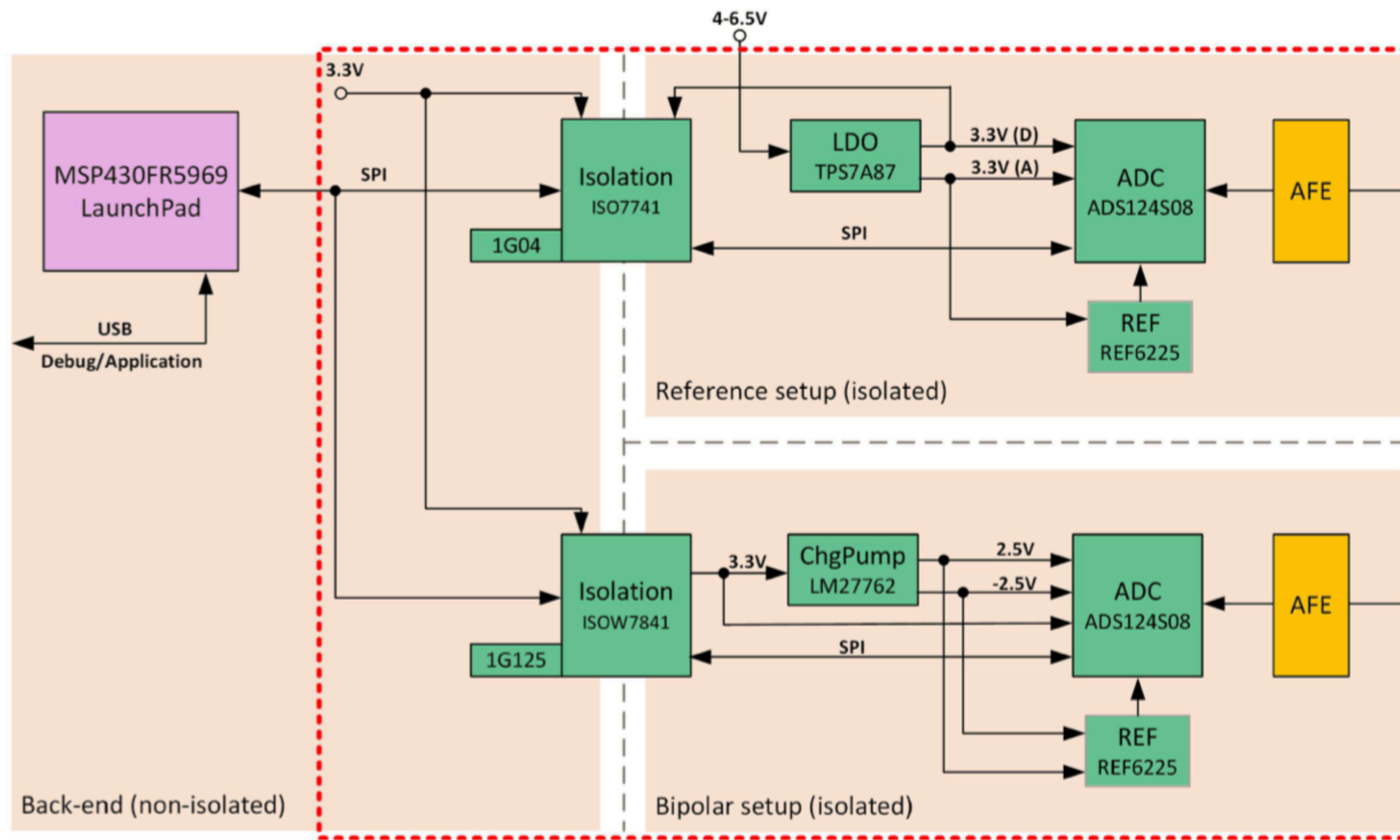
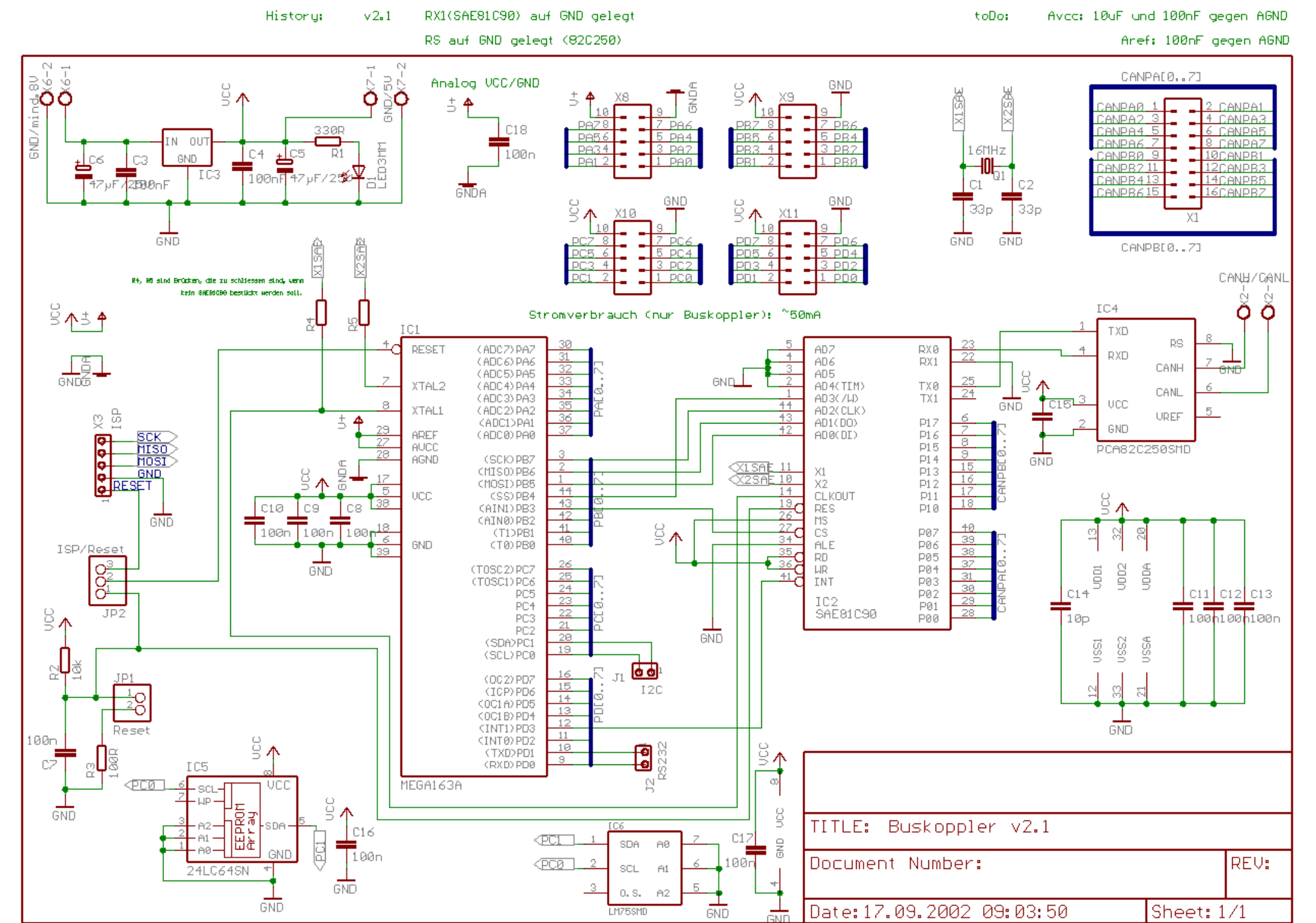


原理图的设计和风格

设计不仅是给自己看的....



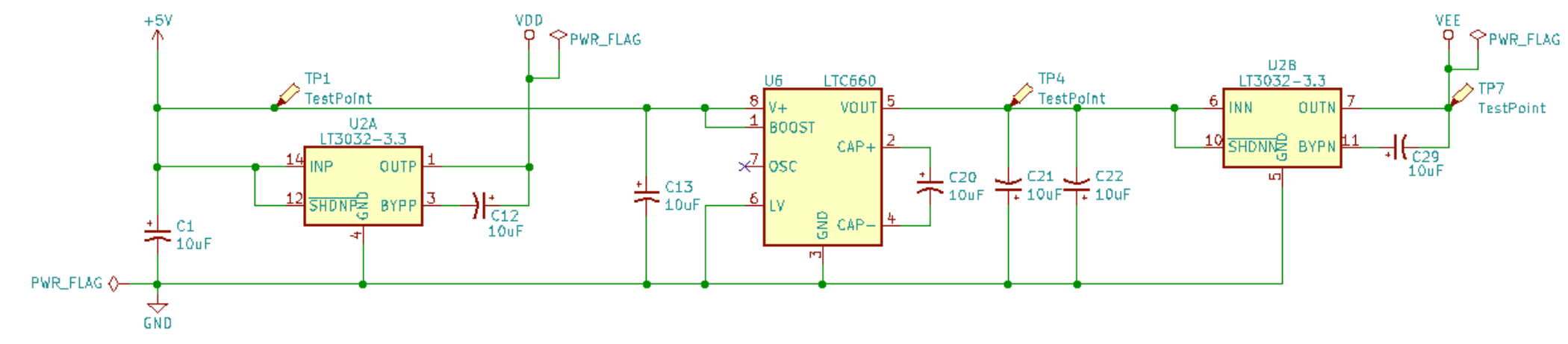
系统框图



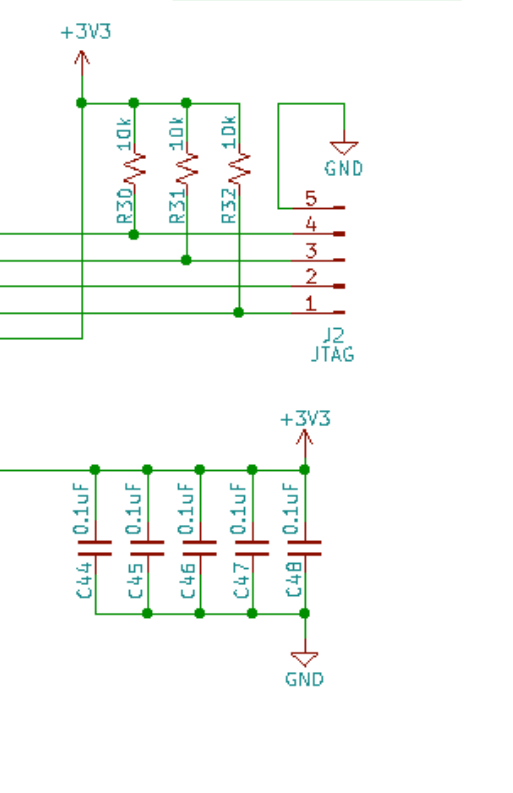
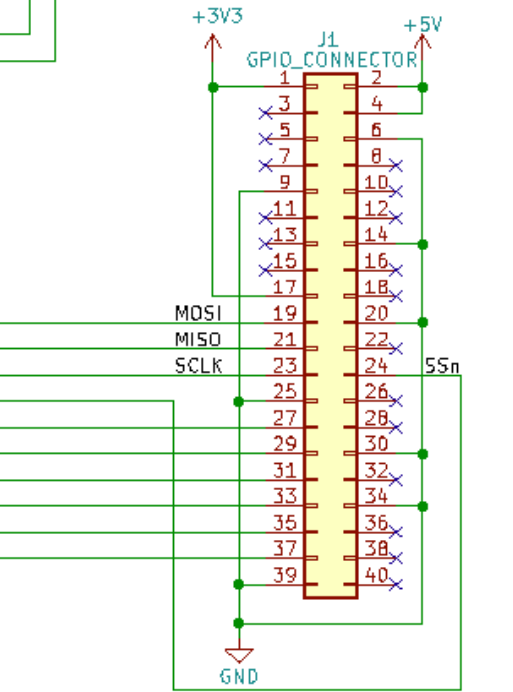
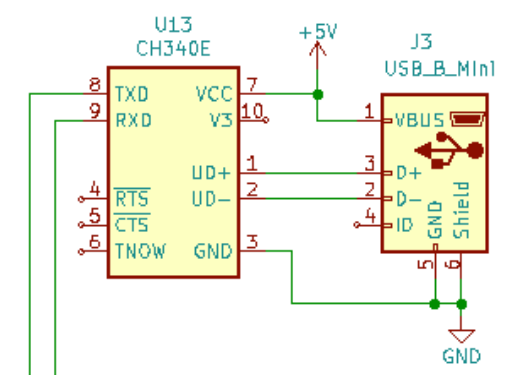
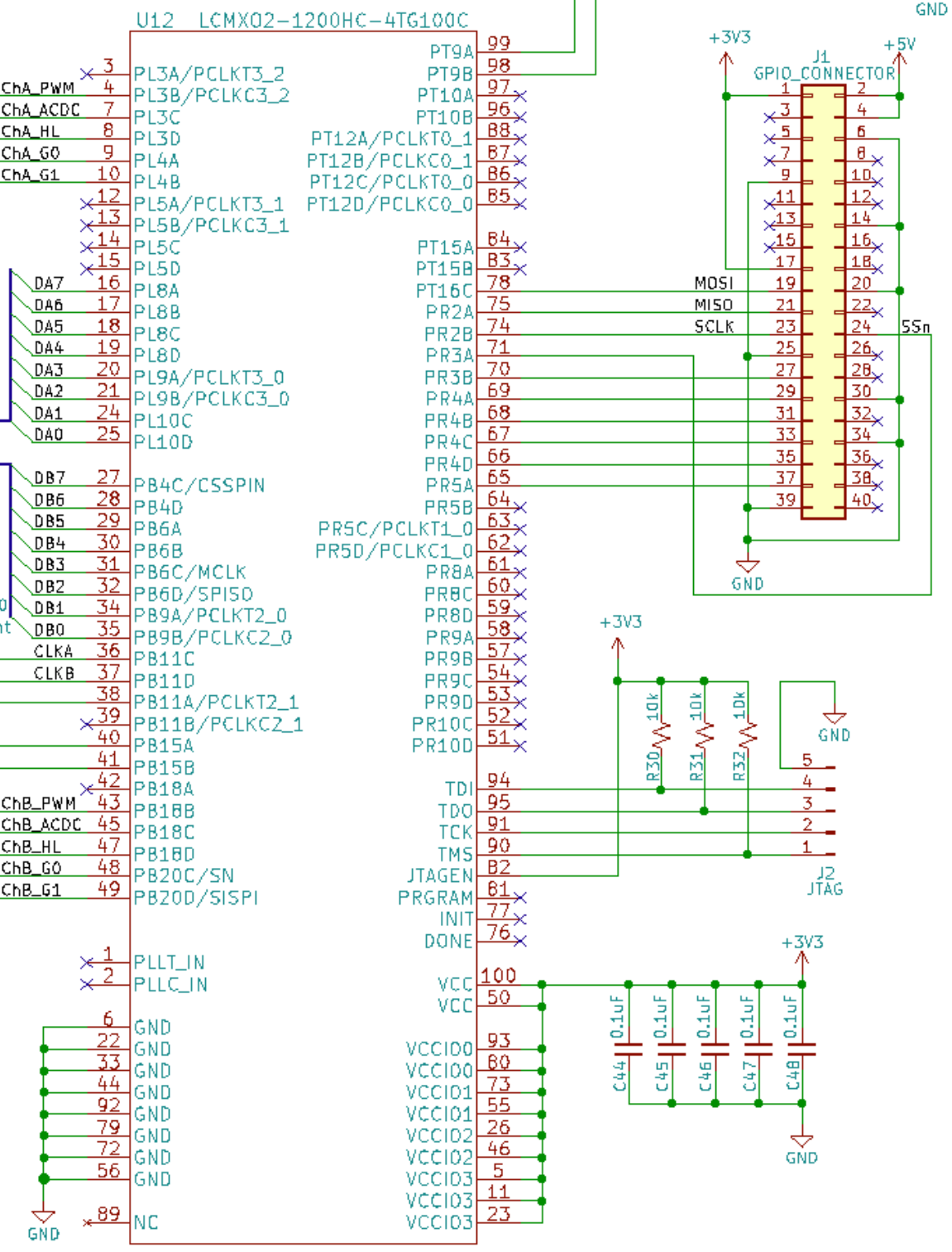
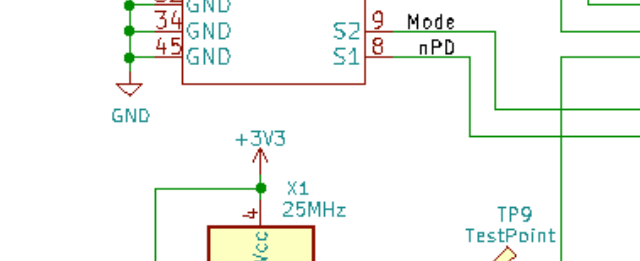
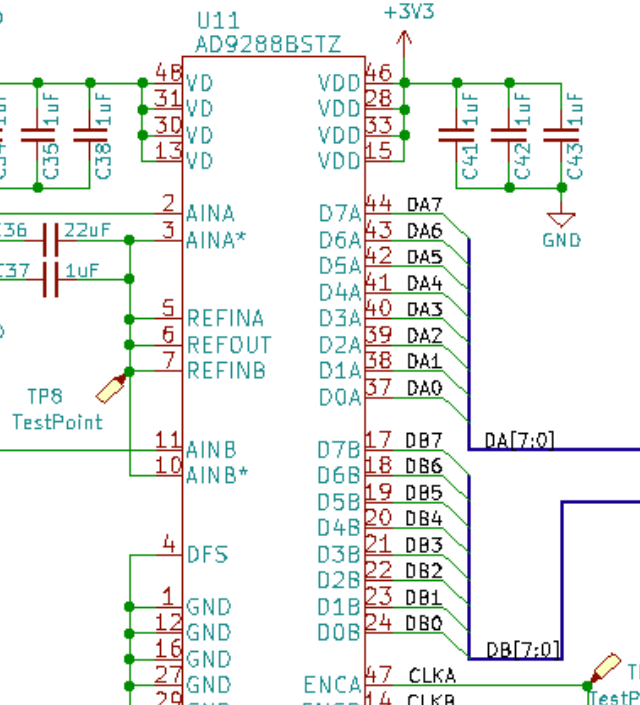
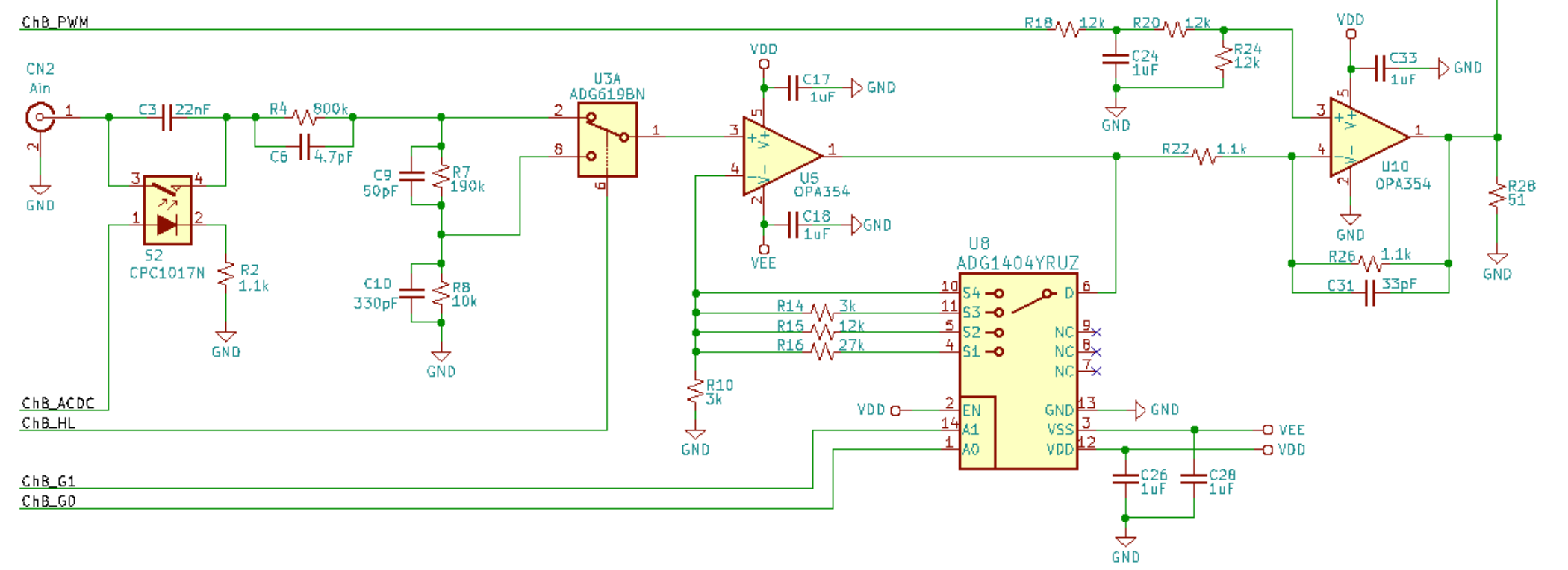
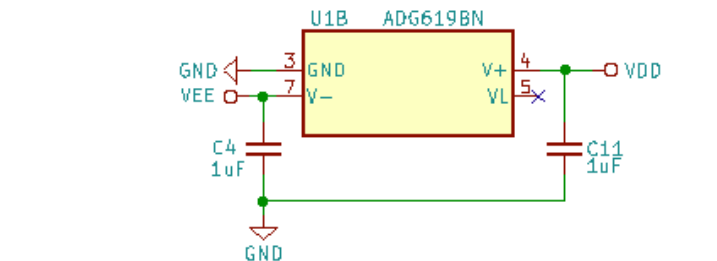
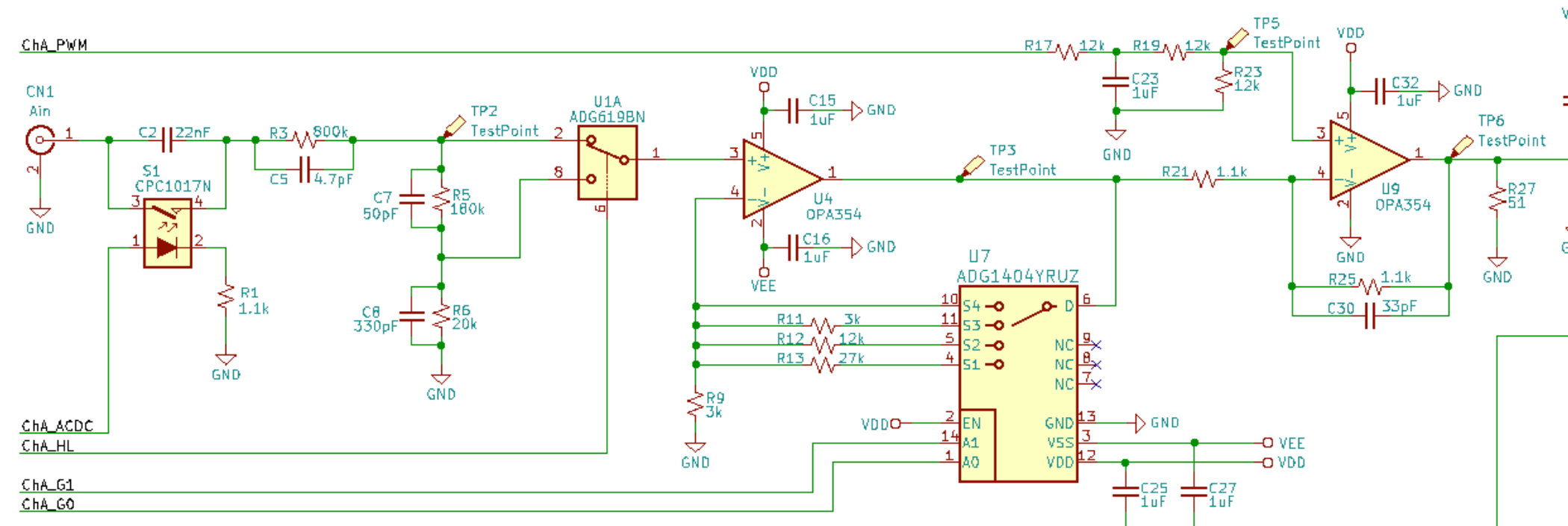
系统原理图

原理图设计流程

- ① **创建工程和文件**
- ② **设置图纸大小：** 根据图纸的复杂程度、各元器件的原理图库，一般A4比较合适，一个设计可以采用多页
- ③ **设置文件环境：** 格点大小、格点属性、光标属性、电气格点属性、图纸颜色等
- ④ **加载元器件符号：** 如果有已经构建好的符号，则直接加载来用，如果没有的话需要依照数据手册进行构建
- ⑤ **放置元器件：** 合理化、按照信号流程、可以翻转、旋转放置，方便连线、清晰理解
- ⑥ **原理图连线：** 减少交叉，尽量少用最好是不用文字的Net进行标记
- ⑦ **调整修改原理图：** 网标有没有重复、错误的连接、虚连接
- ⑧ **ERC检查（电气规则检查）：** 电气连接上的错误
- ⑨ **报表输出：** 产生用于布局布线的Netlist、用于采购元器件的BOM清单
- ⑩ **文件输出：** 保存、备份、导出到PDF或其它格式、打印



10MHz Analog Bandwidth, 100MSPs
20Vpp input



- H1 MountingHole
- H2 MountingHole
- H3 MountingHole
- H4 MountingHole

Captured by Gongyu Su based on DSO Nano 203

Sheet: /
File: RPI0.sch

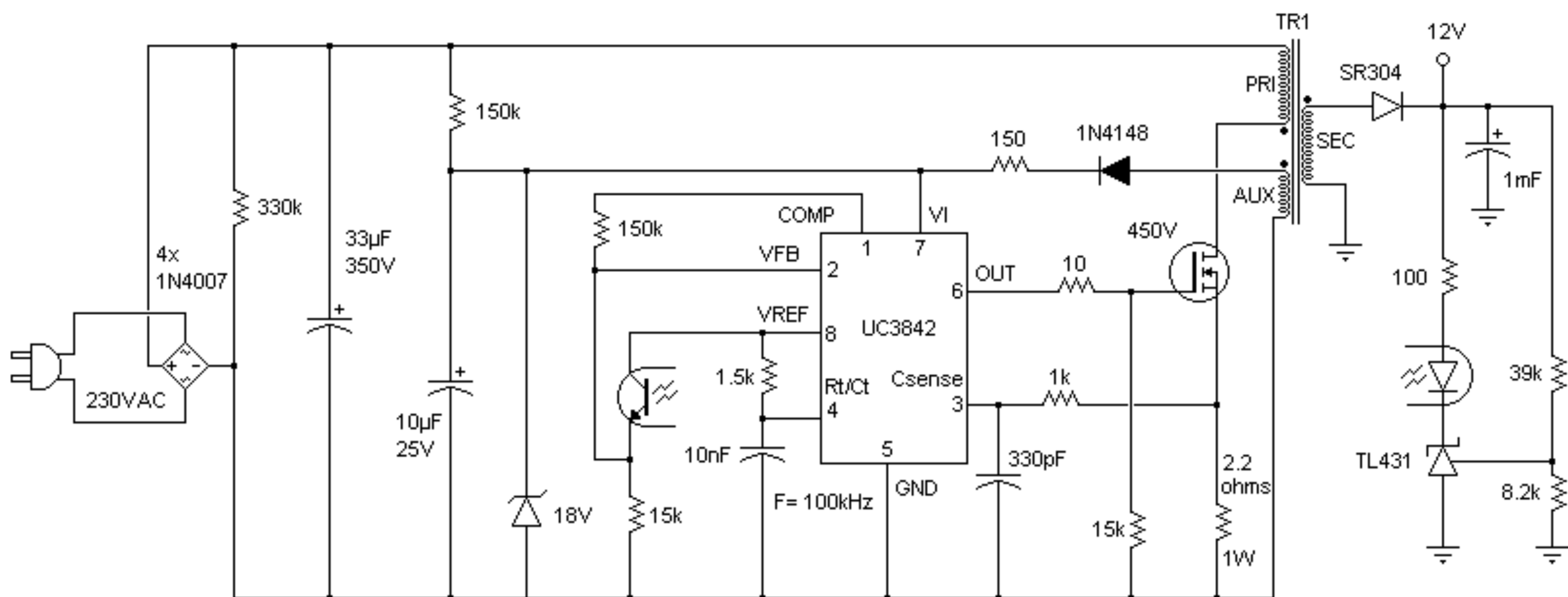
Title: High Speed ADC HAT for Raspberry Pi

Size: A3 Date: 2020-02-01 Rev: 0.1
KICad E.D.A. kicad (5.1.2-1)-1 Id: 1/1

可读性：方便阅读、理解并能够正确使用，减少由于误理解导致的设计错误

UC3842 Flyback Converter Auxiliary Power Supply 15W

<http://uzzors2k.000webhost.com/>



TR1 : Standby flyback transformer from ATX supply

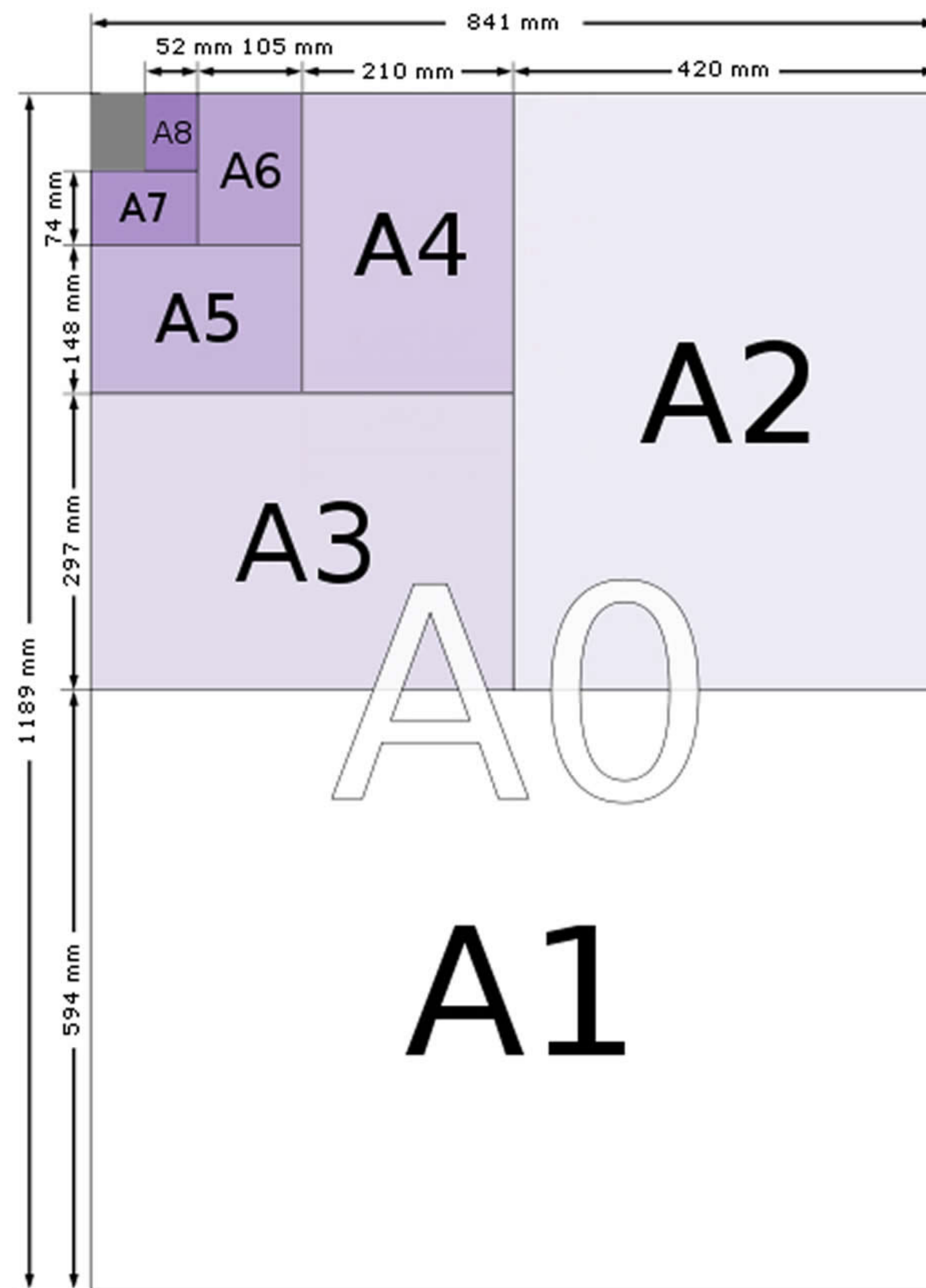
PRI = Winding with most inductance
AUX = next highest inductance
SEC = Remaining or third highest inductance

TL431 reference
adjustable for variable
output voltage

- 给人阅读 - 从逻辑上理解电路的构成、工作原理
- 给机器阅读 - 产生网表、用于后期的布线
- 跟物理上的板卡没有直接对应关系

图纸大小的选用

- 根据电路的复杂程度选择A4、A3，便于打印、阅读
- 可以分成多页，每个页面为独立的功能 - 处理器、电源、存储、网络接口、视频等等
- 设定合适大小的Grid - 与原理图符号的Grid同步



项目相关信息的标注

The image shows a screenshot of a PCB layout software interface. A 'Page Settings' dialog box is open, displaying various parameters for the page layout. The dialog box is divided into two main sections: 'Paper' and 'Title Block Parameters'. The 'Paper' section includes options for size (A3 297x420mm), orientation (Landscape), and custom paper size (Height: 11.000 in, Width: 17.000 in). The 'Title Block Parameters' section includes fields for 'Number of sheets: 1', 'Sheet number: 1', 'Issue Date' (2020-02-01), 'Revision' (0.1), 'Title' (High Speed ADC HAT for Raspberry Pi), 'Company' (EETREE Technology Inc. - www.eetree.cn), and four 'Comment' fields. The 'Issue Date' field is highlighted with a blue box. Below the dialog box, a circuit diagram is visible, showing a +3V3 power supply connected to a J2 JTAG connector and five 0.1uF capacitors (C44-C48) connected to ground. A blue box highlights the title block information in the bottom right corner of the page, which includes the title, revision, date, and other project details.

Page Settings

Paper

Size: A3 297x420mm

Orientation: Landscape

Custom paper size:

Height: 11.000 in

Width: 17.000 in

Layout Preview

Title Block Parameters

Number of sheets: 1 Sheet number: 1

Issue Date: 2020-02-01 <<< 2020/ 4/10

Revision: 0.1

Title: High Speed ADC HAT for Raspberry Pi

Company: EETREE Technology Inc. - www.eetree.cn

Comment1: Captured by Gongyu Su based on DSO Nano 203

Comment2:

Comment3:

Comment4:

Page layout description file: Browse...

Cancel OK

Unit Information:

- H1 MountingHole
- H2 MountingHole
- H3 MountingHole
- H4 MountingHole

Title Block:

Captured by Gongyu Su based on DSO Nano 203

EETREE Technology Inc. - www.eetree.cn

Sheet: /

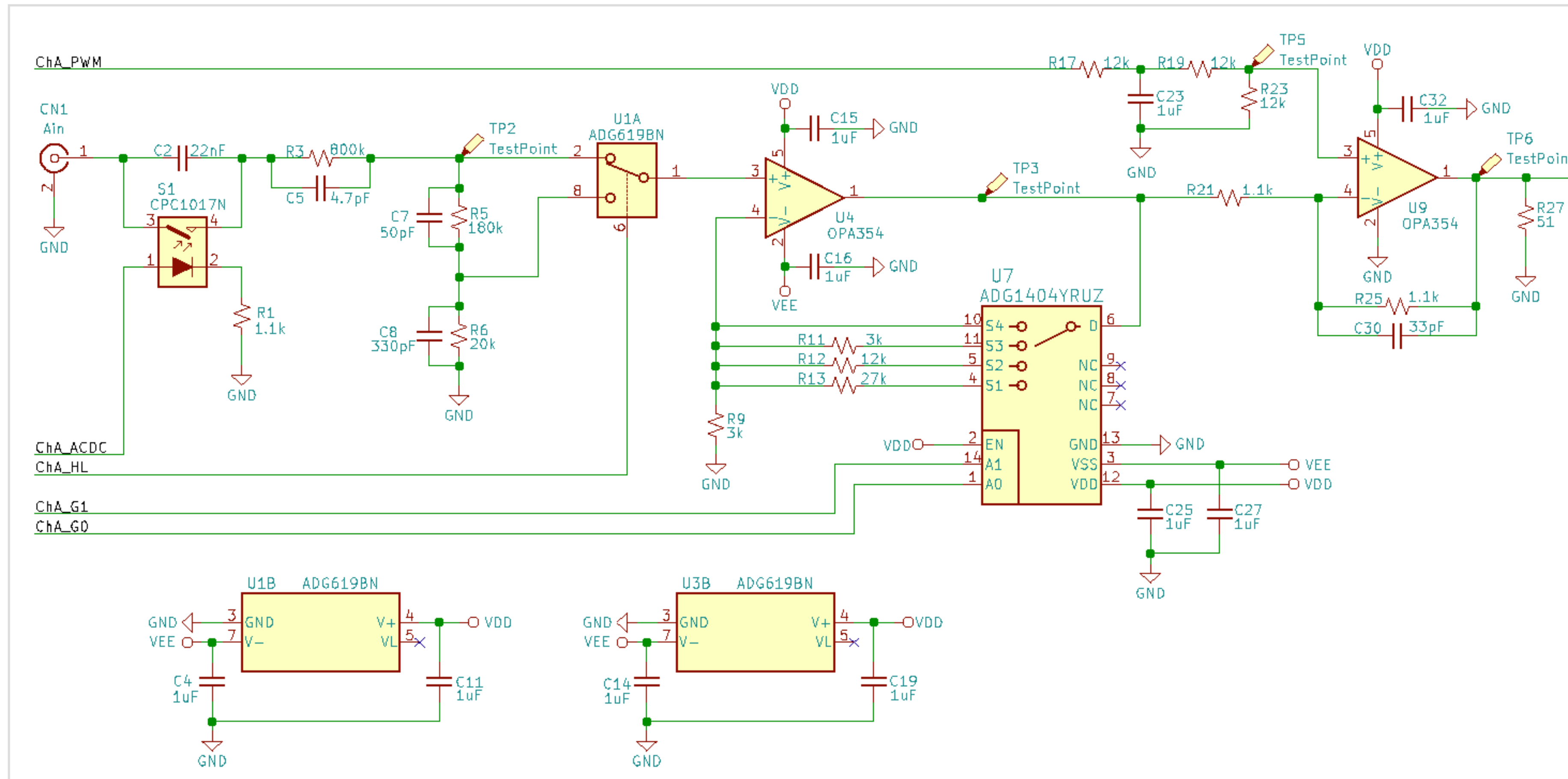
File: RPI0.sch

Title: High Speed ADC HAT for Raspberry Pi

Size: A3	Date: 2020-02-01	Rev: 0.1
KICad E.D.A. kicad (5.1.2-1)-1		Id: 1/1

- 单位
- 绘图人
- 版本号
- 时间

信号流 - “左、上”到“右、下”

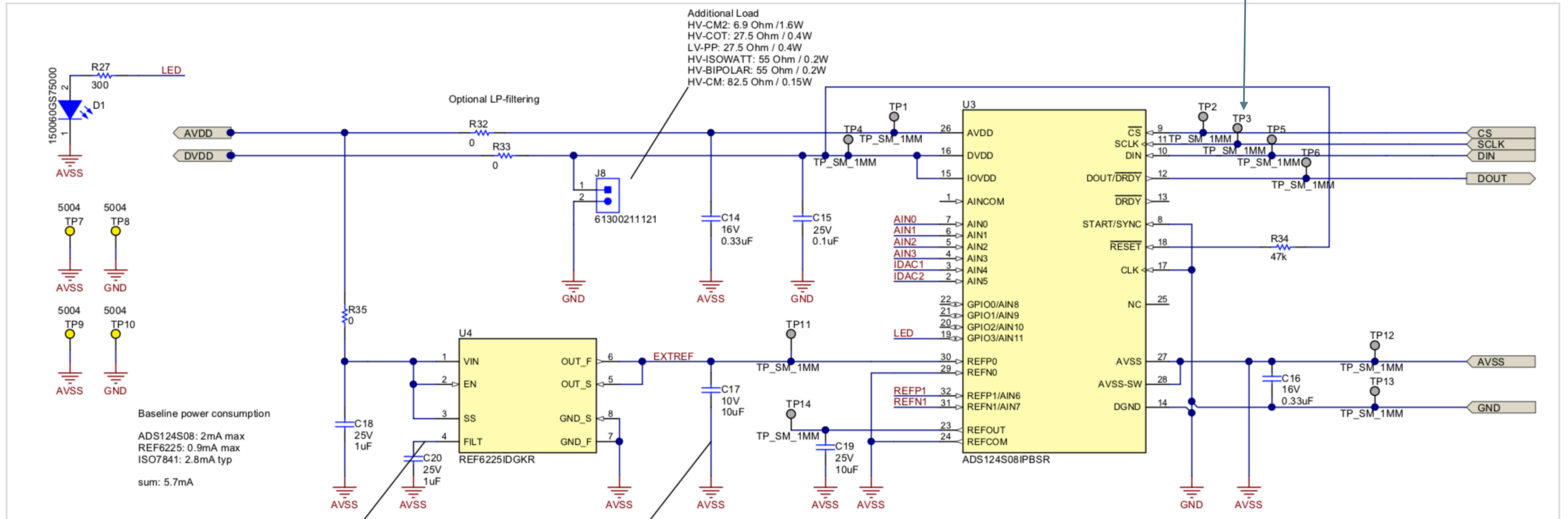


- 符合自然阅读习惯
- 先放置核心器件

关键信号放置测试点，关键器件关键信息加以说明

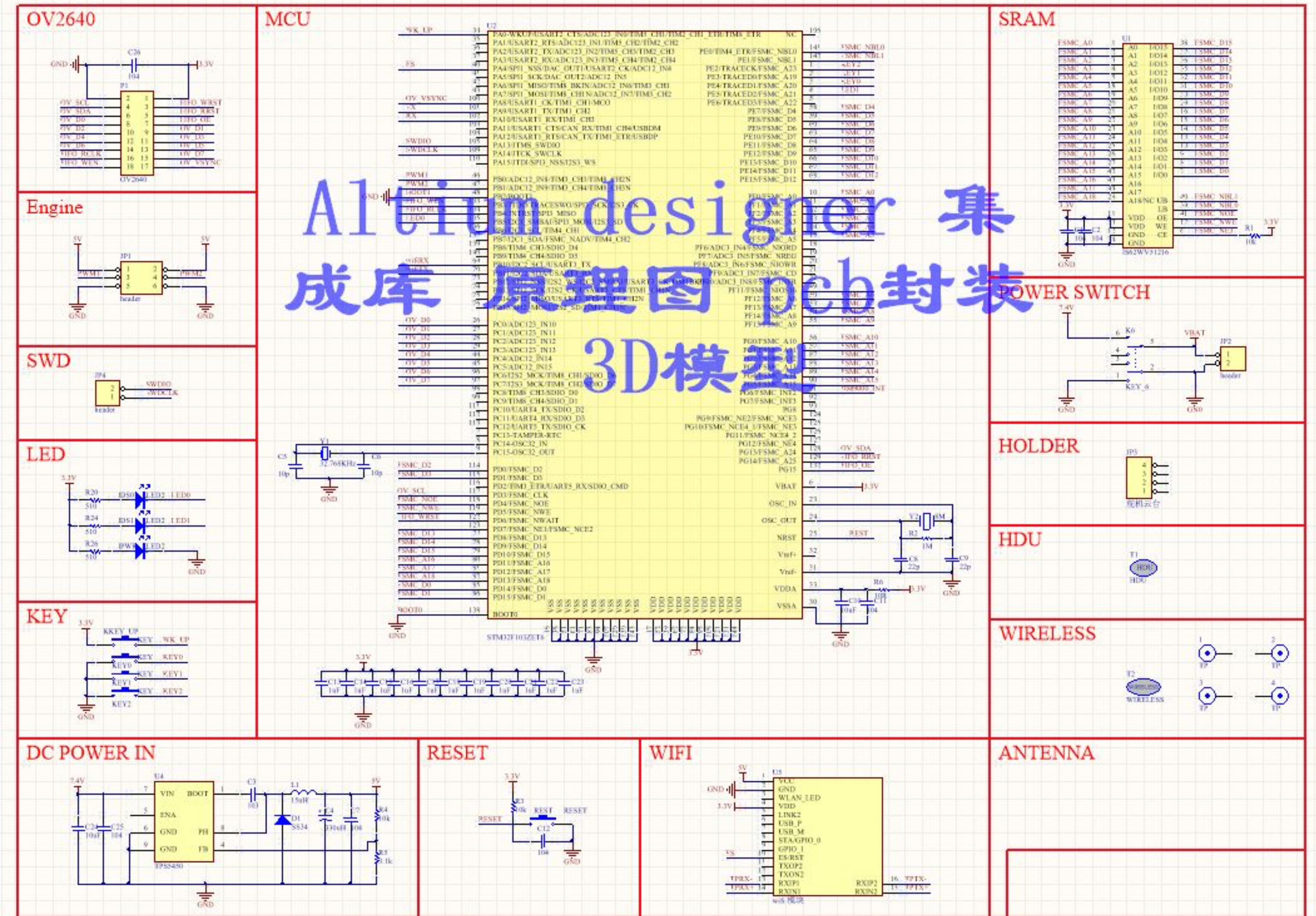
- 标号、值 (comment)
- 重要的属性 - 耐压、精准度、功率等
- 在PCB设计的时候需要注意的地方进行标注
- 不宜放置太多不必要的信息，导致阅读困难

测试点 - TP



信号的连接

- 尽可能不用net
- 尽可能不要用区块来强硬割裂
- 直观、符合人的阅读直觉

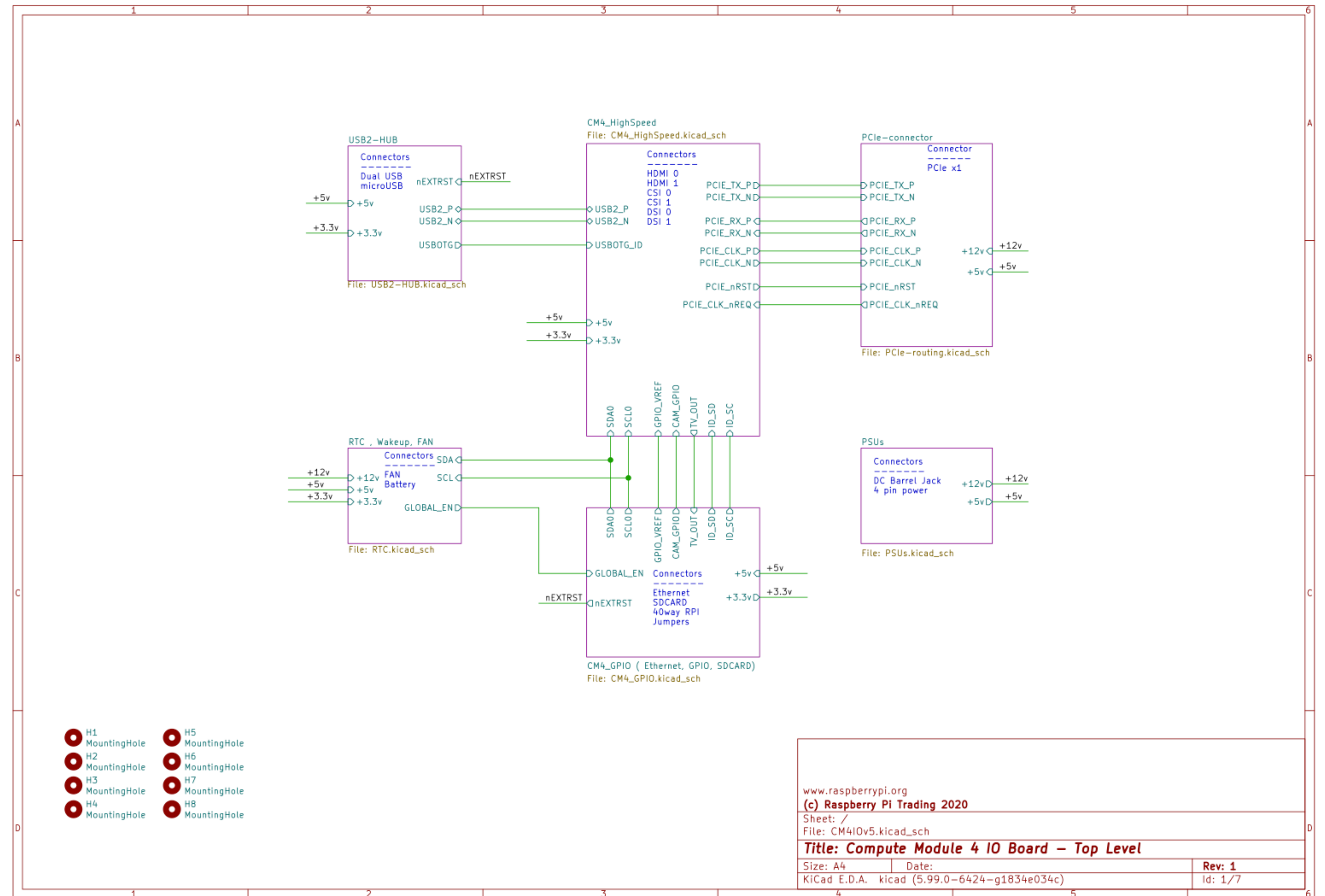


其它要点

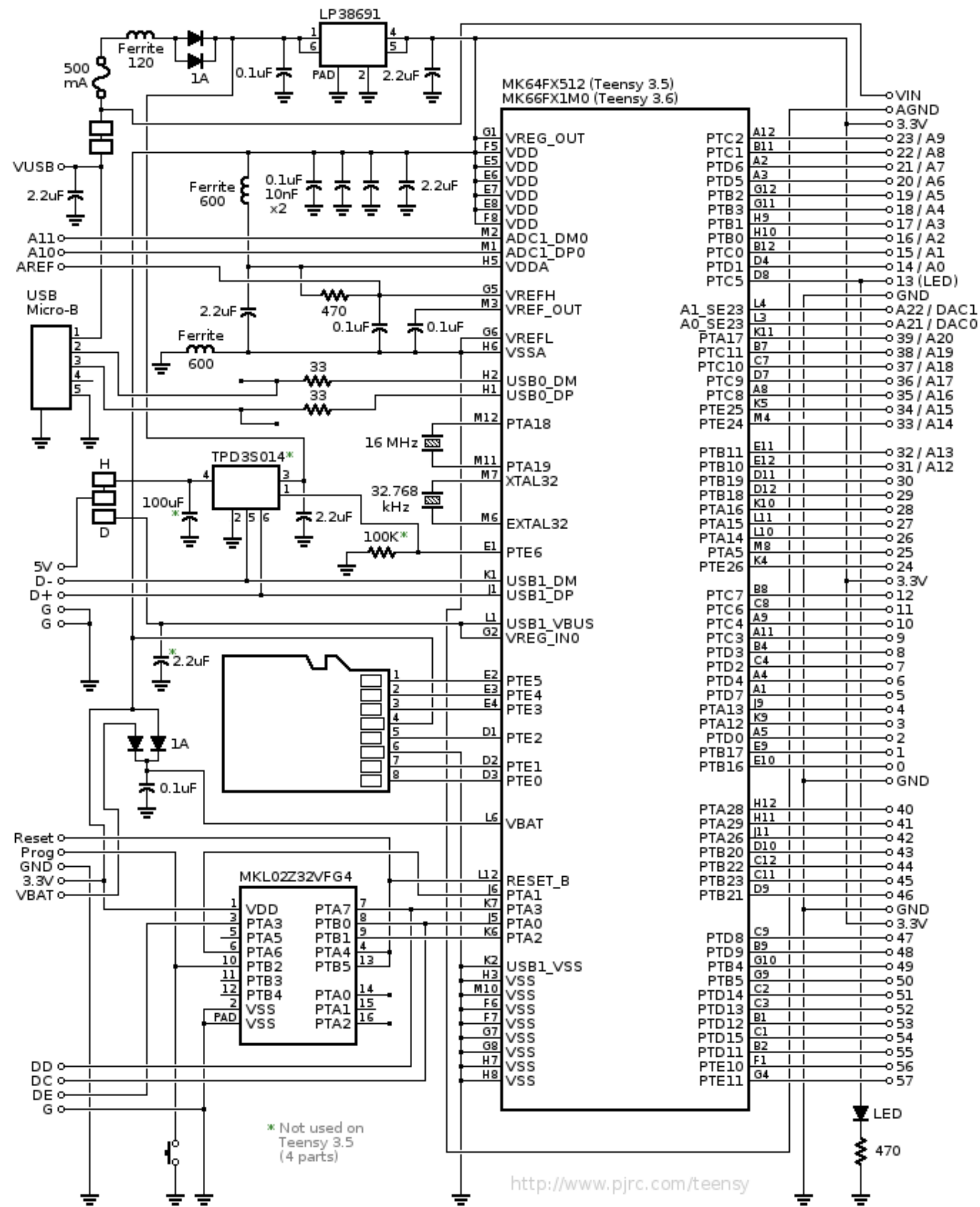
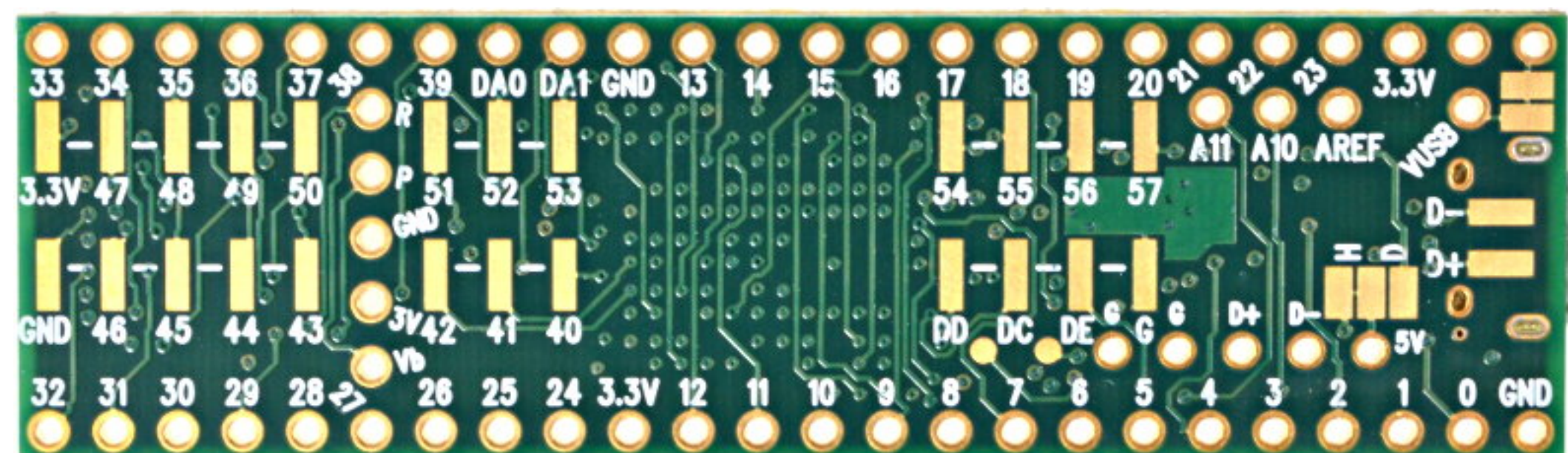
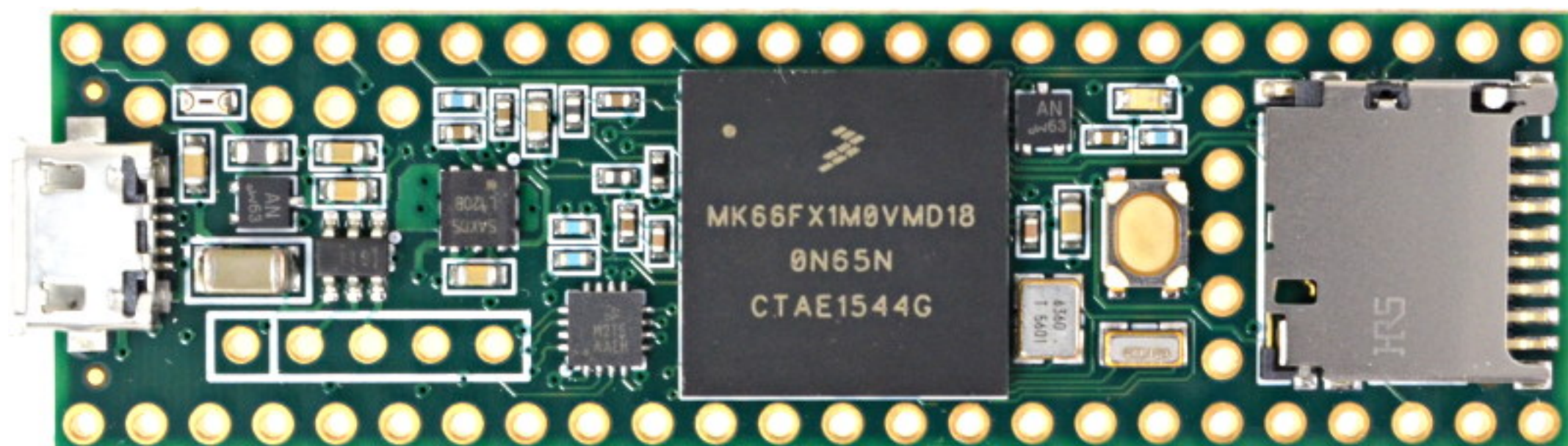
- 容限大的电阻、电容值 / 封装尽可能统一，以降低总体成本
- 靠近某些管脚的关键器件（去耦电容、匹配电阻）需要在电路图上体现并尽可能用文本标注
- 字体、字号、排放位置要统一，保证较强的可阅读性

多页层级设计

- 每个EDA软件的使用方法不同
- 确保页面之间的连接规范、对应
- 可以通过功能进行划分：
 - ① 模拟
 - ② 数字
 - ③ 电源
 - ④ 时钟
- 通过ERC进行检查
- 通过打印进行检查



规范、易读、风格

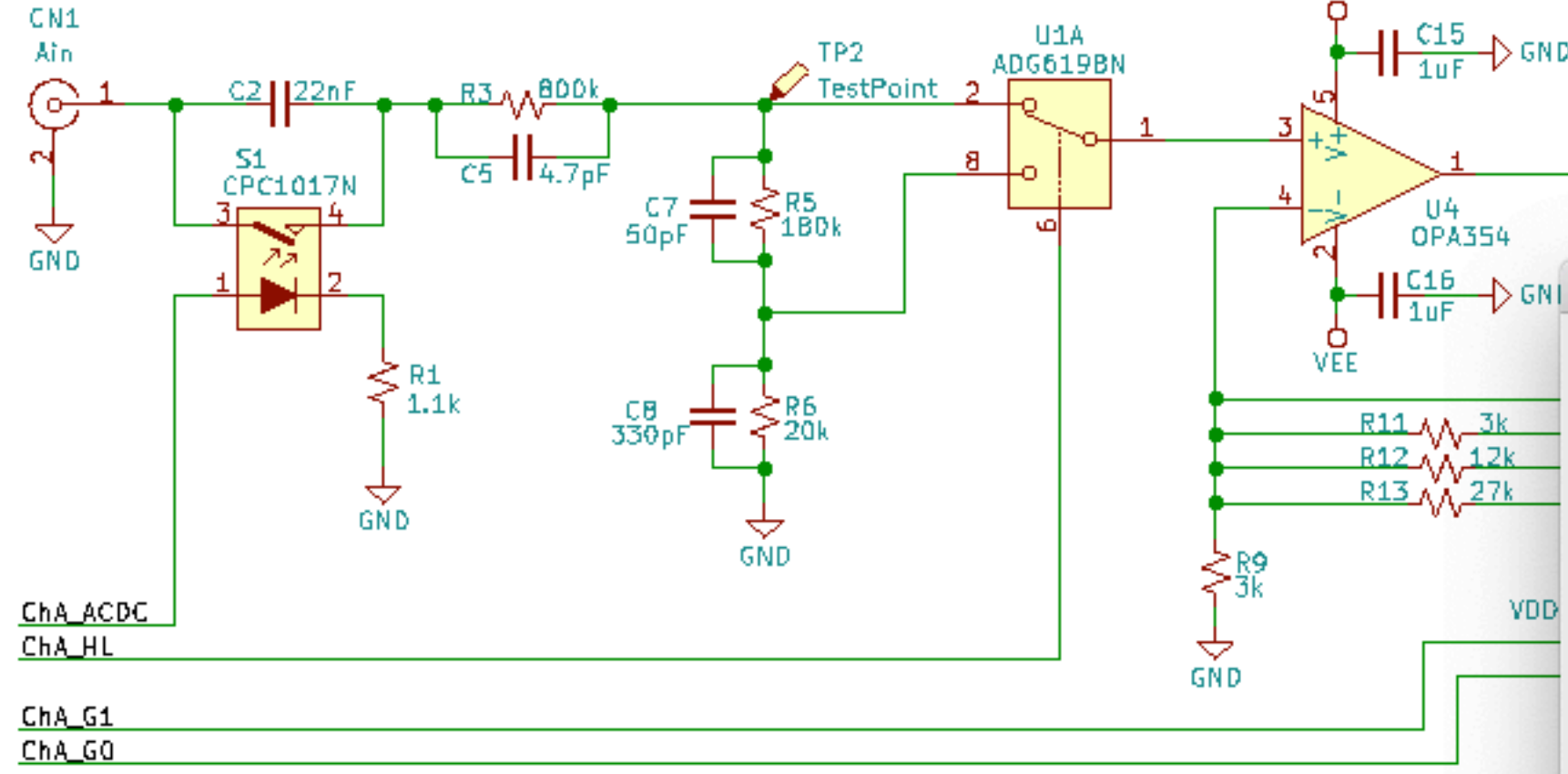


万无一失 - ERC及基于netlist的检查

- ERC反复检查，不放过任何一个Warning，修正空悬管脚以及连接错误的连线
- netlist联系原理图和PCB之间的桥梁，是抽象的元器件之间的连接关系 - 元器件的封装、个数、引脚之间的连接关系
- 打印对比 - netlist同原理图中的每一个连接一一检查

10MHz Analog Bandwidth, 100Msps
20Vpp input

ChA_PWM

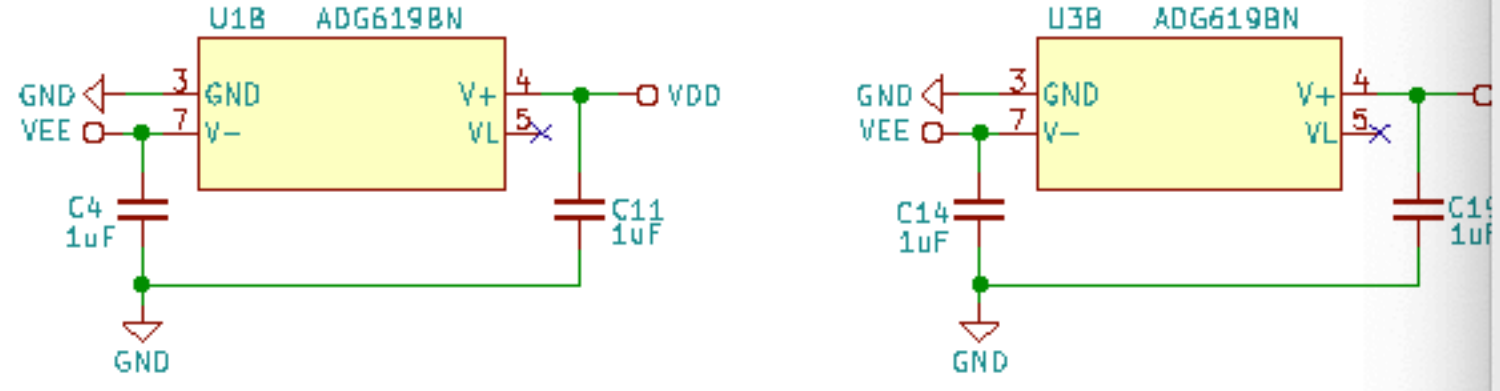


ChA_ACDC

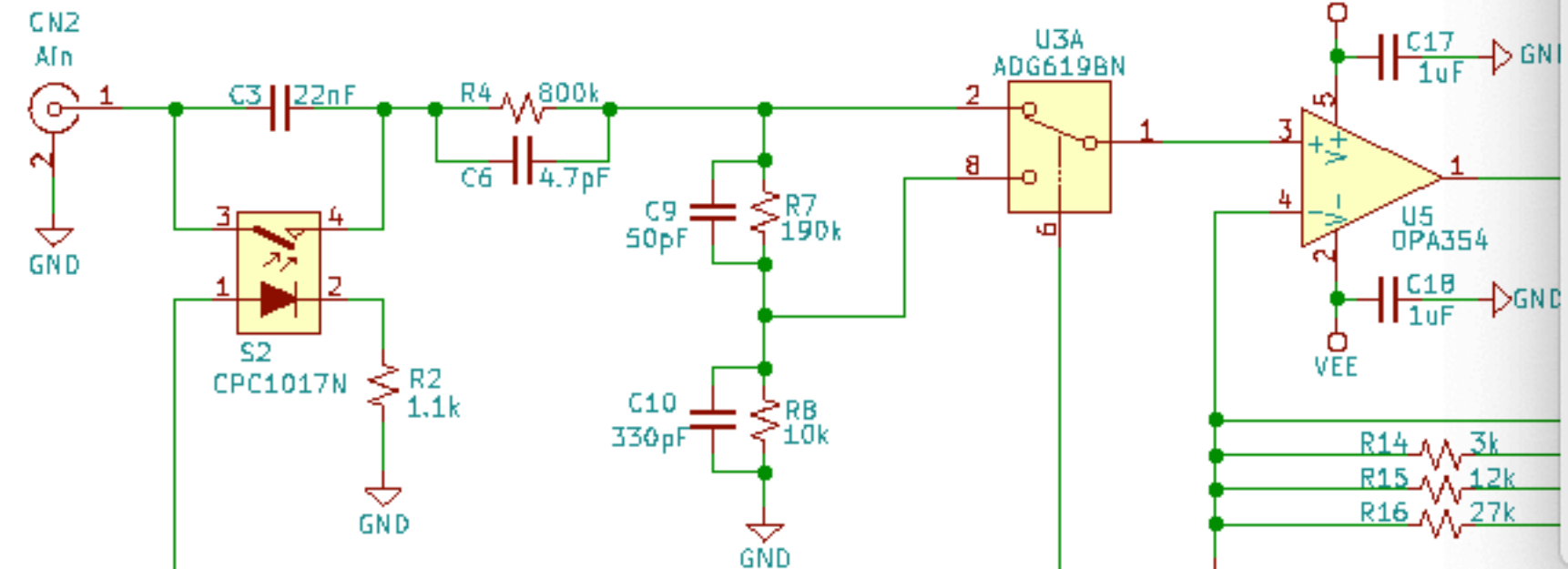
ChA_HL

ChA_G1

ChA_G0



ChB_PWM



ChB_ACDC

ChB_HL

ChB_G1

ChB_G0

Electrical Rules Checker

ERC Options

Label to Label Connections

- Test similar labels
- Test single instances of global labels

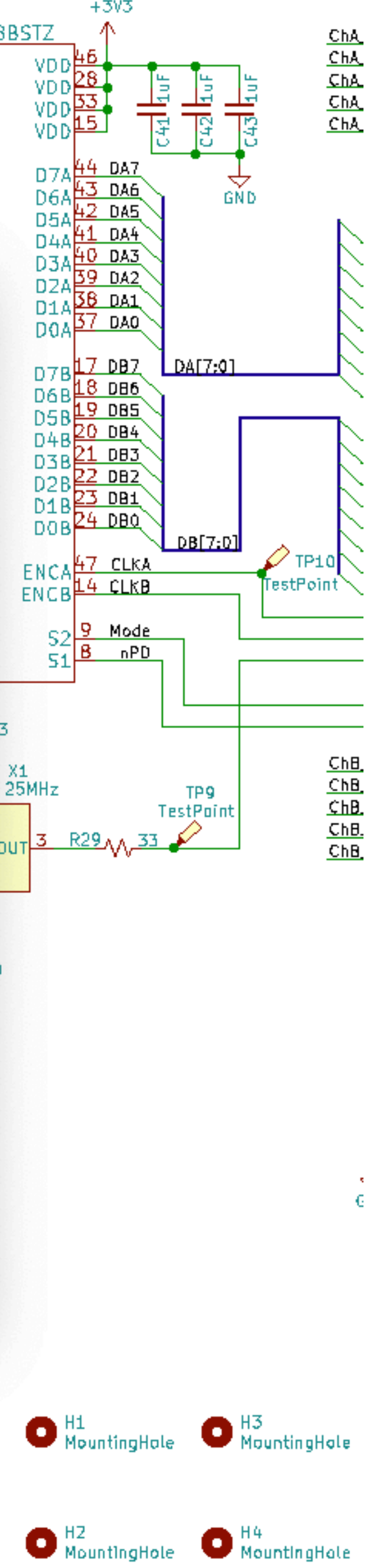
Pin to Pin Connections

Input Pin	<input type="checkbox"/>	Output Pin	<input type="checkbox"/>	Bidirectional Pin	<input type="checkbox"/>	Tri-State Pin	<input type="checkbox"/>	Passive Pin	<input type="checkbox"/>	Unspecified Pin	<input type="checkbox"/>	Power Input Pin	<input type="checkbox"/>	Power Output Pin	<input type="checkbox"/>	Open Collector	<input type="checkbox"/>	Open Emitter	<input type="checkbox"/>	No Connection	<input type="checkbox"/>
Output Pin	<input type="checkbox"/>	<input checked="" type="checkbox"/>																			
Bidirectional Pin	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>																	
Tri-State Pin	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>																
Passive Pin	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>															
Unspecified Pin	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
Power Input Pin	<input type="checkbox"/>											<input type="checkbox"/>	<input type="checkbox"/>								
Power Output Pin	<input type="checkbox"/>													<input type="checkbox"/>	<input type="checkbox"/>						
Open Collector	<input type="checkbox"/>															<input type="checkbox"/>	<input type="checkbox"/>				
Open Emitter	<input type="checkbox"/>																<input type="checkbox"/>	<input type="checkbox"/>			
No Connection	<input type="checkbox"/>																		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Reset to Defaults

Delete Markers

Close Run



设计示例

