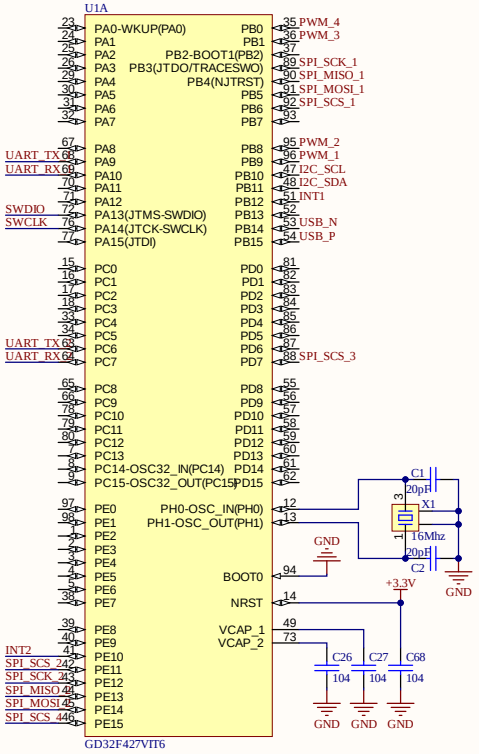
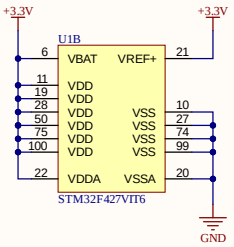
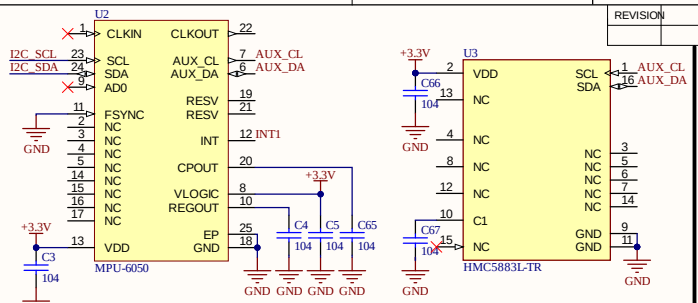
REVISION	DESCRIPTION	DATE	APPROVED



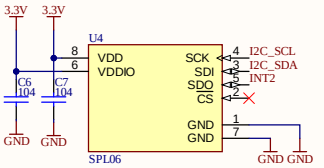
STM32F427主控电路



BOOT0=GND
BOOT1=X
BOOTLOAD从用户闪存启动



九轴陀螺仪(六轴加速度计+三轴磁力计) **9250**已停产，用**MPU6050**代替



注:换博世**BMP390**或**SPL07**

高精度气压计

接口映射表

SWDIO、CLK -> PA12、PA13

数传串口**TX、RX -> PC6、PC7**

TMC4671(一路) -> SPI_1、PB6
TMC4671(二路) -> SPI_2、PE11
TMC4671(三路) -> SPI_1、PD7
TMC4671(四路) -> SPI_2、PE15

姿态传感器 -> 模拟IIC **PD5、PD6**

USB2.0接口 -> **PB14、PB15**

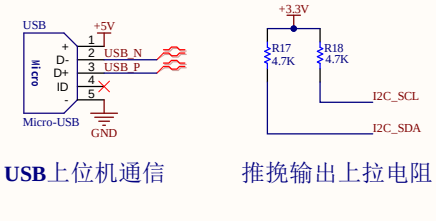
舵机输出 -> **PB9、PB8、PB1、PB0**

功耗计算表

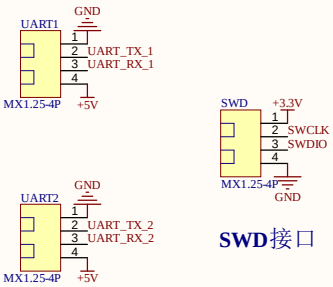
按最极端情况设计，如下:

STM32F427：最大工作电流**270mA**，按**300mA**计算
MPU9250：最大工作电流**3.7mA**，按**5mA**计算
SPL06：最大工作电流**0.36mA**，按**1mA**计算
TMC4671：最大工作电流**95mA**，按**100mA**计算，总功耗**400mA**
舵机：最大工作电流**800mA**，堵转电流**1A**计算，总功耗**4A**
电流传感器：极小，忽略
霍尔编码器：最大工作电流**16mA,**按**20mA**计算，总功耗**80mA**

最极端情况总功耗：**4.786A**，选型**5A**，最大**6A**



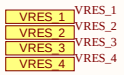
USB上位机通信　　推挽输出上拉电阻



UART串口　　**SWD**接口

外部数据与控制接口

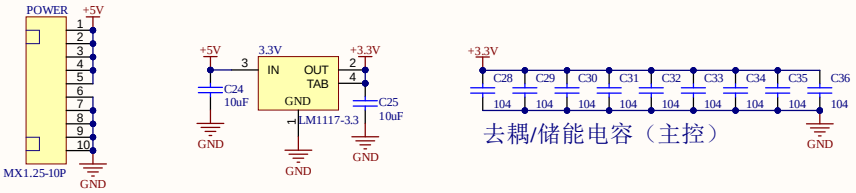
SPI_B　　**SPI_A**



2.5V参考电压

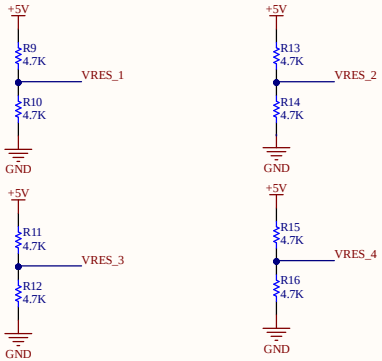
端口标识

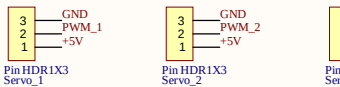
电源设计：5V供电以及3.3V供电，从电源hub接入5V电源



去耦/储能电容（主控）

参考电压分压





PWM输出

APPROVALS	DATE
ENG: ChengDanguo	
DSN: ChengDanguo	
CHK: ChengDanguo	
REFERENCE DOCUMENTS	
BOM:	
ASSY DWG:	
FAB DWG:	
PCB DWG:	

PROJECT: Altium

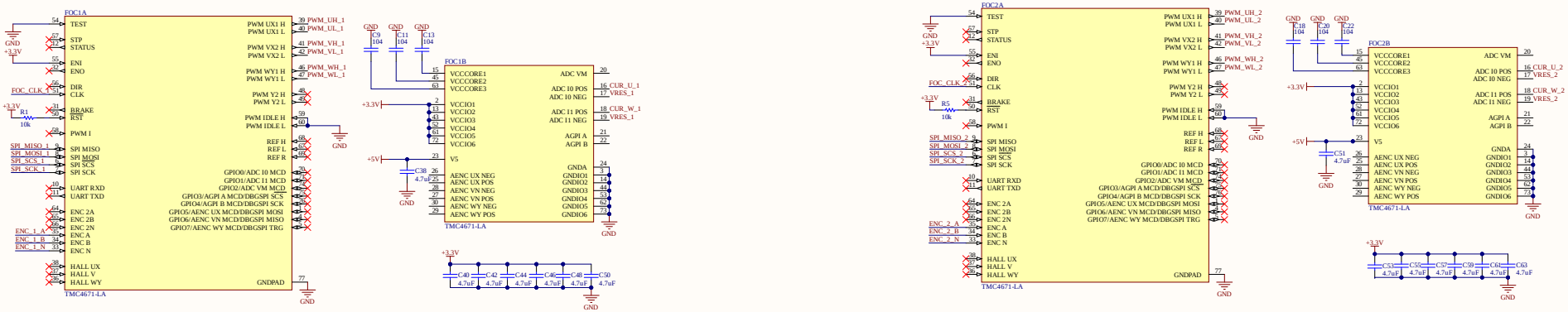
PROJECT REVISION: Not in version control　DOCUMENT REVISION: Not in version control　DESIGN ITEM:

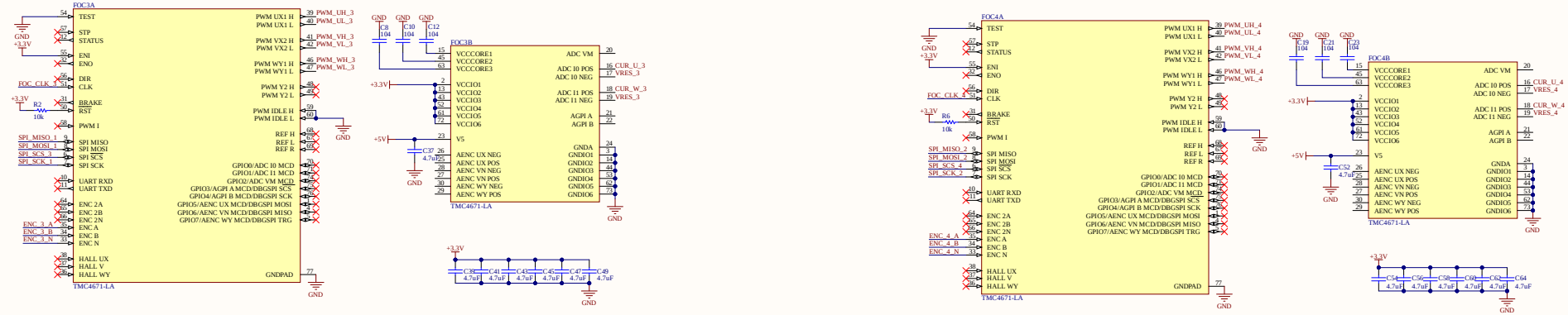
TITLE: Mulit-FOC

SIZE: A3　CAGE CODE　DWG NO.　REV

SCALE:　FILE NAME: controller and sensers.SchDoc　SHEET 1 OF 2

REVISION	DESCRIPTION	DATE	APPROVED





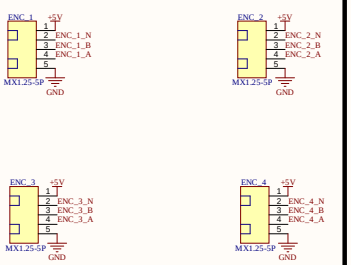
四路硬件**FOC**控制器

PS:SPI通道**1**控制**1**、**3**相，通道**2**控制**2**、**4**相，在实现具体控制功能时要注意这一点

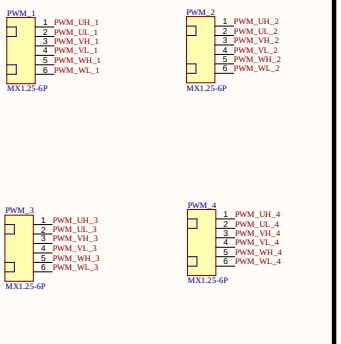
PPS：在某些应用中该排布不受影响，但某些应用中该排布并非最理想，但考虑布线难度，这种排布不得已而为之

磁编码器选用**AS5047P**

性能好，延迟低，**ABN**编码



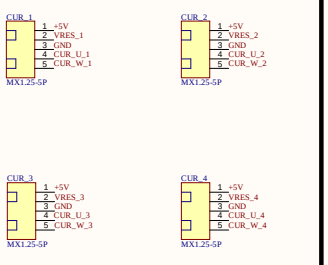
四路磁编码器通道



四路**SVPWM**输出通道

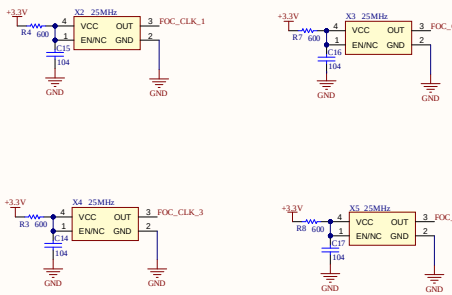
输出**5V**和**2.5V**分压基准电压

输入**U**相与**V**相电流信号

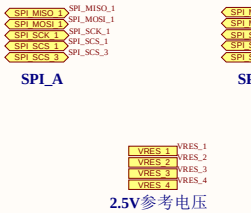


四路电流采样输入通道

只有**25MHz**可产生正确时序



TMC4671时钟晶振



2.5V参考电压

端口标识

APPROVALS	DATE	PROJECT	Altium
ENG: ChengDanguo			
DSN: ChengDanguo		PROJECT REVISION: Not in version control	DOCUMENT REVISION: Not in version control
CHK: ChengDanguo			DESIGN ITEM
REFERENCE DOCUMENTS		TITLE	Mulit-FOC
BOM			
ASSY DWG:		SIZE A2	CAGE CODE / DWG NO. / REV
FAB DWG:			
PCB DWG:		SCALE:	FILE NAME driver.SchDoc
			SHEET 2 OF