

THE ARDUINO DEVELOPMENT KIT



Types & Applications

by

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Preface

- Arduino is a open source electronics, prototyping platform based on flexible, easy-to-use hardware and software.
- Arduino facilitates the use of μ Cs for project development.
 - It relieves the developers from building the HW manually.
- It comes with different shapes and sizes to accommodate various applications.

Origins

- “ARDUINO” is an Italian word, meaning “STRONG FRIEND”.
 - The English version of the name is “Hardwin”.
- Firstly created the at Interaction Design Institute (IDII), Ivrea, Italy in 2005.
 - By Massimo Benzi and others.
- “Arduino” is basically Created for economical reasons.
 - Having a prototype, software that would allow wiring programs to run on the new platform is written.



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- The prototype was redesigned for mass production and a test run of 200 boards was made.
- Orders began coming in from other design schools and the students looking for Arduinos, and the Arduino project was born.
 - Massimo Banzi and David Cuartielles became the founders.

Design Goals

The main intentions behind designing the Arduino board can be listed as:

1. Work with both windows and Mac (as most design students use one)
2. USB connectivity (MacBooks don't have serial ports).
3. Nice and simple design.
4. Cheap (about 20 euros, the cost of going out for pizza in Europe).
5. More powerful than a BASIC stamp.
6. Something that could be built/fixed easily.

Brands & Sales

- Since the entire project is open source, anyone can build and sell Arduino-compatible devices.
 - The Arduino project relies heavily on its branding for its financial success .
- Other projects manufacture compatible and cheaper boards.
 - However, people are loyal to the Arduino branded boards because they associate quality and a certain image to the final product.

Sales per Year

- The following table shows the progress of Arduino development boards in term of sales from 2005 to 2011.

Year	Units Sold
2005	200
2006	10000
2010	12000
2011	300000

Competition

- Before Arduino, the largest manufacturers in the design market segment were the PIC microcontroller family (made by Microchip) and the BASIC Stamp (made by Parallax).
- Since the introduction of the Arduino, other large companies have tried to enter the design market, including Texas Instruments, and even Microsoft.
 - However, the open-sourced tools of the Arduino and the size of its community are large barriers for new platforms to overcome.

Chart of Competition



Comparison among different competitors in programmable boards from 2004 till 2011

Arduino Flavors

- There have been many revisions of Arduino, some of them are:

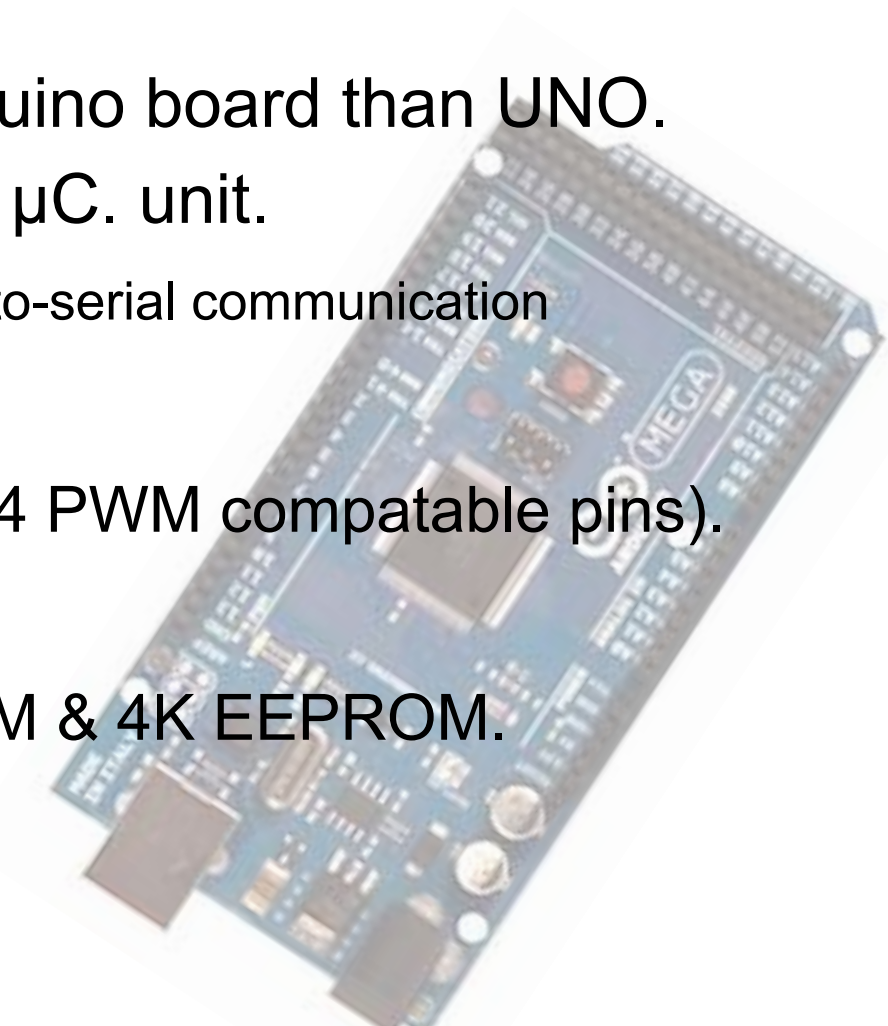
1. **Arduino UNO:**

- "Uno" means one in Italian.
- Most common Arduino board.
- Run by an Atmega 328 μ C. unit.
 - With ATmega8U2 as USB-serial Interface chip.
- Has 14 digital I/O Pins (6 are PWM capable), 6 analog inputs, 32K flash memory, 2k SRAM, 1k EEPROM and clock speed of 16 MHz.



2. Arduino Mega 2650

- A larger, more powerful Arduino board than UNO.
- Based on the ATmega2560 μ C. unit.
 - Uses the ATmega8U2 for USB-to-serial communication
- Features include:
 - a) 54 digital I/O pins(including 14 PWM compatible pins).
 - b) 16 analog input pins.
 - c) 256K flash memory, 8K SRAM & 4K EEPROM.
 - d) 16 MHz clock speed.



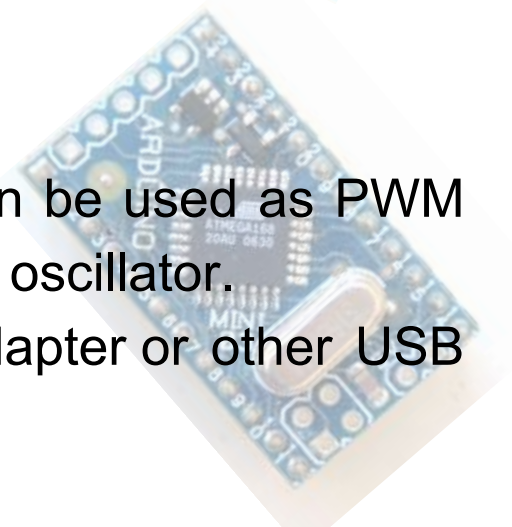
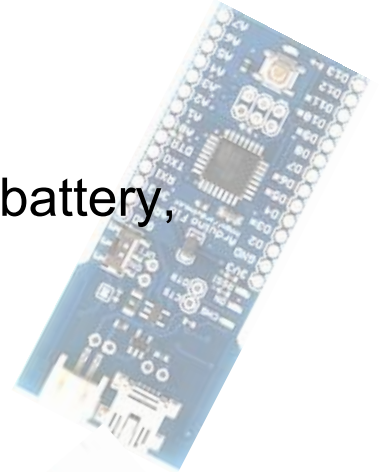
Other Arduino Boards

3. **Arduino Fio:**

- An Arduino intended for use as a wireless node.
- Has a header for an *XBee* radio, a connector for a LiPo battery, and a battery charging circuit.

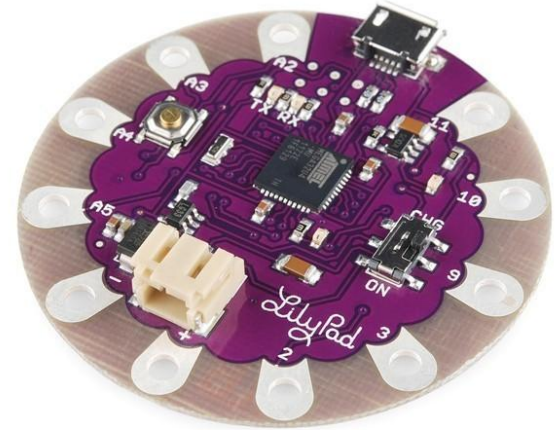
4. **Arduino Mini:**

- Used in compact applications when space really matters.
- Has 14 digital input/output pins (of which 6 can be used as PWM outputs), 8 analog inputs, and a 16 MHz crystal oscillator.
- It can be programmed with the USB Serial adapter or other USB or RS232 to TTL serial adapter.



LilyPad Arduino

- A stripped-down, circular Arduino board.
- Designed for portable applications.
 - Stitching into clothing and other fabric/flexible objects.
- Needs an additional adapter to communicate with a computer.
- A revision called LillyPad Arduino 03.
- Has 6-pin programming header that's compatible with FTDI USB cables.
- Automatic reset support.
- Surface mounted.



Summary

Arduino	Processor	Flash K.B	EEPROM K.B	SRAM K.B	Digital I/O pins	with PWM	Analog input pins	USB Interface type	Dimension s inches	Dimension s mm
Diecimila	ATmega168	16	0.5	1	14	6	6	FTDI	2.7" x 2.1"	68.6mm x 53.3mm
Duomillanove	ATmega168-328P	16-32	0.5-1	1-2	14	6	6	FTDI	2.7" x 2.1"	68.6mm x 53.3mm
Uno	ATmega328P	32	1	2	14	6	6	ATmegaBU2	2.7" x 2.1"	68.6mm x 53.3mm
Mega	ATmega1280	128	4	8	54	14	16	FTDI	4" x 2.1"	101.6mm x 53.3mm
Mega2560	ATmega2560	256	4	8	54	14	16	ATmegaBU2	4" x 2.1"	101.6mm x 53.3mm
Fo	ATmega328P	32	1	2	14	6	8	None	1.6" x 1.1"	40.6mm x 27.9mm
Mini	ATmega168 or ATmega328	16-32	0.5-1	1-2	14	6	8	FTDI	1.70" x 0.73"	43mm x 18mm
UnoPort	ATmega168V or ATmega328V	16	0.5	1	14	6	6	None	2" x	50mm x

Different types of Arduinos with features

References

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Thank you for Listening

