Microprocessor Course and Lab

Thursdays 17:00 – 20:00

Prof. Costas Foudas, Physics Department, University of Ioannina, F3.303, x8750

The Course Goals are:

- **To explain how do the computers work**
- **To teach you the inner workings of a computer both on the programming (assembly) and hardware (interfaces) side**
- **To teach you how to work independently and find yourself all you need for your project. Hence, no book. All the information that you need is on the Web**
- **To teach you to design and construct a commercial product**
- **You will be using a microprocessor which has wide range of applications in automobiles, appliances and other industrial applications**
- **To give you useful career skills**

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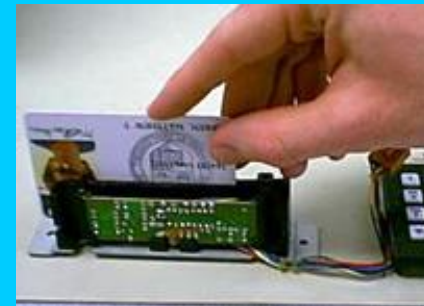
At the end you will learn:

- **Designing basic electronics circuits and interfaces**

- **Will be completely familiar with the detailed cpu information of the ATMEL ATmega1284 microprocessor**

- **Programming in AVR assembly**
    - **The basic commands**
    - **How to write an assembly program; subroutines**
    - **The tools to compile and download your programs to the ATmega1284 chip**

At the end you will be able to:

- **Project** : How to use a microprocessor to create an application and construct something useful :
  - Some electronics will be needed
  - Interfacing the microprocessor with various devices
  - Ideas and motivation are important

- Writing a good and clear report on a project you have done

Course Duration and Milestones

- **The Microprocessor part is 4 weeks**
  - **Two weeks theory and two weeks in the lab**
- **The ATmega1284 is the microprocessor used for this course.**
- **At the end you will make a small project by yourself and you will prepare a report**
- **Your mark will come from the report and oral examination at the end.**

FOR MORE INFORMATION AT:

https://alpha.physics.uoi.gr/foudas_public/

10/23/2019

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Course Duration and Milestones

17/10/2019	Θεωρία μC	ΑΙΘΟΥΣΑ Φ2-121	
24/10/2019	Θεωρία μC		
31/10/2019	Εργαστήριο μC	Εργ. Ψηφιακών Φ2-137	
07/11/2019	Εργαστήριο μC		
14/11/2019	Θεωρία FPGA	ΑΙΘΟΥΣΑ Φ2-121	
21/11/2019	Θεωρία FPGA		ΠΕΜΠΤΗ 17:00-20:00
28/11/2019	Εργαστήριο FPGA	Εργ. Ψηφιακών Φ2-137	
05/12/2019	Εργαστήριο FPGA		
12/12/2019	Εργαστήριο FPGA		
19/12/2019	Εργαστήριο FPGA		
16/01/2020	Εργαστήριο FPGA		

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The ATMEL ATmega 1284 Programming Board
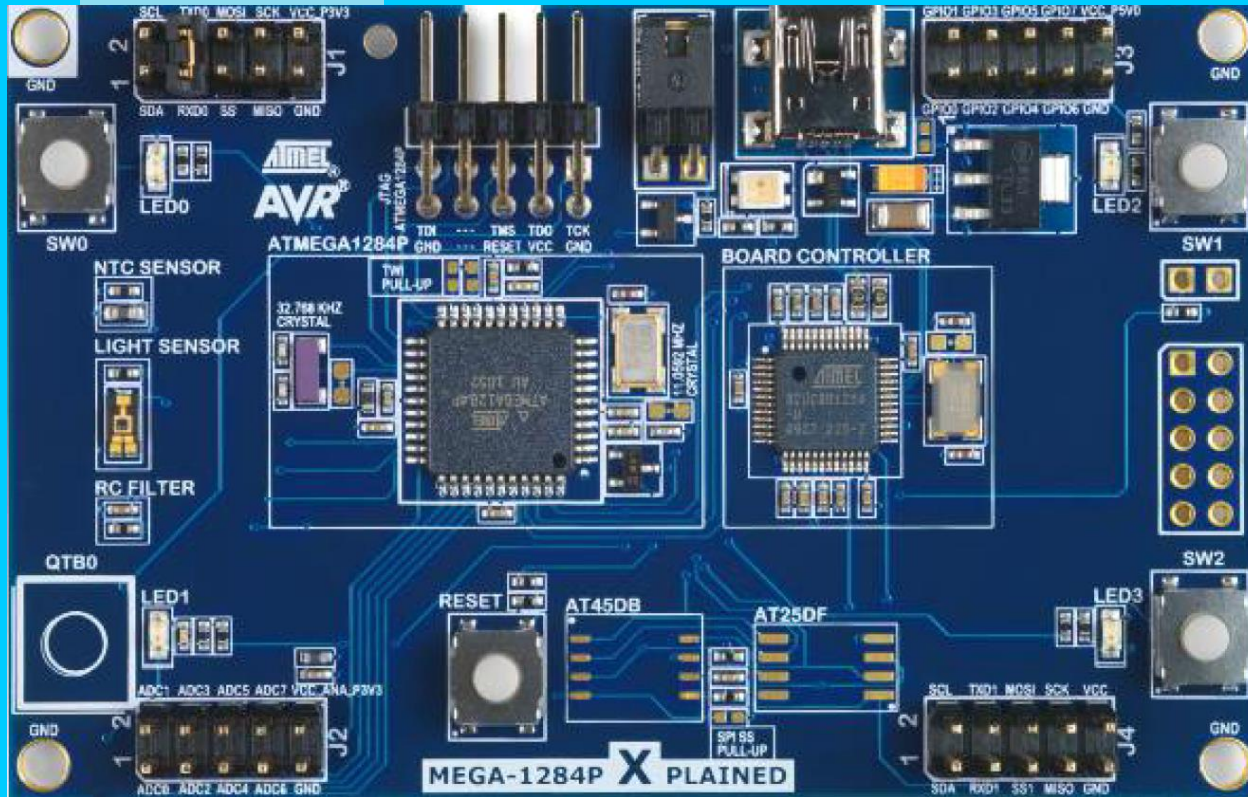
This is a development and programming board for the ATMEL ATmega2184 microcontroller or microprocessor. Typically used by designers to try firmware before designing a new board.

Modern electronics design is very much **software design** (Microcontrollers, FPGA, PLD……). Not 100% true since you do need the hardware to program…

Capabilities of MEGA-1284P Xplained Hardware
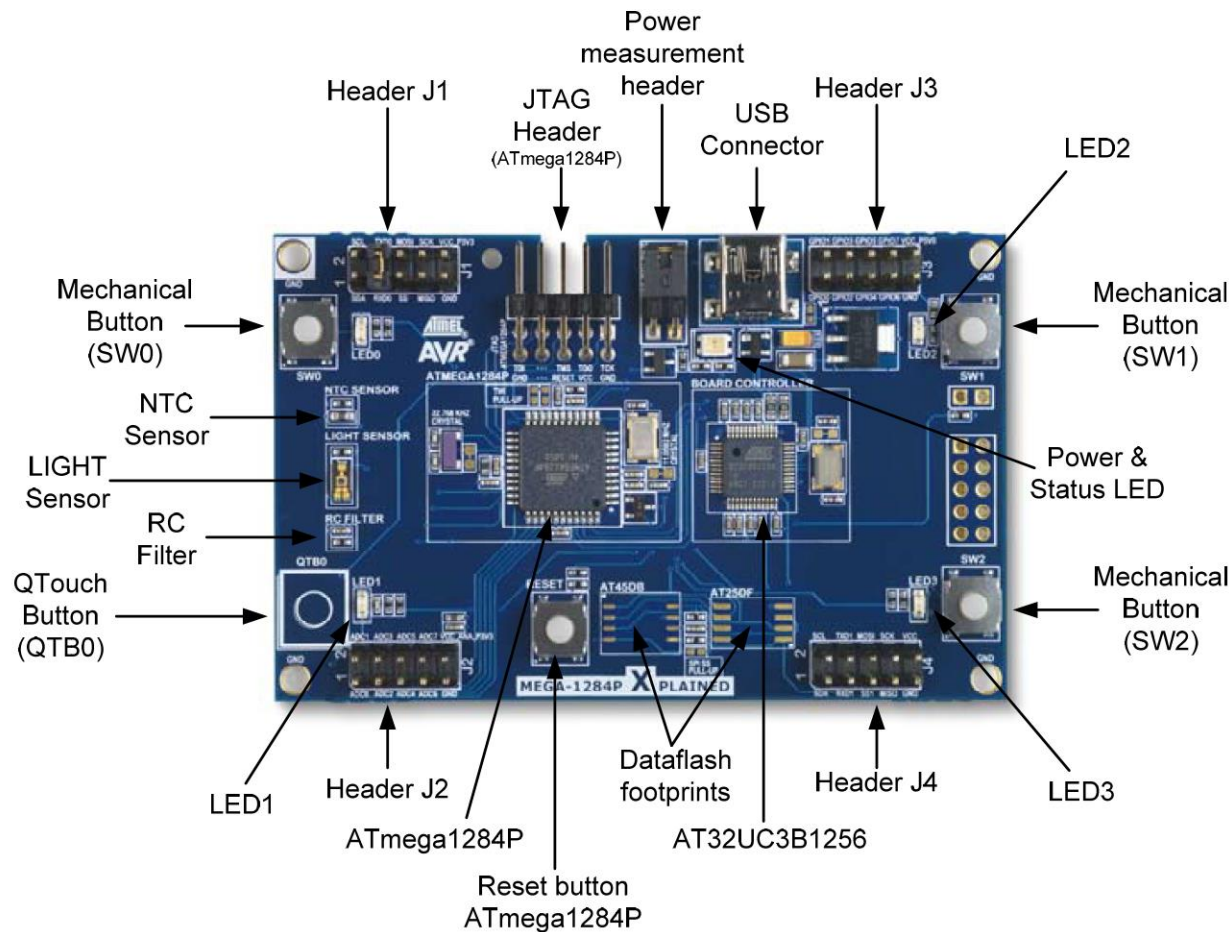
- Headers J1, J2, J3, J4 for I/O
- JTAG, USB connectors for programming
- 4 Buttons allow users to input data.
- Temperature and light sensors can be read.
- Reset button

The Project Report Goals

- **To teach you to describe your project in a clear and professional manner**

- **The teach you to focus on the main message you need to pass to the reader**

- **To produce a report in time**

- **To learn to document the good work you have done**

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The Project Report Structure

- **Abstract**
- **Introduction**
- **High Level Design**
- **Software and Hardware Design**
- **Results and Performance**
- **Updates Modifications and Improvements**
- **Conclusions**
- **Appendices**

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