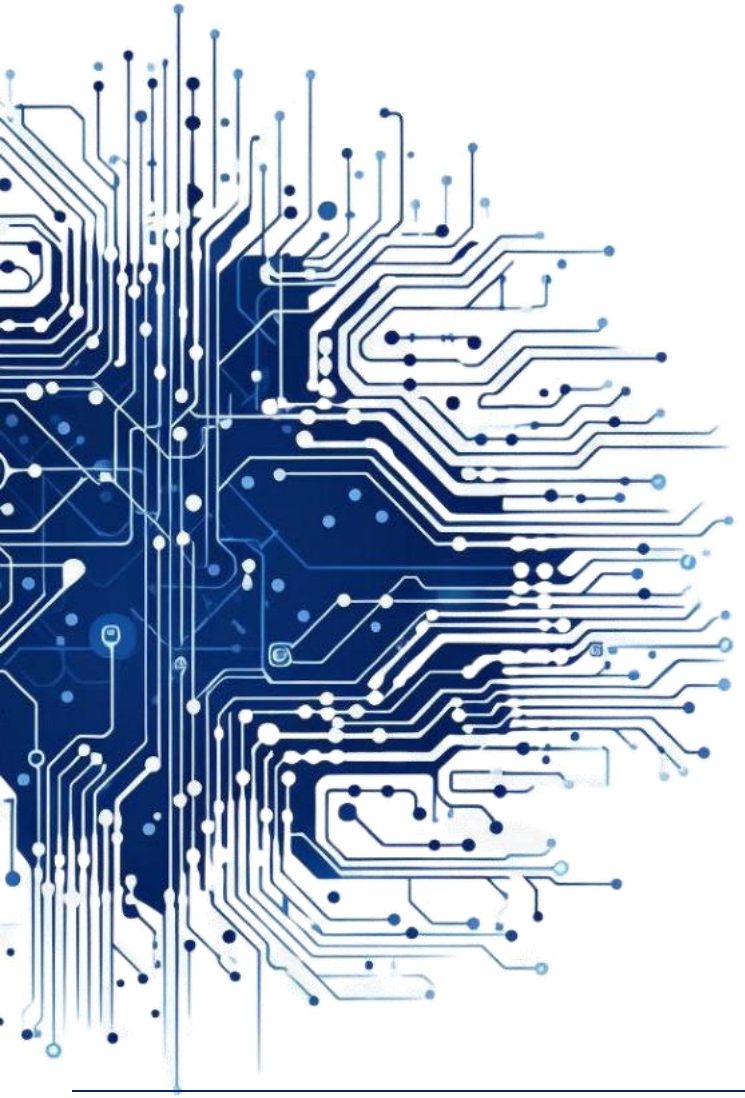
KiCad在先楫半导体EVK设计中的使用

KiCad in HPMicro Evaluation Kit Design

2025年11月13日

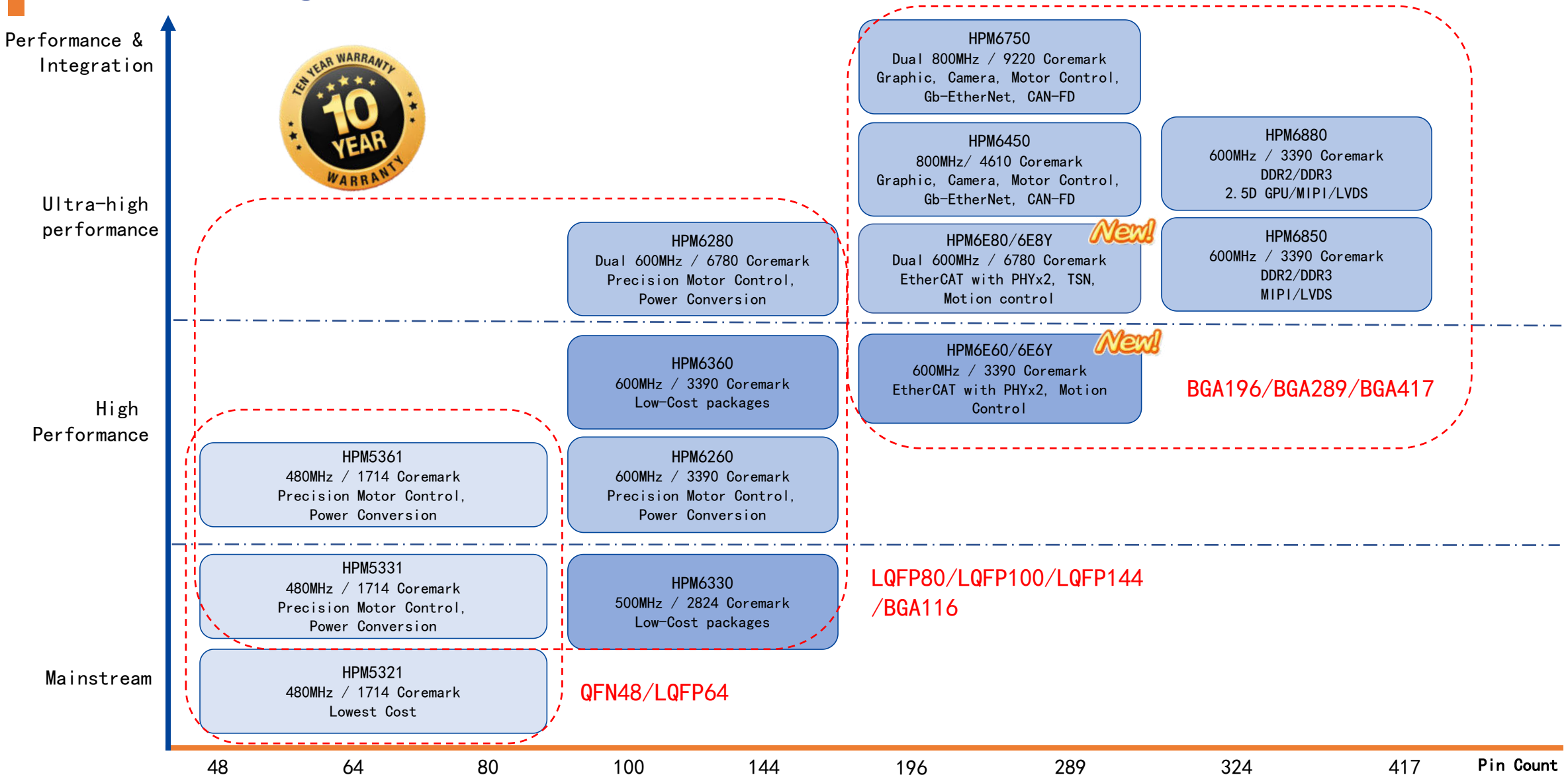
HPMicro Semiconductor Co.,Ltd.

HPMicro: Global Leader of General Purpose RISC-V MCU



- High Performance MCU series for Industrial and Automotive Applications
- Extensive Eco-system include Comprehensive HW/SW Development Tools, SDK, Middleware.
- ISO 9001, ISO 26262/IEC 61508 Certified
- 10-year Longevity Program, Stable Supply Chain

HPMicro High-Performance RISC-V MCUs Portfolio



HPMicro Product Features

Superior Computing Power

Heterogeneous Multi-Core

Record-breaking CoreMark

Powerful DSP

Algorithm Hardware Acceleration

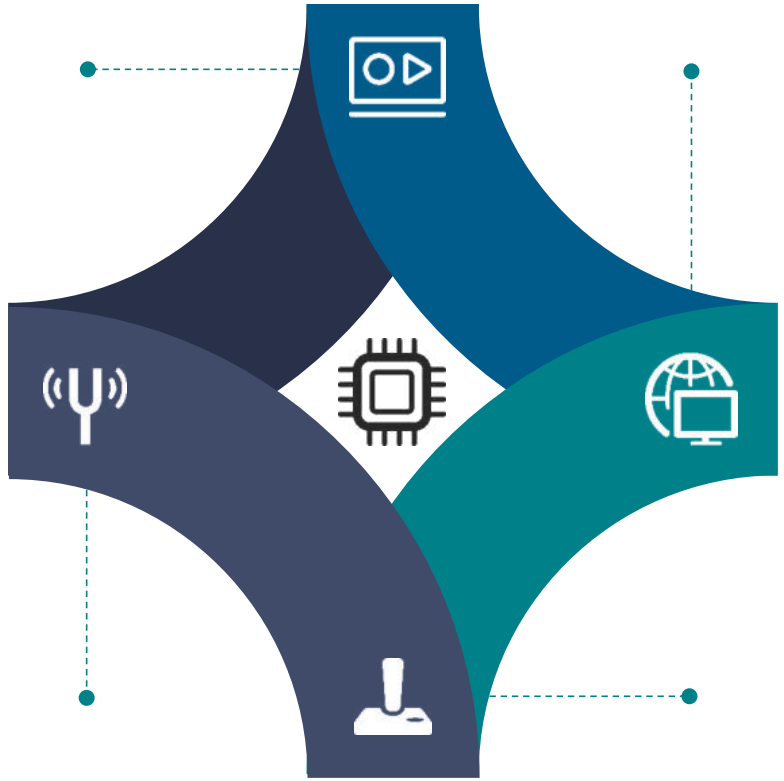
Best-in-class for Multi-Media

2.5D GPU w OpenVG

Low-Power Graphics Acceleration

MIPI/LVDS/RGB Display

DMIC/Voice Processing



Outstanding Connectivity

TSN with Switch

EtherCAT

Gb Ethernet

High Speed USB with PHY

CAN-FD

Excellent Precision Control

16-bit ADC, 12-bit DAC, Operational Amplifiers, Analog Comparators

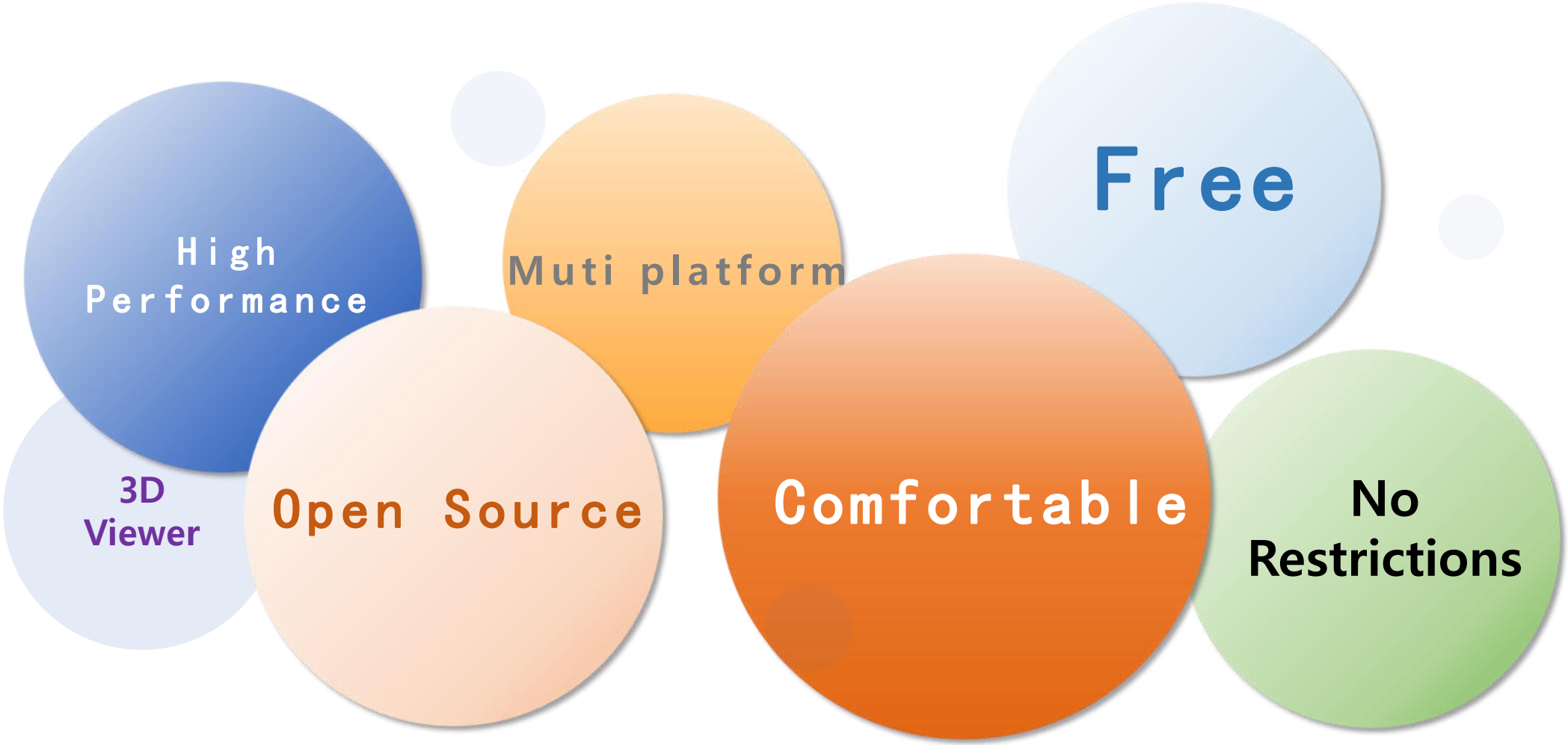
Programmable Logic Array

High Resolution PWM

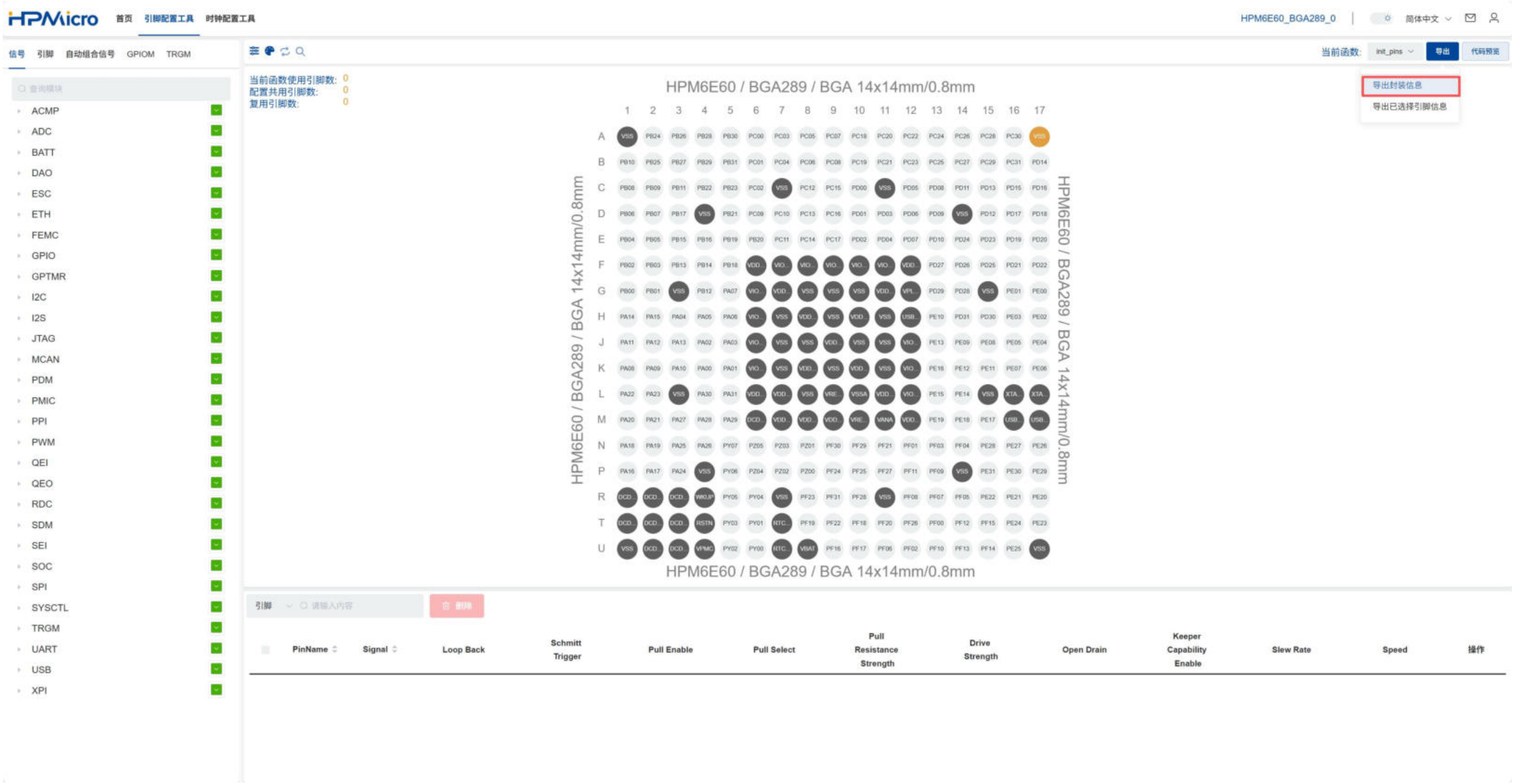
Incremental/absolute position sensor interfaces

Hardware Closed-Loop Controller

Why KiCad?

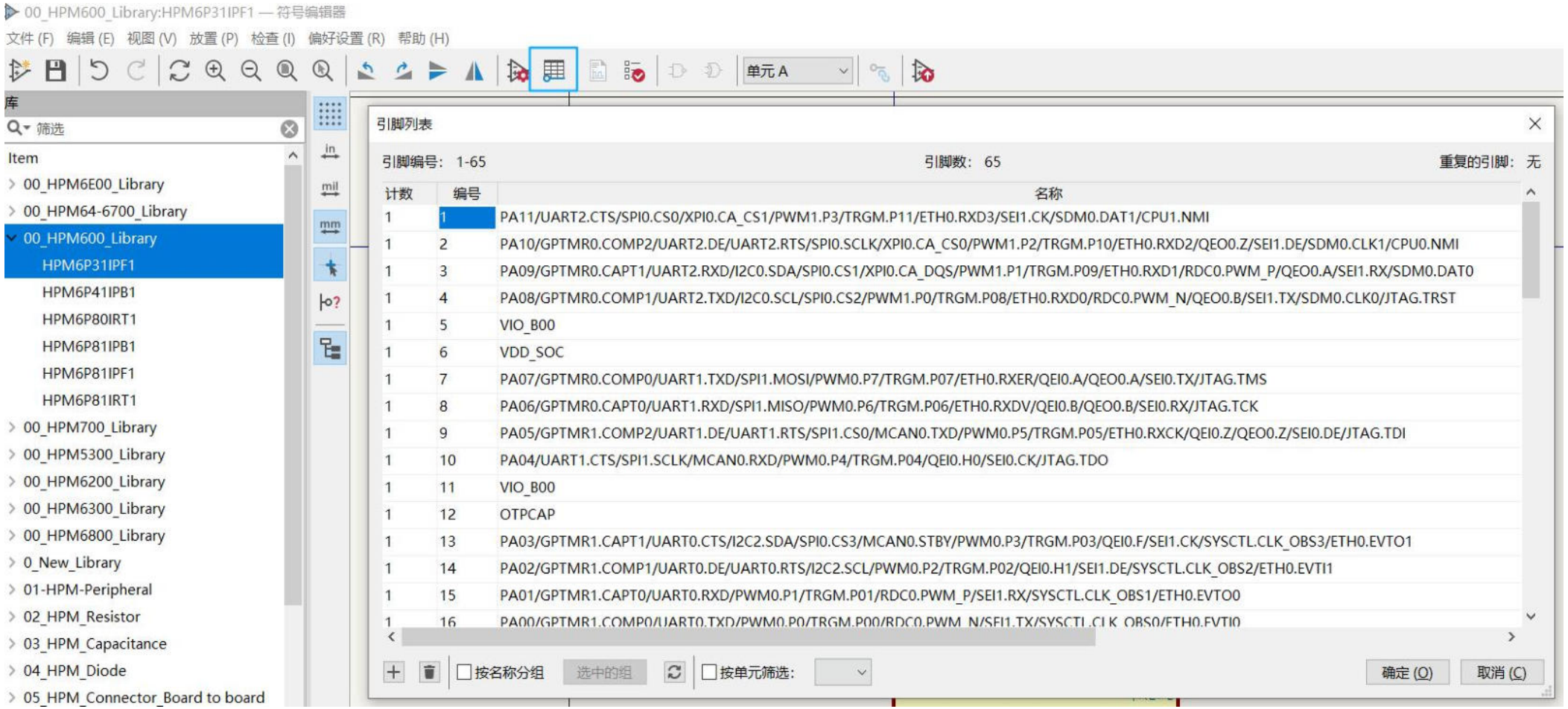

High Performance
Muti platform
Free
3D Viewer
Open Source
Comfortable
No Restrictions

Feedback From Engineers



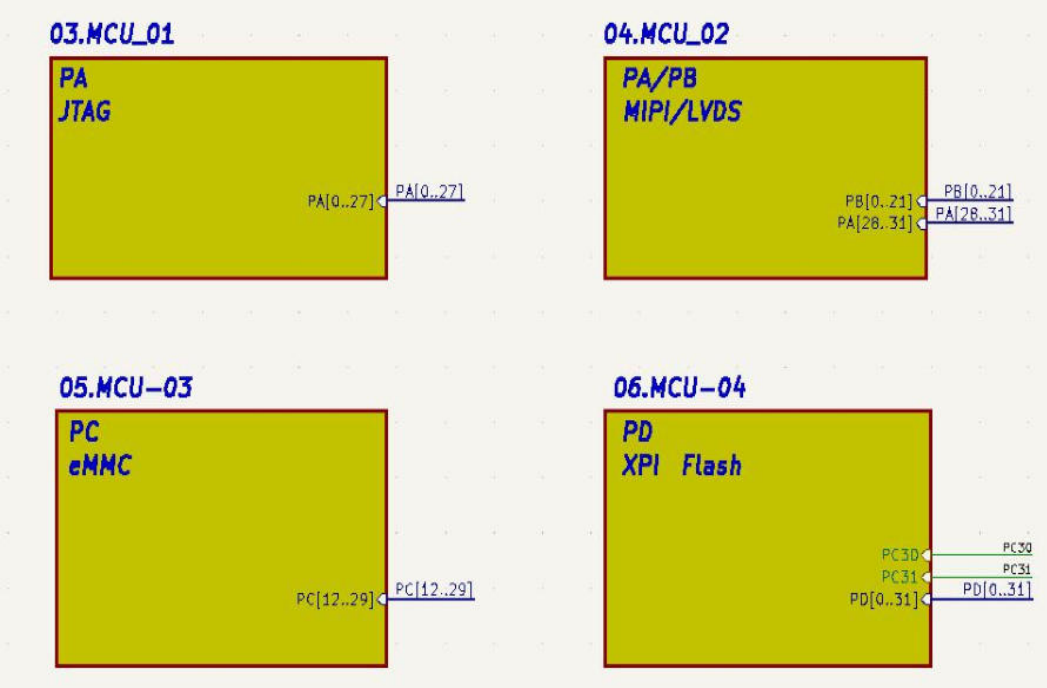
Feedback From Engineers

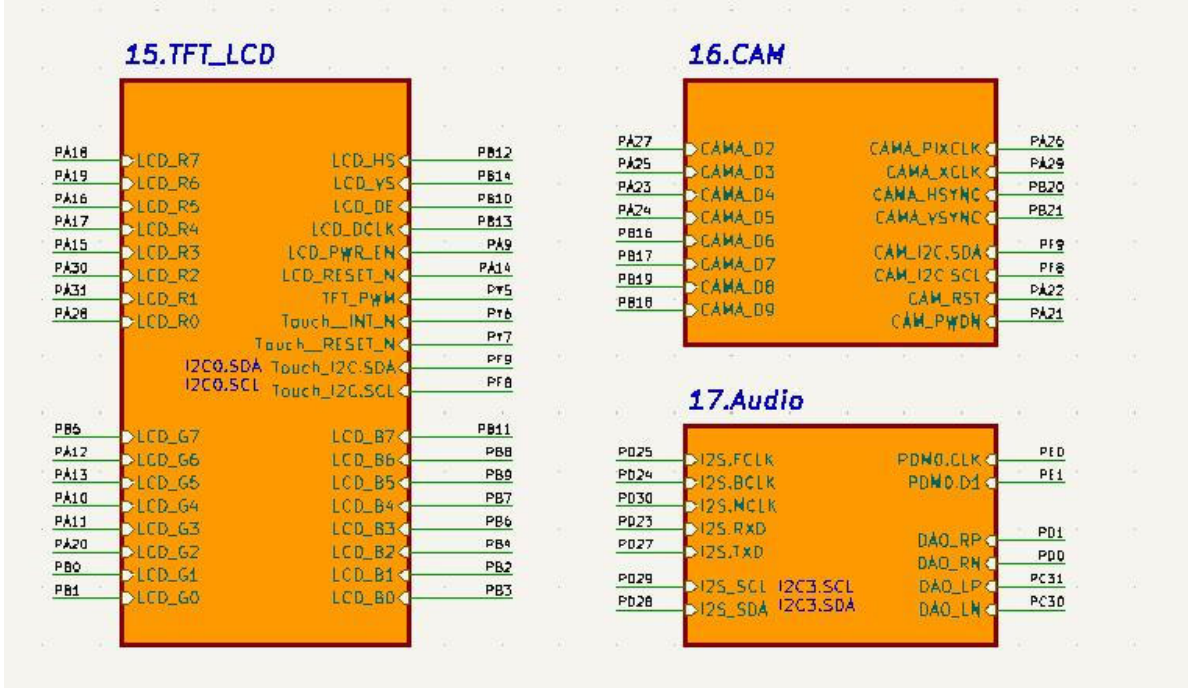
Information from pinmux tool of HPMicro, export to KiCad symbol editor - pin table, easy to build symbols
先楫半导体pinmux工具导出的封装信息，可直接粘贴到KiCad的符号编辑器-引脚信息表中，快速建库



Feedback From Engineers

The hierarchical schematic diagram greatly enhances the manageability, readability, and collaboration efficiency of the project.
层次式原理图极大的提升了项目的可管理型、可阅读性、协作效率



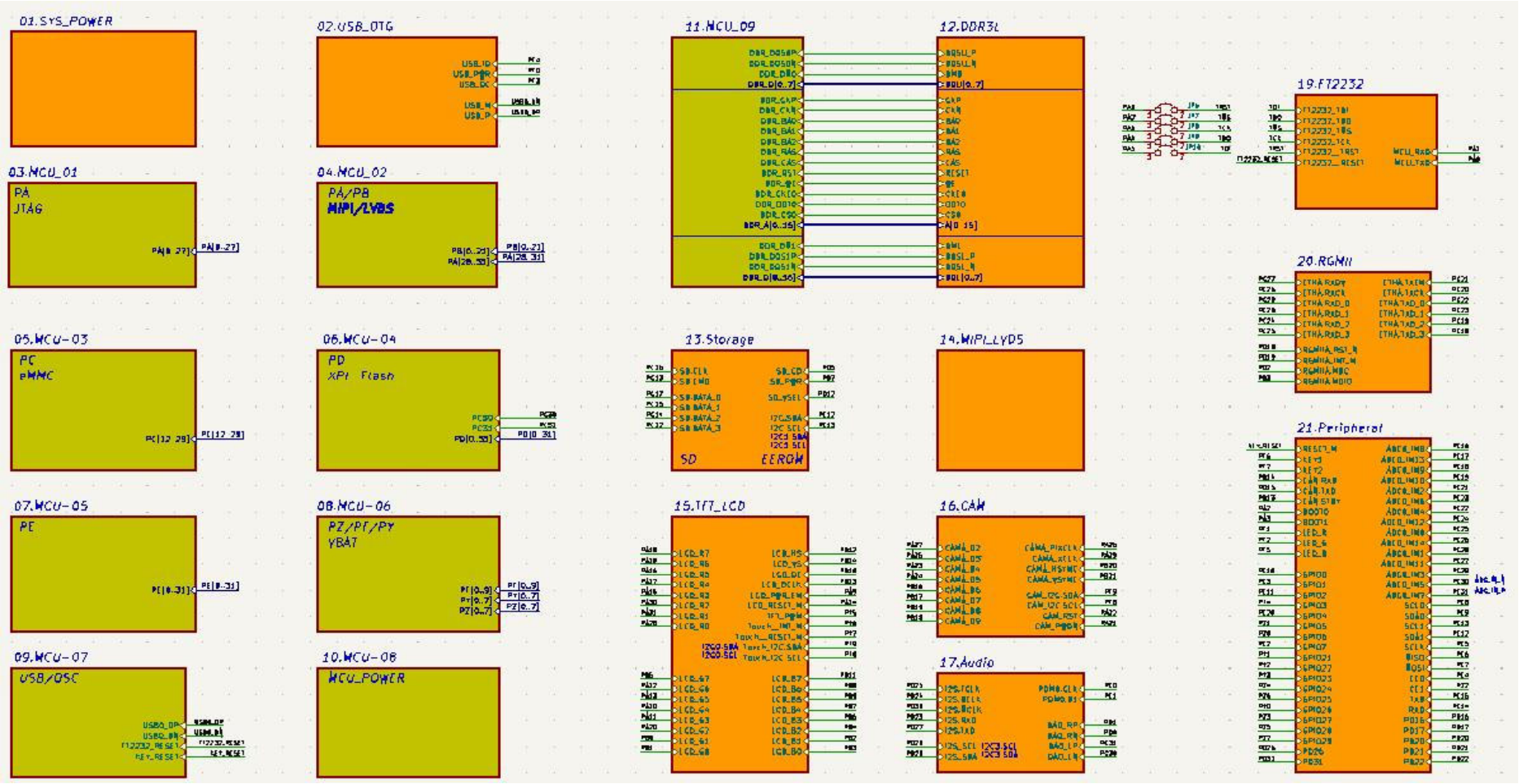


Pin information can also be linked in the top-level design of hierarchical schematics.
层次式原理图的顶层设计中也可以链接引脚信息

Feedback From Engineers

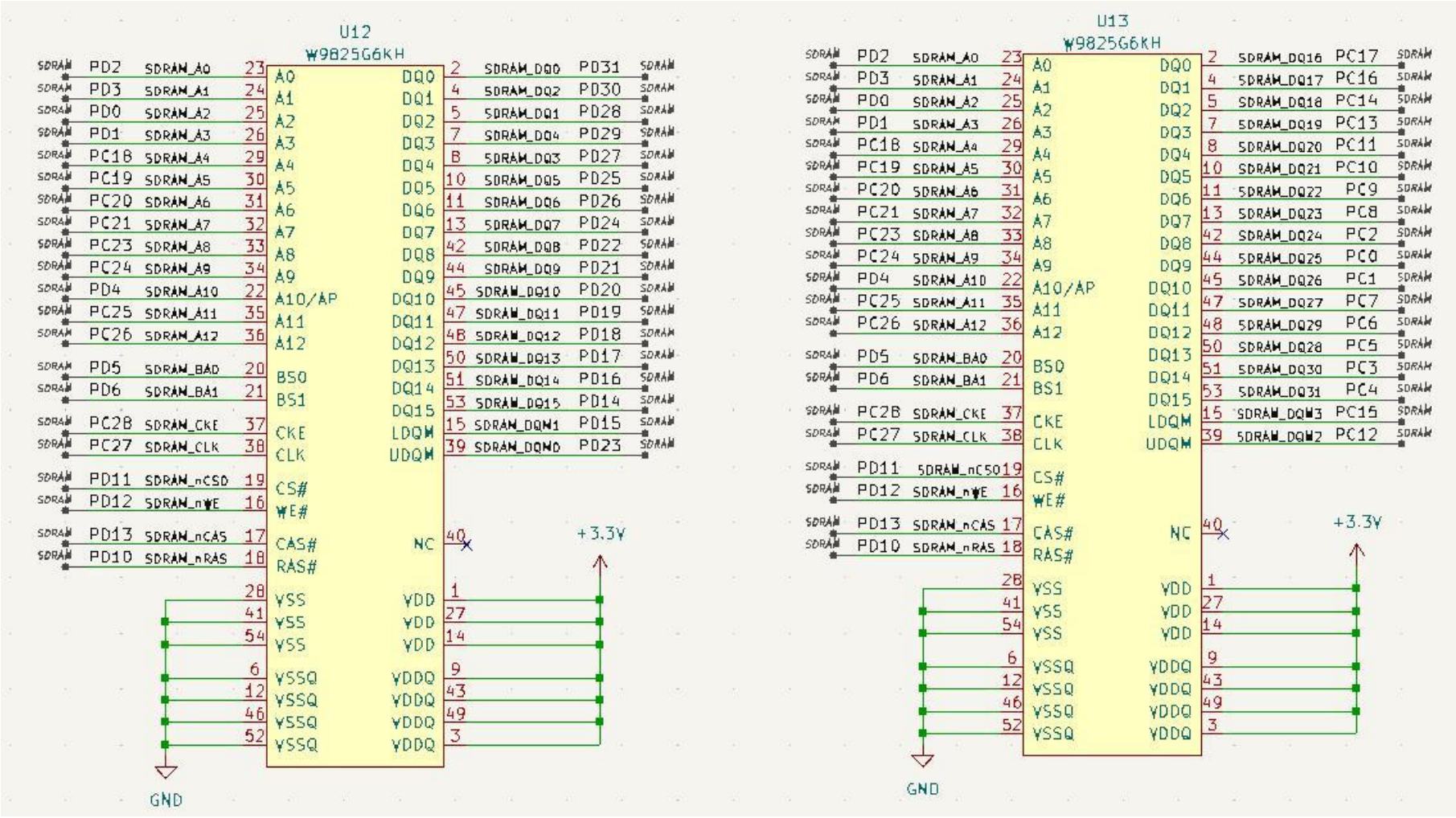
In the usage scenarios of chip manufacturers evaluation kit development, there is a significant reuse of peripheral circuits, difference among various series is the choice of pins

芯片原厂设计EVK的使用场景中，有大量的外围电路复用，各型号差异仅在于不同系列引脚选择不同



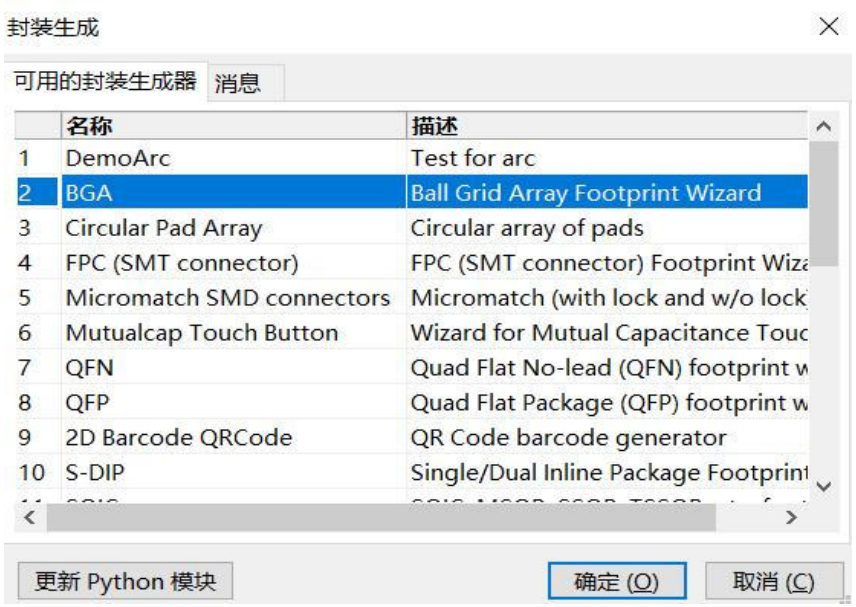
Feedback From Engineers

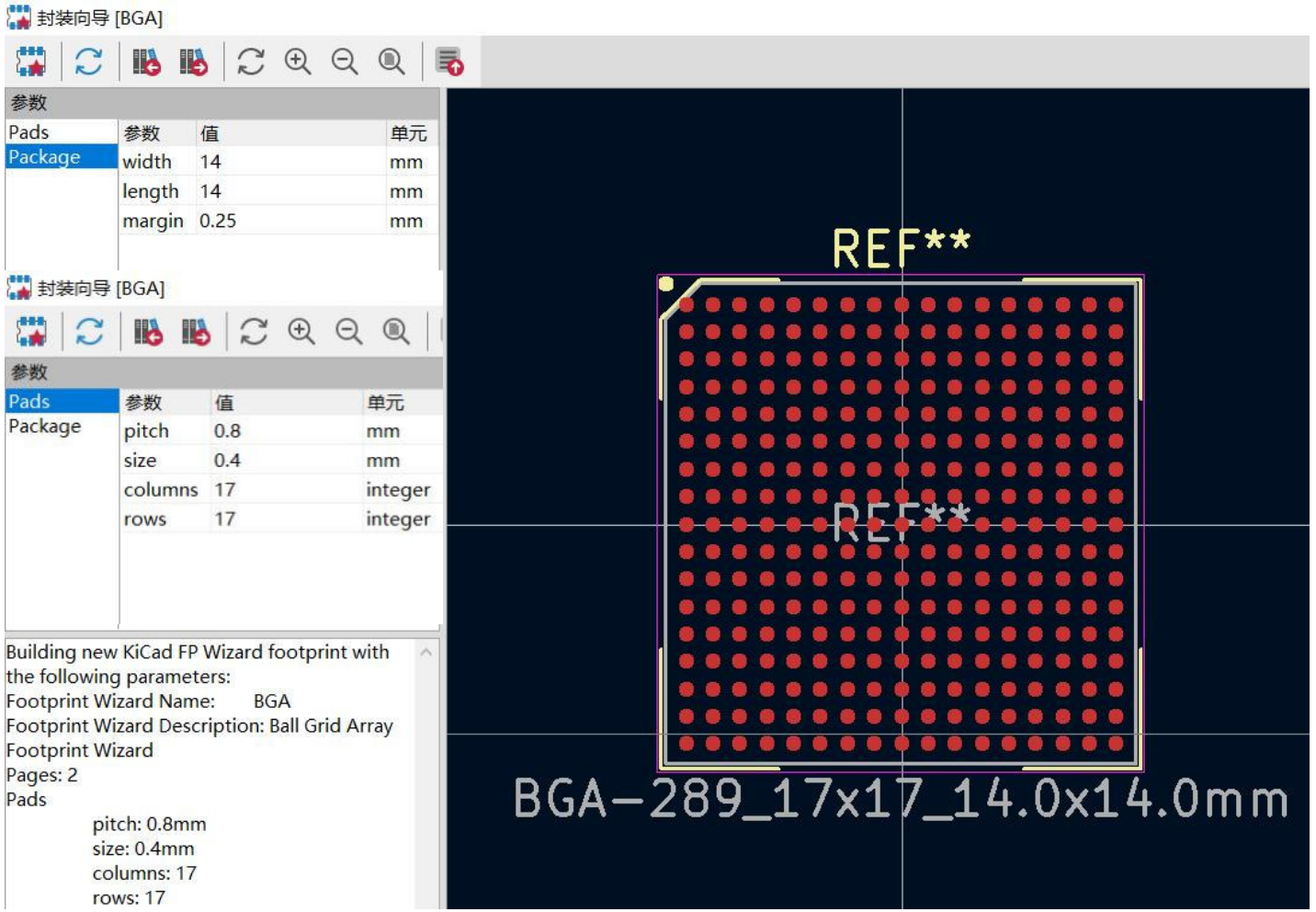
Set network classes and rules to facilitate subsequent PCB layout rule settings
设置网络类与规则，方便后续PCB布线设置规则



Feedback From Engineers

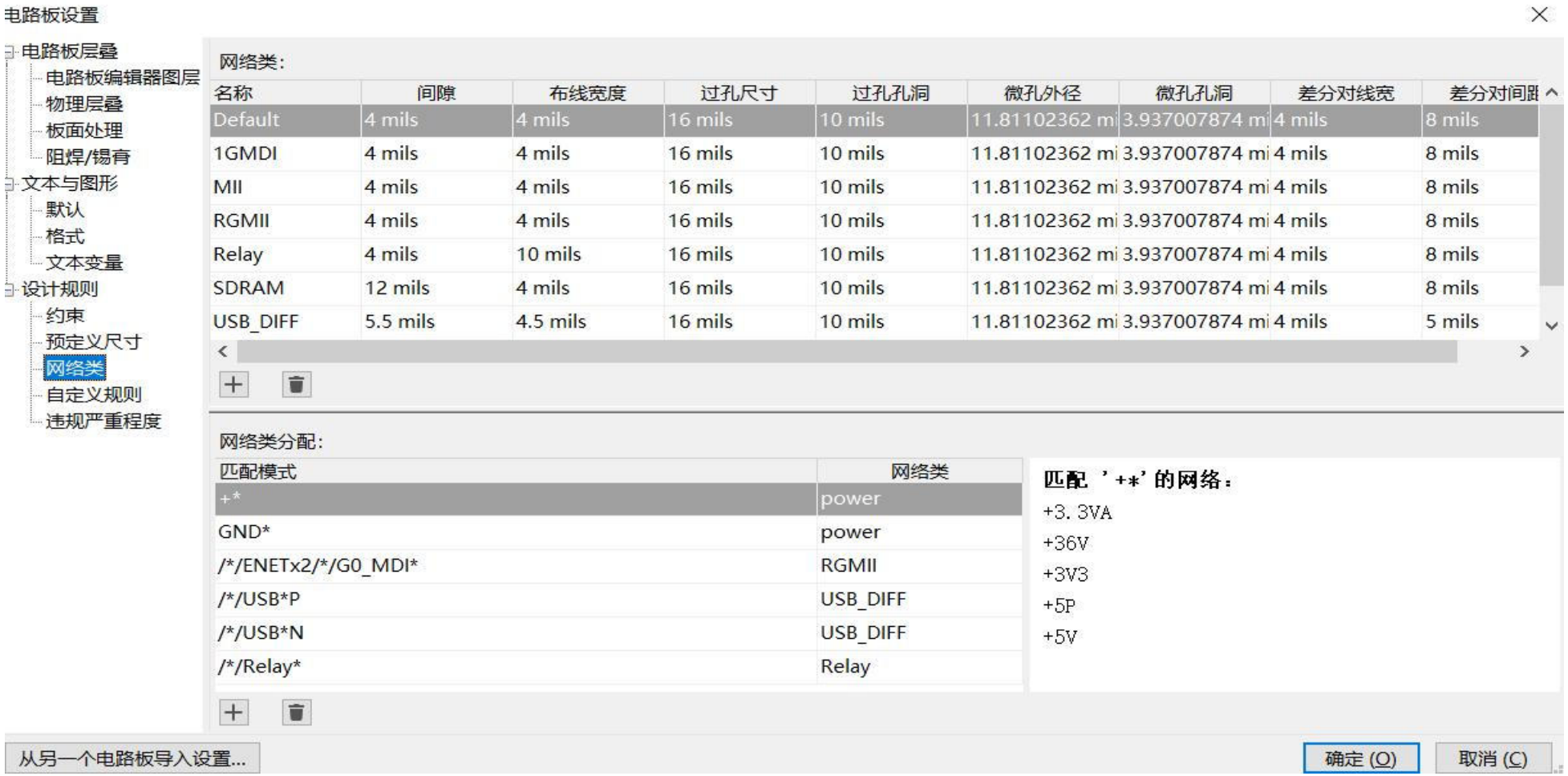
The footprint wizard facilitates the generation of footprint
封装向导轻松创建PCB封装，如BGA289，输入以下参数即可完成创建





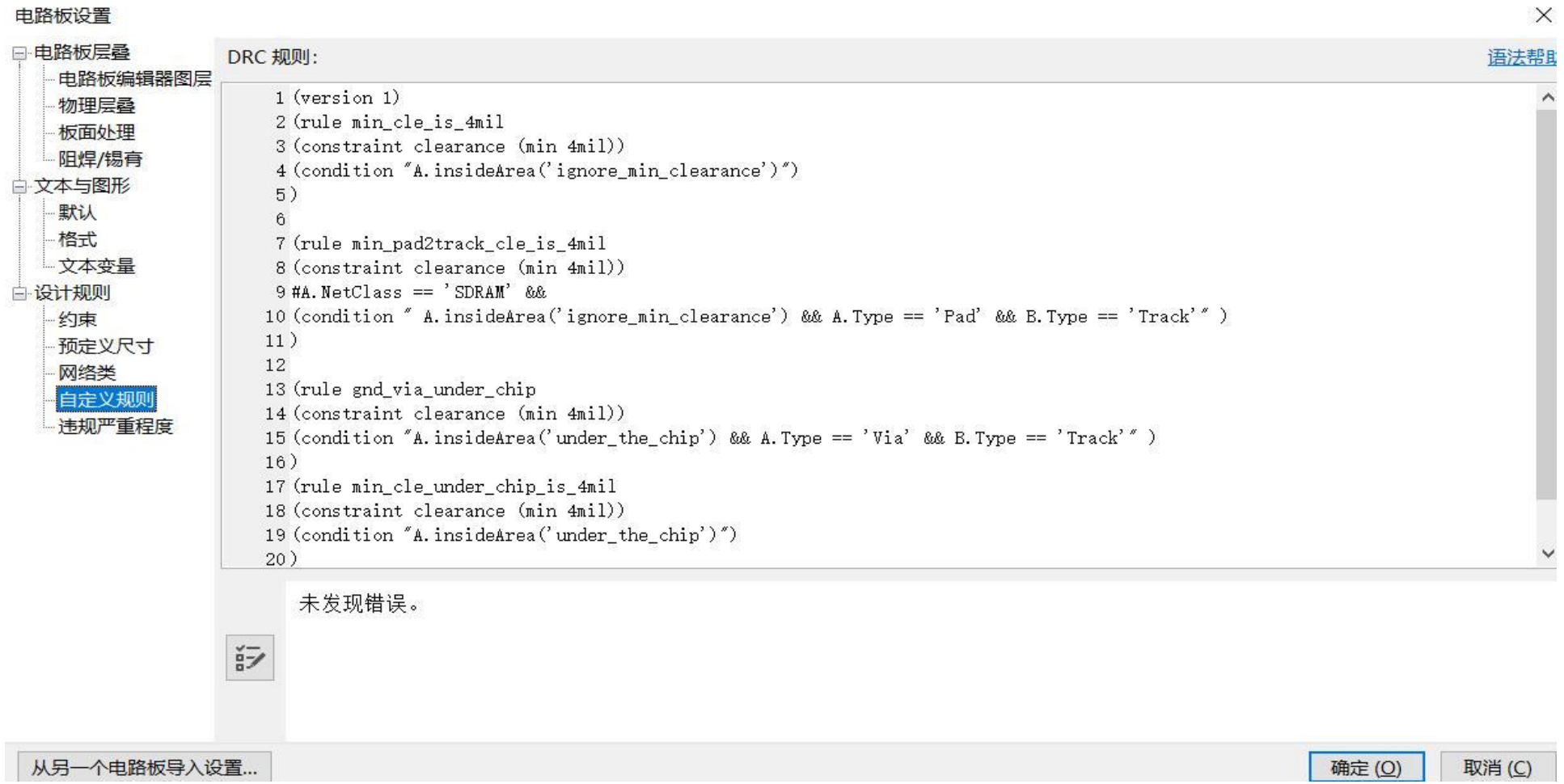
Feedback From Engineers

The footprint wizard facilitates the generation of footprint
不同网络规则单独设置线宽线距，匹配模式高效的对网络进行分类



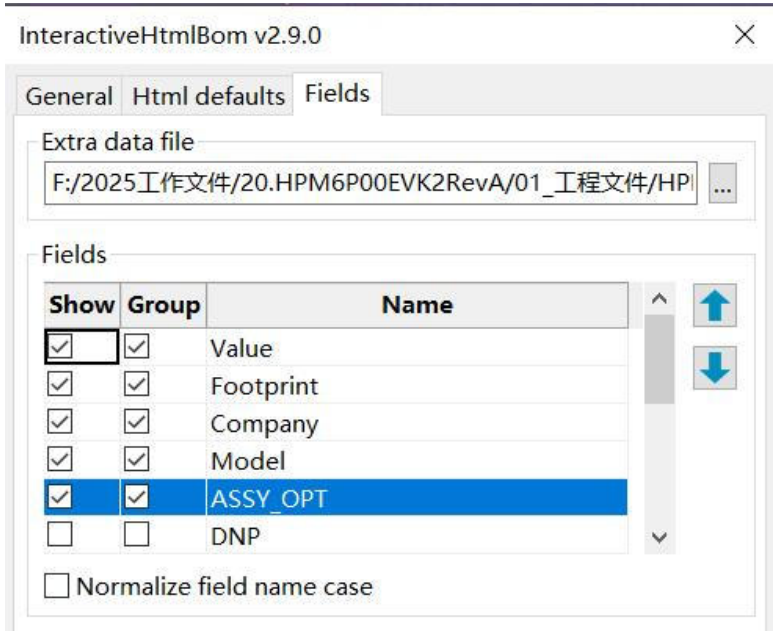
Feedback From Engineers

Custom Rules
自定义规则



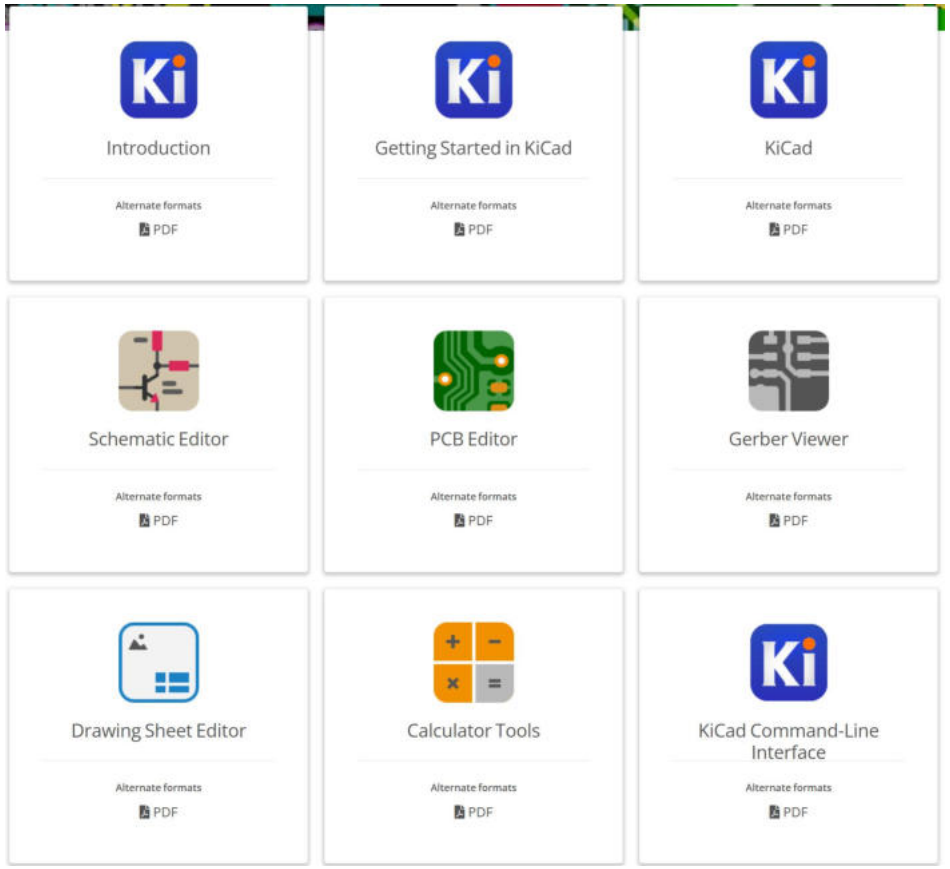
Feedback From Engineers

InteractiveHtmlBom plugin generates BOM.
InteractiveHtmlBom插件一键生成BOM。



Feedback From Engineers

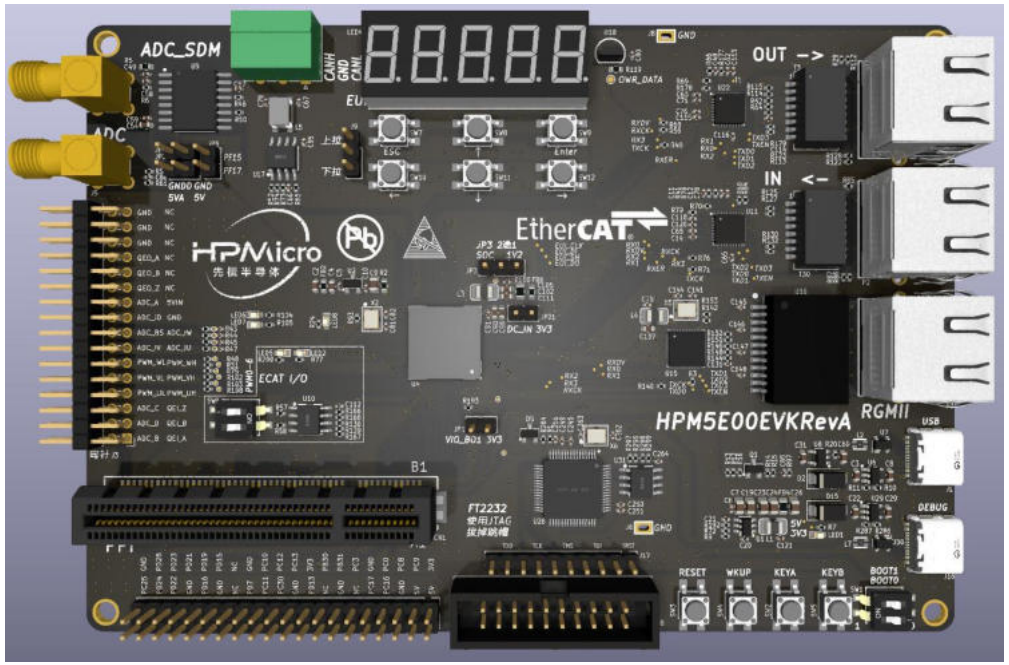
Easy to use, intuitive UI, rich documentation and community support, making it very quick to learn.
用户界面直观，文档和社区支持丰富，易学易用

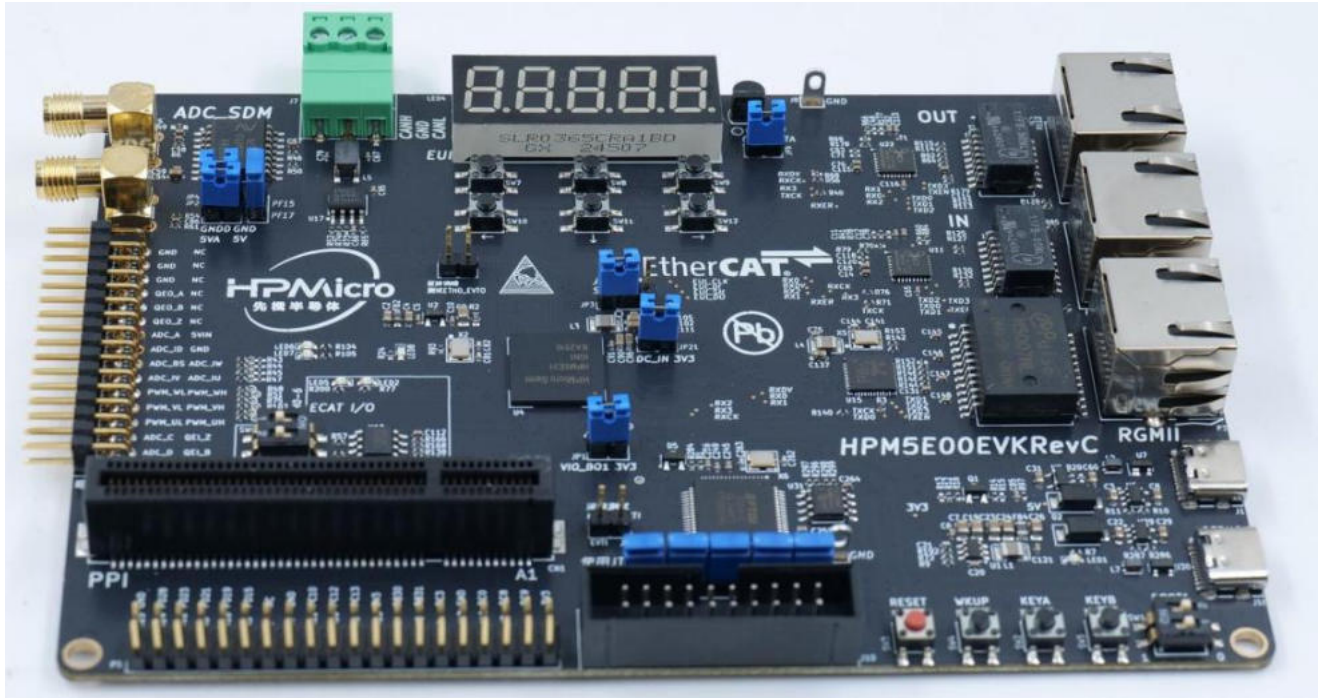


Feedback From Engineers

3D Viewer

HPM5E00EVK

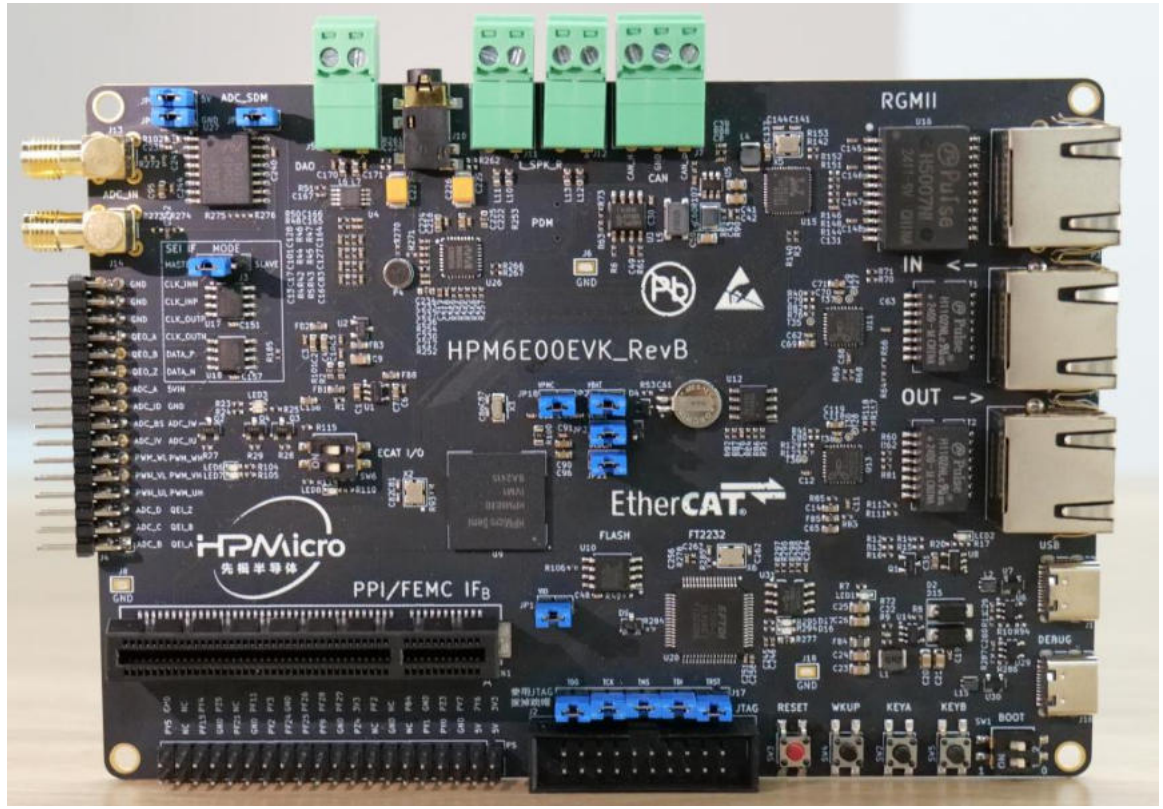


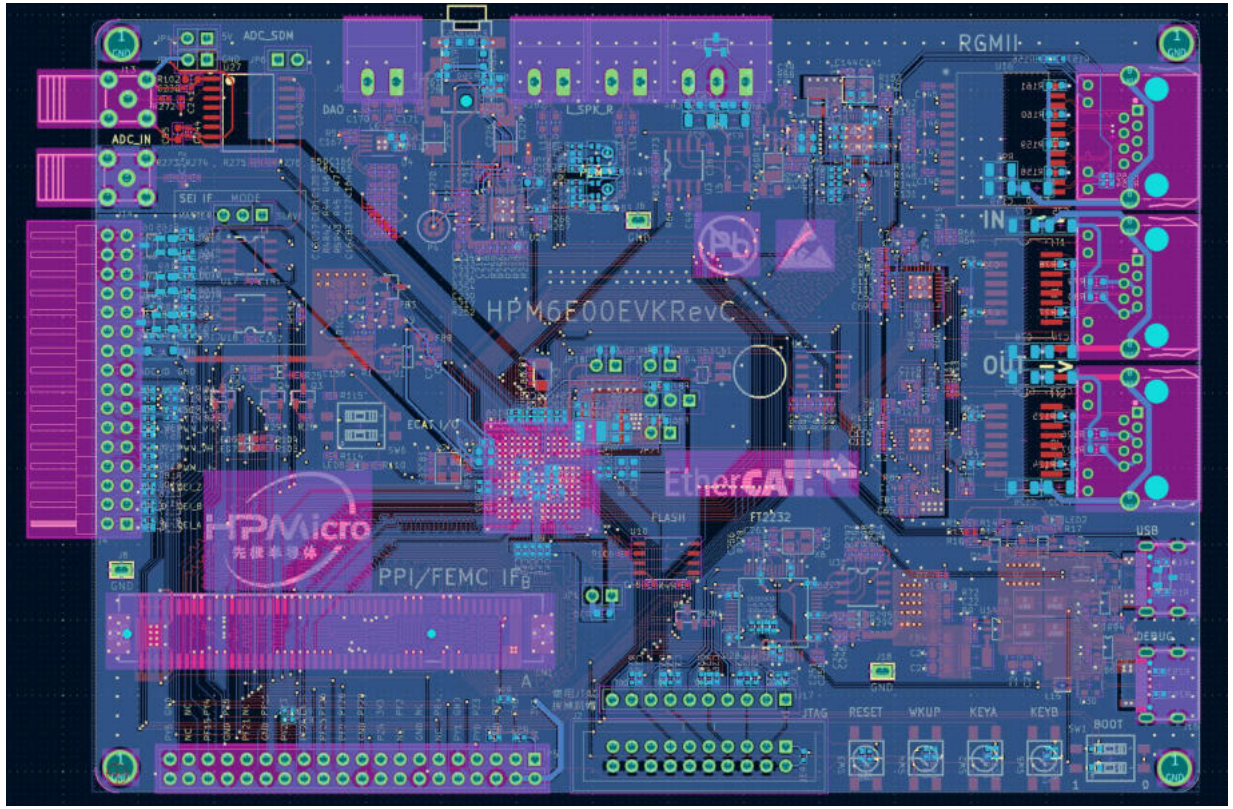


RGMII , Ethercat , FEMC , Motor Interface , Sigma-Delta , CAN , USB , On board debugger ,
千兆网、Ethercat、并口内存拓展、电机接口、隔离采样、CAN通信、USB、板载调试器

Reference Design

HPM6E00EVK

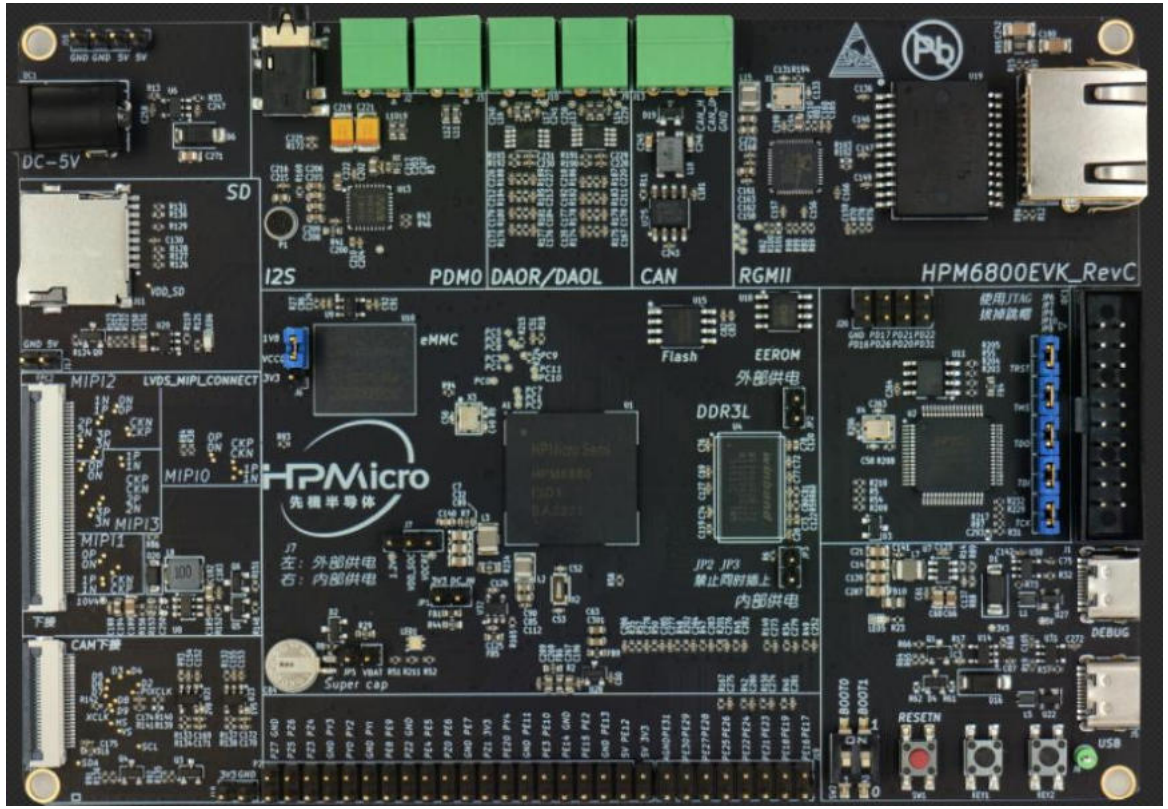


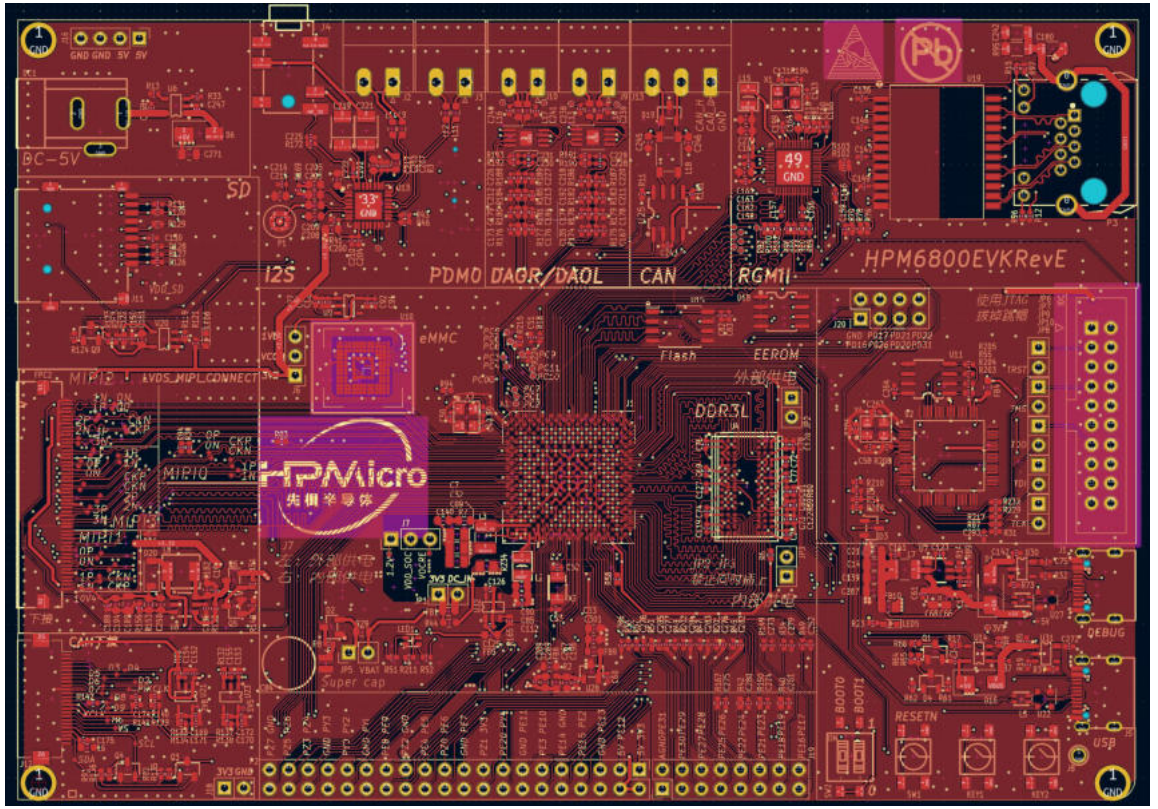


RGMII , Ethercat , FEMC , Motor Interface , Sigma-Delta , CAN , USB , On board debugger , Audio
千兆网、Ethercat、并口内存拓展、电机接口、隔离采样、CAN通信、USB、板载调试器、音频

Reference Design

HPM6800EVK



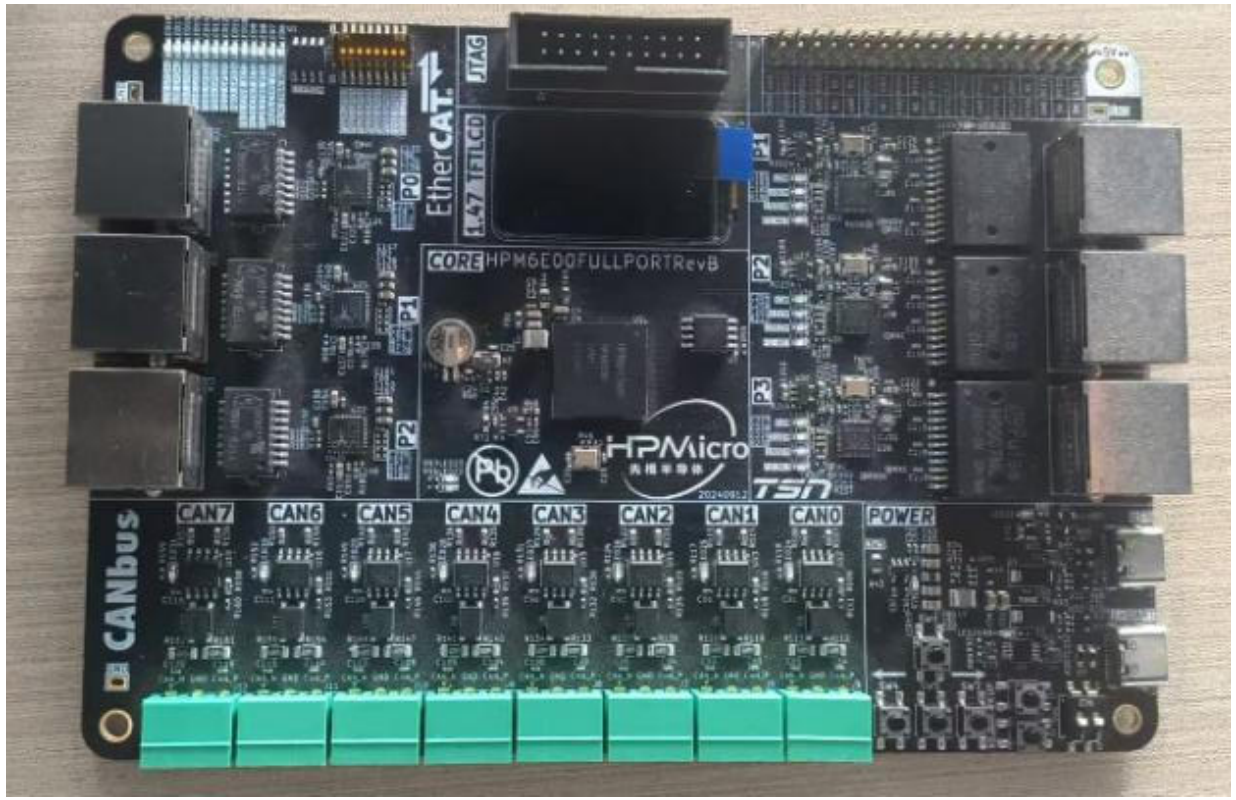


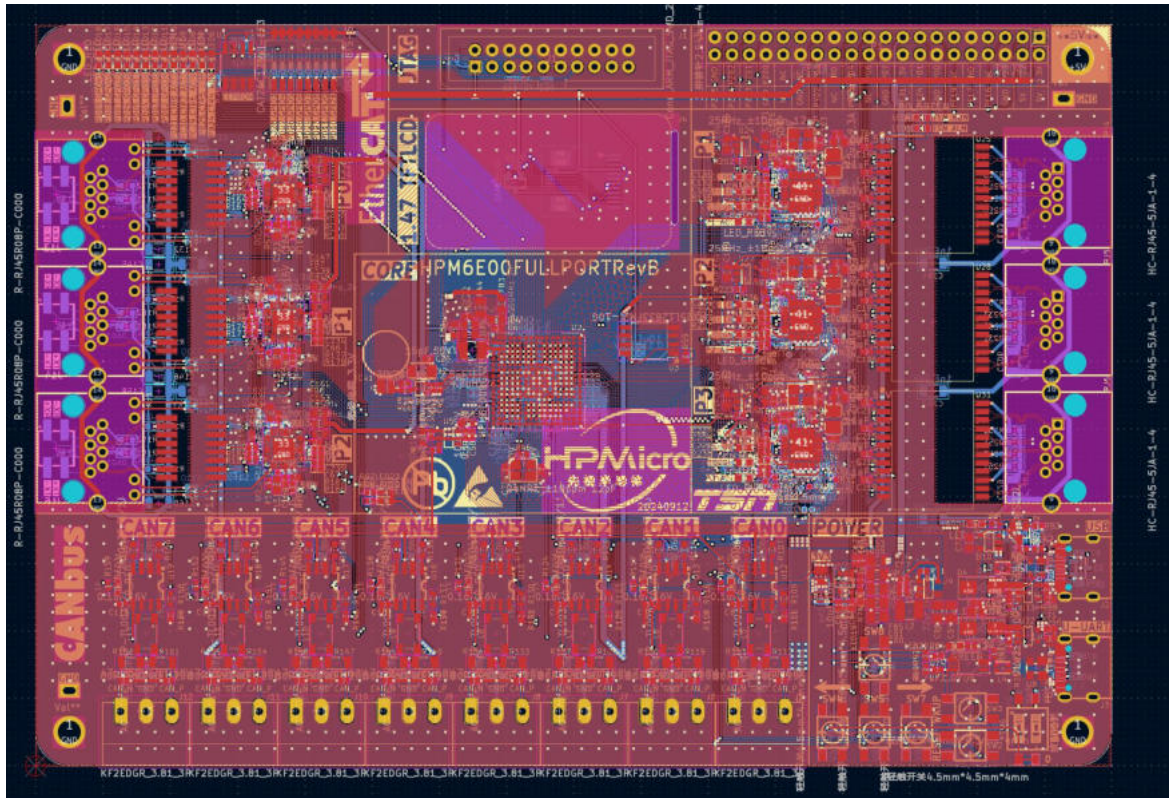
RGMII , DDR3 , MIPI DSI , MIPI CSI , LVDS , EMMC , Audio , On board debugger

千兆网、DDR3、MIPI显示接口、MIPI相机接口、LVDS、EMMC、音频、板载调试器

Reference Design

HPM6E-Communicate board



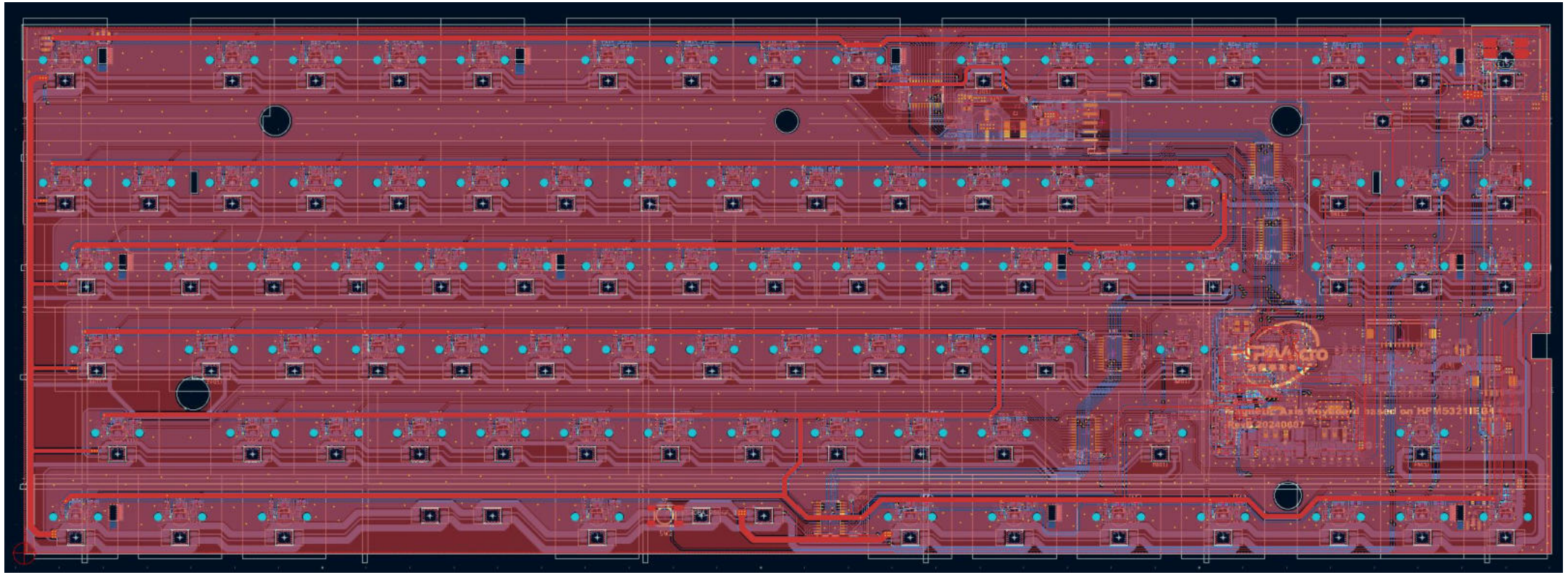


CANFD*8 , Ethercat*3 , TSN*3

8路CANFD，3个Ethercat网口，3个TSN交换机网口

Reference Design

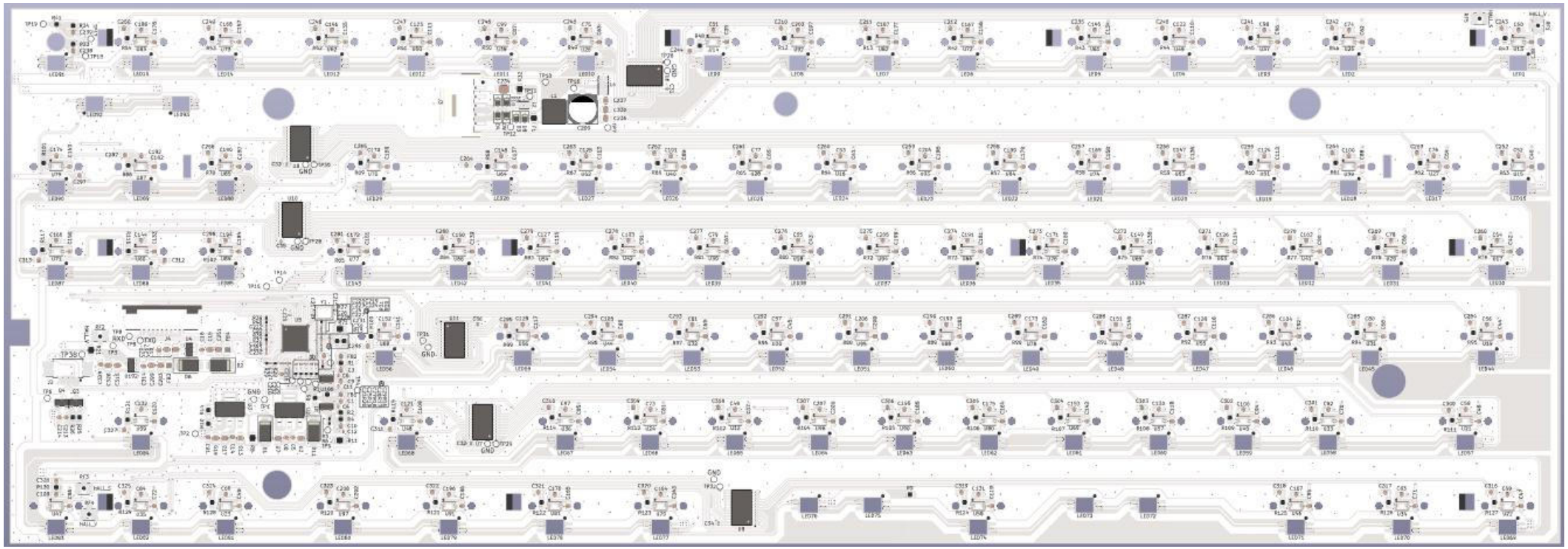
Keyboard solution



HPMicro 键盘方案

Reference Design

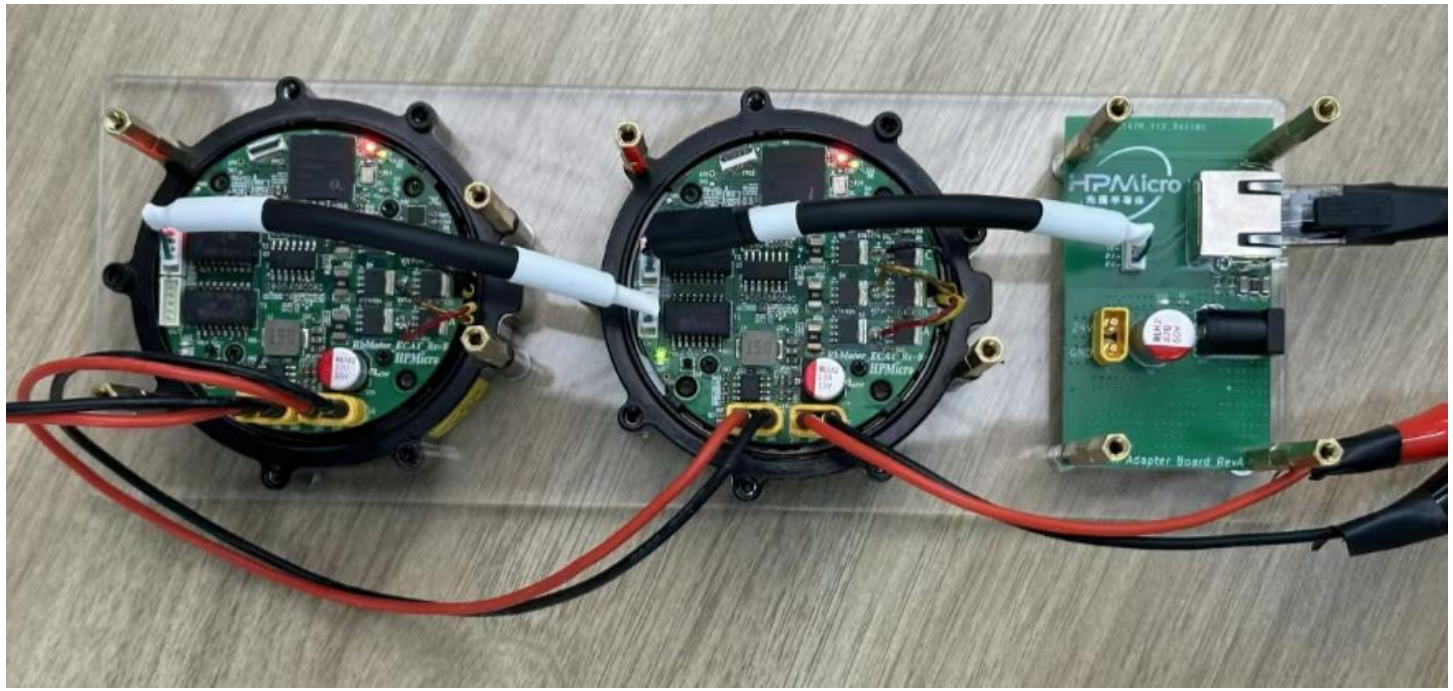
Keyboard solution

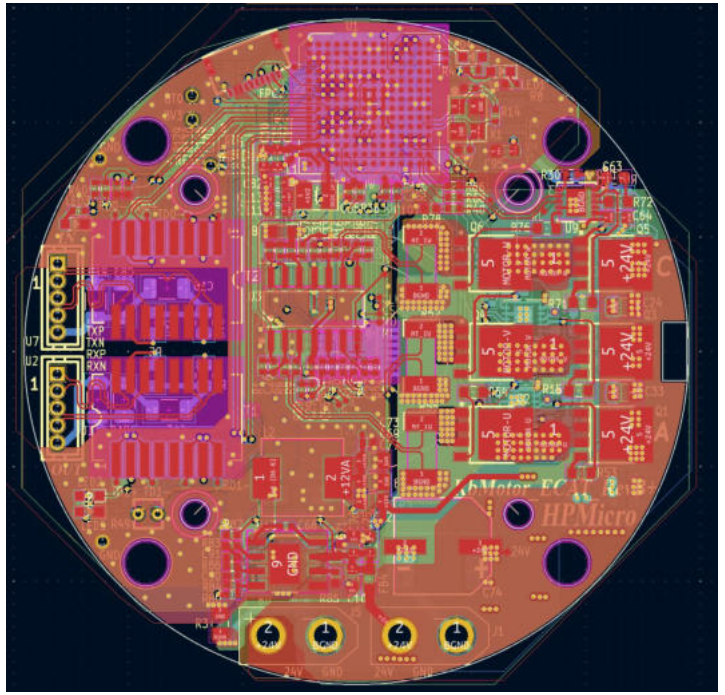


HPMicro 键盘方案

Reference Design

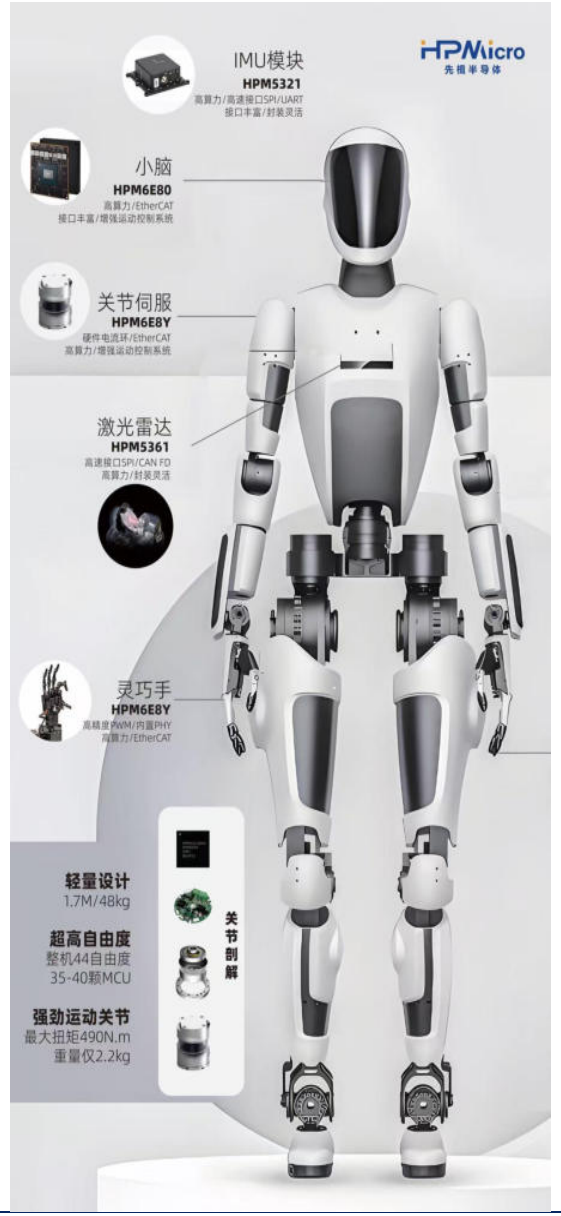
Robot joint motor driver





HPMicro 机器人关节电机方案

HPM IN Robot



从芯片到智能，推动机器人的底层进步

先楫产品覆盖机器人运动控制，实时通信及环境感知

高算力：单核480MHz ~ 双核600MHz

- *减少关节伺服的三环计算延时，提高系统响应特性；*
- *实现IMU、力矩等传感器的快速计算、滤波等；*

丰富的Roadmap：HPM6E00~HPM5300

- *满足关节驱动、编码器、IMU等多场景需求；*
- *实现平台统一，减少研发成本；*

电机控制专用外设：硬件电流环/SEI等

- *电流环处理延时减少到~200ns，提高响应性；*
- *高算力助力提高驱动的功率密度；*
- *兼容脉冲、Tamagawa等主流编码器协议；*

集成正版授权的EtherCAT 从站：

- *满足机器人对实时性通讯的要求；*
- *支持应用层协议；*
- *支持机器人产品全球化*

高精度ADC，SDM等：

- *提高电流、位置等信号采样精度；*
- *实现电机精准控制*

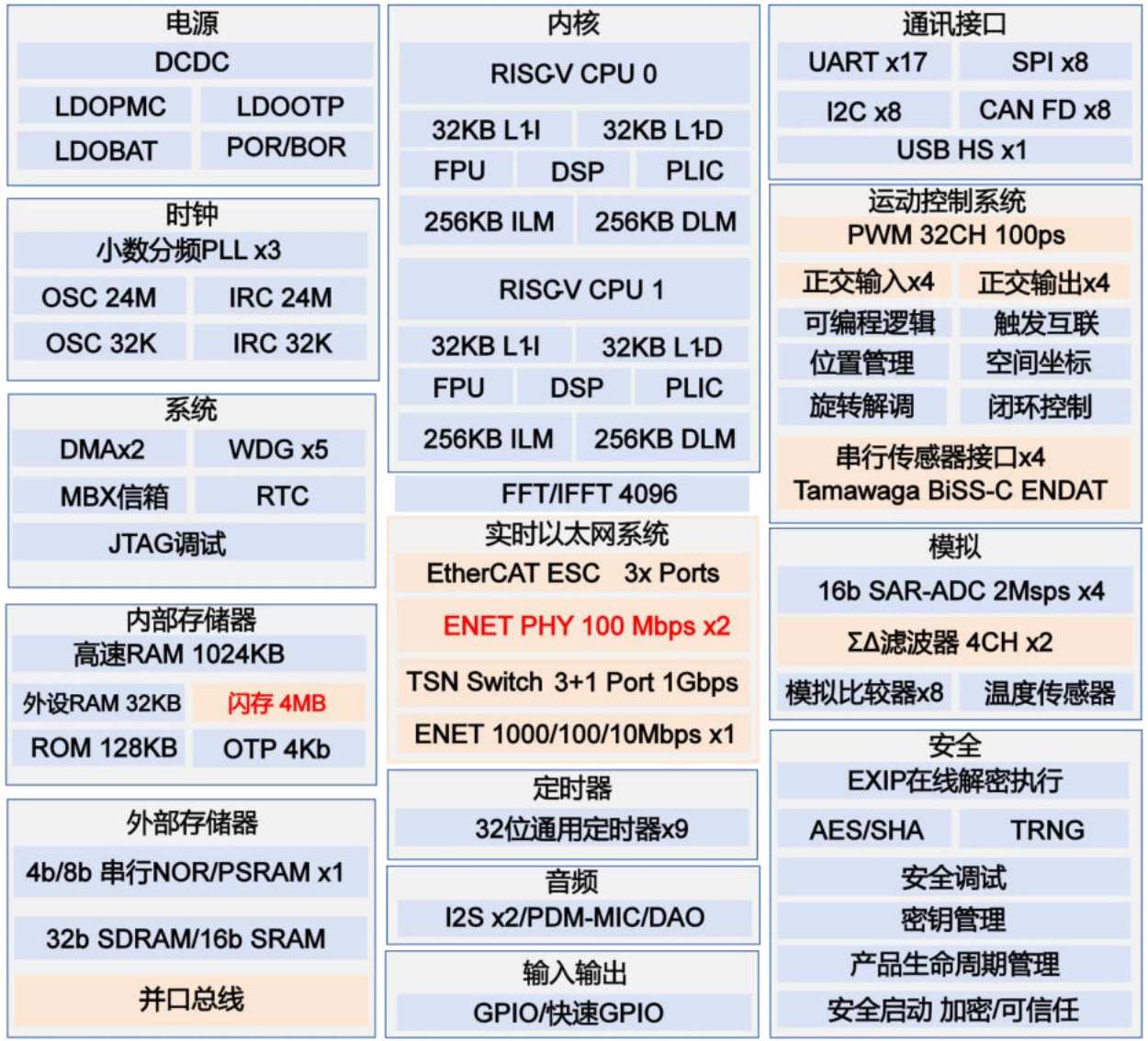
灵活的封装：

- *从6X6 QFN 48到 14X14 BGA289；*
- *集成PHY等外围芯片，减少PCB面积*

HPM6E8Y: Integrate 100Mbps PHY and Flash

【产品特点】

- 高性能RISC-V双核，主频高达600MHz；
- 高达2MB SRAM，192KB ROM，4Kb OTP；
- TSN交换机，3个外部端口+1个内部端口
- EtherCAT Slave控制器，3个MAC端口
- 1个千兆以太网MAC控制器
- 2个100Mbps以太网PHY
- 32通道高分辨率PWM控制器，100ps
- 增量式和绝对值位置传感器接口x4
- 串行编码器输入/输出：支持多摩川，BISS-C，ENDAT等
- 8个CAN-FD接口
- 4个16b SAR ADC
- 2个4通道Σ Δ滤波器
- 289MAPBGA，14x14，0.8 pitch
- 196MAPBGA，12x12，0.8 pitch
- TA：-40 ~ 105°C



HPM IN Robot

关节模组(1) - HPM6ExY

- EtherCAT通讯，正版授权IP
- 高集成度：内置2个PHY
- 高算力 600MHz & 硬件电流环
- 宽工作温度：105° C

关节模组(2) - HPM5300

- 4个CANFD\16b ADC
- 丰富的编码器接口
- 宽工作温度：105° C

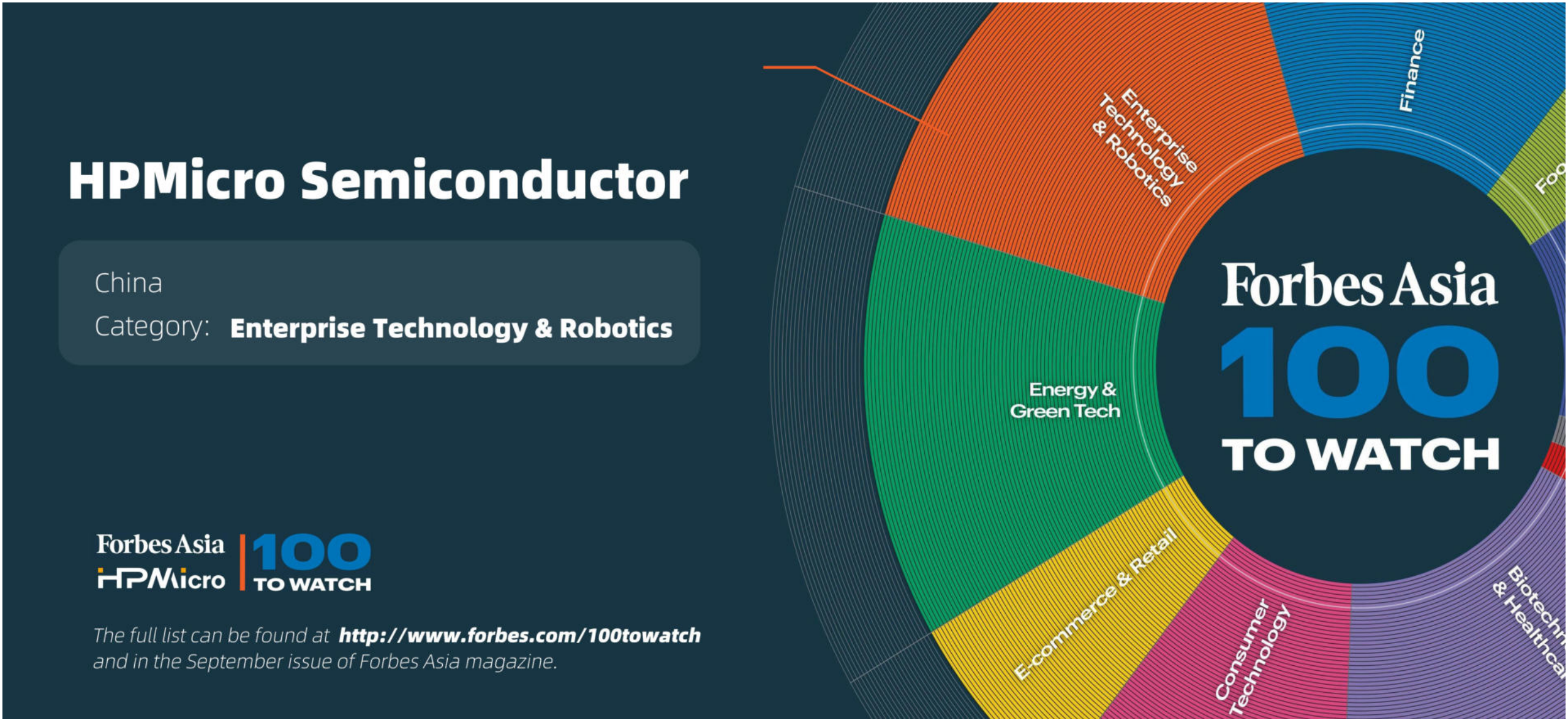
IMU 模块- HPM5300

- 高算力 480MHz
- 高速接口 SPI/UART；
- 小封装：6*6；

编码器- HPM5300

- 16b高精度ADC；
- 适合磁编、电感编；
- 封装灵活QFN48；

HPM IN Forbes100



HPMicro Ecosystem

Software Tools and IDE

IDE

Free commertial license

Commertial license needed

HPM Studio

开发工具

SDK

HPM Pin Mux

HPMLink

HPMPerTool

HPMPLx

RTOS & Middleware

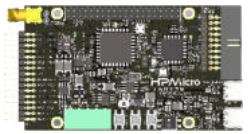
RTOS

Middleware

Evaluation Kit

HPM6750EVK

HPM6300EVK



HPM5300EVK

HPM6750EVKMiNI

HPM6200EVK

HPM6000 Motor Control Board

Application

Dashboard

Motor control

UI

AI

ESI/PCS

Communicaition

Audio/Audio

Edge computing

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先楫半导体官方新闻发布

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