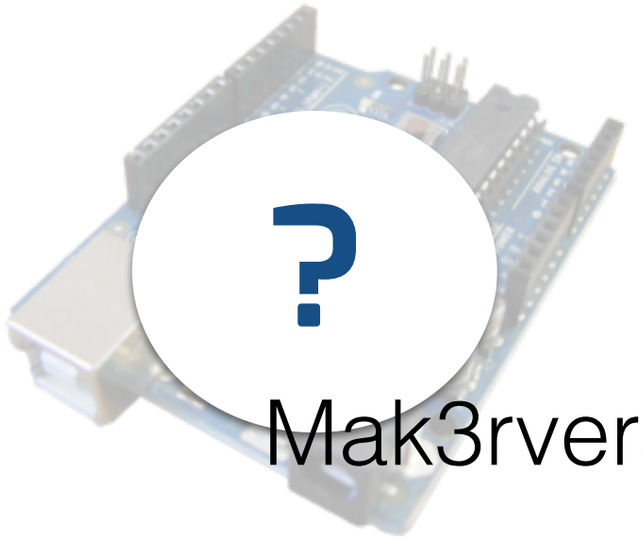
The Genius of Arduino



?

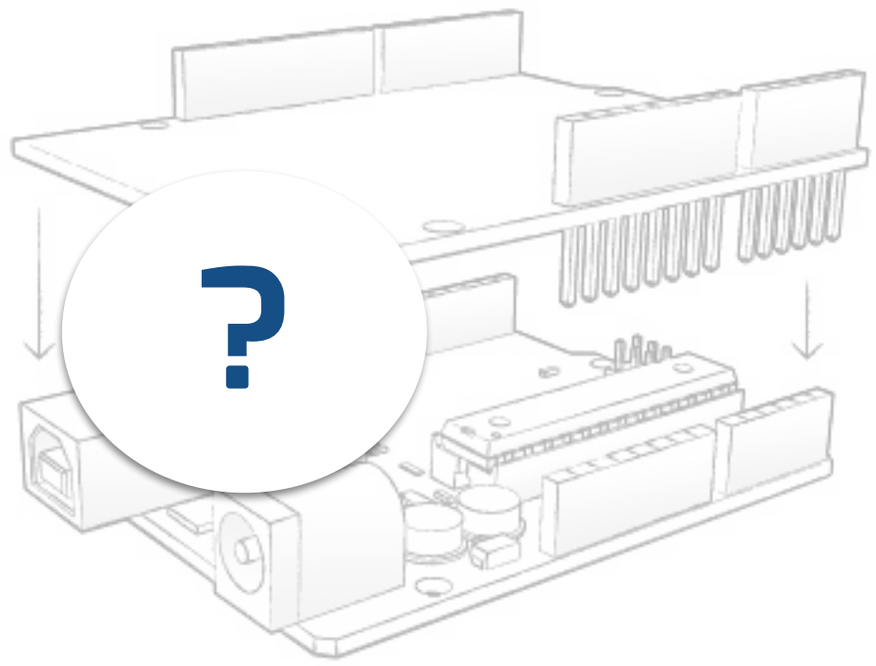
Mak3rvers1t!

?

?

Shield

Arduino



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My Arduino timeline

2007

2009

2011

2011

2012

2012

2012

2013

2011 - 2012
The UNO

Arduino v Rpi

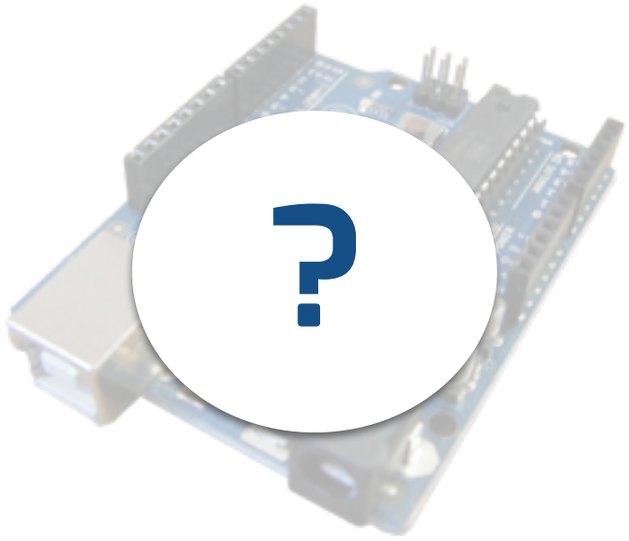
Microcontroller v **Microprocessor**

Made for a specific use (not very extendable)	The brains of desktops, notebooks, servers etc.
Includes processor , ram and input/output	Processor is very powerful but needs external ram and I/O
runs a simple program directly (not via an operating system)	Runs an operating system

Arduino v Rpi

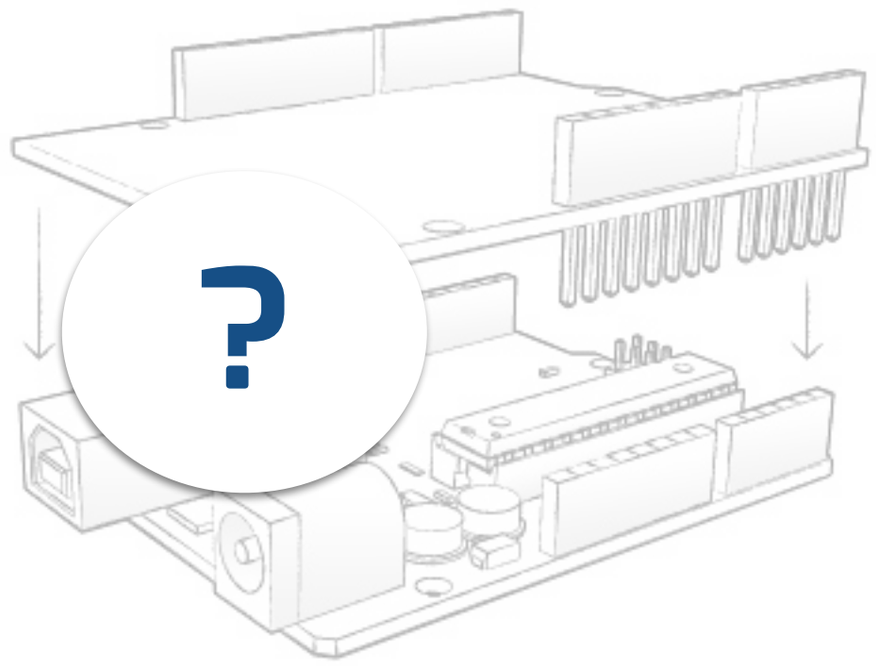
Microcontroller v Microprocessor

The Genius of Arduino



Shield

Arduino

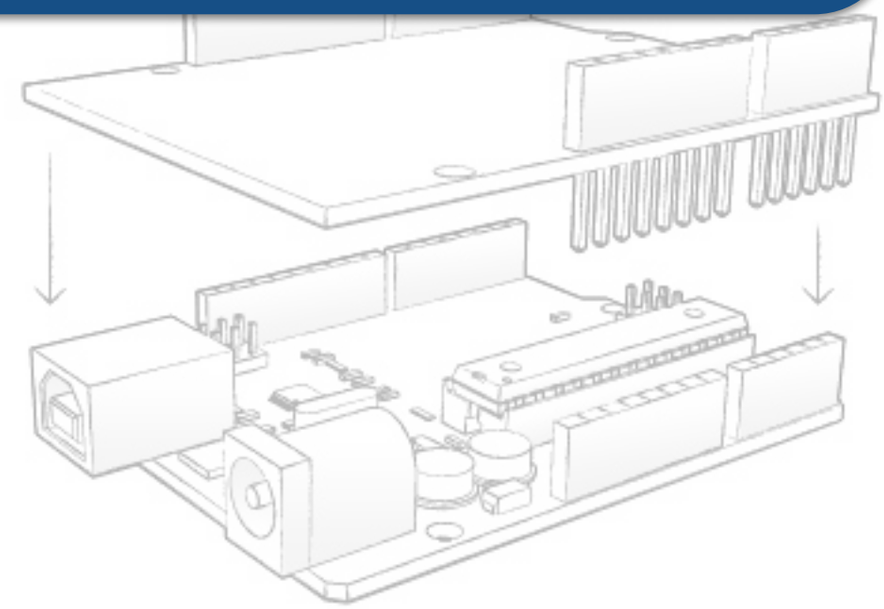


Standardisation

1. **Standardised format, voltage, peripheral connections, and programming language**

Shield

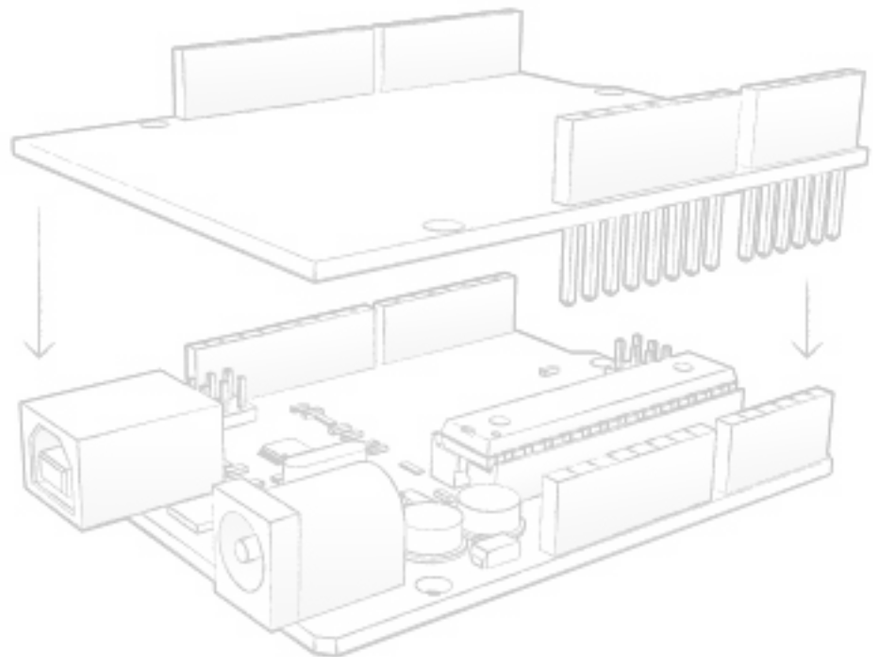
Arduino



Integrated environment

2

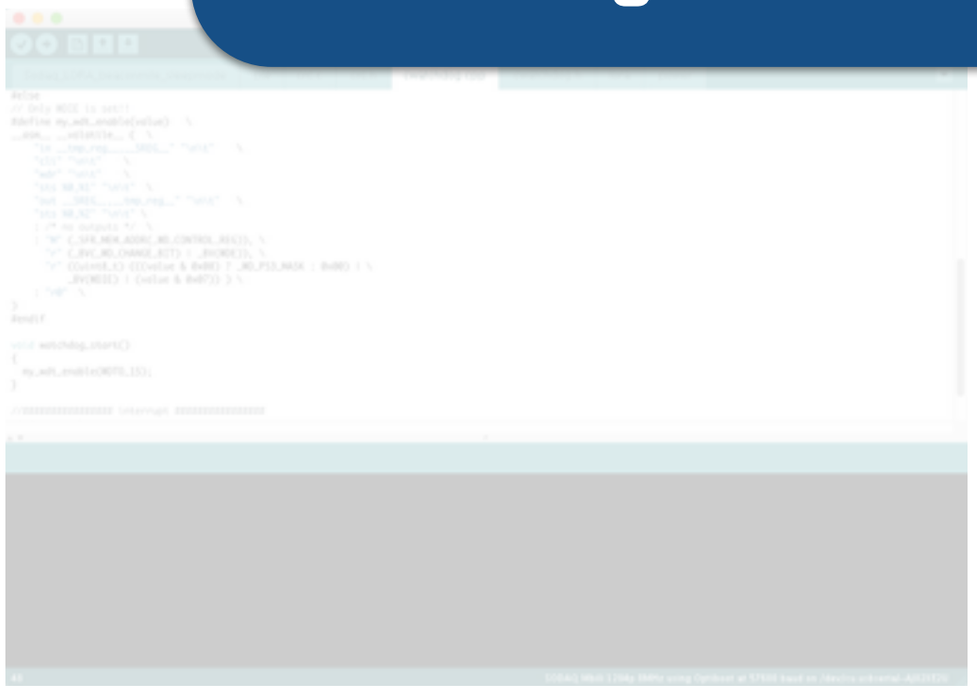
Easy to use, Easy to manage libraries, Same code works on ALL arduinos

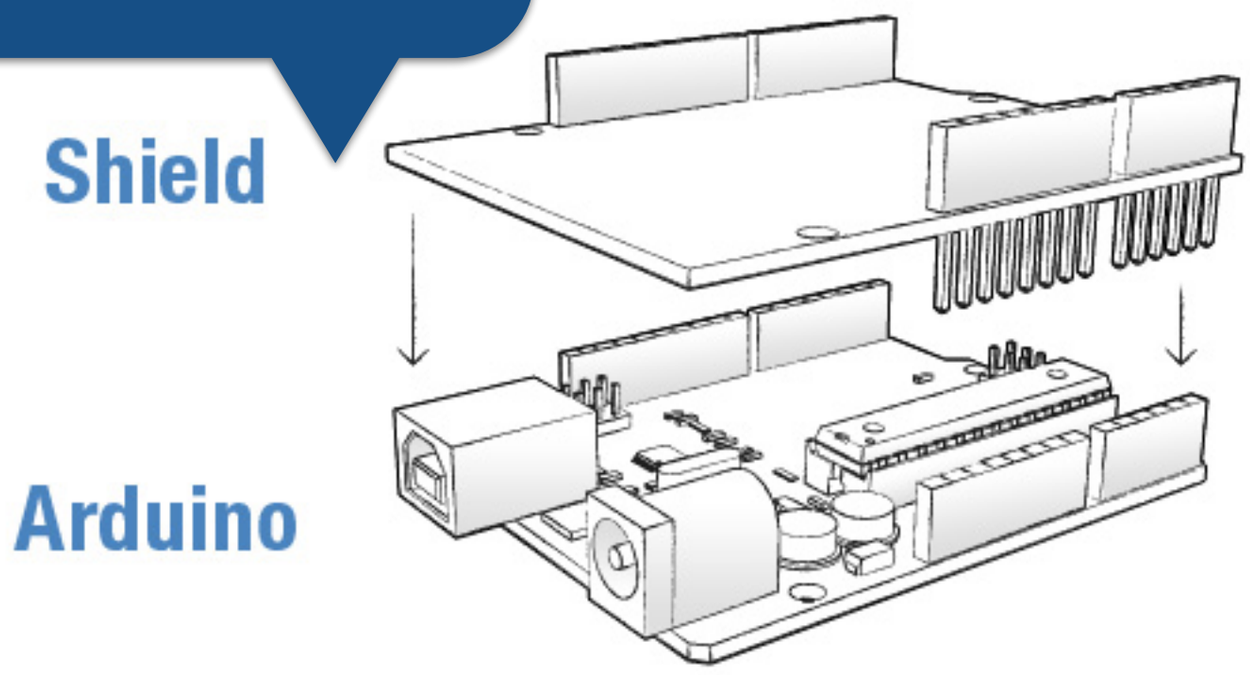


Extendable

3

By stacking “sheields” on to the standard arduino you can add features missing from the original

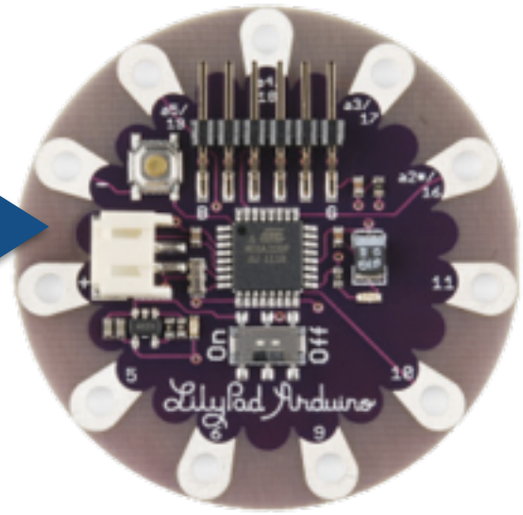


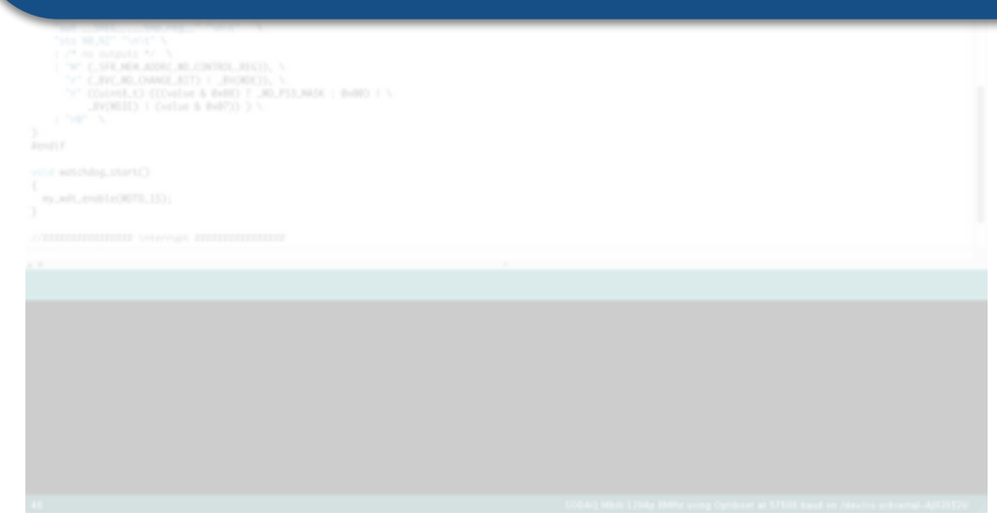


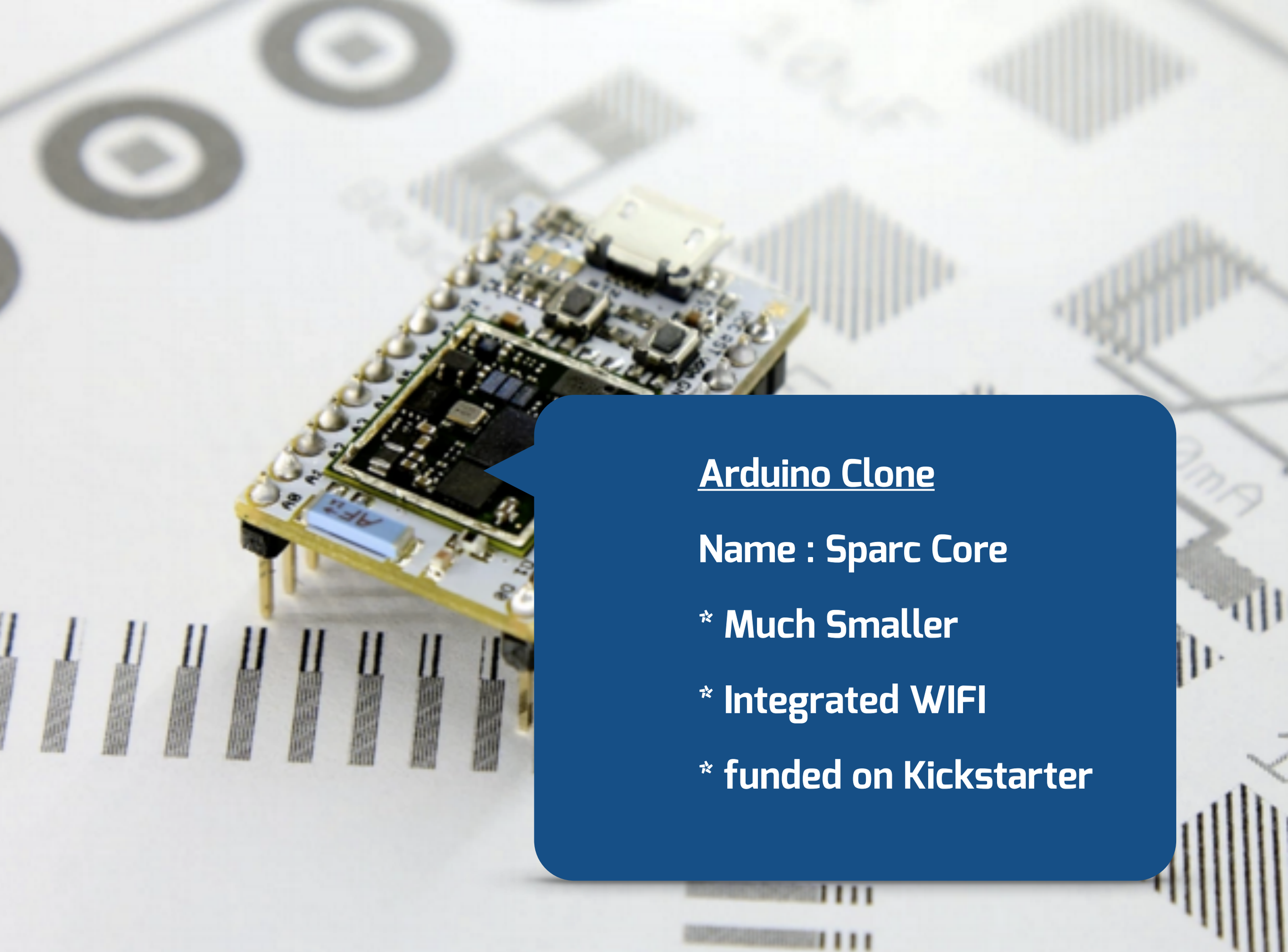
Completely open source

4

Which leads to many specialised clones being made and sold. This example is of wearable projects







Arduino Clone

Name : Sparc Core

* **Much Smaller**
* **Integrated WIFI**
* **funded on Kickstarter**

Arduino Clone

Name : Digispark

* Tiny!
* cheap
* funded on Kickstarter

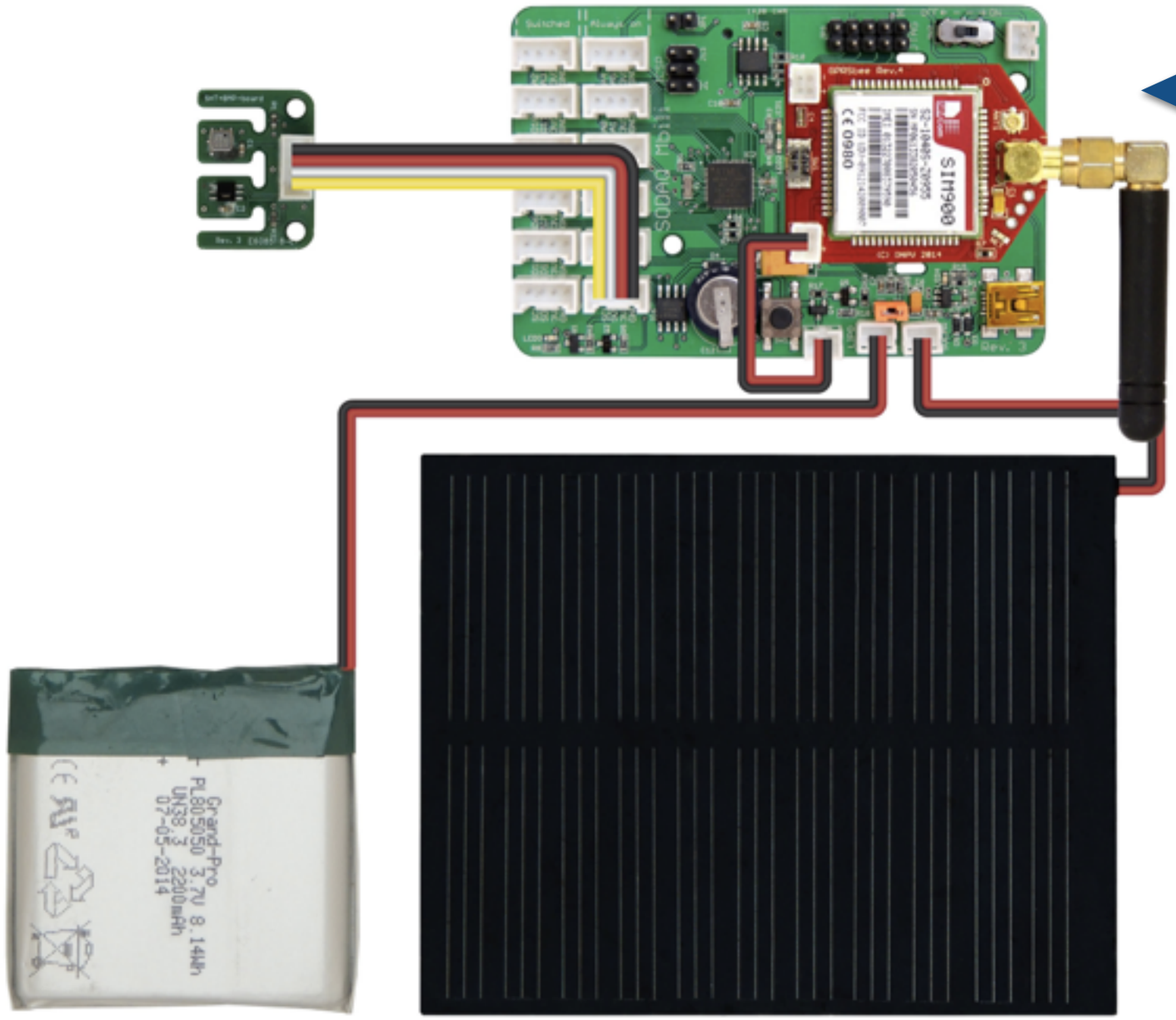
Arduino Clone

Name : RFDUINO

Super tiny!

Wireless

funded on Kickstarter



SODAQ

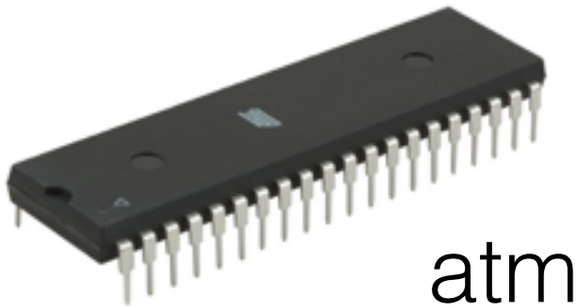
Arduino Clone

Name : SODAQ

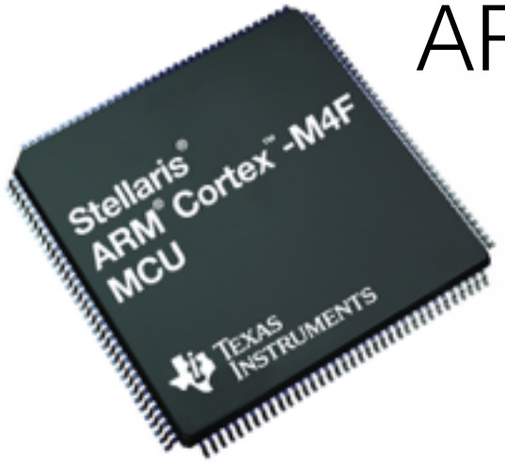
* Integrated SOLAR + Rechargable battery
* plug and play connectors
* plug and play communications (WIFI,3G, LoRa, more)
* funded on Kickstarter
* 100% Dutch

Arduino v Rpi

Microcontroller v Microprocessor



atmel



ARM cortex

Scalable and Compatible Architecture

ARM CORTEX Processor Technology
Cortex-M0

90 µm

Lowest cost
Low area

ARM CORTEX Processor Technology
Cortex-M0+

15 years

Lowest power
Outstanding energy efficiency

ARM CORTEX Processor Technology
Cortex-M3

n°1

Performance efficiency
Feature rich connectivity

ARM CORTEX Processor Technology
Cortex-M4

Digital Signal Control (DSC)
Processor with DSP
Accelerated SIMD
Floating point (FP)

ARM CORTEX Processor Technology
Cortex-M7

5 CoreMark per MHz

Maximum DSC Performance
Flexible Memory System
Cache, TCM, AXI, ECC
Double & Single Precision FP

Digital Signal Control application space

'8/16-bit' Traditional application space

'16/32-bit' Traditional application space

Technical Data

Electrical Characteristics - ATmega Series Microcontrollers

Microcontroller	Package	Program Memory	SRAM	EEPROM	I/O Pins	Timers	A/D	SPI	I²C	PWM	USART	Oscillator	Datasheet
28 Pin PDIP													
ATMEGA48V-10PI	PDIP28	4k	512	256	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	10	
ATMEGA8A-PU	PDIP28	8k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	3	Yes	16	
ATMEGA8L-8PU	PDIP28	8k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	3	Yes	8	
ATMEGA88-20PU	PDIP28	8k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	20	
ATMEGA88PA-PU	PDIP28	8k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	20	
ATMEGA88V-10PU	PDIP28	8k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	10	
ATMEGA168-20PU	PDIP28	16k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	20	
ATMEGA168V-10PU	PDIP28	16k	1024	512	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	10	
ATMEGA328-PU	PDIP28	32k	2048	1024	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	20	
ATMEGA328P-PU	PDIP28	32k	2048	1024	23	2x8-bit,1x16-bit	6x10-bit	Yes	Yes	6	Yes	20	
40 Pin PDIP													
ATMEGA644PA-PU	PDIP40	64k	4096	2048	32	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	20	
ATMEGA644V-10PU	PDIP40	64k	4096	2048	32	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	10	
ATMEGA1284P-PU	PDIP40	128k	16384	4096	32	2x8-bit,2x16-bit	8x10-bit	Yes	Yes	6	Yes	20	
32 Pin TQFP													
ATMEGA48-20AU	TQFP32	4k	512	256	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	20	
ATMEGA48V-10AU	TQFP32	4k	512	256	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	10	
ATMEGA8-16AU	TQFP32	8k	1024	512	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	3	Yes	16	
ATMEGA168-20AU	TQFP32	16k	1024	512	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	20	
ATMEGA168PA-AU	TQFP32	16k	1024	512	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	20	
ATMEGA168V-10AU	TQFP32	16k	1024	512	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	10	
ATMEGA328P-AU	TQFP32	32k	2048	1024	23	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	6	Yes	20	
44 Pin TQFP													
ATMEGA162-16AU	TQFP44	16k	1024	512	35	2x8-bit,1x16-bit	Comparator	Yes	Yes	6	Yes	16	
ATMEGA16L-8AU	TQFP44	16k	1024	512	32	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	4	Yes	8	
ATMEGA32L-8AI	TQFP44	32k	2048	1024	32	2x8-bit,1x16-bit	8x10-bit	Yes	Yes	4	Yes	8	