

MODELLING OF AN INTEGRATED DIRECIONAL UNIT

TEAM MEMBERS

SNEHIL SURESH WAKCHAURE

AJITH ERRABELLY

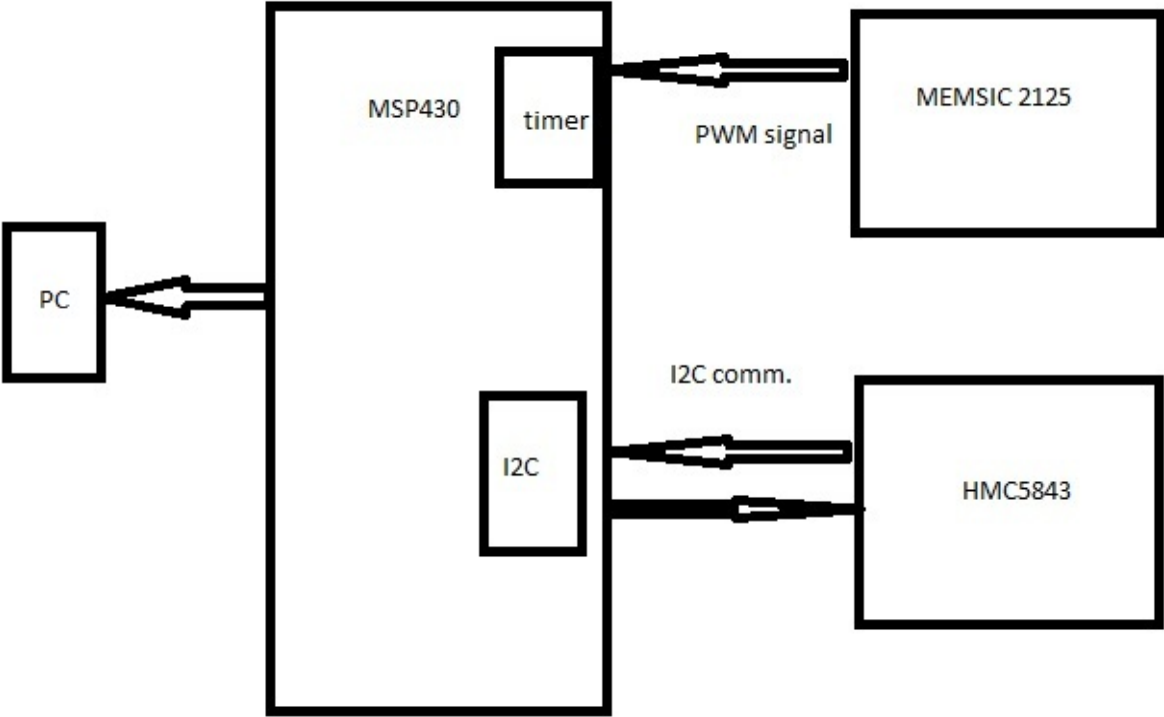
SRINIDHI SREEPAD

PRATHEEK RAJATH

Overview

- Industry specific application-Directional Drilling
 - Directional drilling background: seismic survey, Vertical well drilling, Deviation from vertical wells
 - Part of Measurement while drilling
 - Importance of the system:
 - Directional survey-Inclination & Azimuth
 - Data: stored data & real time data
 - Telemetry methods used-Mud pulse (+/-), Collar wired, Electromagnetic
 - Used only in directional wells
 - Directional driller-estimates the orientation and position of the drill bit
- System output: Inclination & Azimuth (True North v/s Geographical North)

Block Diagram:



Components:

1) Accelerometer MEMSIC2125

- Measures Tilt & Vibration
- Simple PWM pulse output of g-force for each axis
- Power Requirements: 3.3 to 5 VD
- Analog output of temperature (TOut pin)
- Operating temperature over 0 to 70 °C
- The PWM output can be captured using the Timer Capture mode of MSP430
- Challenges: Tilt compensation, Calculation of Inclination using PWM data

2) Magnetometer HMC5843

- Can be used as a magnetic compass
- x,y,z axis sensors to measure horizontal and vertical components of Earth's magnetic field
- Power Requirements: 3.3 to 5 VD
- Uses I2C communication with various modes of operation: continuous, idle, single, off
- Has Challenges: Reading data from internal register, Calculation of Azimuth

Timeline:

- Interface with accelerometer: by November 10th
- Interface with magnetometer: by November 20th
- Testing and debugging: by November 30th