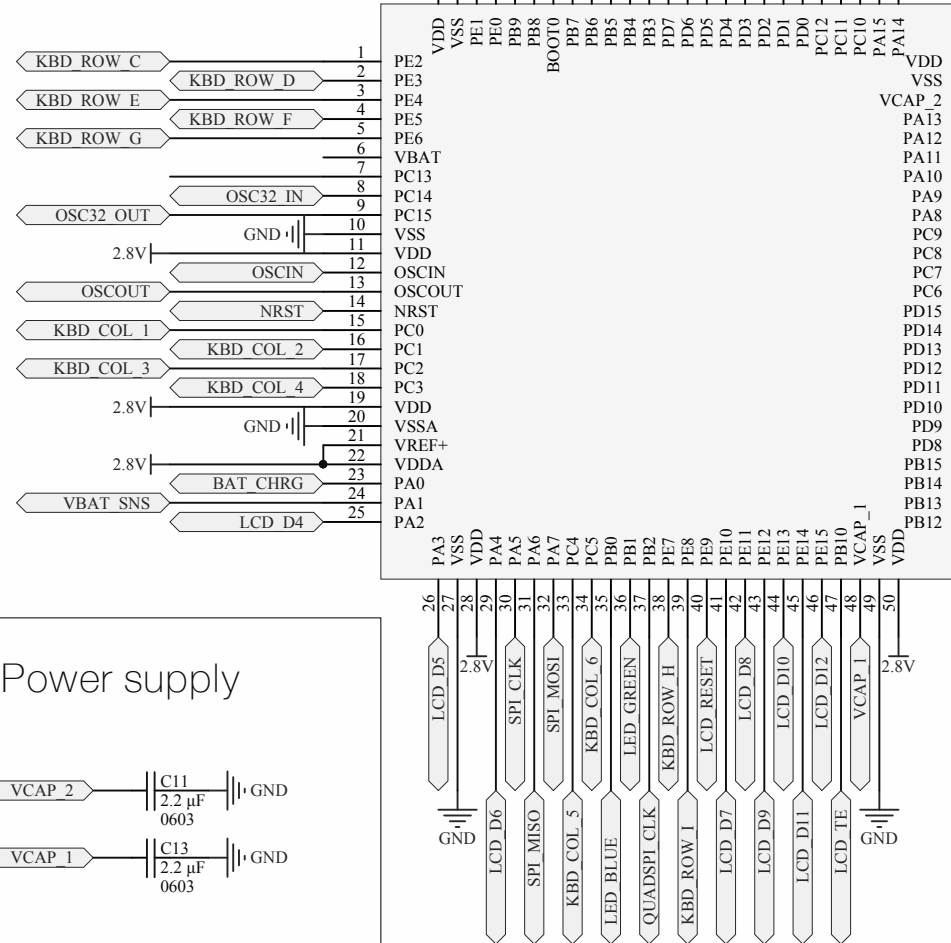


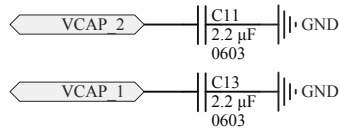
MCU

LCD_LIGHT = PC9 = TIM3_CH4
LCD_CSX = PC4 = FSMC_NE4
LCD_DATINS = PC3 = FSMC_A0

LED_RED = PA6 = TIM3_CH1
LED_GREEN = PA7 = TIM3_CH2
LED_BLUE = PB0 = TIM3_CH3

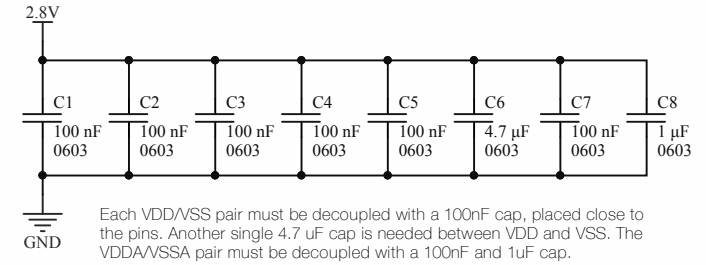


Power supply

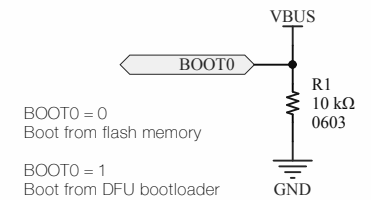


Voltage regulator requires a 4.7 uF capacitance on VCAP. On packages with 2 VCAP pins, that value is evenly split.

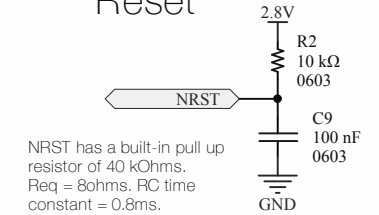
Decoupling



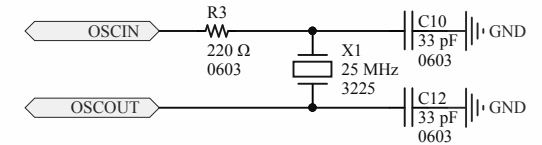
Boot mode



Reset

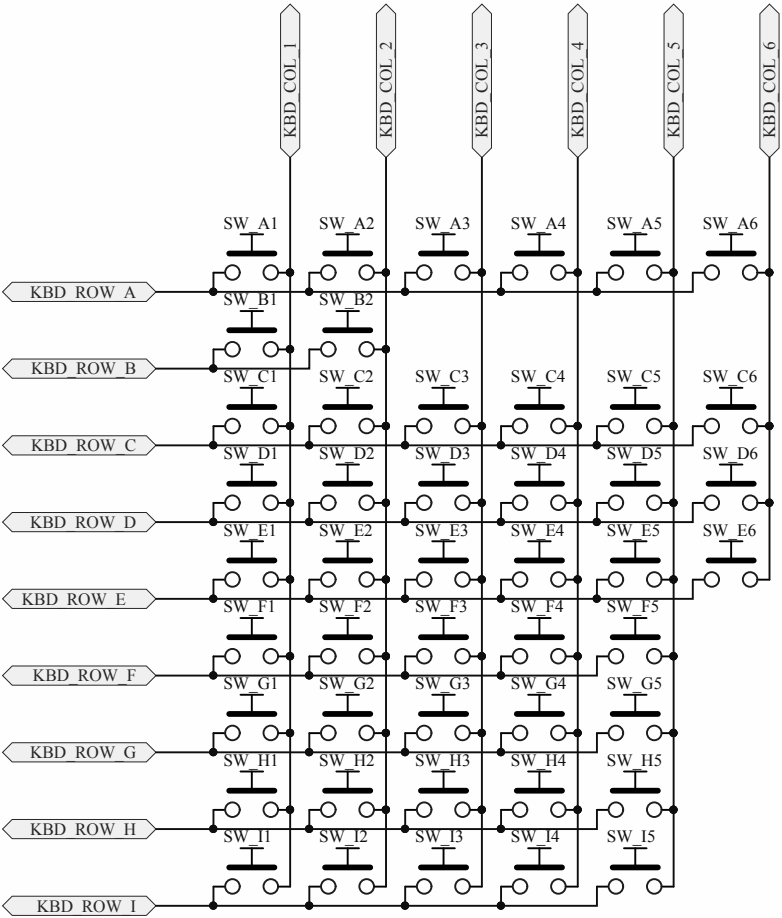


High-speed oscillator



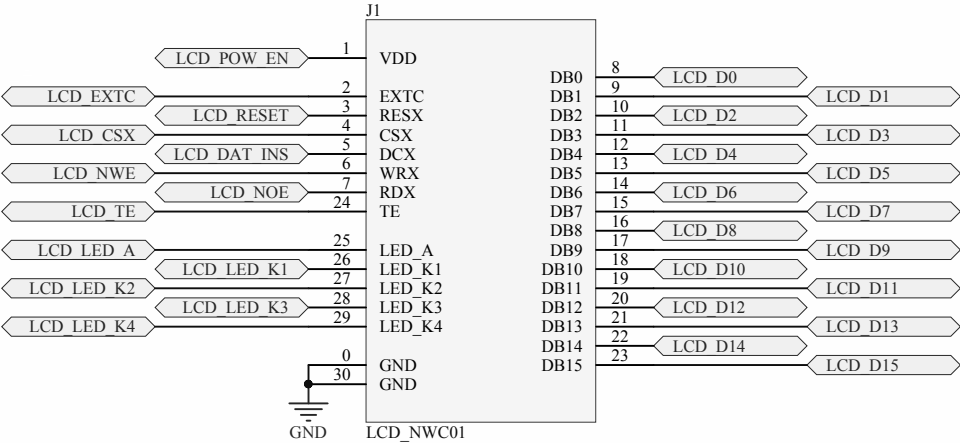
Title MCU			NUMWORKS
Size: A4	Number: 1	Revision:	
Date: 6/1/2017	Time: 10:34:18 AM	Sheet 1 of 5	

Matrix keyboard

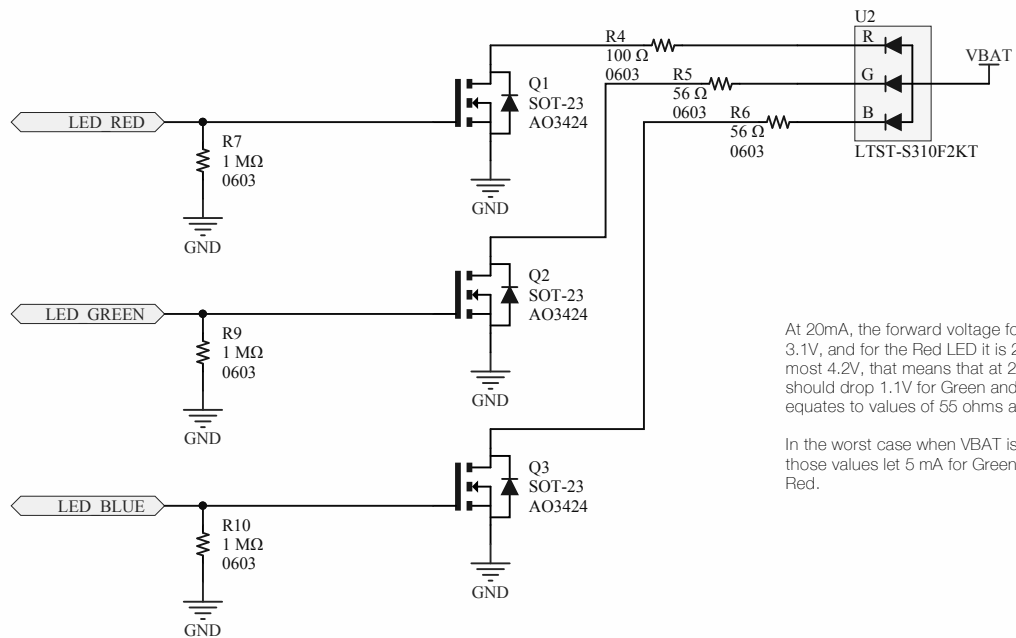


LCD panel

ST7789V draws a max intensity of 7 mA, and STM32 can provide up to 20 mA per pin. That's why we're powering the LCD controller directly from the MCU.



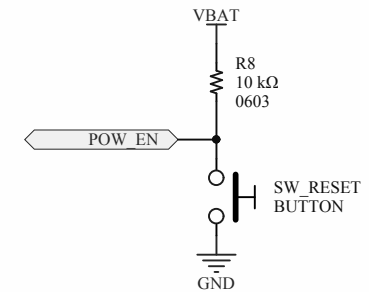
RGB LED



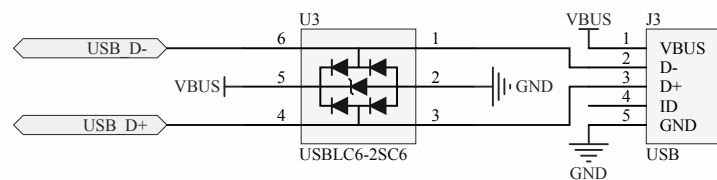
At 20mA, the forward voltage for the Blue and Green LED is 3.1V, and for the Red LED it is 2.1V. Since VBAT will be at most 4.2V, that means that at 20 mA the ballast resistor should drop 1.1V for Green and Blue and 2.1V for Red. That equates to values of 55 ohms and 105 ohms respectively.

In the worst case when VBAT is very low (below 3.2V), those values let 5 mA for Green and Blue, and 10 mA for Red.

Reset button

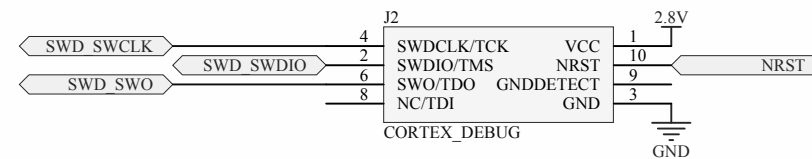


USB port



We are a USB device, therefore we leave the ID pin floating.

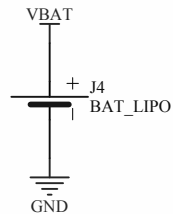
Cortex debug port



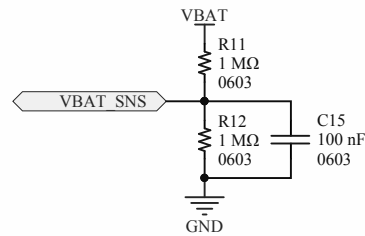
Title <i>Peripherals</i>		
Size: A4	Number:4	Revision:*
Date: 6/1/2017	Time: 10:34:19 AM	Sheet4 of 5

NUMWORKS

Battery

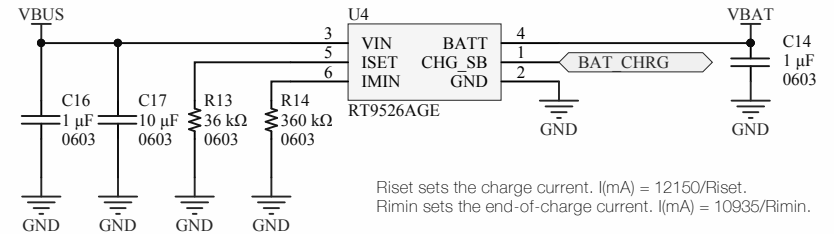


Battery voltage measurement



VBAT being around 3.7V, the divider will waste 2uA.
Which would take 74 years to deplete a 1200 mAh battery.

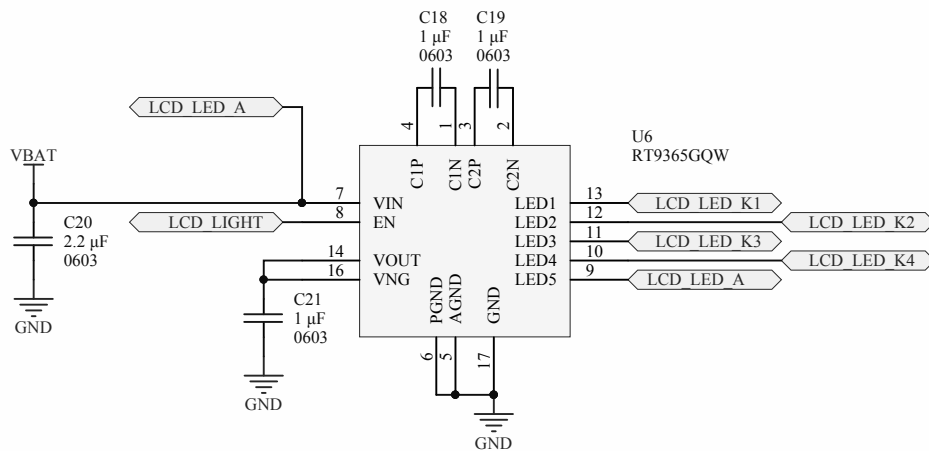
LiPo USB charger



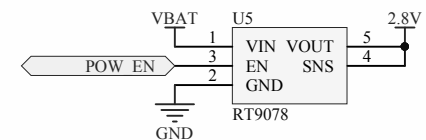
Riset sets the charge current. $I(\text{mA}) = 12150/\text{Riset}$.
Rimin sets the end-of-charge current. $I(\text{mA}) = 10935/\text{Rimin}$.

Riset = 23.4 kOhms, Iset = 500 mA
Rimin = 234 kOhms, Imin = 46 mA.

LCD backlight power supply



Logic power supply



Title **Power**

Size: A4

Number:5

Revision:*

Date: 6/1/2017

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NUMWORKS

