6 serial Baud rate should NEVER be changed from 9600 baud.
5. The RS232 Data Output Word must be set to the TCM2.6 standard output format.
6. All three channels Heading, Pitch and Roll need to be enabled.

Please contact TRDI customer service to request technical support. TRDI can be contacted using any of the following means:

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NOTES

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