Criando clones de Arduino

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github.com/fkuhne/aday18

Agenda

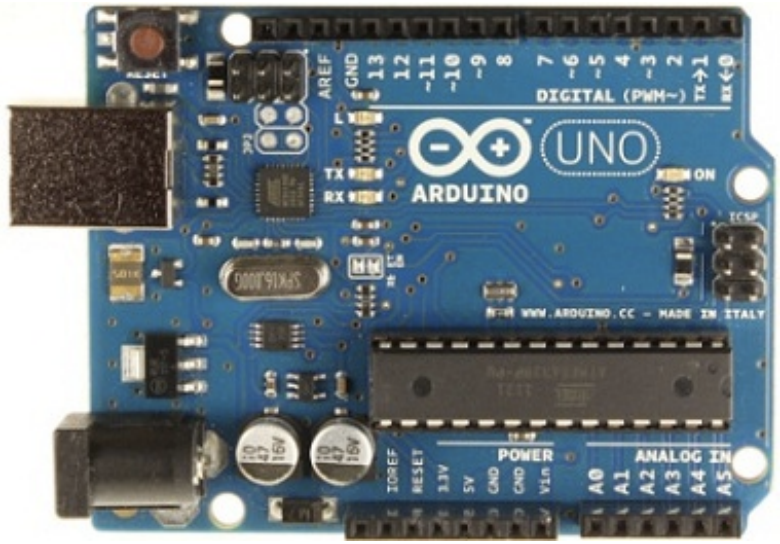
- Investimento
- Open Hardware e Open Software
- Circuito Completo X Mínimo
- Bootloader
- Montagem do circuito
  - Em protoboard
  - Em PCI

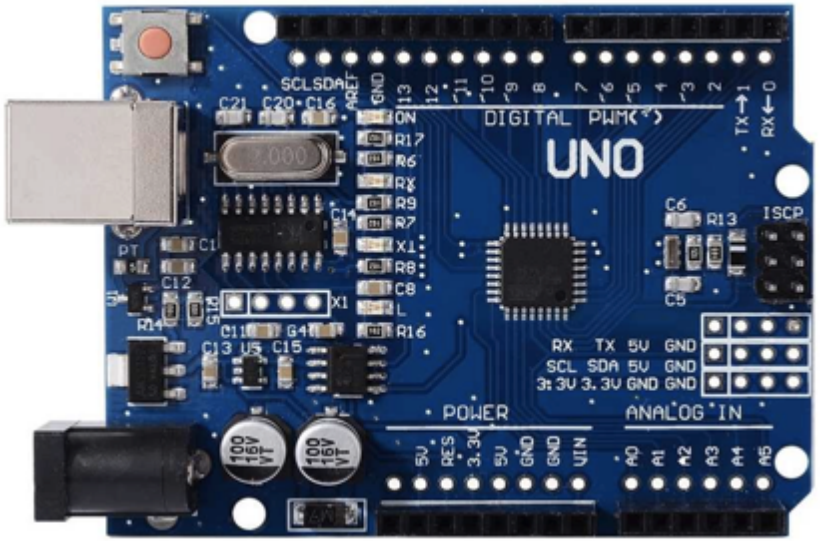
Investimento

Investimento

- Preço de um clone UNO em POA: **R$48**

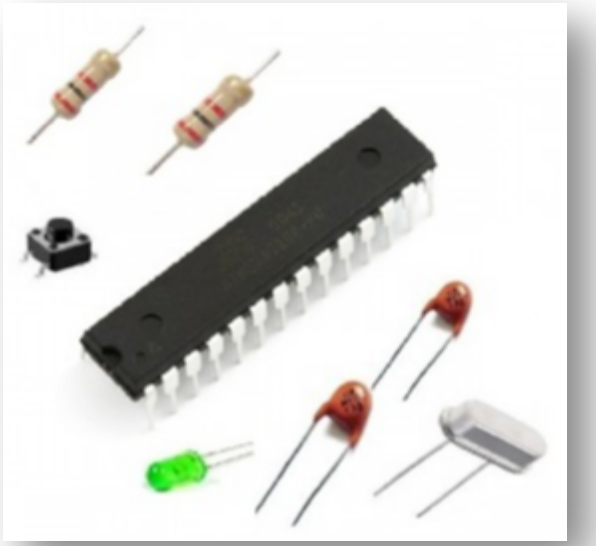
- eBay: **R$13**

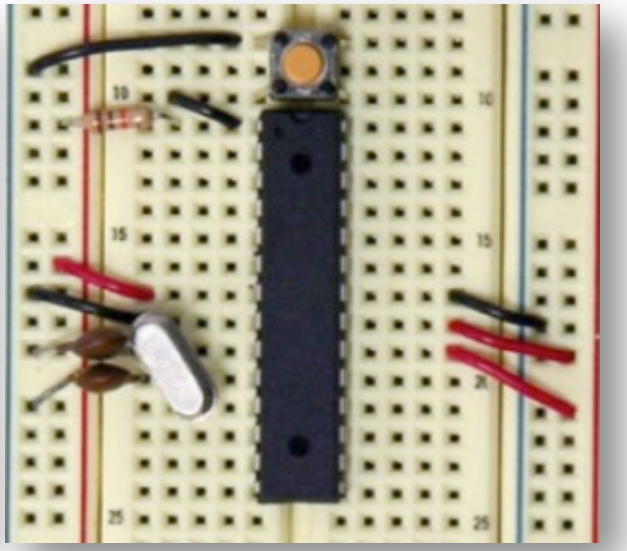




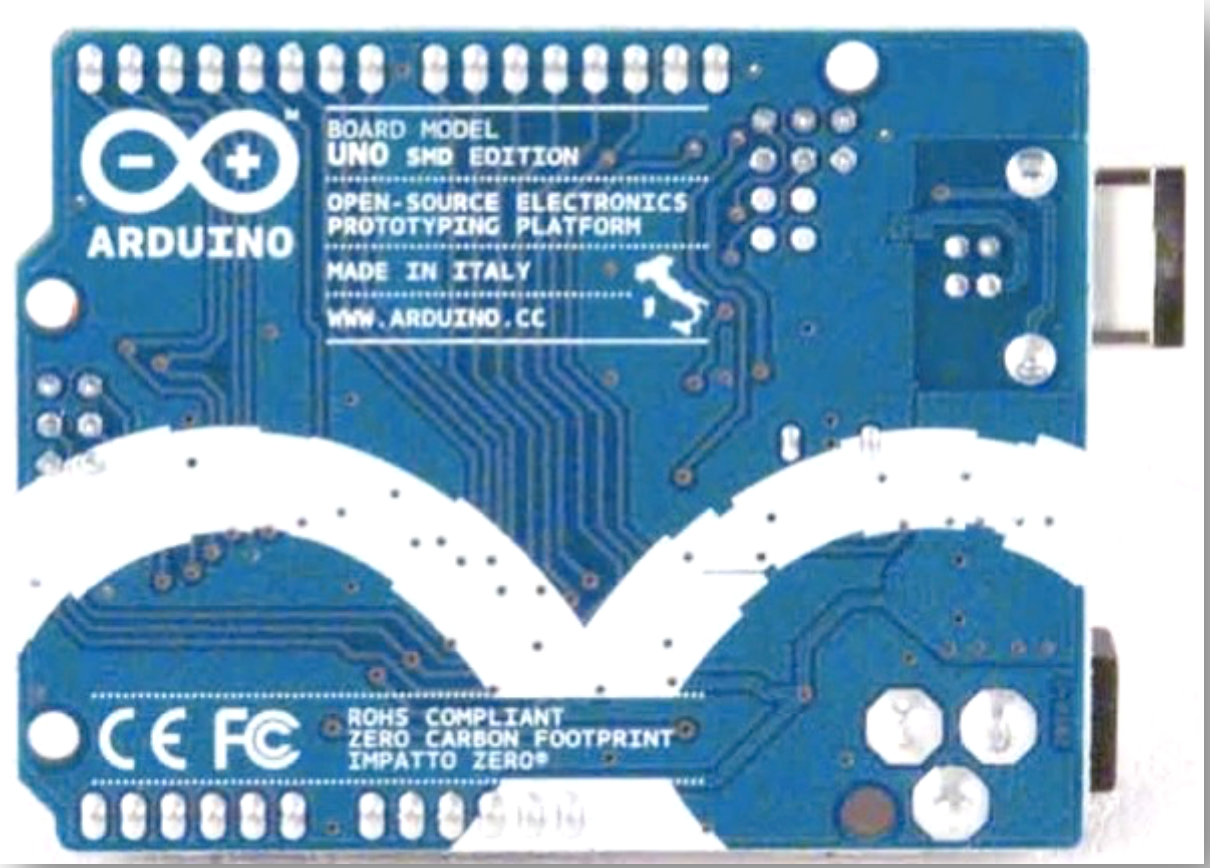
Investimento

- Kit *standalone*: **R$22**
- eBay: Atmega328P: **R$ 6**





Arduino: Open SW E HW

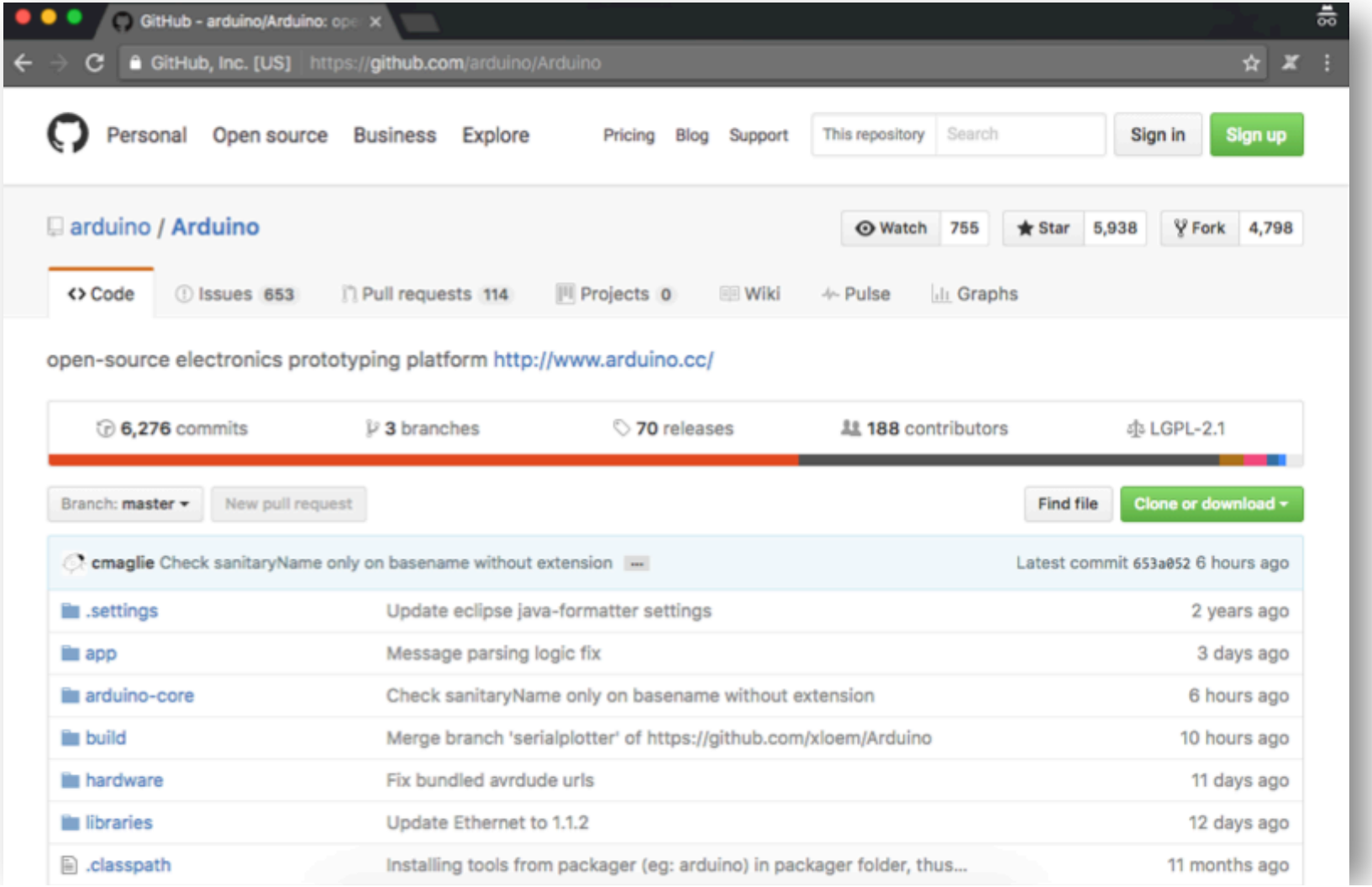


open source

open source hardware

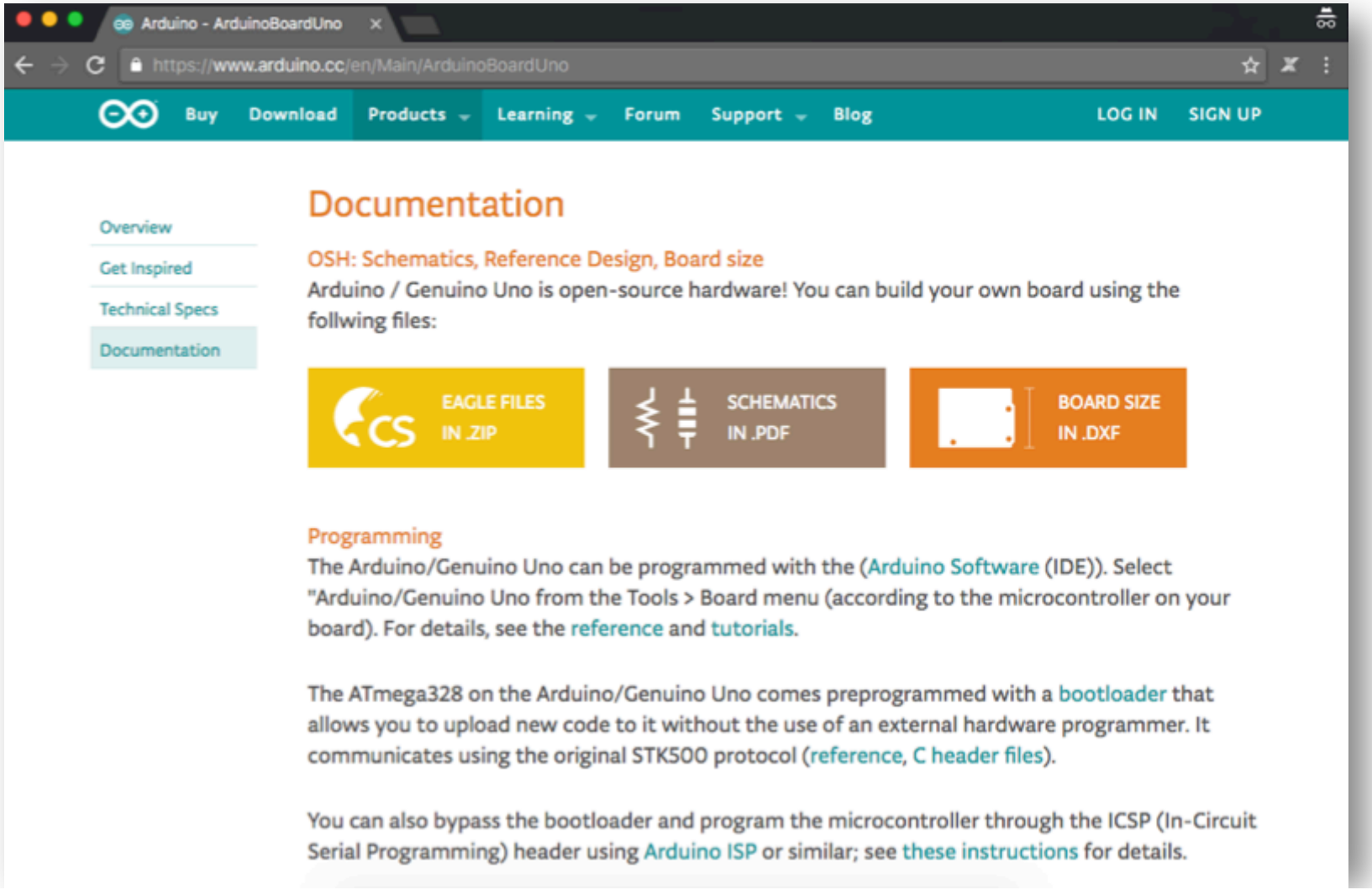
Arduino: Open SW E HW

https://github.com/arduino

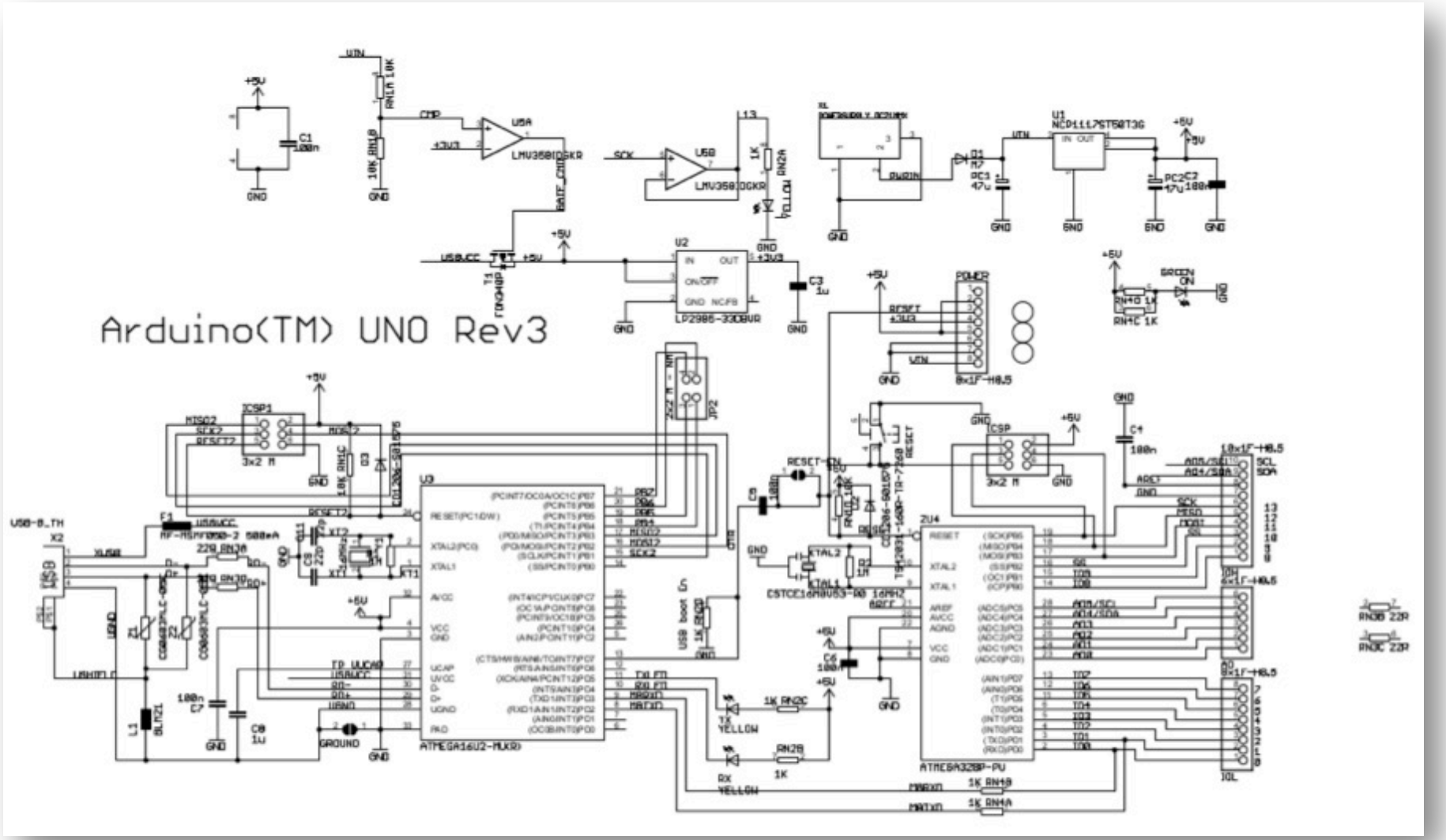


Arduino: Open SW E HW

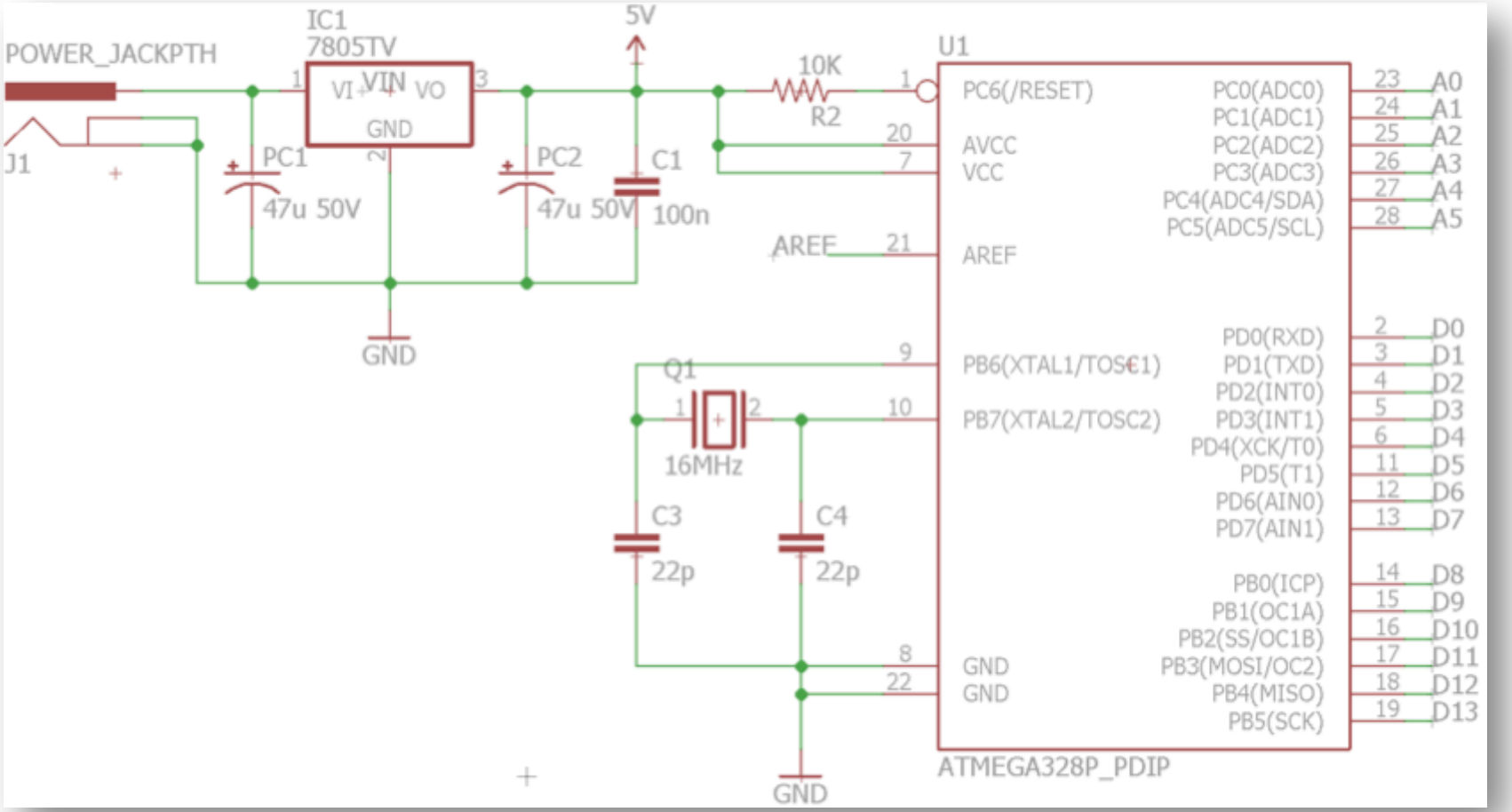
https://www.arduino.cc/en/Main/ArduinoBoardUno



Circuito Completo

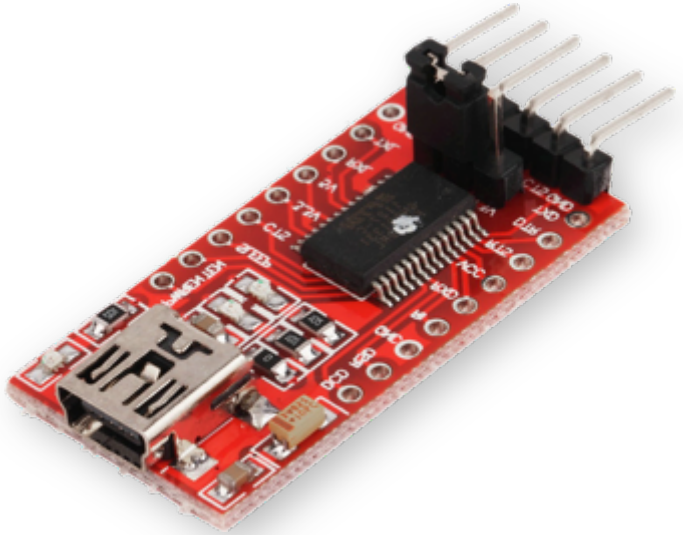


Circuito Mínimo (sem FTDI)



Circuito Mínimo (sem FTDI)

- FTDI: conversor serial/USB
- Necessário quando vamos comunicar com o PC e gravar *sketches*
- Pode ser compartilhado com várias placas!
- Em POA: **R$34**
- E-bay: **R$6**
- Cabo!! (mini USB B)



Bootloader

- Programa que gerencia o carregamento de *sketches* via conexão com o Arduino IDE

- Ocupa 512 bytes na memória flash

- http://www.arduino.cc/en/Hacking/Bootloader

Bootloader

- Como gravar o bootloader em um chip novo?
- É necessário um hardware externo: *In System Programmer* (ISP)
- Método usado aqui: *Arduino ISP*: http://www.arduino.cc/en/Tutorial/ArduinoISP

Arduino ISP:

- Criando um *Arduino ISP*:

  1º) Conectar um (outro) Arduino no PC

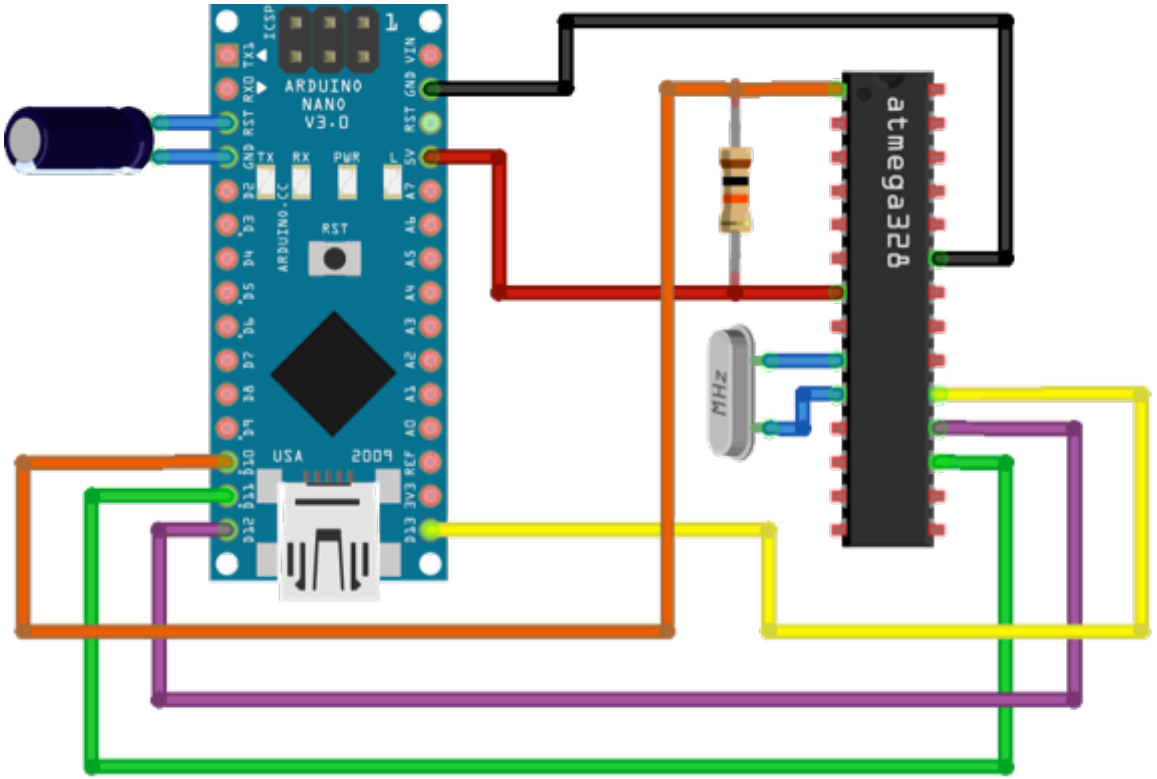
  2º) Gravar o sketch *ArduinoISP*

  3º) Adicionar um capacitor de 10uF entre o RST e o GND

  Pronto! Temos um gravador de AVRs! :)

Bootloader

4º) Conectar o Arduino ISP ao Atmega (conexão SPI):

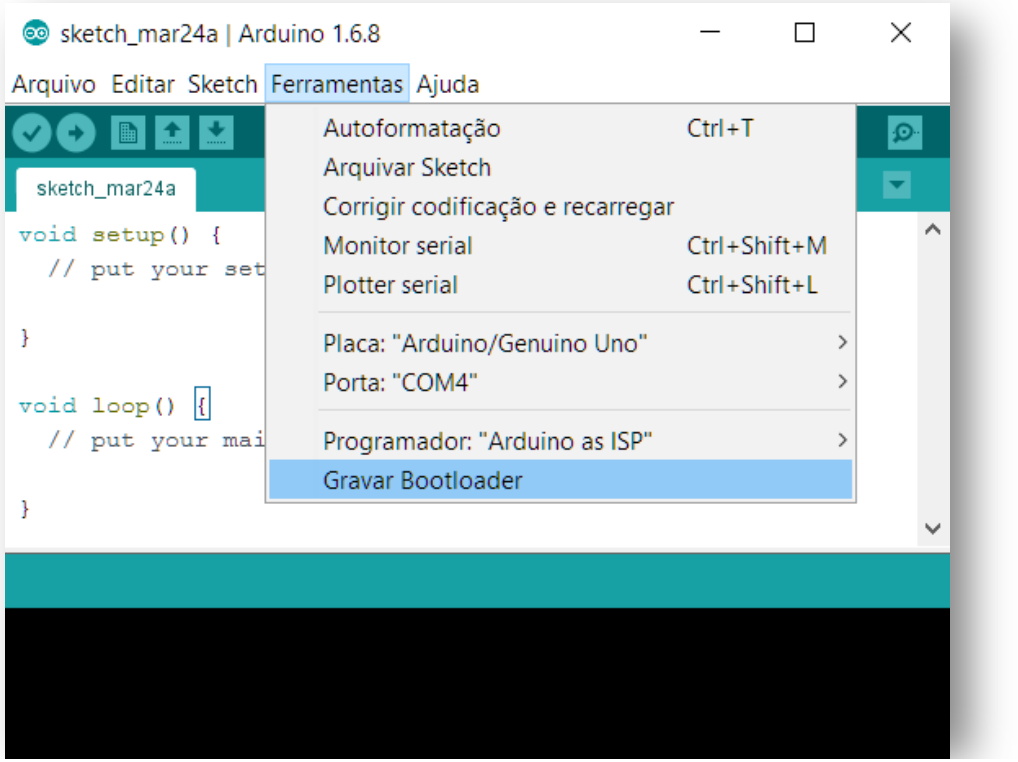


Gravando o bootloader

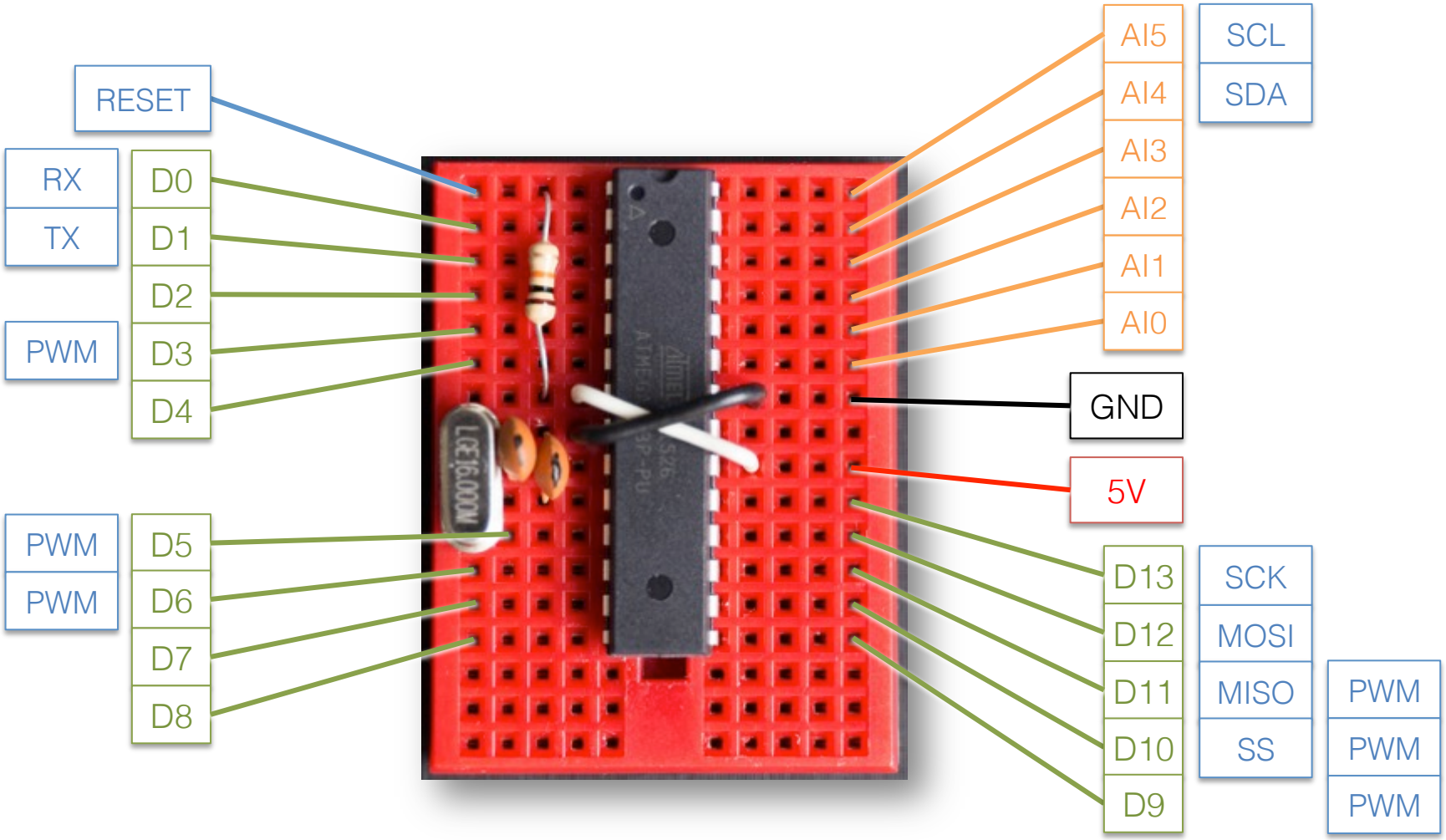
5º) Selecionar placa (Uno) e porta serial

6º) Selecionar programador “Arduino as ISP”

7º) Selecionar “Gravar Bootloader”:

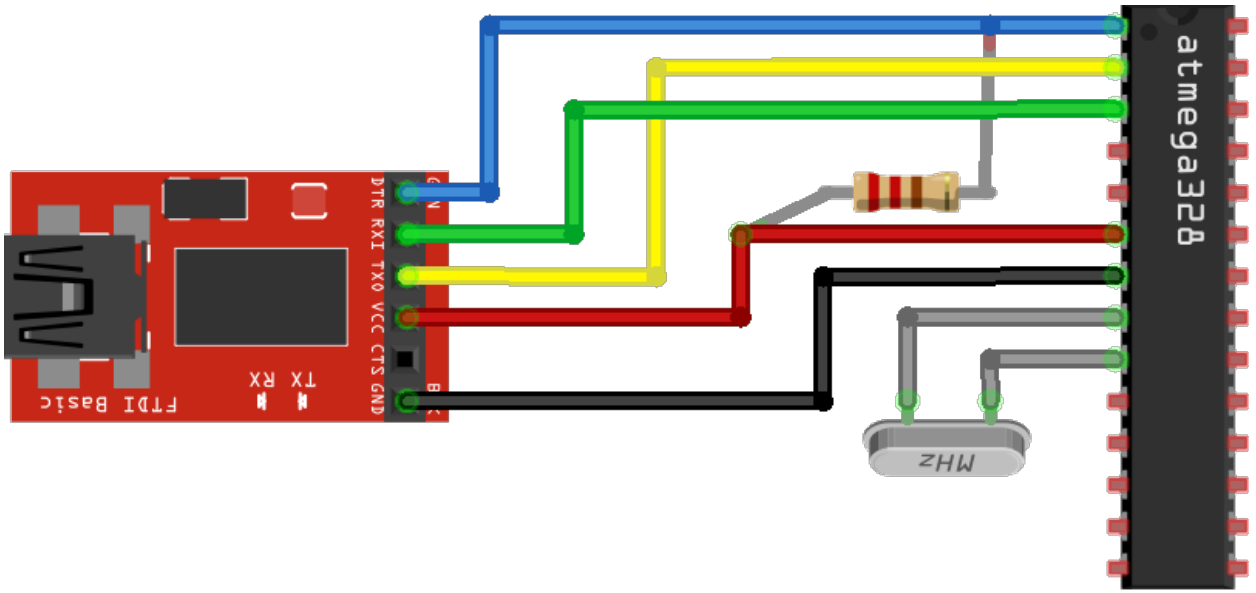


Montagem em Protoboard

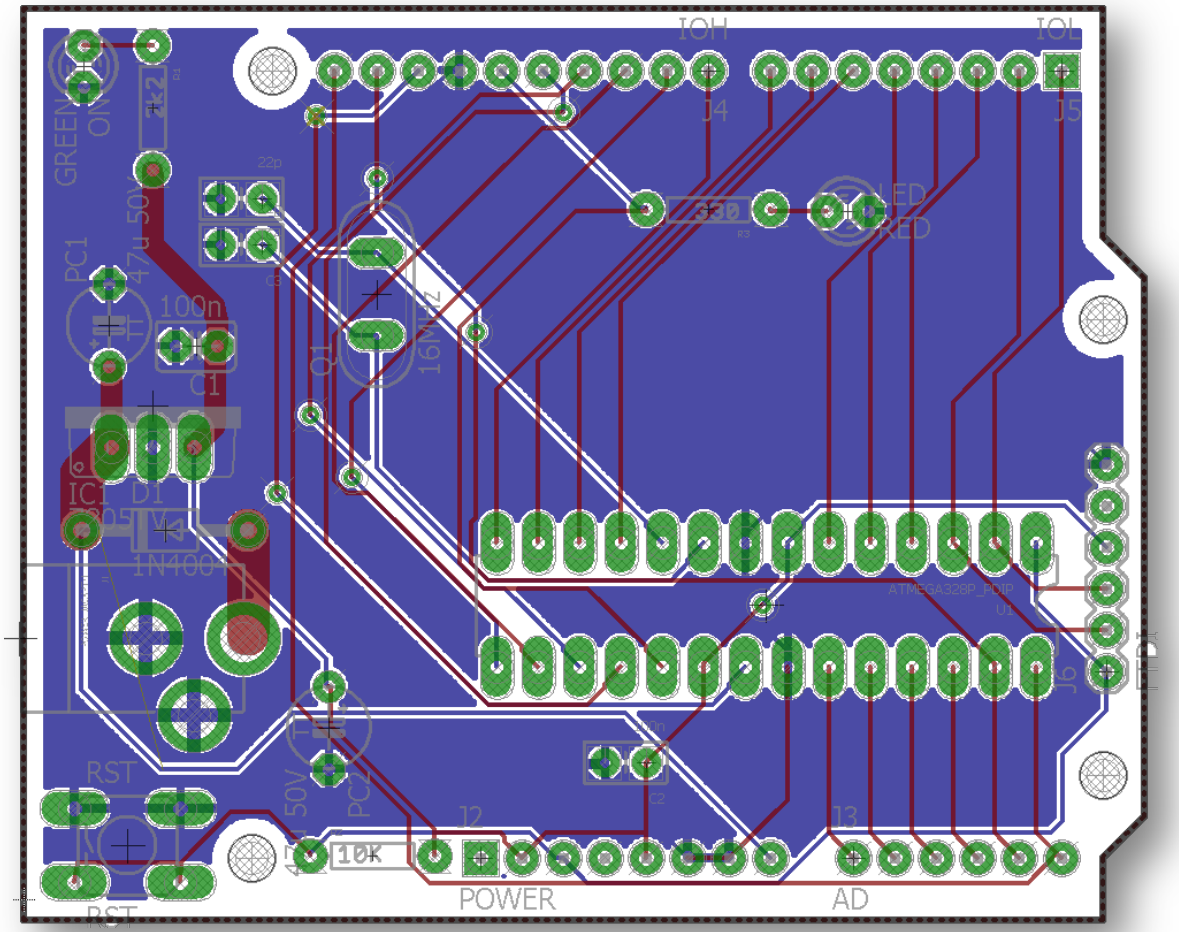


Montagem em Protoboard

- Conexão com a placa FTDI:

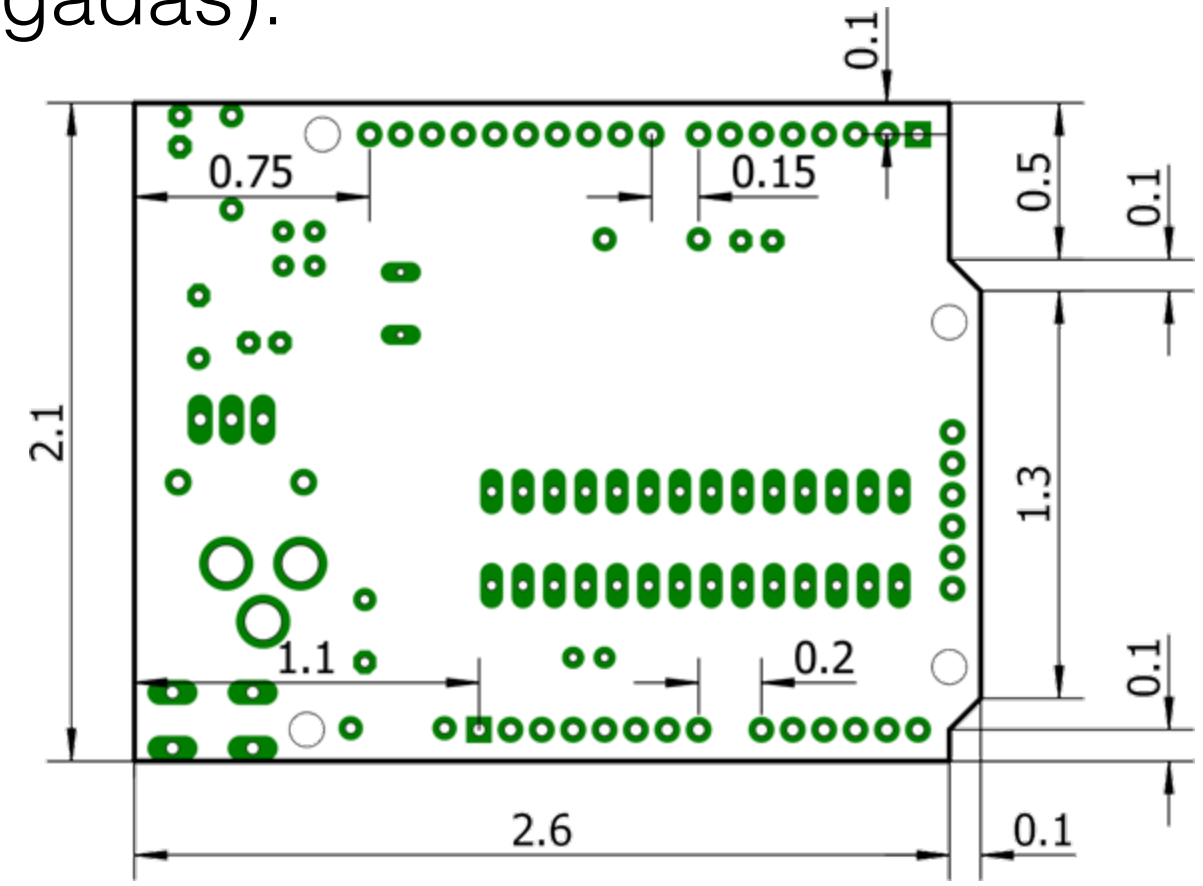


Montagem em PCI

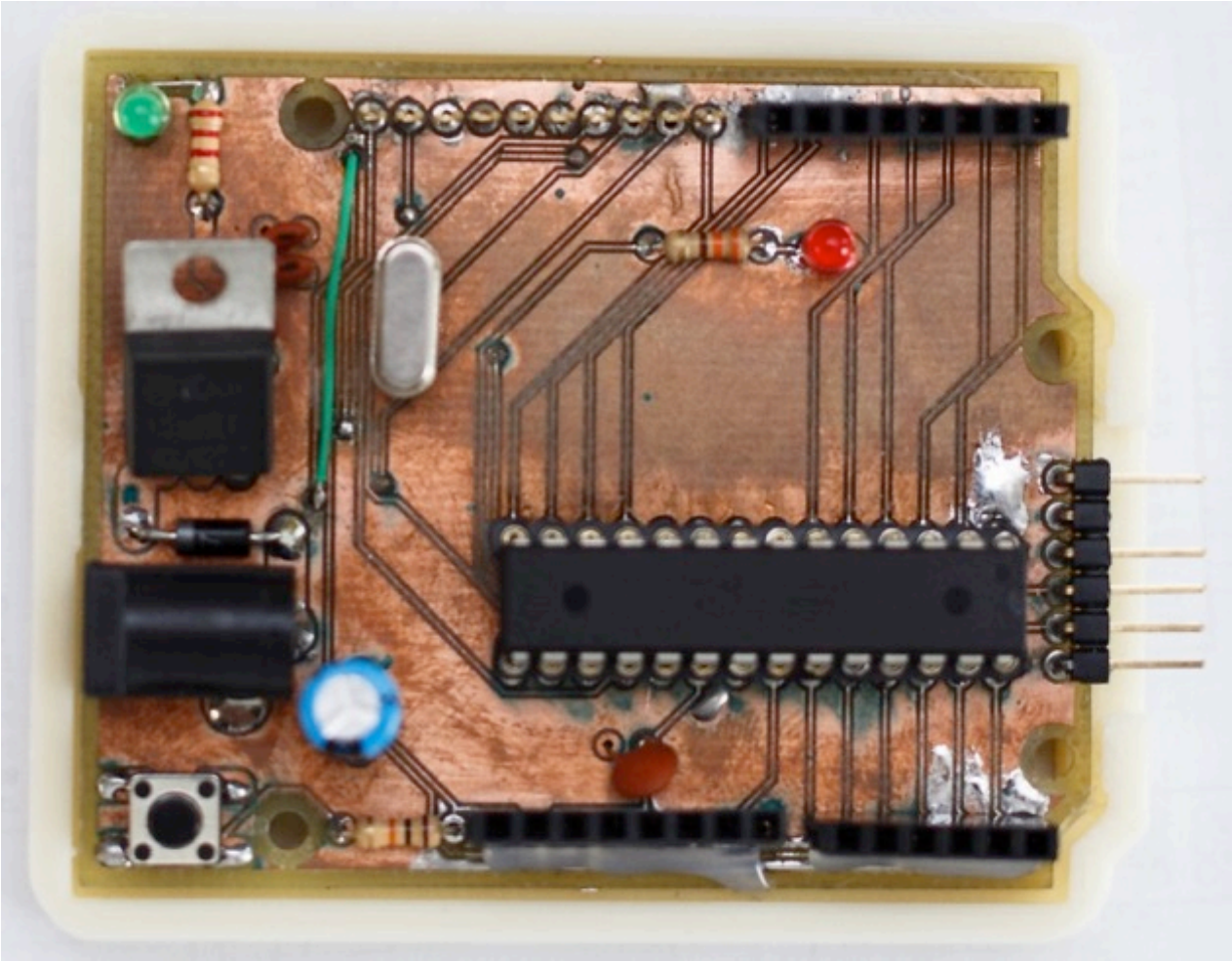


Montagem em PCI

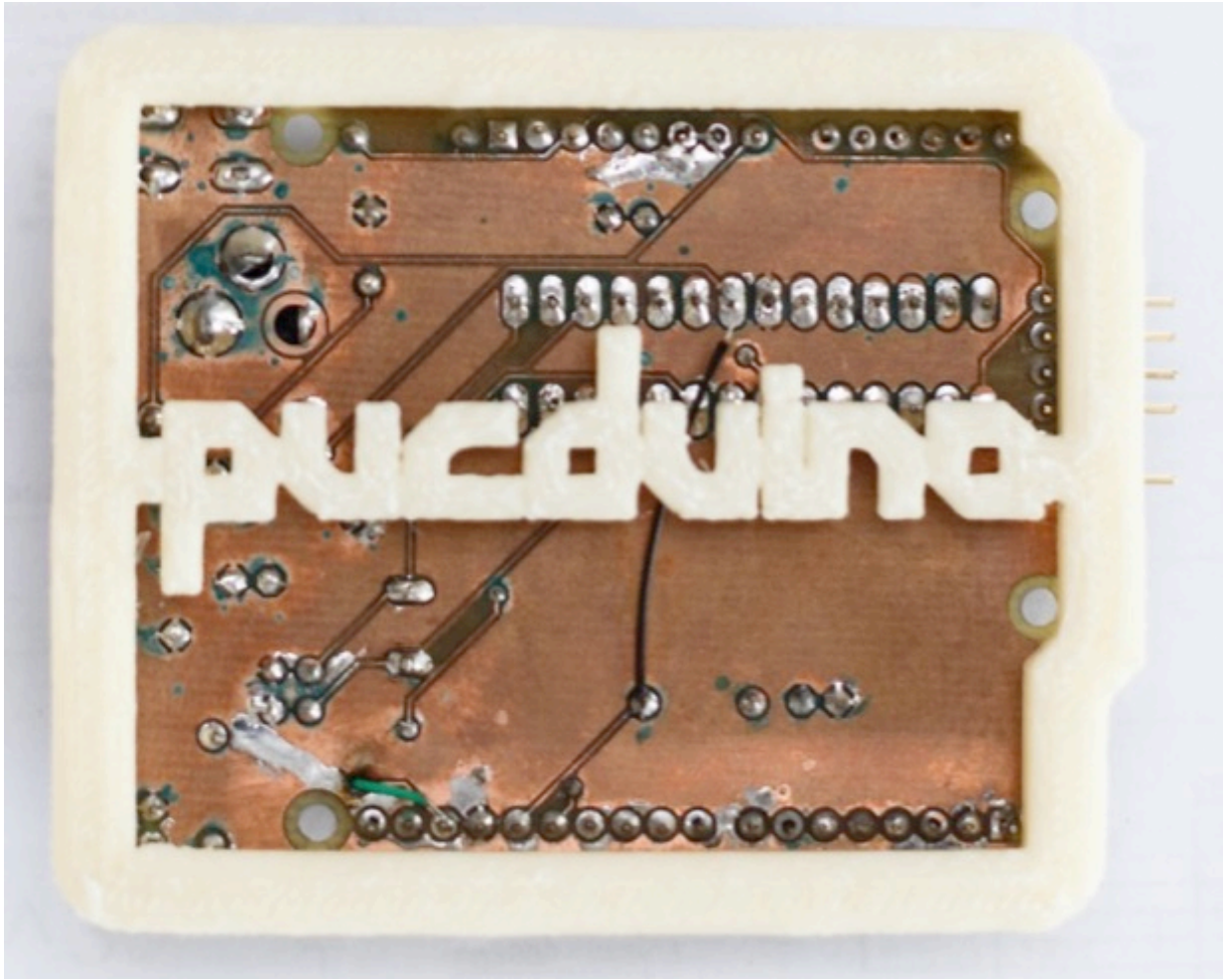
- Dimensões de um Arduino Uno (em polegadas):



Montagem em PCI



Montagem em PCI



Recursos utilizados neste projeto

- Kit standalone Webtrônico:
  www.webtronico.com/arduinos/placas-arduino/kit-arduino-standalone.html
- Arduino Pinouts:
  pighixxx.com/atmega328v3_0.pdf
  pighixxx.com/unov3pdf.pdf
  pighixxx.com/nanopdf.pdf
- Fritzing:
  fritzing.org
- EAGLE:
  www.cadsoftusa.com/download-eagle
- Lib componentes Sparkfun:
  github.com/sparkfun/SparkFun-Eagle-Libraries

Recursos utilizados neste projeto

- Fabricação da PCB no LEE (LPKF)
- Gravação do bootloader: Arduino Nano
- FTDI
- Componentes diversos (resistores, capacitores, LEDs, protoboards) roubados do LEE ou comprados no eBay

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