**CTD41**

**EMULATOR**

Table of Contents

Table of Contents

1 Description

2 Block Diagrams

3 Functional Description

4 Supported Features

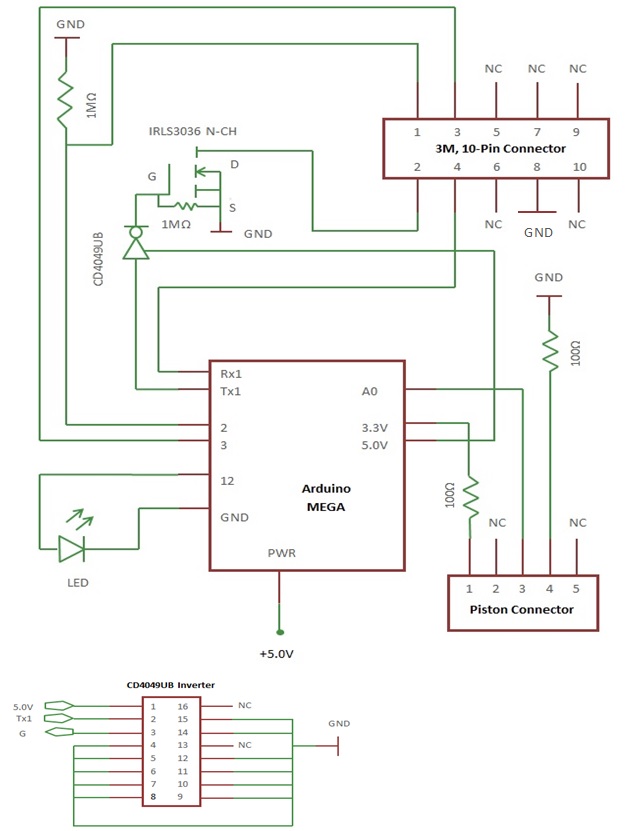
# 1 Description

This document describes the hardware and software functionality of the simulator. The purpose of this document is to provide a detailed description of the hardware, demonstrate how the simulator will be used for testing, and list the expectations and goals of the project. The document will also show how these goals and expectations were met.

1.1

# 2 Block Diagram

Below is the block diagram of the simulator



# 3 Functional Description

The simulator will be the means of performing mission tests for the Teledyne Webb Research Float product that runs on the APF-9 controller board. The simulator will replace the CTD for testing purposes.

The major functional blocks of the simulator are as follows:

* Microprocessor
  + Flash = 256KB
  + SRAM = 8KB
  + EEPROM = 4KB
* Power Management
  + 5V
* Communications
  + Serial (x4)
    - Serial0 for USB-to-TTL Serial chip
    - Serial1 TTL serial data with APF-9

**APF-9 Simulation Supported Commands:**

**s commands**

**s p:** returns a pressure value

**s t:** returns a pressure & temperature value

**s s:** returns a pressure & temperature & salinity value

**s n:** returns the serial number

**s f:** returns the firmware version

**s b:** displays generic coefficients

**s a:** enters continuous profiling mode

**s d:** exits continuous profiling mode

**s b:** does bin average of data collected during continuous profiling mode

**s g:** enters gateway (command mode)

**s k:** configures the “seabird”

**esc:** hit the esc key to leave gateway mode

**gateway commands (run once in gateway mode a.k.a. command mode)**

* **ds:** returns generic data, can update data in the source code
* **dc:** returns generic data, can update data in the source code
* **da:** returns the bin average data, will only work after running the bin average command
* **id:** (also can use id on) will turn on ice detect mode
* **ic:** (also can use ic on) will turn on ice cap mode
* **ib:** (also can use ib on) will turn on ice breakup mode
* **id off:** will turn off ice detect mode
* **ic off:** will turn off ice cap mode
* **ib off:** will turn off ice breakup mode
* **build:** will tell the user whether the simulator is working with the APF-9 or APF-11 code
* **qsr:** will exit command mode

**APF-11 Simulation Supported Commands:**

**seabird\_ commands**

**seabird\_get\_p:** returns a pressure value

**seabird\_get\_t:** returns a temperature value

**seabird\_get\_pt:** returns a pressure & temperature value

**seabird\_get\_pts:** returns a pressure & temperature & salinity value

**seabird\_start\_profile:** enters continuous profiling mode

**seabird\_stop\_profile:** exits continuous profiling mode

**seabird\_binaverage** does bin average of data collected during continuous profiling mode, note that the values returned from the bin average command only loosely reflect the actual data collected, and will try to mimic an actual mission, there will also be a degree of randomness, especially the samples per bin

**seabird\_cmode (on):** enters command mode, might not send back S> prompt immediately, but still will work if user presses enter to get S> prompt back

**seabird\_cmode off:** exits command mode

**sys\_chat COM[] B[]:** allows serial data to be sent to the simulator, COM[] should be replaced with the com port # (e.g. COM2), and B[] should be replaced with the baud rate (e.g. B9600)

**cmode commands (run once in command mode and in the sys\_chat)**

* **ds:** returns generic data, can update data in the source code
* **dc:** returns generic data, can update data in the source code
* **da:** returns the bin average data, will only work after running the bin average command
* **id:** (also can use id on) will turn on ice detect mode
* **ic:** (also can use ic on) will turn on ice cap mode
* **ib:** (also can use ib on) will turn on ice breakup mode
* **id off:** will turn off ice detect mode
* **ic off:** will turn off ice cap mode
* **ib off:** will turn off ice breakup mode
* **build:** will tell the user whether the simulator is working with the APF-9 or APF-11 code
* **qsr:** will exit command mode (should run seabird\_cmode off)
* **esc:** exits sys\_chat to re-enter normal command mode (cmode)