**Semi-Autonomous Mapping Submersible Design Review**

Required Tasks:

GSM/GPRS Communication

Underwater sonar mapping

Obstacle detection

Self-charging

Self-diagnostics

Secondary Tasks:

Photograph capture

Subsystems:

**Depth sonar**

**Perimeter sonar**

**GPS**

**GSM/GPRS**

**Backup systems**

Secondary depth sonar

Contained Control Unit (CCU)

Isolated MCU with internalized backup power and direct control to the following systems:

Motors

Ballast

IMU

GPS

GSM/GPRS

Hazard equipment

**Memory**

SD Card

Generated data files

System logs

EEPROM

Software settings

Flash

64-128kb?

SRAM

Variable memory

**Motor control**

**Solar charging and monitoring**

**Piston ballast system**

**Hazard equipment**

Light mast

Waterproof piezo speaker

**Primary control board**

**Power distribution**

**Simulation diagnostics**

Full external data simulation input and diagnostic monitoring

**Display**

8868 Display for debugging

Minimum Requirements:

Arduino compatible

Internal flash for programs (64-128kb?)

Solar self-charging

4 hour continuous run time

Navigation lights and audio

GSM Text control

Depth finding up to 100m

GPS Self-correction

IMU

Max depth of 100m

Obstacle avoidance

SD Card reading

Simulation diagnostics

Preferred Requirements:

6 hour continuous run time

GPRS Server control

Depth finding up to 200m

Board serial communications:

Busy line

Pulldown resistor

Data line

Primary I/O line

SS

Individual lines that run between every IC that needs to be connected

Sensor data is shared between the main system and the backup

Processors:

ATmega168

System backup

ATtiny85

RTC

GPIOt: 3

SPIt: 1

Serial I/O

ATtiny84

GSM communication

Lights

ATtiny84

Motor drivers

GPIOt: 6

SPIt: 1

Serial I/O

2 O

4 I

ATtiny84

Motor control

GPIOt: XDrivers \* 2

SPIt: 1

XDrivers + 1 Serial I/O

ATmega168

SPIt:

GPIOt:

Sensor data

3 axis accelerometer

3 axis gyro

compass sensor

3 leak sensors

2 depth sensors

5 proximity sensors

ATmega328P/1284P/x128A1/x128A1U

CPU

328P Pros:

Temp sensor

5V

328 Cons:

Small flash

2 SPI

1 UART

2kB sRAM

6 PWM

1284P Pros:

16kB sRAM

1096B EEPROM

5V

1284P Cons:

3 SPI

2 UART

No temp sensor

6 PWM

x128A1 Pros:

High pin count

12 SPI

8 UART

12 Bit ADC

High speed ADC

DAC

Temp sensor

24 PWM

24 Analog comparators

x128A1 Cons:

3.3V

x128A1U Pros:

USB Device

ATtiny84

Display

Testing:

Parts List:

Notes:

Reed power switch

EEPROM setting bits