GY80 10 DOF IMU – BMP085 Barometric Pressure Sensor

AIAA OC Rocketry – July 5, 2015

The CanSat shield Version 4 uses a GY-80 10 DOF (Degree Of Freedom) IMU (Inertial Measurement Unit). This IMU consists of four separate sensors:

- ADXL345 Triple Axis Accelerometer
- HMC5883L Triple Axis Magnetometer
- L3G4200D Triple Axis Gyro
- BMP085 Pressure and Temperature Sensor

If you are using the GY80 IMU and the CanSat shield from NAROM (via AIAA OC Rocketry) you do not need to use the MPX4115A Barometric Pressure Sensor since the GY80 includes the BMP085 Pressure and Temperature sensor. As a word of caution, most of the documentation that you will find on line from NAROM still uses the older Arduino shields. For SPARC we will be using the Version 4 shield, which added the ability to use the GY80

The CanSat shield design and most of the sketches used in the CanSat project are from NAROM (Norwegian Centre for Space Related Education) and Jens Frederik Dalsgaard Nielsen from Aalborg University and we thank him for making this possible for SPARC.

This .ZIP file contains information to help get the ADXL345 3-Axis Accelerometer up and running. It includes the following files and folders:

- DOCUMENTATION FOLDER
    - Cansat_arduino_shield_ver4 (Schematic).pdf – is the schematic for the NAROM Version 4 Arduino Shield
    - GY80Schematic.jpg – is the schematic for the entire GY80 PCB with all four sensors
    - SKU_145912_101.jpg is the schematic, picture, and a little information on the GY80
    - BMP085_DataSHeet_Rev.1.0_)1July2008.pdf – is the datasheet for the barometric pressure sensor with temperaturer
- LIBRARIES FOLDER
    - BMP085 library is used to talk to the barometric pressure sensor
- LINKS FOLDER
    - "Aalborg University Shield V4 Web Page" will take you to a web page on the CanSats and the Shield. This appears to be an early description of the V4 shield – the modifications described will already be done on the final V4 shield
    - "Arduino Software Tools Web Page" will take you to the main Arduino web site where you can download the IDE (Integrated Development Environment) for writing and compiling Arduino code for your CanSat project. And there is a lot of great information elsewhere on that site
    - BMP085 – Adafruit Github Library will take you to an Adafruit Github repository with BMP085 code
    - BMP085 - Sparkfun Quickstart will take you to a Sparkfun tutorial on the BMP085
    - CanSat-GY80 will take you to a page from Aalborg University on the GY80 part of the CanSat

- o DY80 Web Page from Aalborg University will take you to another page from Aalborg University on the GY80 part of the CanSat
- o GY80 – 4Tronix (links to docs) will take you to the 4Tronix web site (European) with more information on the GY80
- o "NAROM 2013 CanSat Book (Uses Older Shield)" will let you download the NAROM CanSat Book with a lot of good information about the project. Again, this references an older Shield

- SKETCHES FOLDER
  The sketch was provided by Jens at NAROM/Aalborg university and modified by AIAA OC Section Rocketry and will allow you to make certain you are receiving data from the ADXL345 on the GY80
  - o BM0850test contains the BMP0850test.ino sketch. When you are ready to test your shield with the GY80 in place, add the new library folders to the Arduino Library and use the Serial Monitor to see the barometric pressure. Data is minimally annoted and unfiltered – just to make certain your BMP085 is functional:

    temp(C) 25.70 - pressure (Pa) 99723 - pressure(rel 1 std atm) 0.00 - height(m) 134.22

  - o BMP085hwi2c contains the bMP0850hwi2c.ino sketch. As with the test sketch above, it is meant to verify your BMP085 sensor is functional. The output is more descriptive than above:

    Calibrating … Calibrated
    Temperature: 25.6 C
    Pressure: 99734 Pa
    Standard Atmostphere: 0.9843
    Altitude: 133.46M