

901805 - Coastal Biogeochemical Sensing

Week 52

1. Thom Maughan
 - a. Met with Yui on release plans for pHFETSOS v3.9.2 and v4.x

Week 50

1. Scott Jensen
 - a. Continued work to track down temperature coefficients
2. Thom Maughan
 - a. Demonstrated the OCR-504 driver to Yui and Jacki. Next step is to get HyperOCR up and running.

Week 49

1. Scott Jensen
 - a. Trying to isolate temperature sensitive components in signal chain
2. Brent Jones
 - a. Tearing down Spray34 looking at corrosion damage due to cracked wing
 - b. Modifying MFET design to fit on the Wire Walker
3. Thom Maughan
 - a. Discussions with Yui

Week 48

1. Scott Jensen
 - a. Discussion and considerations of temperature drifts

Week 46

1. Scott Jensen
 - a. nanoFET layout
2. Brent Jones
 - a. Doing inventory in anticipation of upcoming deployments
3. Thom Maughan
 - a. A round of bug fixes while in Texas and support for Irene

Week 45

1. Scott Jensen
 - a. Preparing for nanoFET layout
2. Thom Maughan
 - a. Verified ADS1284 functionality for components bought from Shenzhen via agent
 - b. Support for MFET/MPHOX firmware.

Week 44

1. Thom Maughan
 - a. Review of nanoFET updated design with Scott and Yui
 - b. Received ADS1248 from China, testing the quality.

Week 43

1. Scott Jensen
 - a. L:opcaiton parts and finishing revision of nanoFET
2. Brent Jones
 - a. Prepping Spray 34 for a battery exchange
3. Thom Maughan
 - a. Discussed possible options for nanoFET in 2022 rather than 2023 with Scott and Yui. Processor and ADS1248 order. Ordered parts for IrDA dongle for 2022 work.
 - b. Support QA of MFETs and setup of a dedicated laptop so we can return loaner.
 - c. OCR cable checkout for MFET.

Week 42

1. Scott Jensen
 - a. Working on revision B of nanoFET. Final is waiting for testing and proof of concept with ISFET adapter
2. Thom Maughan
 - a. Meeting with Scott and Yui.
 - b. Chip shortage is pushing nanoFET to 2023 based on electronics lead times. Gave Scott the nanoFET. Delivered 'bad boards' to be used for parts salvaging. Found and ordered processors.

Week 41

1. Scott Jensen
 - a. Readied latest release of ISFET adapter for testing

Week 40

1. Scott Jensen
 - a. Settling in on a unipolar bias scheme for the ISFET
2. Brent Jones
 - a. Flying spray 34 in support of Yui's experiments
3. Thom Maughan
 - a. Found the Eclipse Egit tutorial and sent that to Irene. She is now functional using Code Composer Studio Egit, though we still have a ways to go on git setup and usage.

Week 39

1. Brent Jones
 - a. Flying Spray34 in support of Yui's experiments
2. Thom Maughan
 - a. Committed first draft of updated serial driver to bitbucket for Irene, working thru git challenges.
 - b. Started software management document to aid the long term voyage to using git.
 - c. Git integration in Code Composer Studio has presented challenges, along with being git newbies. Thanks to Kent for his steady support and knowledge transfer.

Week 38

1. Brent Jones
 - a. Recovered Spray glider 34 and diagnosed non functioning SBE pump
 - b. Replaced pump and re deployed glider 34
 - c. Flying glider 34 in support of Yui's experiments
2. Thom Maughan

- a. Git integration with CCS is working and Irene is functional with CCS and the v3 codestream on the Mac. Next is to figure out how to fork the v4 code stream.
- b. Re-wrote uart / optode / ctd drivers to enable Irene's driver development for vector velocimeter driver.

Week 37

1. Thom Maughan
 - a. Git repo setup in bitbucket. Test both command line and Code Composer Studio git integration setup and documented for Irene. Thanks to Kevin and Kent for support and guidance.

Week 36

1. Brent Jones
 - a. Flying Spray 34 in support of Yui's experiments until pulling it off and doing work for CANON

Week 34

1. Scott Jensen
 - a. Working out temperature issues with unipolar bias scheme
 - b. Planning for future revisions of nanoFET
2. Brent Jones
 - a. Installed new batteries on Spray29. Removed old batts. Proceeding with normal turnaround procedures
3. Thom Maughan
 - a. pHFET-SOS bug fixes and enhancements are finished the release is done for MPHOX/MFET firmware. Release notes updated, procedure for nsFOCE firmware updated and config written.
 - b. Attended NanoFET analog temperature sensitivity data review. NanoFET v2 was given the green light.

Week 33

1. Brent Jones
 - a. Continuing to run Spray 34
 - b. Diagnosing problems with Spray 29 flurometer

Week 32

1. Scott Jensen
 - a. Trouble locating multiplexer for ISFET adapter. Current schedule is 11/6/2021
2. Brent Jones
 - a. Flying Spray 34 in support of Yui's experiments
3. Thom Maughan
 - a. Tried Jira and Backlog, both nice bug trackers, but not a fit (yet) for the team. Accepting bugs into a shared google doc, by email and slack. The 'filing of a bug' is more important than the bug tracking system.
 - b. Implemented features from review on 30 Jun and have completed all the bug fixes
 - c. Testing, testing, testing. MpHOx, MFET and nanoFET.
 - d. Released pHFET-SOS v3.8.9 for lab testing on 5 Aug, planning final release Aug 19. Sixteen boards have been programmed
 - e. First proto of Instrument Simulator for CTD (MicroCAT), Aanderaa 5860 and Aanderaa Optode.
 - f. Handed off QA box and cable kit to Joseph. James is trained and can update firmware and checkout boards also.

Week 31

1. Brent Jones
 - a. Flying Spray 34 in support of Yui's experiments

Week 30

1. Thom Maughan
 - a. Wrapping up pHFETs test and release for MpHOx and MFET.
 - b. Worked with Irene Hu on Code Composer Studio setup, build, load and run.
 - c. Reviewed ADV c++ driver.
 - d. Connect and played with HyperOCR hyperspectral radiometer.

Week 29

1. Brent Jones
 - a. Flying spray 34 in support of Yui's experiments
2. Thom Maughan
 - a. Working on bug list, testing, testing, testing. Getting ready to provide release candidate to the team.
 - b. ~100 minute periodic thermal cycle. Air conditioning is suspected, supporting Joseph in tests.

Week 28

1. Brent Jones
 - a. Proposal
 - b. Flying Spray 34 in support of Yui's experiment
2. Thom Maughan
 - a. Irene Hu and Yui provided change requests and bug reports. In progress implementing.
 - b. Reviewed 901805 2022 proposal
 - c. James Mc is doing a great job on programming MPHOXs with QA station. Manufacturing request for cables is in progress.

Week 25

1. Brent Jones
 - a. Prepped, deployed, and am flying Spray34 in support of Yui's experiments
2. Thom Maughan
 - a. Slides for nanoFET status, updates for 2022 ideas doc
 - b. Working on nanoFET, MFET and MPHOX software dev.
 - c. Bug tracker setup, Jira and Backlog eval. Jira is a bit more complex, but will go with the standard MBARI tool.

Week 23

1. Thom Maughan
 - a. User testing. Found a bug with fatfs.
 - b. Working on PWM for solenoid valve and pump soft start
 - c. Released both MFET and MpHOX code for lab use / testing.

Week 22

1. Scott Jensen
 - a. Checked out for detailed testing the unipolar ISFET adapter on a prototype MCAP
2. Thom Maughan

- a. Testing on MFET and MpHOx is complete.
- b. Implemented improvements to QA routine, with the notion of having outside manufacturing run the QA routine or EE Tech team. It takes about one minute per board for this release.
- c. Released v3.8.1 for MFET and MpHOx to the Carbon team for lab testing.
- d. Working on 2022 proposal inputs
- e. Paul Coenen is working on the QA workstation test jig. We've got 40 MpHOx and 20 MFETs to process. James and Joseph are checked out on the QA setup. I owe Joseph a follow up as our session was cut short due to trip to dentist.

Week 21

- 1. Brent Jones
 - a. Flying Spray29 in support of Yui's experiment
 - b. Redesigning flow cell for SBE GDF pH sensor
- 2. Thom Maughan
 - a. Paul C did a great job packaging and mounting boards and test setup into the 'dev box'. In progress is a similar, the 'QA box'. This will be a big help going thru the run of 40 MpHOx boards and latest batch of MFET. Automated board checkout routine is in the latest firmware release with a consolidated (and stored) QA report for provenance tracking.
 - b. Testing of build variants for MFET and MpHOx was more efficient with the 'dev box', bugs found and fixed.
 - c. Serial instrument simulator parts are all in. Request EE-Tech to build three for Aanderaa Optode, Aanderaa Conductivity and Seabird SBE37 MicroCat simulators.
 - d. Firmware for MFET and MpHOX dev / testing is at 'release candidate' state.

Week 20

- 1. Scott Jensen
 - a. Design for unipolar ISFET to MFET adapter PCB
- 2. Thom Maughan
 - a. Firmware release for testing by Carbon lab.
 - b. Review of data grouping proposal. Grouping and support of legacy users.
 - c. Temperature conversion: worked on three variable Steinhart-Hart alg and trying to understand the equation used by Scripps (four variable). Researching and testing. Converted to single to double precision. Three equations, three unknowns to generate S-H coefficients if we were to encode the calibration of the thermistor.
 - d. Working to improve QA procedure. James M. did a walkthrough for Yui. Working to further automate to make James job easier with all the same traceability.

Week 19

- 1. Brent Jones
 - a. Flying Sprays 29 and 34 in support of Yui's experiments
- 2. Thom Maughan
 - a. Updating config options and sampling per review comments.
 - b. Starting to test the MFET build

Week 18

- 1. Scott Jensen
 - a. Unipolar DuraFET biasing seems to be working a few tests remain
- 2. Brent Jones
 - a. Flying Spray 29 in support of Yui's experiments

- b. Prepping Spray 34 for deployment
- 3. Thom Maughan
 - a. Big push on MpHOx software is winding down. Review with Yui on Wed resulted in a short list of changes.
 - b. Ordered parts to make instrument simulators for SBE MicroCat, Aanderaa Optode and conductivity.
 - c. Working with Paul C to get an esd box with dev boards mounted. Will replicate once we get the first one 'right'.
 - d. QA procedure updated. Requested the remaining MpHOx boards be tested next week. First batch resulted in 3 fails. Inventoried the boxes.

Week 17

- 1. Scott Jensen
 - a. Received the new bias PCB and thus far the circuit looks promising
- 2. Thom Maughan
 - a. Pushing to release the latest software. Testing and review is creating todo items, but the list is converging.
 - b. Thanks to James M. for helping with easy bias battery measurement probe. Gave Scott a setup and he found an assembly error on the 'bad' MCAP board
 - c. Wrote QA firmware and put together a setup for programming and testing the 40 mphox+mcap boards.

Week 16

- 1. Scott Jensen
 - a. Submitted updated DuraFET bias front end PCB prototype.
 - b. Reviewing MCAP tester results
- 2. Brent Jones
 - a. Flying Sprays 29 and 34 in support of Yui's work and CANON.
- 3. Thom Maughan
 - a. Majority of time working on new release for MpHOx, MFET. Getting close, reviewed progress with Yui.
 - b. Spent time measuring the analog sims (Jensenian V2) and doing variability analysis on 5 MCAP boards for a qa test procedure. Found 2 of the 5 MCAPS have problems. Test results and procedure handed to Scott J for hardware debug.

Week 15

- 1. Scott Jensen
 - a. Testing of MCAP tester
 - b. nanopHOx bias scheme being adjusted.
- 2. Brent Jones
 - a. Flying Spray 29 in support of CANON
 - b. Prepping Spray 34 for deployment

Week 14

- 1. Scott Jensen
 - a. A little work on the nanopHOx bias circuit. Due to common mode ranges some of the bias point need to be adjusted
- 2. Brent Jones
 - a. Flying Spray 29 in support of Yui's lab
- 3. Thom Maughan
 - a. Primary effort this week is on completing enhancement list for MpHOx/MFET, finding and fixing a few bugs by inspection, refactoring, testing, testing.

- b. Found an issue with counter electrode current scaling - slack discussions with Yui and Scott
- c. Setting up DAG board with BME280 and FRAM/Flash as nanoFET proxy

Week 13

1. Brent Jones
 - a. Prepped and deployed Spray 34
 - b. Flying sprays 29 and 34
2. Thom Maughan
 - a. Working on nanoFET board checkout. Met with Scott on differences between MCAP and nanoFET analog interface, implemented the nanoFET specific changes.
 - b. 32KHz clock is now working which enabled the rtc and hibernate module, working to figure out sleep issues and rtc problem
 - c. Implementing new features and enhancements on MpHOx and MFET.

Week 12

1. Thom Maughan
 - a. Working with Scott on nanoFET. Devised a procedure for working remote with a single nanoFET board.
 - b. Setting up a DAG board with BME280 and FRAM/chip flash as a development proxy for the nanoFET.
 - c. Working on Yui's feature list with MpHOx as target board. New mikroProg ICDI fixed the stability problems with CCS wonderfully. MikroElectronica support is responsive and I sent the files for reproducing hex programming issues with their Arm Suite tool.

Week 11

1. Thom Maughan
 - a. Started on feature / bug list with MpHOx as dev hardware. Target connection issues related to supporting multiple chips in the same codebase and/or moving to CCS v10. Resolved by installing CCS v7 on another pc which reconfigured the mikroprog jtag emulator.

Week 10

1. Scott Jensen
 - a. Received the nanpHOx prototype back and have determined that the 32kHz oscillator needed replacing.
2. Brent Jones
 - a. Flying Spray29 in support of active experiment
 - b. Completing ballast of Spray34 in anticipation of deployment next week

Week 9

1. Brent Jones
 - a. Continued flying of Spray29 in support of Yui's pH experiments
2. Thom Maughan
 - a. nanoFET board bringup, workinprogress, going reasonably well but need the 32Khz clock osc operational.
 - b. A/D converter is working, menu items for discrete channel testing are functioning. Did not have the Jensenian board, so not sure of noise/accuracy. Sending board to Scott to enable his analog checkout.
 - c. Ordered missing FRAM, arrived (late), just as I mailed the nanoFET back to MBARI for Scott Jensen.

- d. MpHOx boards have been transferred to Scott Jensen. He is onsite and can coordinate with Joseph, Yui and Chad on board inventory and checkout.
- e. New batch of MFETs are in progress. Met to discuss board QA procedure.

Week 8

- 1. Scott Jensen
 - a. More coordination of build. MFET's have now been received.
 - b. npHOx development
- 2. Brent Jones
 - a. Flying Spray29
 - b. Continued prepping Spray 34
- 3. Thom Maughan
 - a. nanoFET board bringup.

Week 7

- 1. Scott Jensen
 - a. Keep apprised of the current build progress
- 2. Brent Jones
 - a. Flying Spray 29
 - b. Prepping Spray 34

Week 6

- 1. Scott Jensen
 - a. Support of builds
- 2. Brent Jones
 - a. Prepped, deployed, and am flying Spray 29
 - b. Diagnosed bad cable on Spray 29 that led to bad readings when immersed.
 - c. Continued Prep on Spray 34
- 3. Thom Maughan
 - a. Working on nanoFET

Week 5

- 1. Scott Jensen
 - a. Checked out first two articles from fabricator of the next order of MFET's
- 2. Brent Jones
 - a. Continued to rebuild and prep sprays 29 & 34 for upcoming deployments
- 3. Thom Maughan
 - a. nanoFET board bringup.
 - b. Working on new features
 - c. MpHOx board checkout (4 fails).

Week 4

- 1. Scott Jensen
 - a. Dealt with a few questions about incoming order
- 2. Brent Jones
 - a. Preparing Spray 29 for deployment. Investigating feasibility of using BOG CPF to carry microrider turbulence sensor
- 3. Thom Maughan

- a. Working on nanoFET board bringup, pinmux and registers are init'd, working on adapting peripheral drivers as needed. Seeing lots of need to refactor the codebase, will need to figure out when to fork off a functional version for some much need restructuring.
- b. MpHOx / MCap board test. Three fails will be brought into MBARI for Scott.
- c. Adding PWM driver for solenoid control

Week 3

1. Scott Jensen
 - a. Researching opamp possibilities that are low power, high input impedance but wide enough common-mode for the new bias circuit configuration.
2. Thom Maughan
 - a. Priority is on nanoFET board bringup, in progress, main focus.
 - b. Toolchain qualification and update to CCS v10 is complete, a few bumps, but not bad.

Week 2

1. Scott Jensen
 - a. Keeping track of MFET and MCAP build
2. Brent Jones
 - a. Merging older down/up profiling code with latest code so I only have to maintain one. Adding capability to change profiling from down/up to just up over iridium

Week 1

1. Thom Maughan
 - a. Meeting with Yui and Joseph to discuss software task list, board support and priorities
 - b. Sorted out the problem with CCSv10 IDE workspace import bug with dependent libraries. Migrating codebase to CCS v10.
 - c. 901713 - Nearshore FOCE: setting up mphox and conductivity sensor with cable borrowed from Crissy.