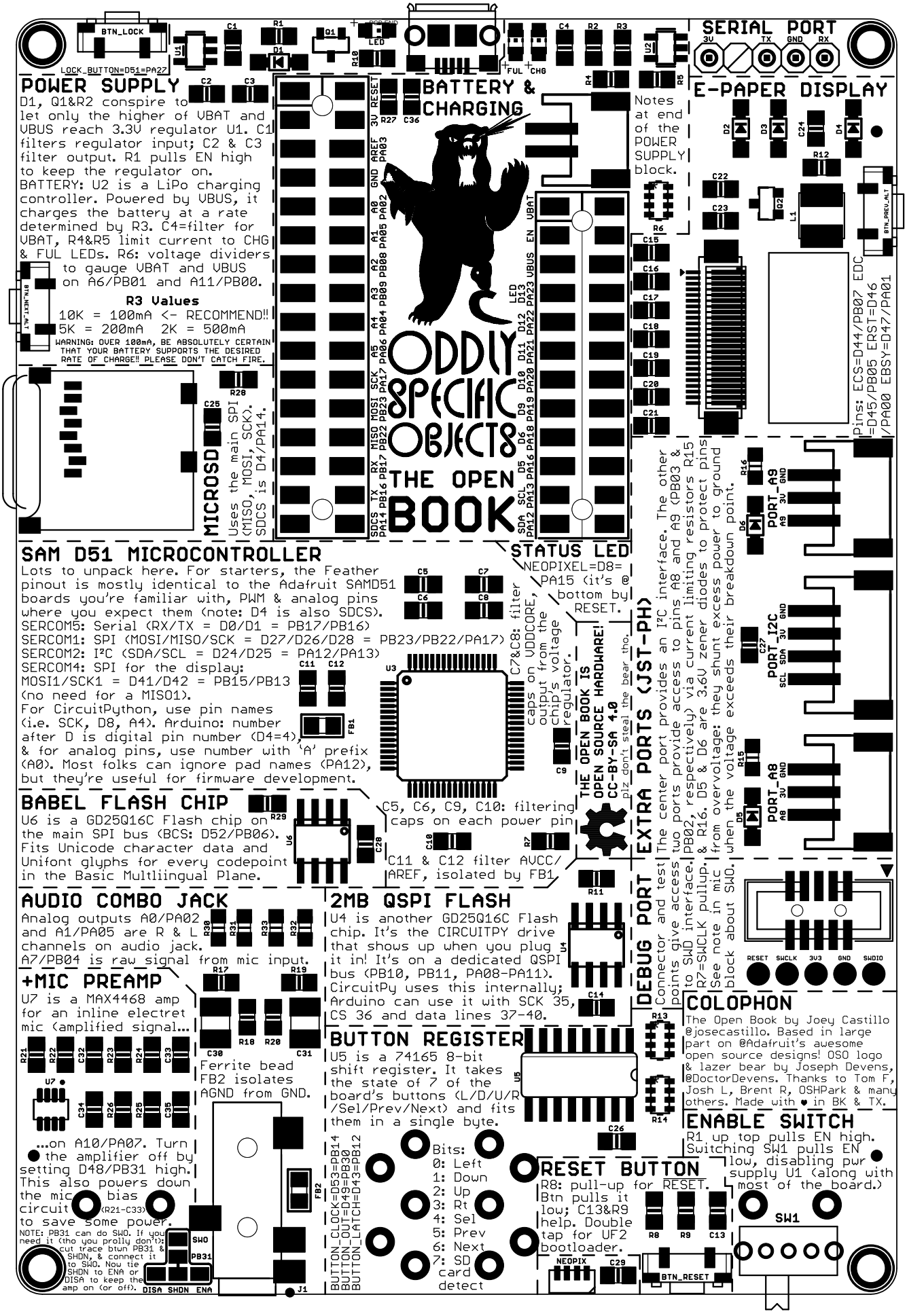
BTN_LOCK
LOCK_BUTTON=D51=PA27
U1
C1
R1
D1
Q1
LED
R19
C4
R2
R3
U2
FUL
CHG
SERIAL PORT
3V
TX
GND
RX
POWER SUPPLY
D1, Q1&R2 conspire to let only the higher of VBAT and VBUS reach 3.3V regulator U1. C1 filters regulator input; C2 & C3 filter output. R1 pulls EN high to keep the regulator on.
BATTERY: U2 is a LiPo charging controller. Powered by VBUS, it charges the battery at a rate determined by R3. C4=filter for VBAT, R4&R5 limit current to CHG & FUL LEDs. R6: voltage dividers to gauge VBAT and VBUS on A6/PB01 and A11/PB00.
R3 Values
10K = 100mA <- RECOMMEND!!
5K = 200mA 2K = 500mA
WARNING: OVER 100mA, BE ABSOLUTELY CERTAIN THAT YOUR BATTERY SUPPORTS THE DESIRED RATE OF CHARGE!! PLEASE DON'T CATCH FIRE.
C2
C3
BATTERY & CHARGING
R4
R5
R6
Notes at end of the POWER SUPPLY block.
E-PAPER DISPLAY
D2
D3
C24
D4
R12
C22
C23
G2
L1
BTN_PREV_ALT
BTN_NEXT_ALT
C15
C16
C17
C18
C19
C20
C21
Pins: ECS=D44/PB07 EDC
=D45/PB05 ERST=D46
/PA00 EBSY=D47/PA01
R28
C25
MICROSD
Uses the main SPI (MISO, MOSI, SCK). SDCS is D4/PA14.
3V RESET
AREF PA03
GND PA02
A0 PA02
A1 PA05
A2 PB08
A3 PB09
A4 PA04
A5 PA06
SCK PA17
MOSI PB23
MISO PB22
RX PB17
TX PB16
SDCS PA14
VBAT
EN
VBUS PA23
LED D13
D12 PA22
D11 PA21
D10 PA20
D9 PA19
D6 PA18
D5 PA16
SCL PA13
SDA PA12
ODDLY SPECIFIC OBJECTS
THE OPEN BOOK
SAM D51 MICROCONTROLLER
Lots to unpack here. For starters, the Feather pinout is mostly identical to the Adafruit SAMD51 boards you're familiar with, PWM & analog pins where you expect them (note: D4 is also SDCS).
SERCOM5: Serial (RX/TX = D0/D1 = PB17/PB16)
SERCOM1: SPI (MOSI/MISO/SCK = D27/D26/D28 = PB23/PB22/PA17)
SERCOM2: I²C (SDA/SCL = D24/D25 = PA12/PA13)
SERCOM4: SPI for the display:
MOSI1/SCK1 = D41/D42 = PB15/PB13 (no need for a MISO1).
For CircuitPython, use pin names (i.e. SCK, D8, A4). Arduino: number after D is digital pin number (D4=4), & for analog pins, use number with 'A' prefix (A0). Most folks can ignore pad names (PA12), but they're useful for firmware development.
C5
C7
C6
C8
C11
C12
FB1
U3
C9
C7&C8: filter caps on VDDCORE, output from the chip's voltage regulator.
STATUS LED
NEOPIXEL=D8=PA15 (it's @ bottom by RESET.
THE OPEN BOOK IS OPEN SOURCE HARDWARE!
CC-BY-SA 4.0
plz don't steal the bear tho.
EXTRA PORTS (JST-PH)
The center port provides an I²C interface. The other two ports provide access to pins A8 and A9 (PB03 & PB02, respectively) via current limiting resistors R15 & R16. D5 & D6 are 3.6V zener diodes to protect pins from overvoltage: they shunt excess power to ground when the voltage exceeds their breakdown point.
R16
PORT_A9
A9 3V GND
D6
C27
PORT_I2C
SCL SDA 3V GND
R15
PORT_A8
A8 3V GND
D5
BABEL FLASH CHIP
U6 is a GD25Q16C Flash chip on the main SPI bus (BCS: D52/PB06). Fits Unicode character data and Unifont glyphs for every codepoint in the Basic Multliingual Plane.
R29
U6
C28
C5, C6, C9, C10: filtering caps on each power pin
C10
R7
C11 & C12 filter AVCC/AREF, isolated by FB1
R11
DEBUG PORT
Connector and test points give access to SWD interface.
RESET SWCLK 3V3 GND SWDIO
AUDIO COMBO JACK
Analog outputs A0/PA02 and A1/PA05 are R & L channels on audio jack. A7/PB04 is raw signal from mic input.
R30
R31
R33
R32
2MB QSPI FLASH
U4 is another GD25Q16C Flash chip. It's the CIRCUITPY drive that shows up when you plug it in! It's on a dedicated QSPI bus (PB10, PB11, PA08-PA11). CircuitPy uses this internally; Arduino can use it with SCK 35, CS 36 and data lines 37-40.
U4
C14
+MIC PREAMP
U7 is a MAX4468 amp for an inline electret mic (amplified signal...
R17
R19
R18
R20
C30
C31
R21
R22
C32
R23
R24
C33
U7
C34
R26
R25
C35
...on A10/PA07. Turn ● the amplifier off by setting D48/PB31 high. This also powers down the mic bias circuit (R21-C33) to save some power.
NOTE: PB31 can do SWO. If you need it (tho you prolly don't): cut trace btwn PB31 & SHDN, & connect it to SWO. Now tie SHDN to ENA or DISA to keep the amp on (or off).
SWO
PB31
DISA SHDN ENA
FB2
J1
Ferrite bead FB2 isolates AGND from GND.
BUTTON REGISTER
U5 is a 74165 8-bit shift register. It takes the state of 7 of the board's buttons (L/D/U/R/Sel/Prev/Next) and fits them in a single byte.
R13
R14
U5
C26
BUTTON_CLOCK=D53=PB14
BUTTON_OUT=D49=PB30
BUTTON_LATCH=D43=PB12
Bits:
0: Left
1: Down
2: Up
3: Rt
4: Sel
5: Prev
6: Next
7: SD card detect
RESET BUTTON
R8: pull-up for RESET. Btn pulls it low; C13&R9 help. Double tap for UF2 bootloader.
R8
R9
C13
NEOPIX
C29
BTN_RESET
COLOPHON
The Open Book by Joey Castillo @josecastillo. Based in large part on @Adafruit's awesome open source designs! OSO logo & lazer bear by Joseph Devens, @DoctorDevens. Thanks to Tom F, Josh L, Brent R, OSHPark & many others. Made with ♥ in BK & TX.
ENABLE SWITCH
R1 up top pulls EN high. Switching SW1 pulls EN low, disabling pwr supply U1 (along with most of the board.)
SW1