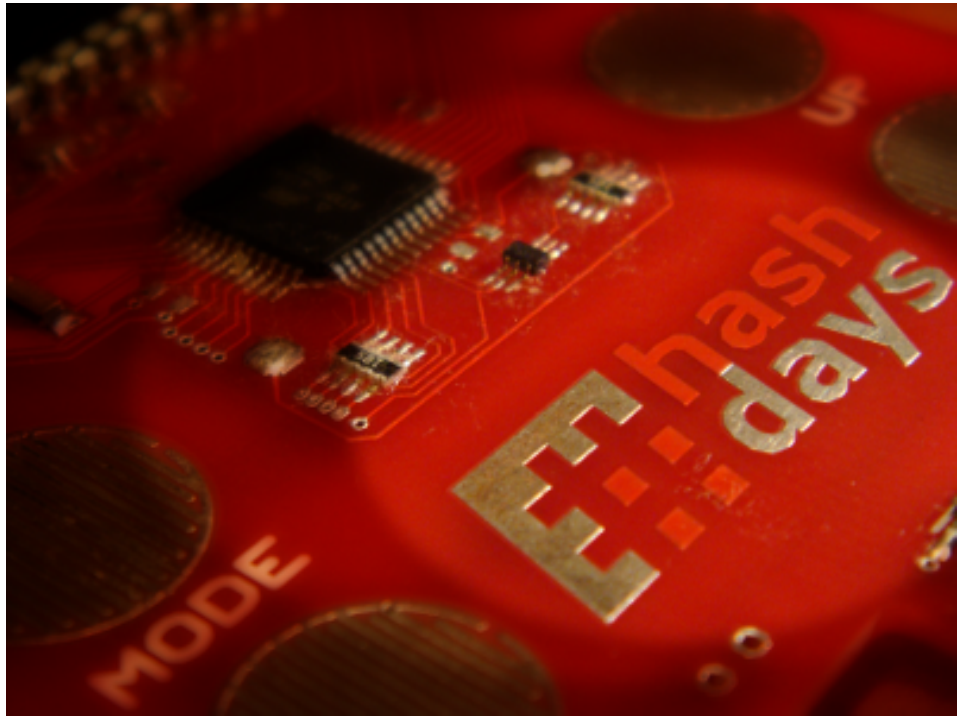
Hashdays Badge Hacking



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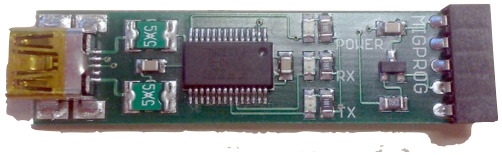
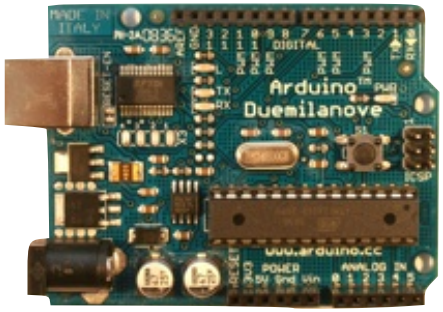


Bootloader

=

Arduino



... but much cooler

ARDUINO

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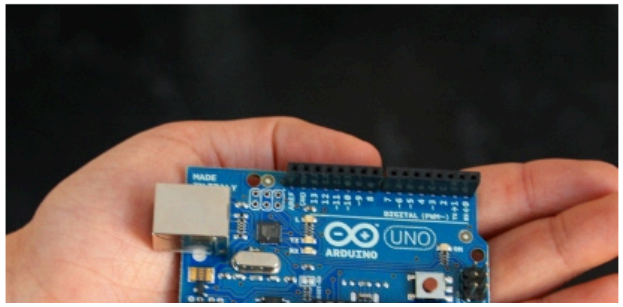


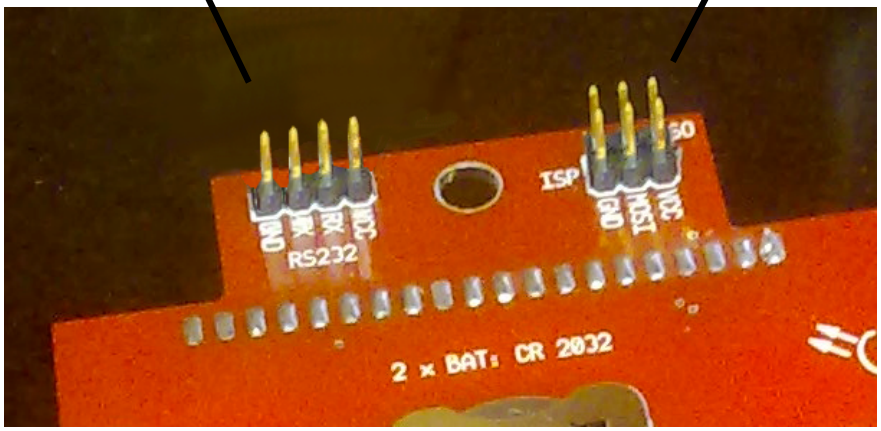
Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.

Arduino can sense the environment by receiving input from a variety of sensors and can affect its

Solder Pins

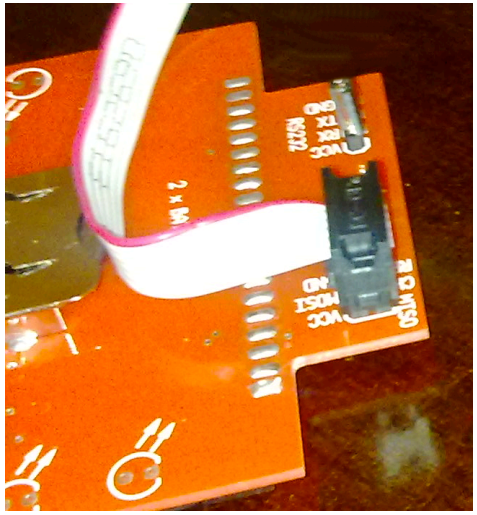
Serial Adapter
for Bootloading

ISP Socket



All modifications at
your own risk!

Connect ISP Programmer



Upload Bootloader

(.hex file, don‘t use Arduino Software)

Arduino Pro or Pro Mini (3.3V, 8MHz) w/ ATmega 168

Set Fuse Bits

efuse=F8, hfuse=DF, lfuse=E2

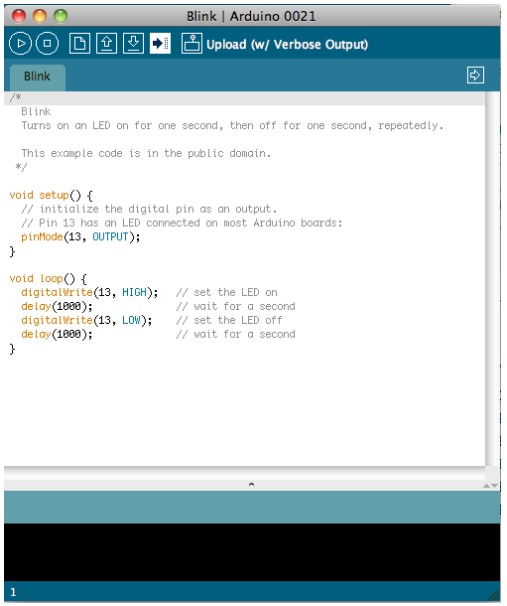
Connect Serial to USB Interface

Install

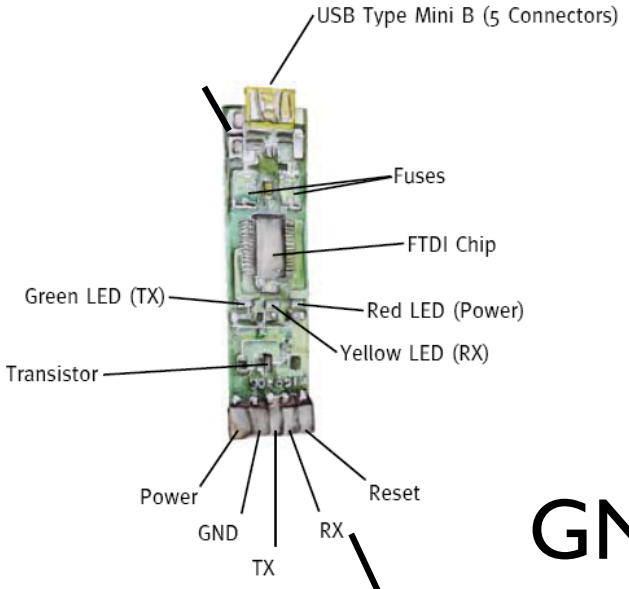
Arduino Software
and
USB Driver
and
dogm128 Library
(for Display)

-> http://arduino.cc/en/Main/Software

->http://code.google.com/p/dogm128/

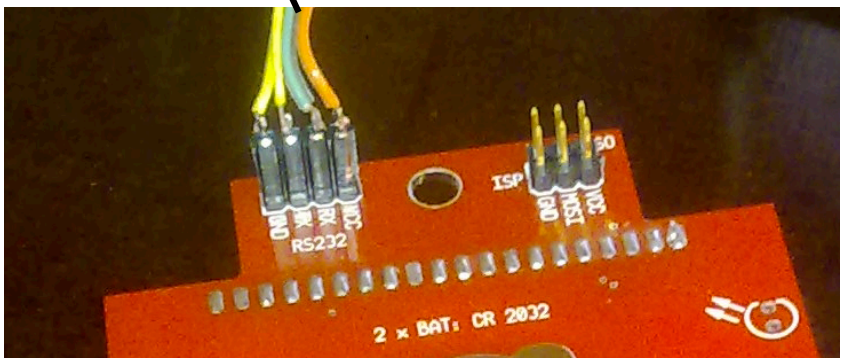


USB



3,3 V!

GND, RX, TX



Badge Specific Codes

```
int a0Pin = 1;      // address line a0 for the dogm module
```

```
DDRB |= (1<<PB0);      SET LCD POWER
PORTB |= (1<<PB0);

DDRB |= (1<<PB1);     CLEAR RESET
PORTB |= (1<<PB1);
```

```
pinMode(4, OUTPUT);      // Activate Buttons
digitalWrite(4, HIGH);
```

```
DDRC |= (1<<PC2);       //Activate Right LED
PORTC &= ~(1<<PC2);
```

Language Reference

Arduino

Arduino programs can be divided in three main parts: *structure*, *values* (variables and constants), and *functions*.

Structure

- setup()
- loop()

Control Structures

- if
- if...else
- for
- switch case
- while
- do... while
- break
- continue
- return
- goto

Further Syntax

- ; (semicolon)
- {} (curly braces)
- // (single line comment)
- /* */ (multi-line comment)
- #define
- #include

Arithmetic Operators

- = (assignment operator)
- + (addition)
- - (subtraction)
- * (multiplication)
- / (division)
- % (modulo)

Comparison Operators

- == (equal to)
- != (not equal to)
- < (less than)
- > (greater than)
- <= (less than or equal to)
- >= (greater than or equal to)

Boolean Operators

- && (and)
- || (or)
- ! (not)

Pointer Access Operators

- * dereference operator
- & reference operator

Variables

Constants

- HIGH | LOW
- INPUT | OUTPUT
- true | false
- integer constants
- floating point constants

Data Types

- void
- boolean
- char
- unsigned char
- byte
- int
- unsigned int
- word
- long
- unsigned long
- float
- double
- string - char array
- String - object
- array

Conversion

- char()
- byte()
- int()
- word()
- long()
- float()

Variable Scope & Qualifiers

- variable scope
- static
- volatile
- const

Utilities

- sizeof()

Functions

Digital I/O

- pinMode()
- digitalWrite()
- digitalRead()

Analog I/O

- analogReference()
- analogRead()
- analogWrite() - *PWM*

Advanced I/O

- tone()
- noTone()
- shiftOut()
- pulseIn()

Time

- millis()
- micros()
- delay()
- delayMicroseconds()

Math

- min()
- max()
- abs()
- constrain()
- map()
- pow()
- sqrt()

Trigonometry

- sin()
- cos()
- tan()

Random Numbers

- randomSeed()
- random()

Bits and Bytes

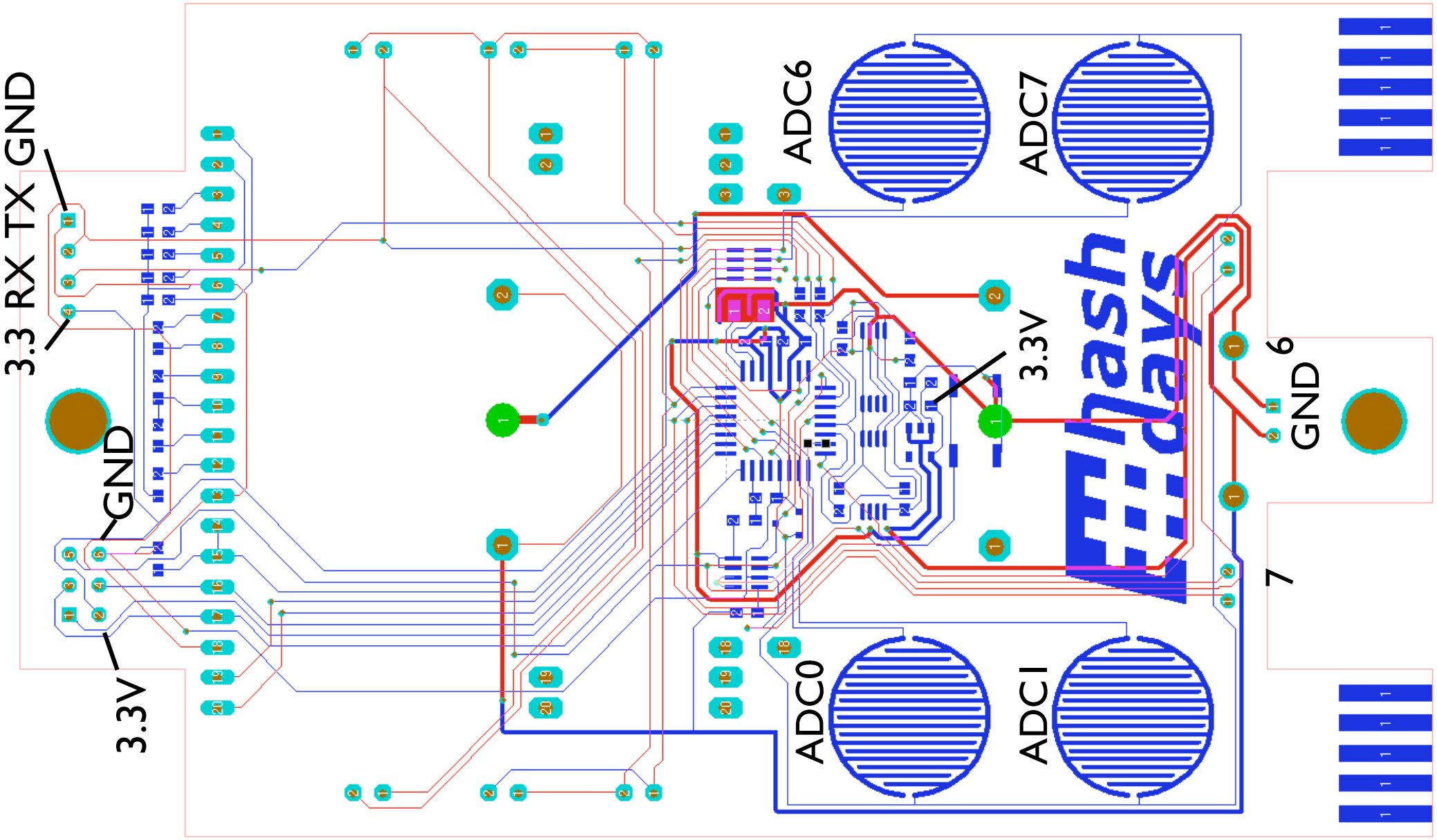
- lowByte()
- highByte()
- bitRead()
- bitWrite()
- bitSet()
- bitClear()
- bit()

dogm128 Display

The C Reference of the dogm128 Library

- Concept
  - Naming Convention
  - Display Orientation
  - Picture Loop
- Function Reference
  - dog_ClrBox
  - dog_ClrHLine
  - dog_ClrPixel
  - dog_ClrVLine
  - dog_Delay
  - dog_DrawArc
  - dog_DrawChar dog_DrawRChar
  - dog_DrawLine
  - dog_DrawPoint
  - dog_DrawStr dog_DrawRStr
  - dog_DrawStrP dog_DrawRStrP
  - dog_GetStrWidth , dog_GetStrWidthP
  - dog_Init
  - dog_NextPage
  - dog_SetBitmap dog_SetBitmapP
  - dog_SetBox
  - dog_SetContrast
  - dog_SetHBitmap dog_SetHBitmapP
  - dog_SetHLine
  - dog_SetInvertPixelMode
  - dog_SetPixel
  - dog_SetVLine
  - dog_XorBox
  - dog_XorHLine
  - dog_XorPixel
  - dog_XorVLine

Hashdays Badge Layout



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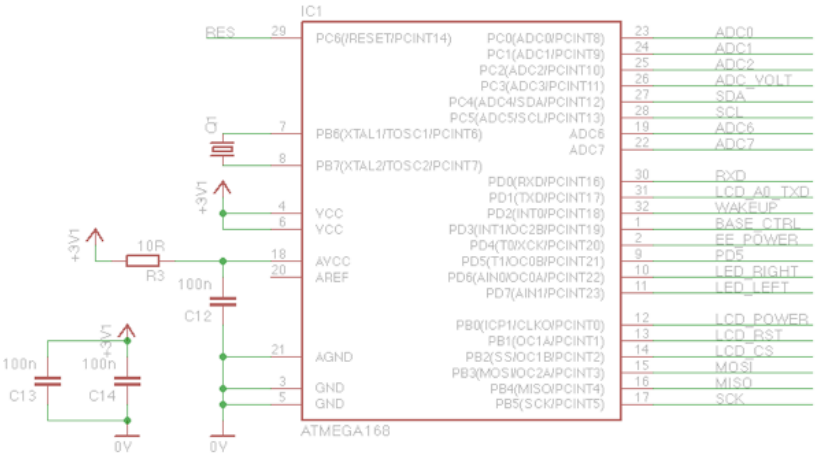
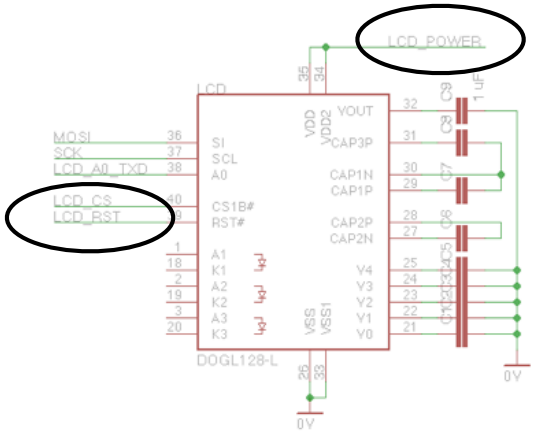
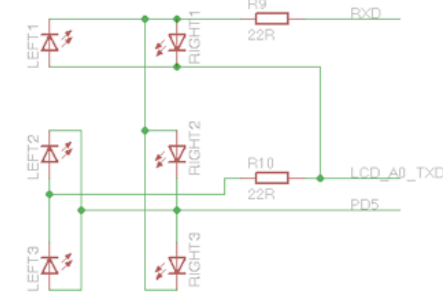
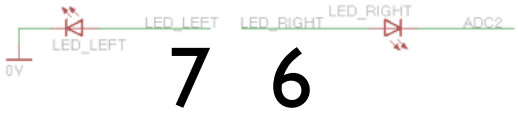
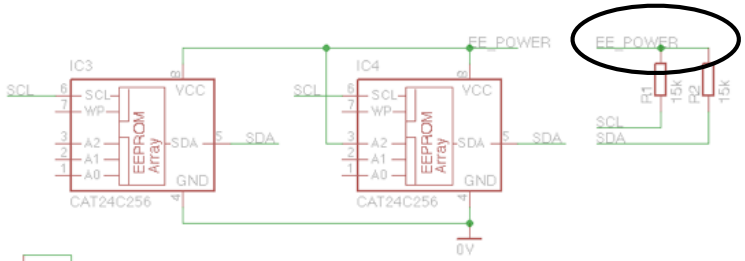
Hashdays Badge Schematics

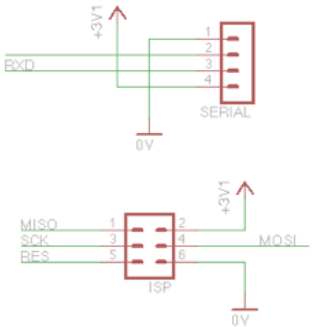


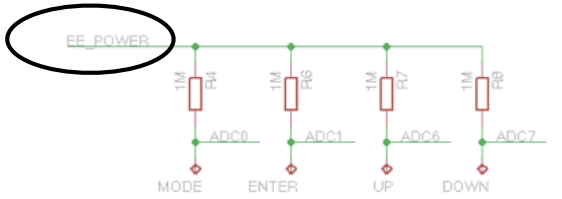


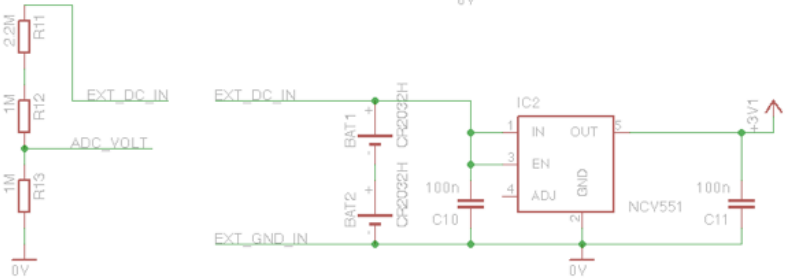


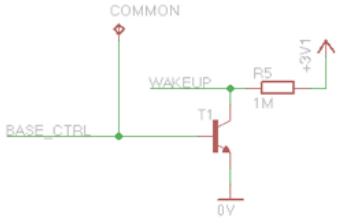


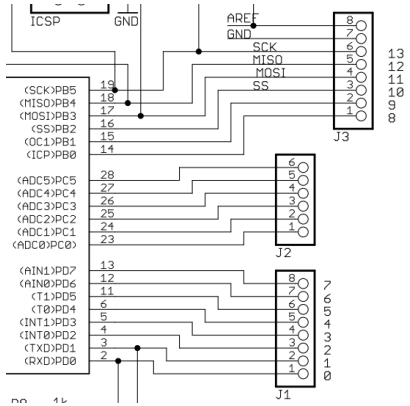












Arduino Pin Assignements

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