

BAP INSTRUCTION MANUAL FOR MPU-9150 AND LSM9DS0

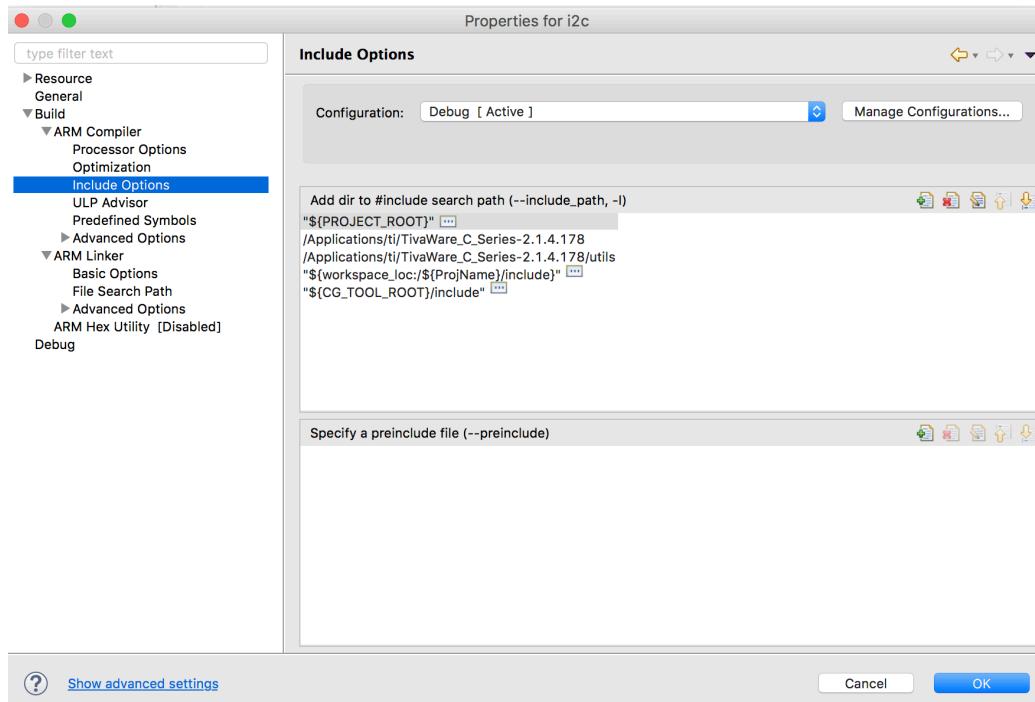
CONTROL AND ROBOTICS RESEARCH LABORATORY

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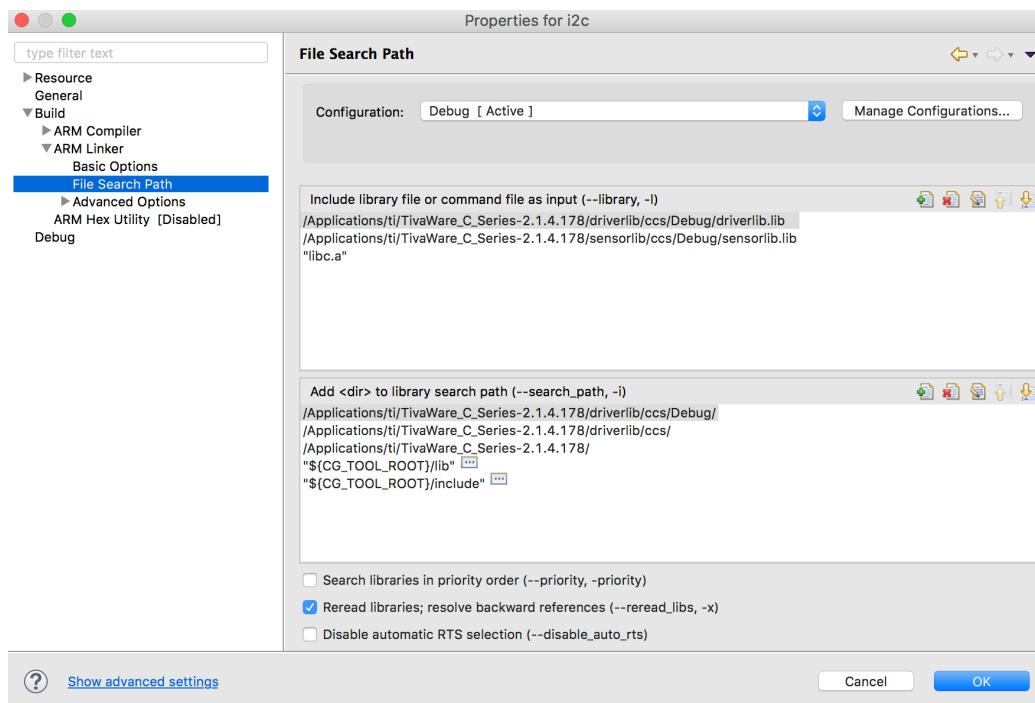
Steps to use MPU-9150 and LSM9DS0 CCS project:

Initial Setup:

1. Download the latest TI Code Composer Studio from the following link:
http://processors.wiki.ti.com/index.php/Download_CCS
2. During Installation in **Processor Support** -> Select **TM4C12x** and **Hercules**. In **Debug Probes** -> Add **SEGGER J-Link**.
3. Download TIVAWARE from the following link:
http://software-dl.ti.com/tiva-c/SW-TM4C/latest/index_FDS.html
Select TivaWare for TM4C Series.
4. Install Tivaware in the same folder as CCS.
5. Open CCS and Go to **Project -> Import CCS Projects** and select the project folder.
6. Once the project is imported onto the workspace right click on the project name and then Go to **Properties -> Build -> ARM Compiler -> Include Options**.
7. Click on the Add symbol and add the following directories from your installation directory:
 1. /ti/TivaWare_C_Series-2.1.4.178/
 2. /ti/TivaWare_C_Series-2.1.4.178/utils



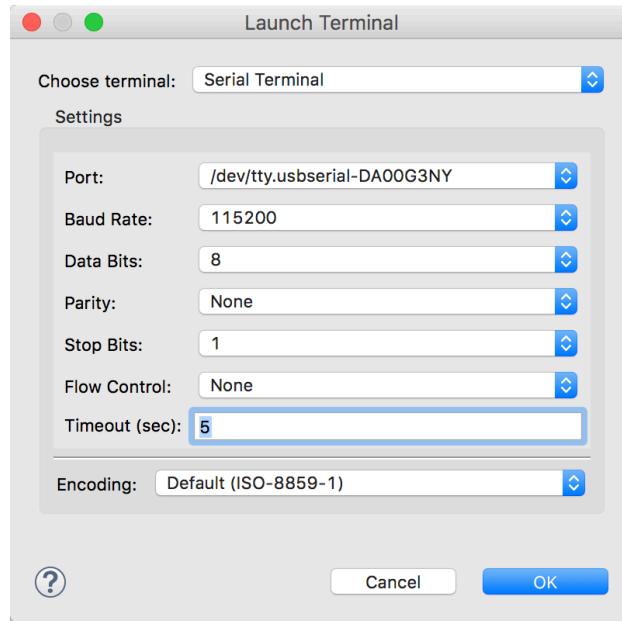
8. Go to **Properties** -> **Build** -> **ARM Linker** -> **File Search Path**.
9. Click on the Add symbol in include library file box and add the following library from your installation directory:
 1. ti/TivaWare_C_Series-2.1.4.178/driverlib/ccs/Debug/driverlib.lib
 2. ti/TivaWare_C_Series-2.1.4.178/sensorlib/ccs/Debug/sensorlib.lib
10. Click on the Add symbol in add library search path box and add the following library from your installation directory:
 1. ti/TivaWare_C_Series-2.1.4.178/driverlib/ccs/Debug/
 2. ti/TivaWare_C_Series-2.1.4.178/driverlib/ccs/
 3. ti/TivaWare_C_Series-2.1.4.178/



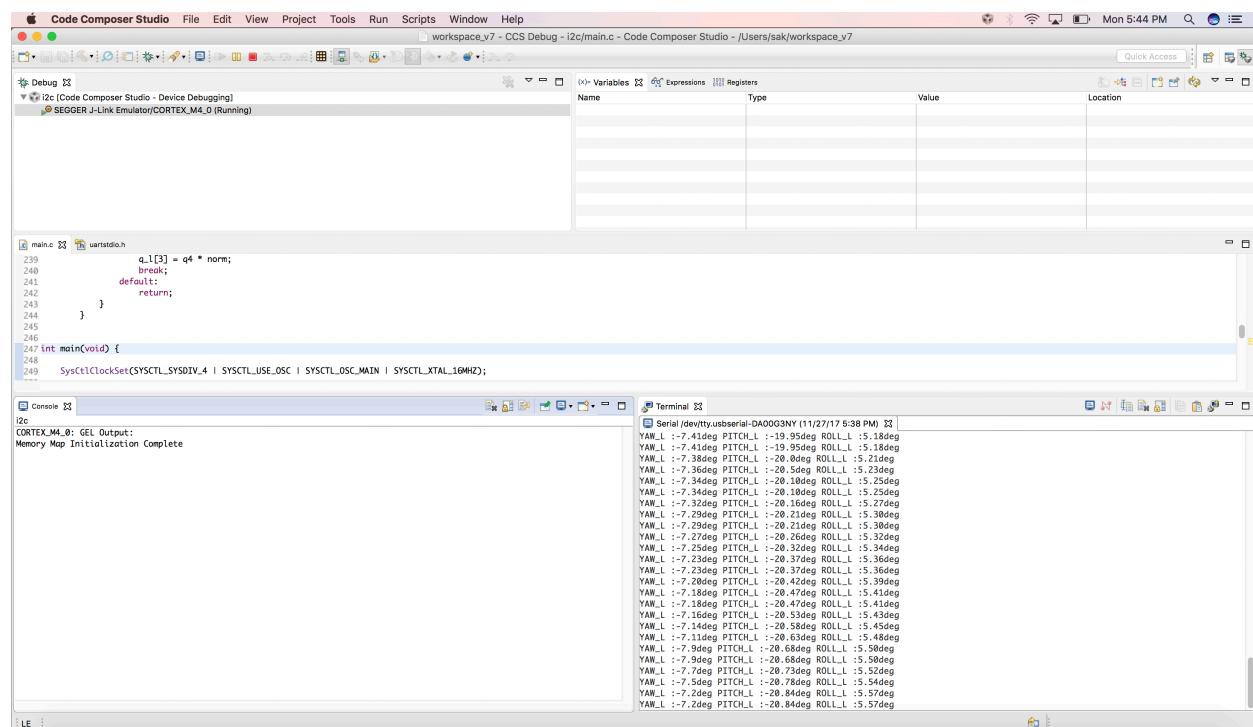
11. After the adding the directories press **OK** and right click on the project and press **Build Project**.
12. Once the project is built, Click on the debug icon 
13. Click on the open terminal icon 

14. Under **Choose Terminal** dropdown select **Serial Terminal**.

15. Under **Port** dropdown select the appropriate port and under **Baud Rate** select **115200**.



16. Click **Run -> Resume**.



Updating the Sample rate:

1. MPU-9150 - in mpu_9150.c file

1. Accelerometer & Gyroscope:

Accelerometer and Gyroscope Config - **Register - 26 - 0x1A**
Overall Sample Rate - **Register - 25 - 0x19**

```
// Configure Gyro and Accelerometer
// Disable FSYNC and set accelerometer and gyro bandwidth to 44 and 42 Hz, respectively;
// DLPF_CFG = bits 2:0 = 010; this sets the sample rate at 1 kHz for both
// Minimum delay time is 4.9 ms which sets the fastest rate at ~200 Hz
i2c_write_reg(MPU9150_ADDRESS, CONFIG, 0x03,f);

// Set sample rate = gyroscope output rate/(1 + SMPLRT_DIV)
i2c_write_reg(MPU9150_ADDRESS, SMPLRT_DIV, 0x04,f);
// Use a 200 Hz rate; the same rate set in CONFIG above
```

2. Magnetometer:

```
MagRate = 10; // set magnetometer read rate in Hz; 10 to 100 (max) Hz are reasonable values
```

2. LSM9DS0 - in imu.c file

1. Accelerometer - **Register - 0x20**
2. Gyroscope - **Register - 0x20**

```
accel_lsm9_write_reg(0x20,0x8F); // 400 Hz update rate, output registers updated only after
read
```

3. Magnetometer - **Register - 0x24**

```
int a = gyro_write_reg(0x20, 0xff); // (bit(2) | bit(1) | bit(0)); // Power on + enable all 3
sensing axes; 760 Hz output data rate and 100 Hz cut-off
```

```
a = mag_write_reg(0x24,0x70); // 50 Hz data rate, high resolution -- set highest bit 1 to
enable temperature sensor
```