

Lab 0: Intro to Atmel XMEGA Development Board, Soldering/Wire-wrapping, and your TA

29-Aug-14

OBJECTIVES

In this lab you will meet your TA and give her/him the required information listed below. Your TA will present a short demonstration on soldering & wire-wrapping during this lab; these skills will aid you in building your **UF 4744 μ Tinkerer (ATXMega128A1U) Development Board** and adding hardware to the board in future labs. After seeing the TA demonstrate these techniques, you will be encouraged (i.e., required) practice soldering and wire wrapping on some practice boards. You will then solder some new headers to access ports and address lines on your UF 4744 μ Tinker Development Board.

Meet your TA. Get to know her/him. Understand the lab policies. Fill out and submit the [Lab Rules and Policies](#) handout.

REQUIRED MATERIALS

- Read, sign, and email the following:
 - [Lab Rules and Policies](#)
- Email your first (lab0) pre-lab report.
- Print parts 6 a) through d) of the pre-lab report (as described in the [Lab Rules and Policies](#) document).
- Read/save the following documents:
 - [UF Board Construction Guide](#)
 - [Atmel Studio Installation Instructions](#)
 - [Electronic Assembly handout](#)
 - [Class syllabus](#)
- Multimeter (from 3701)
- Wire wrap tool (which you will receive in your lab kit)
- Soldering iron (available for use **in lab**)
- Wire cutters and needle nose pliers (shown above, **some** available for use **in lab**, but if you own one, **bring your own**)



A type of wire wrap tool.



Wire wrap tool tip

DISCUSSION

The *Electronic Assembly handout* discusses how to solder, a technique that makes a good electrical (and

mechanical) connection between two locations.

Wire wrapping is another technique for making a good electrical and mechanical connection between two locations. The advantage over soldering is that the process can be easily reversed, and with our wire wrap tool, require no additional equipment. An electrical connection between two pins is established by wrapping bare wire around the first pin, running insulation covered wire to a second pin, and wrapping the second pin with



Proper wire wrapping

the bare wire. There should be 5-7 turns of bare conductor on a wire-wrap pin and about 1 to 1.5 turn of insulated wire on the pin. To obtain 5-7 turns of bare wire, approximately 1-inch of wire should be stripped of insulation.

Multiple wire wrap connections can be made from a single pin (as shown), but daisy chaining should be avoided. Instead, wrap from pins A to B, then from pins C to D, and then from pins B to C. This will allow for easier unwrapping, if necessary.

PRELAB REQUIREMENTS

Read **all** of the documents listed in the above section. Answer the pre-lab questions and complete your first pre-lab report that you will email to the class Gmail account (as specified in the *Lab Rules and Policies* document). Note that your first (lab0) pre-lab report will be very short and will only include title, prelab questions, and appendix. You must print out sections a) and b) for this lab. In the future, you will print out sections a) through d). Answers to the prelab questions can be found in the posted lab documents.

Go through the *Atmel Installation Instructions* to install the software on your laptop. Obtain a screen shot of Atmel Studio running on your laptop that **also shows your name** in big letters on the same screen. To do a screen shot in Windows, press Ctrl-PrtScrn (i.e., select Ctrl and PrtScrn at the same time). Copy this screen shot into PowerPoint, Word, or similar and include this in Appendix section of your pre-lab report that you will email to the class email account (with the proper subject heading).

Separately email the *Lab Rules and Policies* document as specified in the document itself.

Note: Pre-lab requirements **MUST** be accomplished **PRIOR** to coming to your lab.

PRELAB QUESTIONS

1. What minimum lab average is required in order to be **eligible** to pass the course?
2. [How late can you arrive for lab and still be admitted?](#)
[How late can you arrive for lab and still be allowed to take the lab quiz?](#)
3. Where should appropriate lab files be emailed for this course?
4. What is the lab makeup policy if you miss a single lab? Can you drop this lab if ... a) you overslept? b) project for other class due?
5. When soldering a wire to a pin, what should the soldering iron touch and what should the un-melted solder touch?

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6. How many surface mount chips should be in your kit? How many jumpers? How many 1.2k Ω SIP resistor packs?
7. How many turns of bare wire should be on a wire wrap pin? How much wire (in inches) do you need to strip to get these turns on the pins? How many wraps of insulation should be on a wire wrap pin?

LAB PROCEDURE

Parts Kit:

Obtain your 4744 lab kit from your TA. These parts will be used in the labs throughout the semester. **Verify** that your kit has **all the parts** listed on the checklist provided. Immediately notify your TA about any missing parts.

Lab Rules and Policies and Introductions:

Your TA will discuss the lab rules and policies and then give you a general introduction to the laboratory and what will be expected from you for the semester.

Board Construction:

Your TA will demonstrate proper soldering and wire-wrapping techniques so that you will then be able to finish the construction of the board and have the skills to do further soldering and wire wrapping throughout the semester (and throughout your life).

Follow the [*UF Board Construction Guide*](#) available on the website.