

**Group Number:** May1725

**Project Title:** Wireless Energy Measurement System

**Advisor:** Nathan Neihart

**Team Members/Role:**

- 1) Joseph Freeland (Co-Lead)
- 2) Milan Patel (Co-Lead)
- 3) Adam Cha (Communications Lead)
- 4) Adam Dau (Webmaster)
- 5) James Tran (Key Concept Holder)
- 6) Wei LinLin (Key Concept Holder)

o **Weekly Summary**

This week we met with our advisor to show the block diagram we came up with this week. We also completed our Project Plan as well. Our team finalized microcontroller and wifi shield model and has placed the order. We presented the current measurement result with our advisor and had identified major noise issue in ACS712. We created strategy to further improve the performance of the sensor and validate the measurement.

o **Past week accomplishments (please describe as what was done, by whom, when)**

- Adam Cha - Completed weekly report. Watched MSP430 programming tutorials and reviewed PIN layout.
- Adam Dau - Investigated MSP430 board and writing interrupts.
- Joseph Freeland - Estimated RMS power error at various sampling rates.
- Wei LinLin - Attended weekly meeting.
- Milan Patel - Exhausted auto-ranging/small current measurement methods.
- James Tran - Communicated with Allegro representative to place sample order for ACS730 and ACS724 sensor (better versions). Requested approval order for CC3200MOD. Created a rough testing fixture for the sensor. Collected current data sample from ACS712 sensor using Arduino

o **Pending issues (if applicable)**

- Adam Cha - Need to start downloading software and writing practice script code to get a better understanding on how it all works.
- Adam Dau - Currently I am able to write the code for some sample scenarios, but we don't have the hardware signal yet for me to test.
- Joseph Freeland - Going to look further into the wifi shields and how we can incorporate them into our project.
- Wei LinLin - None at this time.
- Milan Patel - None at this time.
- James Tran - Further investigate noise issue at low level current measurement. This can be due to the physical characteristics of the ACS712 sensor. There will be a possibility looking into another sensor.

o **Individual contributions**

**!!! DO NOT EDIT THE RED COLUMN !!!**

**!!! ONLY EDIT BLUE COLUMN !!!**

<b><u>NAME</u></b>	<b><u>Individual Contributions</u></b>	<b><u>Hours this week</u></b>	<b><u>Hours cumulative</u></b>
Adam Cha	Completed weekly report. Watched MSP430 programming tutorials and reviewed PIN layout.	3	18
Adam Dau	Investigated MSP430 board and writing interrupts.	4	12
Joseph F.	Estimated RMS power error at various sampling rates.	3	14
Wei LinLin	Attended weekly meeting.	1	9
Milan Patel	Exhausted auto-ranging/small current measurement methods.	4	24
James Tran	<ul style="list-style-type: none"> <li>- Communicated with Allegro representative to place sample order for ACS730 and ACS724 sensor (better versions)</li> <li>- Requested approval order for CC3200MOD</li> </ul>	7	21

	<ul style="list-style-type: none"> <li>- Created a rough testing fixture for the sensor.</li> <li>- Collected current data sample from ACS712 sensor using Arduino</li> </ul>		
--	---	--	--

**!!! DO NOT EDIT THE RED COLUMN !!!**

**!!! ONLY EDIT BLUE COLUMN !!!**

**o Comments and extended discussion**

Our team is a little bit behind on implementing the hardware parts. We have placed major components this week so hopefully we can speed up the project in the next coming weeks.

**o Plan for coming week (please describe as what, who, when)**

- Adam Cha - Start programming sample code. To get a better idea on how the MSP430 will operate.

Task	Date	Expected outcome
Download MSP430 software and manual	10/24/16	Have the necessary software to program MSP430.
Start doing research on sample code to write and start practicing.	10/24/16	Have a good understanding on how to create software for our project.

- Adam Dau - Investigated MSP430 board and writing interrupts.

Task	Date	Expected outcome
Writing more interrupts	10/24/16	Be able to write interrupts for our MSP430 when the hardware team is ready to send out a signal.

- Joseph Freeland - Look into a Raspberry Pie versus using an Iowa State Server.

Task	Date	Expected outcome

Estimate RMS power error based on various sampling rates	10-25-17	Results for project and a better understanding on how the RMS power error will affect the signal coming out of the device.

- Wei LinLin - Strat simulating current circuit and improve for better performance .

Task	Date	Expected outcome
Get more parameters for signals coming out of oscilloscope.	10/24/16	Easier to understand and evaluate, we didn't have enough parameters before.

- Milan Patel - Look into Auto Ranging

Task	Date	Expected outcome
Research Auto Range Options	10/24/16	Variable gain to measure small currents
Cross check MSPs for compatible ADCs that allow for acceptable resolution	10/27/16	Resolution that allows accurate current measurement of at least 10 ma/bit

- James Tran - Will be working on the voltage measurement, investigate noise issue in the sensor

Task	Date	Expected outcome
Apply low-pass digital filter to see if the sensor is capable of measuring low current	10/25/16	Clean data current measurement.
Simulate voltage divider in ADS to see if this method can be used to measure	10/26/16	Voltage divider must convert 120V to 1.8V

voltage		
---------	--	--

o **Summary of weekly advisor meeting**

**Tasks (Due 1-2 Weeks):**

1. NEED MORE DETAILS FOR PLOTS
2. Get incandescent light bulb to be used as a large load.

**Things To Keep In Mind:**

- Use multimeter to get voltage.
- Need much more parameters of each signal.
- NEED ALL THE DATA (time scale, amplitude, etc).
- Autoranging may be something we want to look into to be able to change gain to get a better  $V_{ref}$ .
- Stay away from square function in Arduino
- Have a sine wave with a offset phase from the clock.
  - Random phase offset.
- Test using sinusoidal sources.
- Use a charger no one wants anymore and use an oscilloscope to measure the power of this charger.
- Under same conditions hook the system up and then see if what we are reading is the correct values.