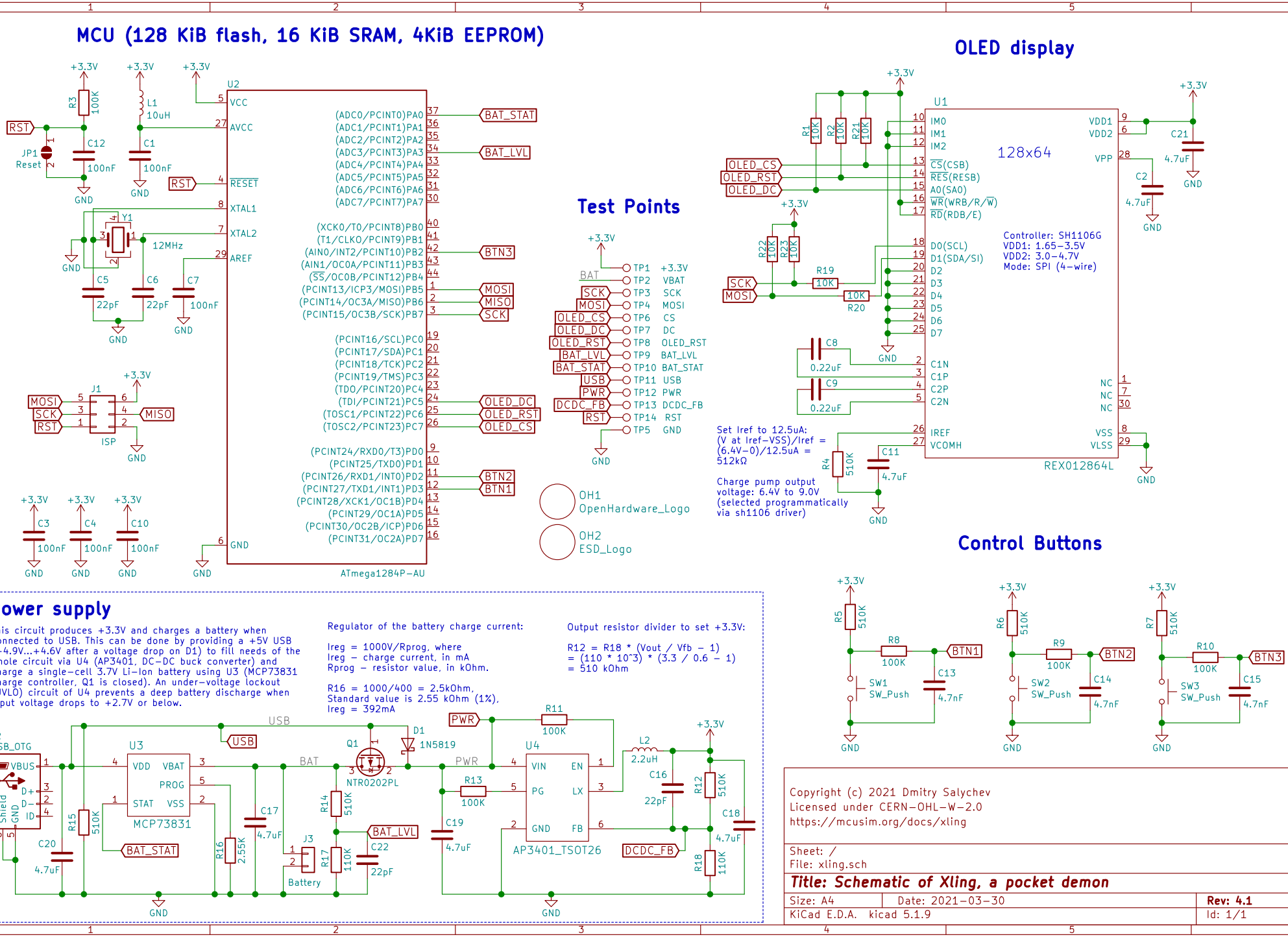
MCU (128 KiB flash, 16 KiB SRAM, 4KiB EEPROM)
OLED display
Test Points
Control Buttons
Power supply
U2
ATmega1284P-AU
U1
128x64
REX012864L
Controller: SH1106G
VDD1: 1.65-3.5V
VDD2: 3.0-4.7V
Mode: SPI (4-wire)
Set Iref to 12.5uA:
(V at Iref-VSS)/Iref =
(6.4V-0)/12.5uA =
512kΩ
Charge pump output
voltage: 6.4V to 9.0V
(selected programmatically
via sh1106 driver)
This circuit produces +3.3V and charges a battery when connected to USB. This can be done by providing a +5V USB (+4.9V...+4.6V after a voltage drop on D1) to fill needs of the whole circuit via U4 (AP3401, DC-DC buck converter) and charge a single-cell 3.7V Li-Ion battery using U3 (MCP73831 charge controller, Q1 is closed). An under-voltage lockout (UVLO) circuit of U4 prevents a deep battery discharge when input voltage drops to +2.7V or below.
Regulator of the battery charge current:
Ireg = 1000V/Rprog, where
Ireg - charge current, in mA
Rprog - resistor value, in kOhm.
R16 = 1000/400 = 2.5kOhm,
Standard value is 2.55 kOhm (1%),
Ireg = 392mA
Output resistor divider to set +3.3V:
R12 = R18 * (Vout / Vfb - 1)
= (110 * 10^3) * (3.3 / 0.6 - 1)
= 510 kOhm
MCP73831
AP3401_TSOT26
NTR0202PL
1N5819
OH1
OpenHardware_Logo
OH2
ESD_Logo
ISP
Battery
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https://mcusim.org/docs/xling
Sheet: /
File: xling.sch
Title: Schematic of Xling, a pocket demon
Size: A4
Date: 2021-03-30
Rev: 4.1
KiCad E.D.A. kicad 5.1.9
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