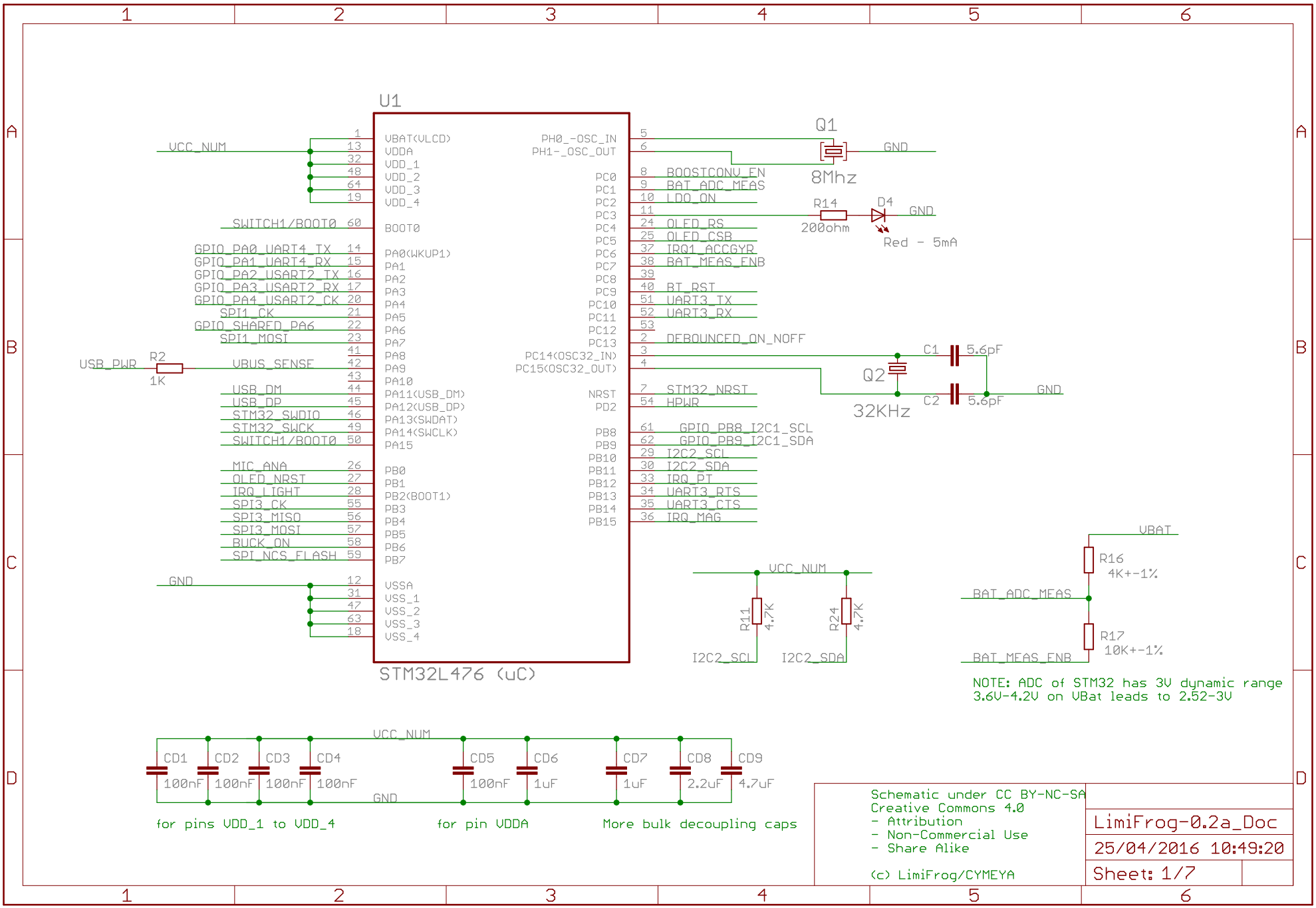
U1
VBAT(VLCD)
VDDA
VDD_1
VDD_2
VDD_3
VDD_4
BOOT0
PA0(WKUP1)
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11(USB_DM)
PA12(USB_DP)
PA13(SWDAT)
PA14(SWCLK)
PA15
PB0
PB1
PB2(BOOT1)
PB3
PB4
PB5
PB6
PB7
VSSA
VSS_1
VSS_2
VSS_3
VSS_4
PH0_-OSC_IN
PH1-_OSC_OUT
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14(OSC32_IN)
PC15(OSC32_OUT)
NRST
PD2
PB8
PB9
PB10
PB11
PB12
PB13
PB14
PB15
STM32L476 (uC)
VCC_NUM
SWITCH1/BOOT0
GPIO_PA0_UART4_TX
GPIO_PA1_UART4_RX
GPIO_PA2_USART2_TX
GPIO_PA3_USART2_RX
GPIO_PA4_USART2_CK
SPI1_CK
GPIO_SHARED_PA6
SPI1_MOSI
USB_PWR
R2
1K
VBUS_SENSE
USB_DM
USB_DP
STM32_SWDIO
STM32_SWCK
SWITCH1/BOOT0
MIC_ANA
OLED_NRST
IRQ_LIGHT
SPI3_CK
SPI3_MISO
SPI3_MOSI
BUCK_ON
SPI_NCS_FLASH
GND
Q1
8Mhz
GND
BOOSTCONV_EN
BAT_ADC_MEAS
LDO_ON
R14
200ohm
D4
Red - 5mA
GND
OLED_RS
OLED_CSB
IRQ1_ACCGYR
BAT_MEAS_ENB
BT_RST
UART3_TX
UART3_RX
DEBOUNCED_ON_NOFF
C1
5.6pF
Q2
32KHz
C2
5.6pF
GND
STM32_NRST
HPWR
GPIO_PB8_I2C1_SCL
GPIO_PB9_I2C1_SDA
I2C2_SCL
I2C2_SDA
IRQ_PT
UART3_RTS
UART3_CTS
IRQ_MAG
VCC_NUM
R11
4.7K
R24
4.7K
I2C2_SCL
I2C2_SDA
VBAT
R16
4K+-1%
BAT_ADC_MEAS
R17
10K+-1%
BAT_MEAS_ENB
NOTE: ADC of STM32 has 3V dynamic range
3.6V-4.2V on VBat leads to 2.52-3V
VCC_NUM
CD1
100nF
CD2
100nF
CD3
100nF
CD4
100nF
GND
for pins VDD_1 to VDD_4
CD5
100nF
CD6
1uF
for pin VDDA
CD7
1uF
CD8
2.2uF
CD9
4.7uF
More bulk decoupling caps
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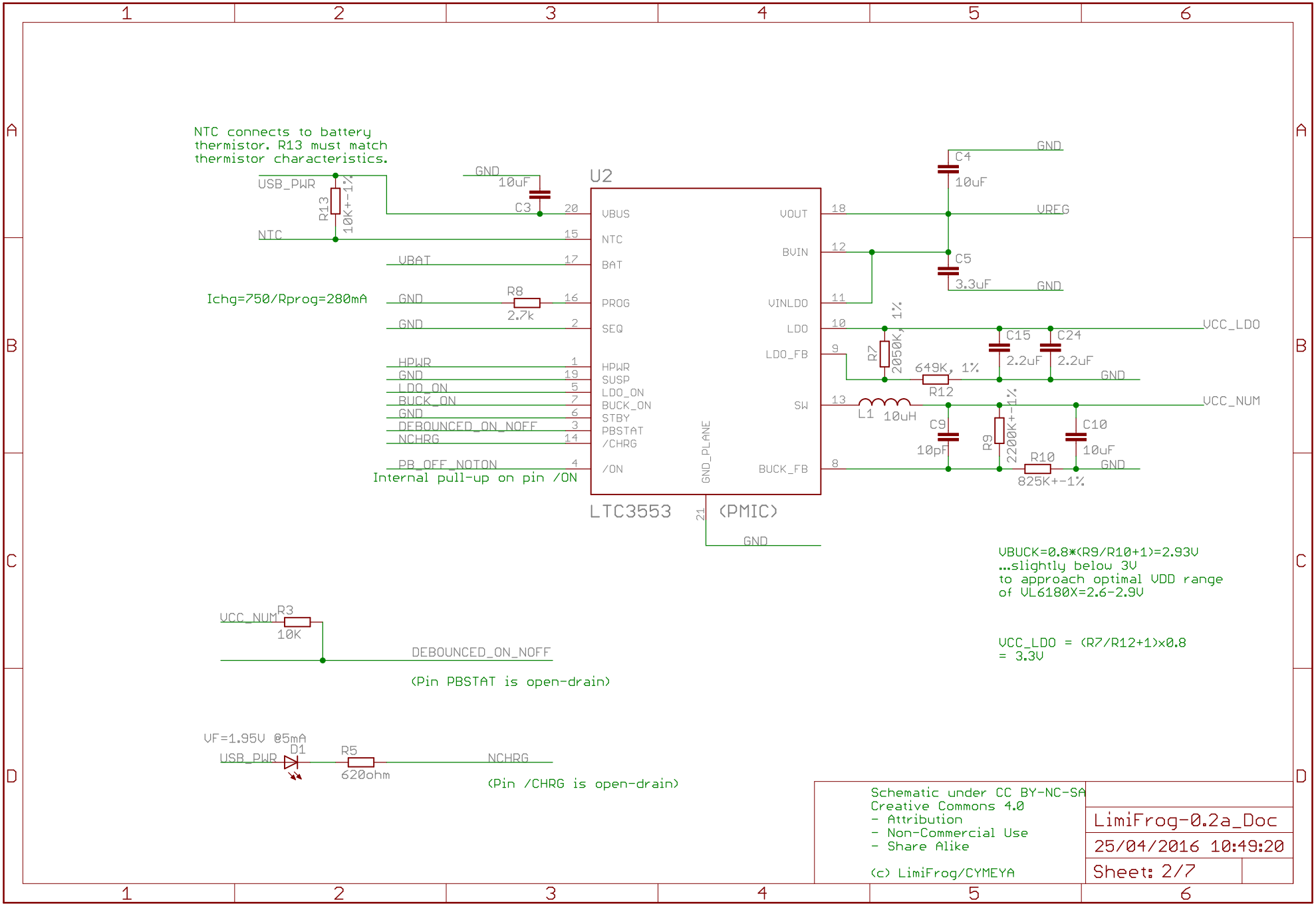
NTC connects to battery thermistor. R13 must match thermistor characteristics.
USB_PWR
R13
10K+-1%
NTC
GND
10uF
C3
U2
VBUS
NTC
BAT
PROG
SEQ
HPWR
SUSP
LDO_ON
BUCK_ON
STBY
PBSTAT
/CHRG
/ON
GND_PLANE
VOUT
BVIN
VINLDO
LDO
LDO_FB
SW
BUCK_FB
LTC3553
(PMIC)
21
GND
VBAT
Ichg=750/Rprog=280mA
R8
2.7k
HPWR
GND
LDO_ON
BUCK_ON
GND
DEBOUNCED_ON_NOFF
NCHRG
PB_OFF_NOTON
Internal pull-up on pin /ON
C4
10uF
VREG
C5
3.3uF
R7
2050K, 1%
649K, 1%
R12
C15
2.2uF
C24
2.2uF
VCC_LDO
L1
10uH
C9
10pF
R9
2200K+-1%
R10
825K+-1%
C10
10uF
VCC_NUM
VBUCK=0.8*(R9/R10+1)=2.93V
...slightly below 3V
to approach optimal VDD range
of VL6180X=2.6-2.9V
VCC_LDO = (R7/R12+1)x0.8
= 3.3V
R3
10K
DEBOUNCED_ON_NOFF
(Pin PBSTAT is open-drain)
VF=1.95V @5mA
D1
R5
620ohm
NCHRG
(Pin /CHRG is open-drain)
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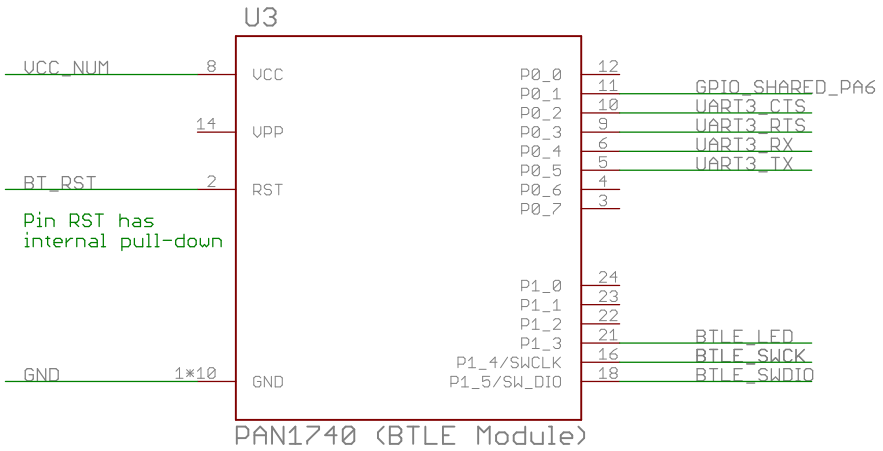

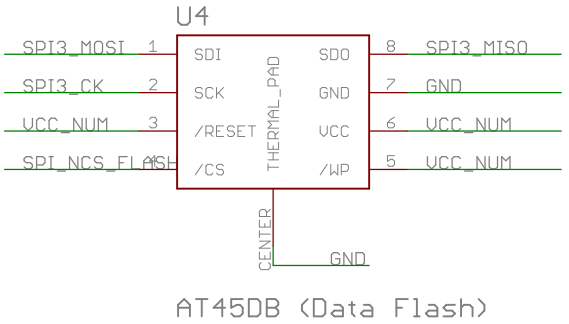

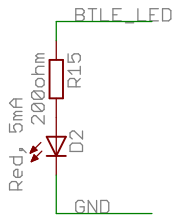

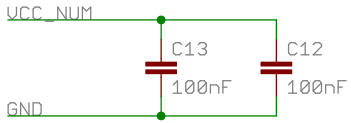

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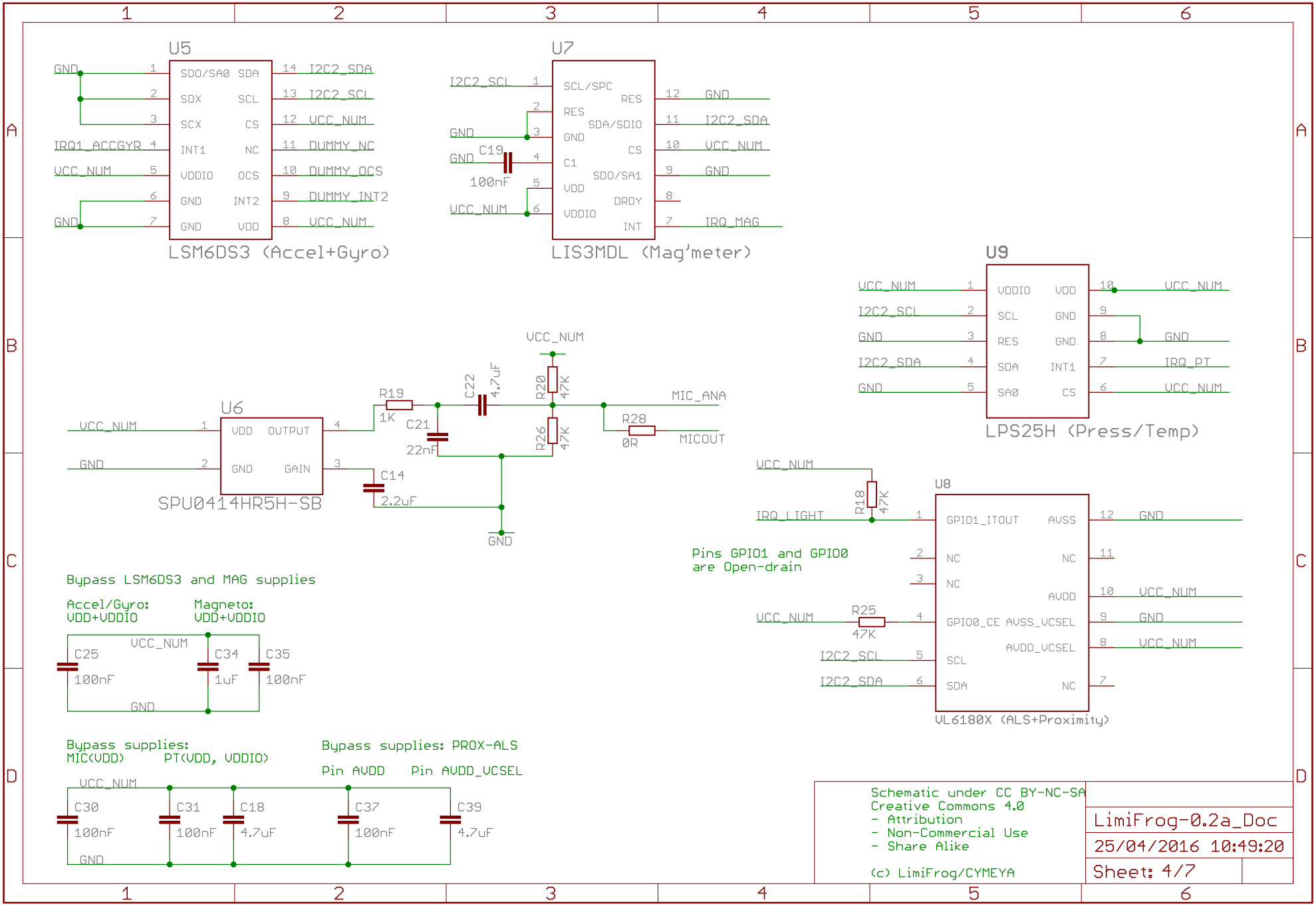
U5
GND
SDO/SA0
SDA
I2C2_SDA
SDX
SCL
I2C2_SCL
SCX
CS
VCC_NUM
IRQ1_ACCGYR
INT1
NC
DUMMY_NC
VCC_NUM
VDDIO
OCS
DUMMY_OCS
GND
INT2
DUMMY_INT2
GND
GND
VDD
VCC_NUM
LSM6DS3 (Accel+Gyro)
U7
I2C2_SCL
SCL/SPC
RES
GND
RES
SDA/SDIO
GND
GND
C19
CS
C1
100nF
SDO/SA1
VDD
DRDY
VCC_NUM
VDDIO
INT
IRQ_MAG
LIS3MDL (Mag'meter)
U9
VCC_NUM
VDDIO
VDD
VCC_NUM
I2C2_SCL
SCL
GND
GND
RES
GND
I2C2_SDA
SDA
INT1
IRQ_PT
GND
SA0
CS
VCC_NUM
LPS25H (Press/Temp)
VCC_NUM
R19
1K
C22
4.7uF
R20
47K
MIC_ANA
U6
VCC_NUM
VDD
OUTPUT
C21
22nF
R26
47K
R28
0R
MICOUT
GND
GND
GAIN
C14
2.2uF
SPU0414HR5H-SB
GND
Bypass LSM6DS3 and MAG supplies
Accel/Gyro:
VDD+VDDIO
Magneto:
VDD+VDDIO
VCC_NUM
C25
100nF
C34
1uF
C35
100nF
GND
VCC_NUM
R18
47K
U8
IRQ_LIGHT
GPIO1_ITOUT
AVSS
GND
Pins GPIO1 and GPIO0
are Open-drain
NC
NC
NC
AVDD
VCC_NUM
VCC_NUM
R25
47K
GPIO0_CE
AVSS_VCSEL
GND
AVDD_VCSEL
VCC_NUM
I2C2_SCL
SCL
I2C2_SDA
SDA
NC
VL6180X (ALS+Proximity)
Bypass supplies:
MIC(VDD)
PT(VDD, VDDIO)
Bypass supplies: PROX-ALS
Pin AVDD
Pin AVDD_VCSEL
VCC_NUM
C30
100nF
C31
100nF
C18
4.7uF
C37
100nF
C39
4.7uF
GND
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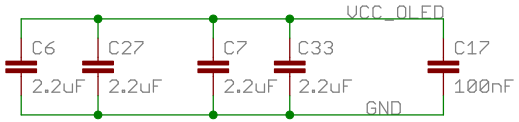
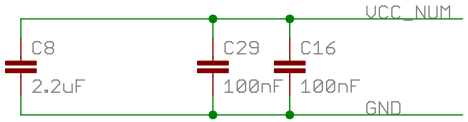
Pay attention to reduction of actual capacitance of small caps like 0402 under DC bias (3V and ~14V here)

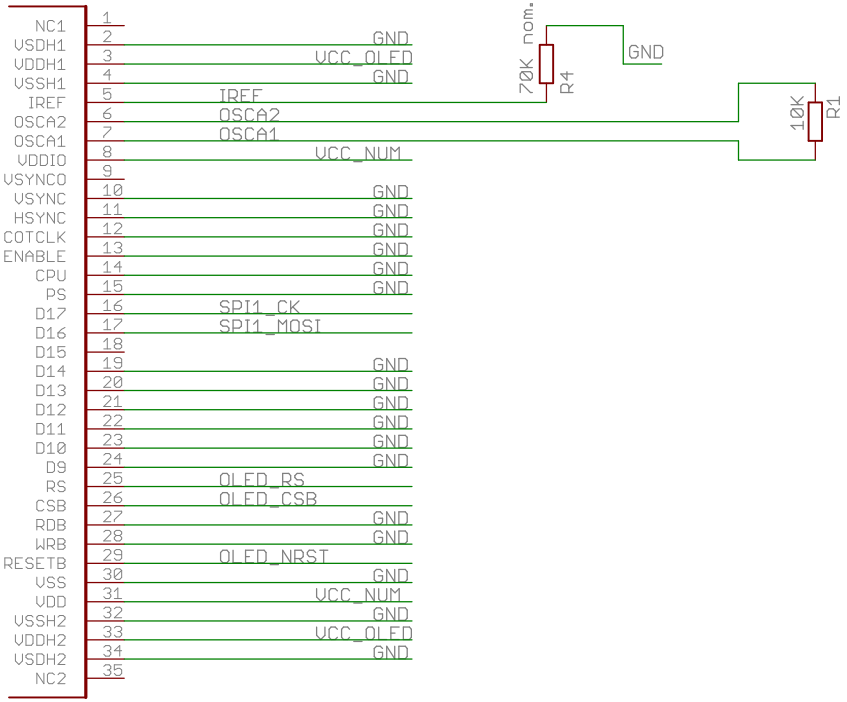


2x 2.2uF on each VDDH input



Bypass for pins VDD and VDDIO

CONN1



FPC connector for OLED

Top layer Fiducials

Bottom layer Fiducials

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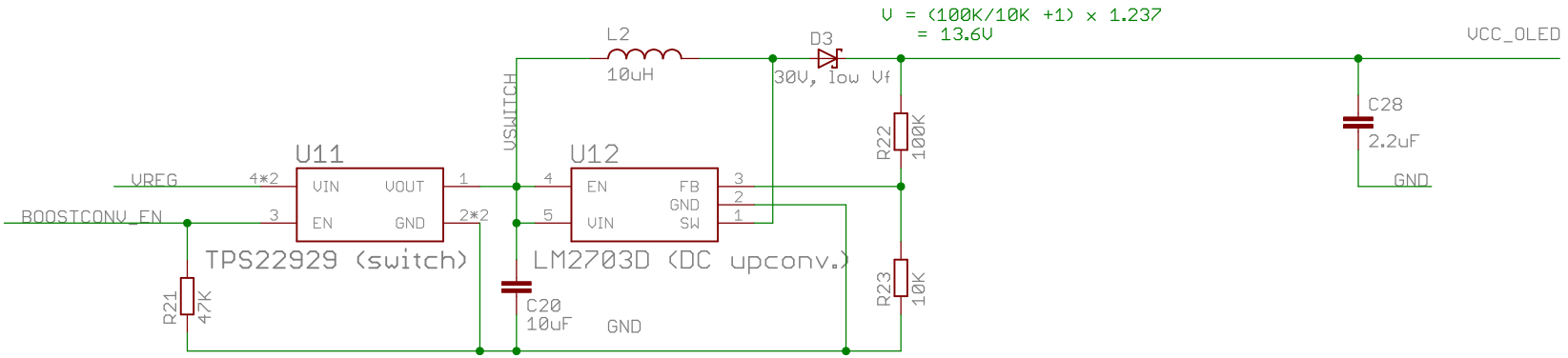

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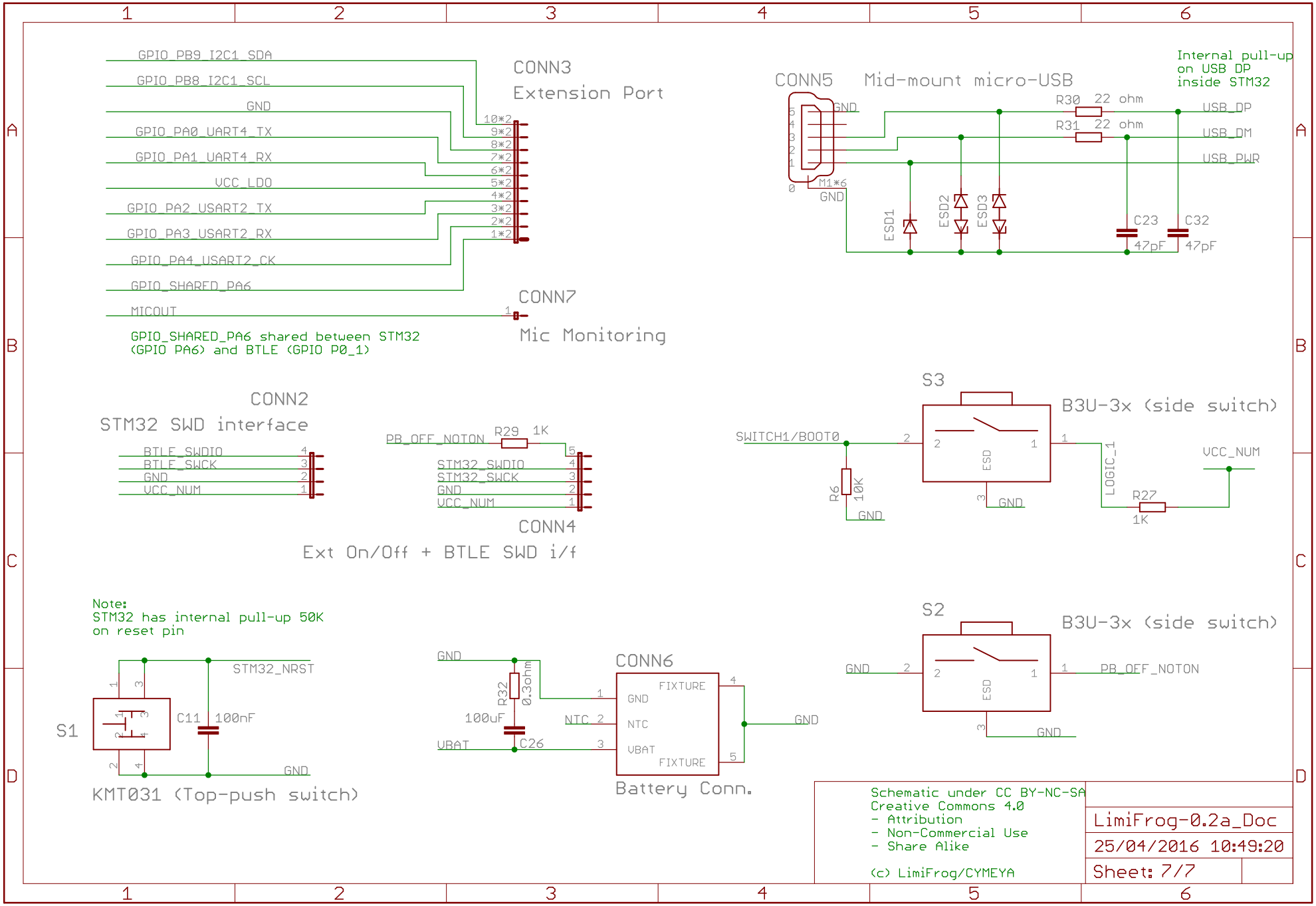
GPIO_PB9_I2C1_SDA
GPIO_PB8_I2C1_SCL
GND
GPIO_PA0_UART4_TX
GPIO_PA1_UART4_RX
VCC_LDO
GPIO_PA2_USART2_TX
GPIO_PA3_USART2_RX
GPIO_PA4_USART2_CK
GPIO_SHARED_PA6
MICOUT
CONN3
Extension Port
GPIO_SHARED_PA6 shared between STM32 (GPIO PA6) and BTLE (GPIO P0_1)
CONN7
Mic Monitoring
CONN5 Mid-mount micro-USB
Internal pull-up on USB DP inside STM32
R30 22 ohm
R31 22 ohm
USB_DP
USB_DM
USB_PWR
ESD1
ESD2
ESD3
C23 47pF
C32 47pF
CONN2
STM32 SWD interface
BTLE_SWDIO
BTLE_SWCK
GND
VCC_NUM
PB_OFF_NOTON
R29 1K
CONN4
Ext On/Off + BTLE SWD i/f
S3
B3U-3x (side switch)
SWITCH1/BOOT0
R6 10K
LOGIC_1
R27 1K
VCC_NUM
Note:
STM32 has internal pull-up 50K on reset pin
S1
C11 100nF
STM32_NRST
KMT031 (Top-push switch)
R32 0.3ohm
100uF
C26
NTC
VBAT
CONN6
FIXTURE
Battery Conn.
S2
B3U-3x (side switch)
PB_OFF_NOTON
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