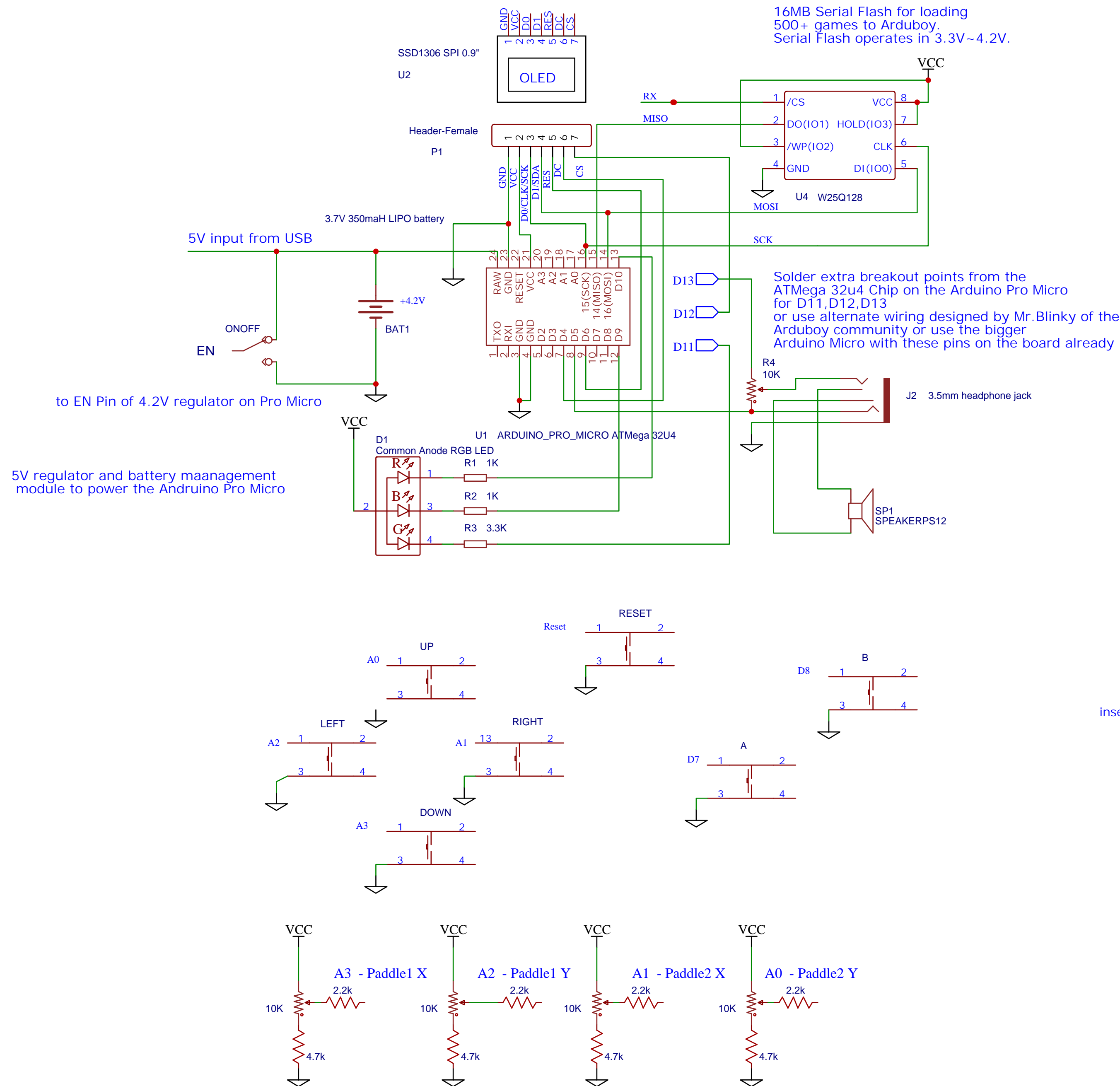# Ardubaby 2020 with flashcart
by : chuengbx   2020/1/1

This is small arduboy that made using Pro Micro clone, 1.3: SSD1306 with paddle, volume control, and headphone jack, all in a foot print smaller than one third of a credit card.

Parts:
Arduino Pro Micro (or Arduino Micro)
0.9" mono OLED with SPI interface on SSD1306 controller. The 7 pin male header of the OLED is plugged into the female header.
The OLED chosen must have the 7th pin for CS. Otherwise, it'll conflict with the Flahcart,
causing screen flickering and misalignment when loading games from flashcart or when playing video stored on the flashcart
16MB serial flash to load 500+ Arudboy games to be self-programmed to Arduino Micro anytime through the Cathy 3K bootloader
(original circuit, python scripts for game loading, and the Cathy 3K bootloader and homemade arduby package is designed by Mr.Blinky (inks below).
4.2V LDO regulator IC - STO32-5 to replace the original on board 5V LDO regulator. When replacing, do not solder the EN pin to the Pro micro board, leave it hanging.
3.7V LiPO Battery is connected to the RAW pin of the Pro Micro to power the Pro Micro.
It's also being charged by the 5V USB when connected to USB port of the computer or a charger. The builtin overcharge proteciton circuit inside the Lipo battery to ensure no overcharging,
WARNING - Please test it to ensure your LIPO's battery protection circuits works first. Otherwise, it may over charge and cause damages or even fire.
Winboard 128Mbit Serial Flash S25Q128
To use the serial flash for game loading, the Cathy 3K boot loader must be burnt to the Pro Micro using USBasp.
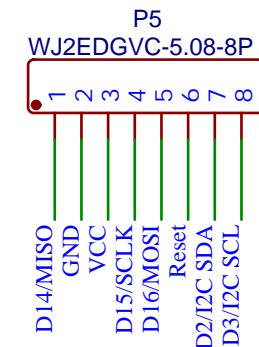
Credits and References to original authors of Arduboy and Flashcart:

1. Original Arduboy production schametics:
   https://community.arduboy.com/t/production-arduboy-schematic/702

2. MR.Blinky's original design of flashcart:
   https://github.com/MrBlinky/Arduboy/tree/master/flashcart

3. MR. Blinky;s GITHUB with python scripts and sample flash cart image binaries for sample games :
   https://github.com/MrBlinky/Arduboy-Python-Utilities

4. MR. Blinky's homemade package (required to operate the flash cart with alternate wiring and different types of OLED other than the SSD1306 used in original Arduboy:
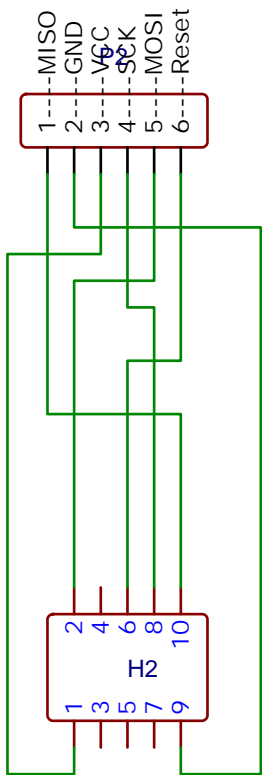   https://github.com/MrBlinky/Arduboy-homemade-package

Ardubaby 2020 y cheungbx 2020/1/1
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Female Header for programming and expansion for I2C interface.
The first 6 pins doubles up as the port to connect to a
conversion cable to a USBasp to burn
the Cath 3K bootloader to the Pro Micro.
The USBasp conversion cable below can be used.

16MB Serial Flash for loading
500+ games to Arduboy.
Serial Flash operates in 3.3V~4.2V.

SSD1306 SPI 0.9"
U2

OLED

Header-Female
P1

3.7V 350maH LIPO battery

5V input from USB

ONOFF

EN

BAT1
+4.2V

to EN Pin of 4.2V regulator on Pro Micro

VCC

D1
Common Anode RGB LED

R1 1K
R2 1K
R3 3.3K

5V regulator and battery maanagement
 module to power the Andruino Pro Micro

U1 ARDUINO_PRO_MICRO ATMega 32U4

RAW GND RESET VCC A3 A2 A1 A0 15(SCK) 14(MISO) 16(MOSI) D10
TXO RXI GND D2 D3 D4 D5 D6 D7 D8 D9

U4 W25Q128
1 /CS   VCC 8
2 DO(IO1) HOLD(IO3) 7
3 /WP(IO2)   CLK 6
4 GND   DI(IO0) 5

RX
MISO
MOSI
SCK

Solder extra breakout points from the
ATMega 32u4 Chip on the Arduino Pro Micro
for D11,D12,D13
or use alternate wiring designed by Mr.Blinky of the
Arduboy community or use the bigger
Arduino Micro with these pins on the board already

D13
D12
D11

R4
10K

J2   3.5mm headphone jack

SP1
SPEAKERPS12

P5
WJ2EDGVC-5.08-8P
1 2 3 4 5 6 7 8
DI4>MISO GND VCC DI5/SCLK DI6/MOSI Reset D2/I2C SDA D3/I2C SCL

USBasp Cable for Credit Card ArduBoy

1--MISO
2--GND
3--VCC
4--SCK
5--MOSI
6--Reset

H2

View from bottom of female header_2x5
insert to the male header of the USBasp Programmer

RESET
Reset 1 2
3 4

UP
A0 1 2
3 4

B
D8 1 2
3 4

LEFT
A2 1 2
3 4

RIGHT
A1 13 2
3 4

A
D7 1 2
3 4

DOWN
A3 1 2
3 4

VCC   A3 - Paddle1 X   2.2k
10K   4.7k

VCC   A2 - Paddle1 Y   2.2k
10K   4.7k

VCC   A1 - Paddle2 X   2.2k
10K   4.7k

VCC   A0 - Paddle2 Y   2.2k
10K   4.7k