Sketching with Hardware

05: Arduino

Day 2: Tuesday, xx.yy.

09:00 Introduction: Arduino

09:30 Hands-on: Arduino

11:00 Small Project

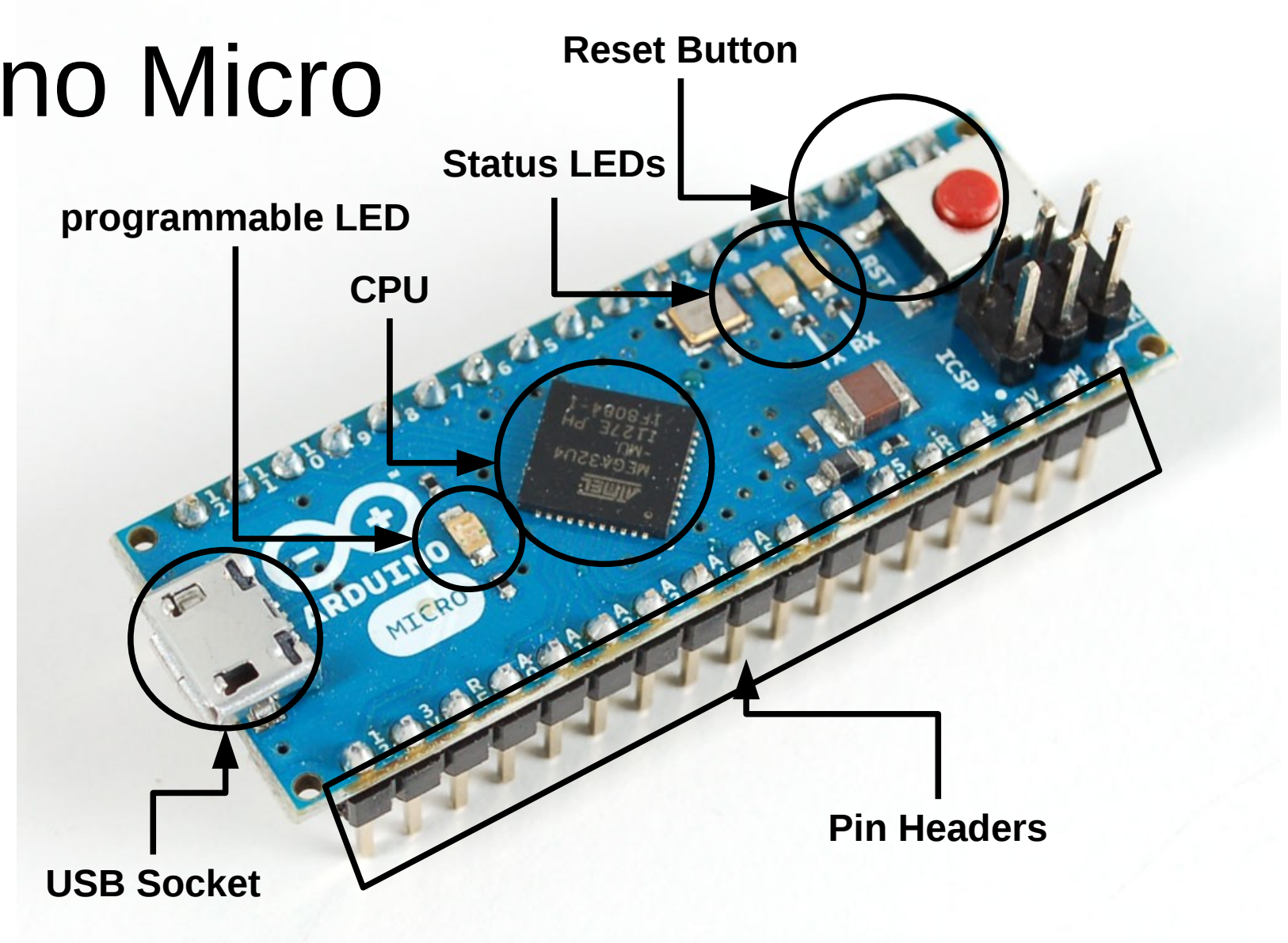
13:00 *Lunch Break*

14:00 Programming

15:00 Extensive Task

17:00 End

Arduino Micro



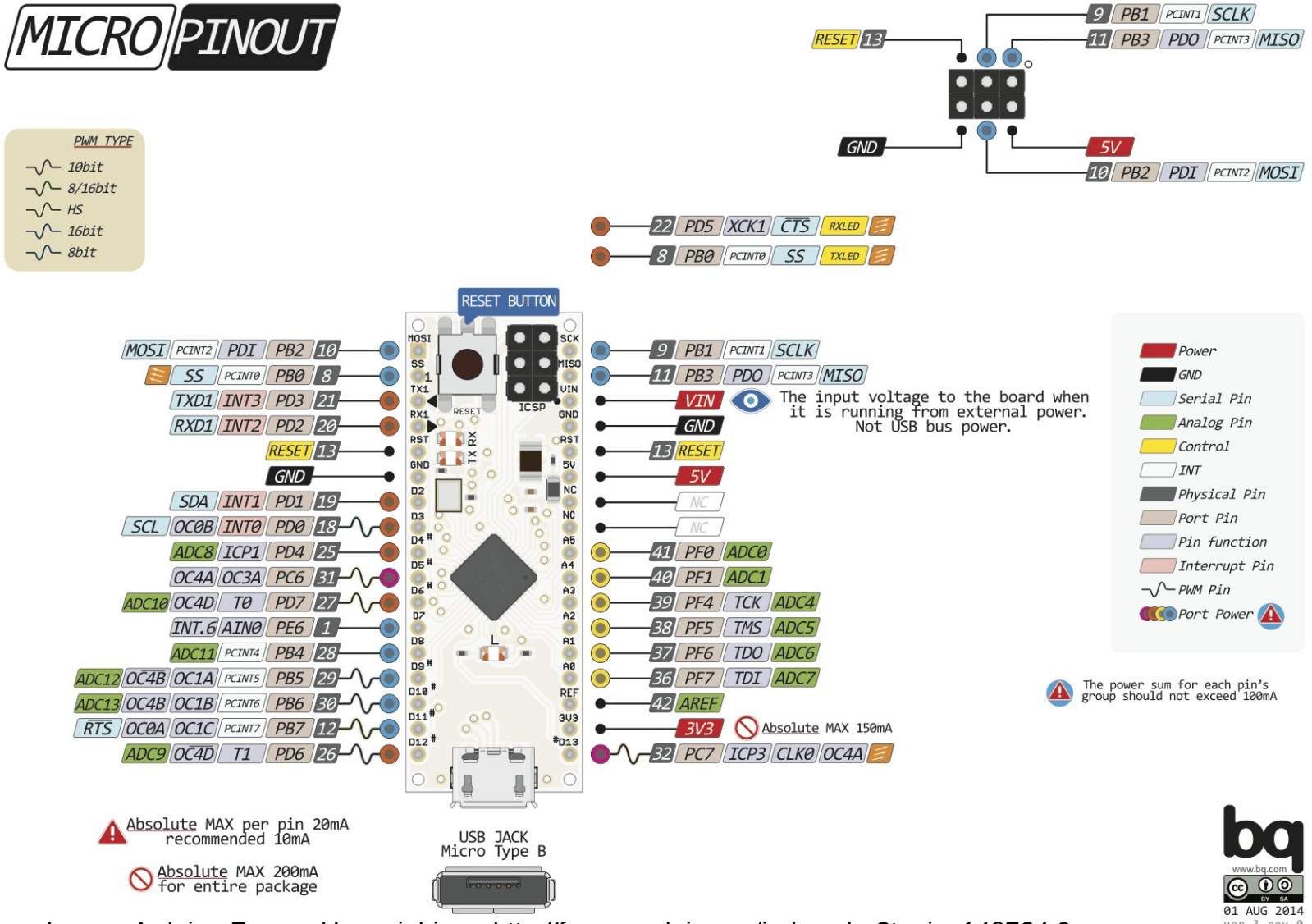
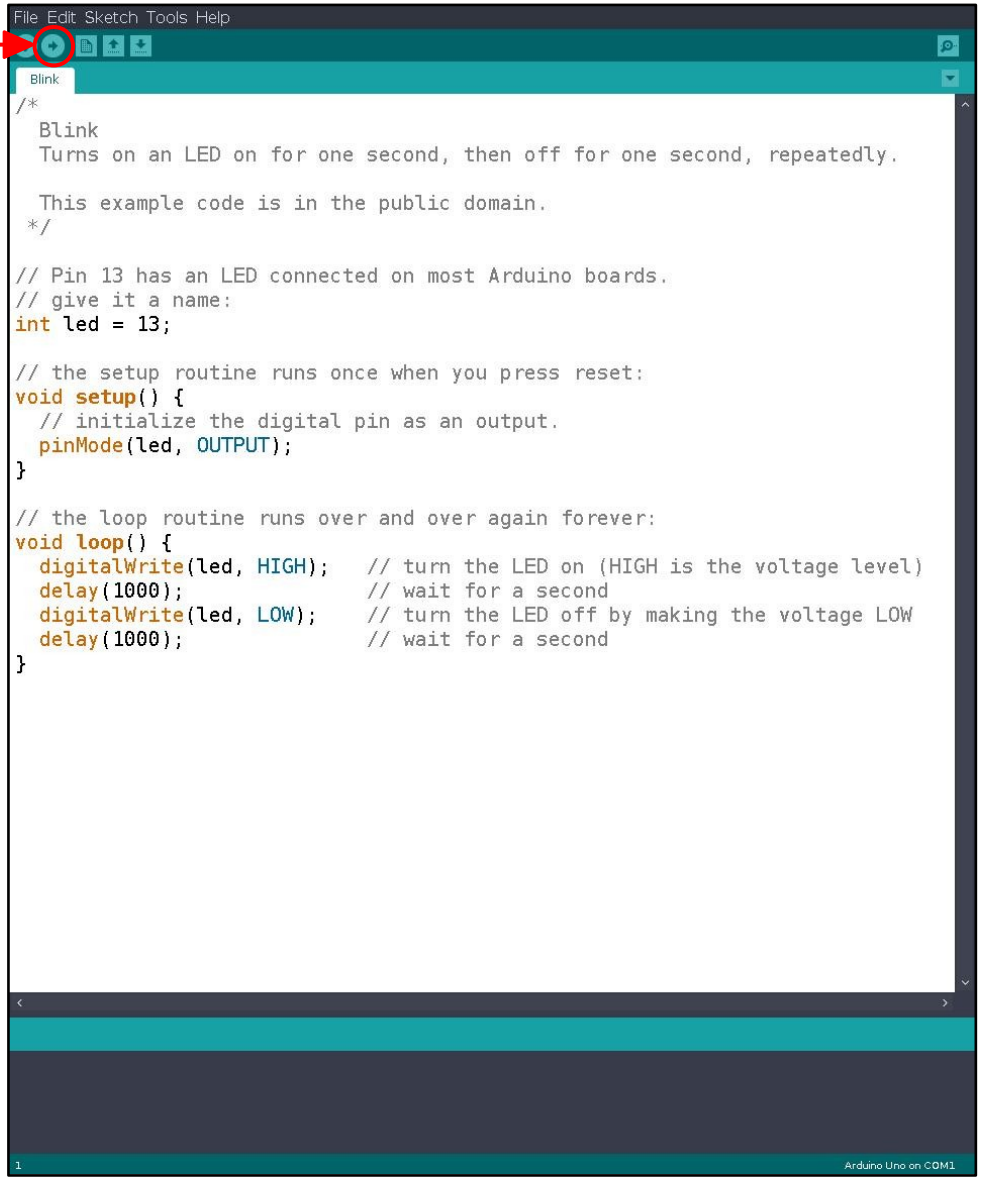


Image: Arduino Forum, User pighixxx, http://forum.arduino.cc/index.php?topic=148734.0

Arduino IDE

- https://www.arduino.cc/en/Main/Software
- Download and install the current version
- Plug in the Arduino via USB
- Tools → Board → Arduino Micro
- File → Examples → Basic → Blink
- Upload the sketch (upload button or ctrl + u)

Upload


File Edit Sketch Tools Help
Blink
/*
Blink
Turns on an LED on for one second, then off for one second, repeatedly.
This example code is in the public domain.
*/
// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;
// the setup routine runs once when you press reset:
void setup() {
// initialize the digital pin as an output.
pinMode(led, OUTPUT);
}
// the loop routine runs over and over again forever:
void loop() {
digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
delay(1000); // wait for a second
digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
delay(1000); // wait for a second
}
1
Arduino Uno on COM1

Hello World: Blink

```
// Pin 13 has an LED connected on most Arduino boards.
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
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// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);               // wait for a second
  digitalWrite(led, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);               // wait for a second
}
```

Tutorial 04: Arduino

Why do we use dedicated ICs?

- Simple circuits can be built **cheaper** and easier
  - Arduino: 5 – 30€
  - Simple IC: < 1€
- Expand the possibilities of Arduino (and others)
- Multitude of specialized chips, e.g. for audio playback, sensors, FPGA, etc.

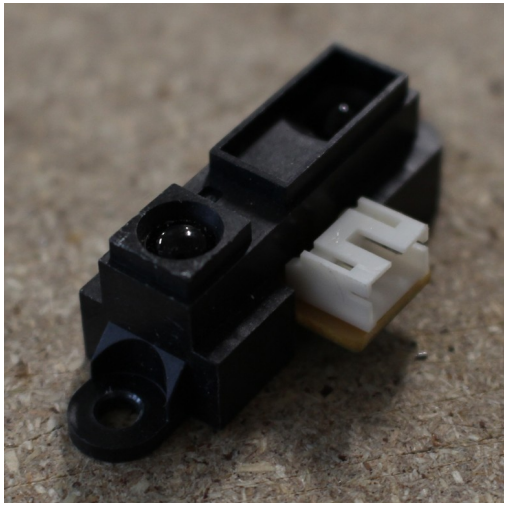
Some Tips

- Arduino is well documented – use the documentation!
- Keep things tidy (code and hardware)
- Keep your code expandable

New components...

Photoresistor

Copper tape



Distance sensor

Tilt switch

Exercise: Custom Input Device

- The Arduino Micro can emulate a mouse or keyboard
- Read the documentation: https://www.arduino.cc/en/Reference.MouseKeyboard
- Build a custom input device for a simple (!) video game of your choice