ASSIGNMENT 1 - STMCubeIDE

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Description of the problem

The goal of this assignment is to develop two STM32 Projects from scratch using STMCubeIDE to interface the HC-SR04 US Sensor with the STM32F103RCT6 Core Board followed by the ICM-20607 IMU Sensor. We were allowed to reference Dr. Venki's code for designing step 1 of this project with the expectation that we display our collected data on the serial terminal.

Task 1

The goal of task 1 was to develop and test an STM32CubeIDE project capable of measuring distances using an ultrasonic sensor. Then we must communicate via USART to output the data to the serial terminal.

To execute this assignment, we created our package Assignment 1a in the workspace da1 that references stdio, stdlib, and string libraries. I initialized the .iocfile to run the clock off of the internal crystal at 72 MHz with a timer1 running a prescalar of 71. Then I configured asynchronous USART1 alongside PB8 and 9 as GPIOs for the Ultrasonic sensor. The main.c file essentially runs the timer, outputs the trigger through the ultrasonic sensor and then calculates the distance between edges for the echo input. Based upon the length of time that the echo pin is high, we output the distance via USART to the serial terminal.

To execute this assignment you must run the following steps

1. Open the Assignment 1a.ioc file and the main.c
2. Run project
3. View the data in the serial terminal

Task 1 Source Code Directory

DesignAssignments/da1/Assignment 1a/

Task 1 Video

https://www.youtube.com/watch?v=XHaJeBxjkso&list=PLZTXnWnnMe9eMQkYrS3KXLsXxmp48Bh74

Task 2

The goal of task 2 was to develop and test an STM32CubeIDE project capable of measuring accelerometer data via the ICM-20607 IMU Sensor. Then, we communicate that data via USART to output the data to the serial terminal.

We struggled greatly in accomplishing this project, however we did a lot of research into using HAL with the IMU and developed the framework of a project that should work, but it won't and we're unsure why. Our file references the stdio, stdlib, and the string libraries. We initialized the i2c communication for the IMU to communicate with the main MCU cpu. We initialized the USART for the board as well.

To execute this assignment you must run the following steps

1. Open the Assignment 1b.ioc file and the main.c file
2. Run project
3. View the data in the serial termina

Task 2 Source Code Directory

DesignAssignments/da1/Assignment 1b/

Task 2 Video

Given our inability to complete this task, we do not have a video submission