#### Project Title: DSP Underwater Acoustic Modem

#### Requester: Tyler Turcotte and Dr. Corey Bachand

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#### Address: 151 Martine Street, Ste 123

#### City: Fall River State: MA Zip Code:02723

#### Date: 08/14/2019

### Please note that all RFP Forms must be completed by or before August 1 of a project cycle. If you have any questions regarding the RFP process for Senior Capstone Projects, please contact the College of Engineering at 508-999-8539. Email inquiries may be sent to rlaoulache@umassd.edu

**Title:**

# DSP Underwater Acoustic Modem

**Description:**

The goal of this project is to package a DSP system into a single system based on only the necessary hardware needed to run from a sample development board. The team will need to decide which elements are necessary to provide only the necessary function to the DSP board. The hardware needed to create this complete system will include the DSP, ADC/DAC, and some UART Peripherals. Power management on the board will also be necessary. Running a sample program that transmits and receives audio will be satisfactory. These are the building blocks to implementation of hardware in a real application.

**Scope:**

*The team will need to develop a small PCB with the necessary peripherals to function as a working DSP.*

1. *Determine which components from the development board are necessary for proper operation.*
2. *Create Schematics and Board Layout and have board manufactured.*
3. *Create BOM based on new board design.*
4. *Assemble Boards*
5. *Upload and modify simple sample program code from TI to be able to run on new developed DSP board. This code will simply pass audio through from one ports to another.*

**Known constraints *(if any)*:**

* Hardware (subject to change)

*TMS320C6748 Evaluation Board and XDS110 Debug Probe*

* Software (subject to change)

Code Composer Studio

C and Assembly Language

Eagle

* Interfaces (subject to change)

*Serial Control Interface*

**Deliverables:**

*-Develop a working prototype board including only necessary hardware to run the DSP modem.*

*-BOM of all parts included in the board assembly.*

*-Schematics and Board Layouts (Eagle recommended).*

*-Demonstration of passing a signal to a transducer and receiving that information.*

**Legal Information:**

Check below if this project involves:

IP Ownership by Sponsor (please contact rlaoulache@umassd.edu)

Non-Disclosure Agreement (please contact rlaoulache@umassd.edu)

**Project Classification:**

Select one of the classifications— Intradisciplinary1 or Interdisciplinary[[1]](#footnote-1):

Intradisciplinary *(select a single discipline)*

Bioengineering

Civil and Environmental Engineering

Computer and Information Science

Computer Engineering

Electrical Engineering

Mechanical Engineering

Physics

Interdisciplinary *(select multiple disciplines)*

Bioengineering

Civil and Environmental Engineering

Computer and Information Science

Computer Engineering

Electrical Engineering

Mechanical Engineering

Physics

**Special Instructions:**

*(To be completed in September by the team that undertakes the project)*

Team Number: ­­­­\_\_\_\_\_\_\_\_

#### Student 1: \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*(Project Manager)*

Student 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Student 3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

#### Student 4: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Student 5: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Faculty Advisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_

#### Project Mentor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Intradisciplinary: working within a single discipline.

   Interdisciplinary: integrating knowledge and methods from different disciplines, using a real synthesis of approaches. [↑](#footnote-ref-1)