

BearPi-IoT Std

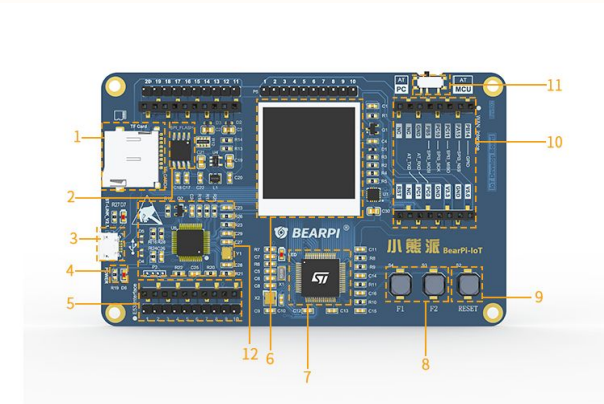
Revision B02

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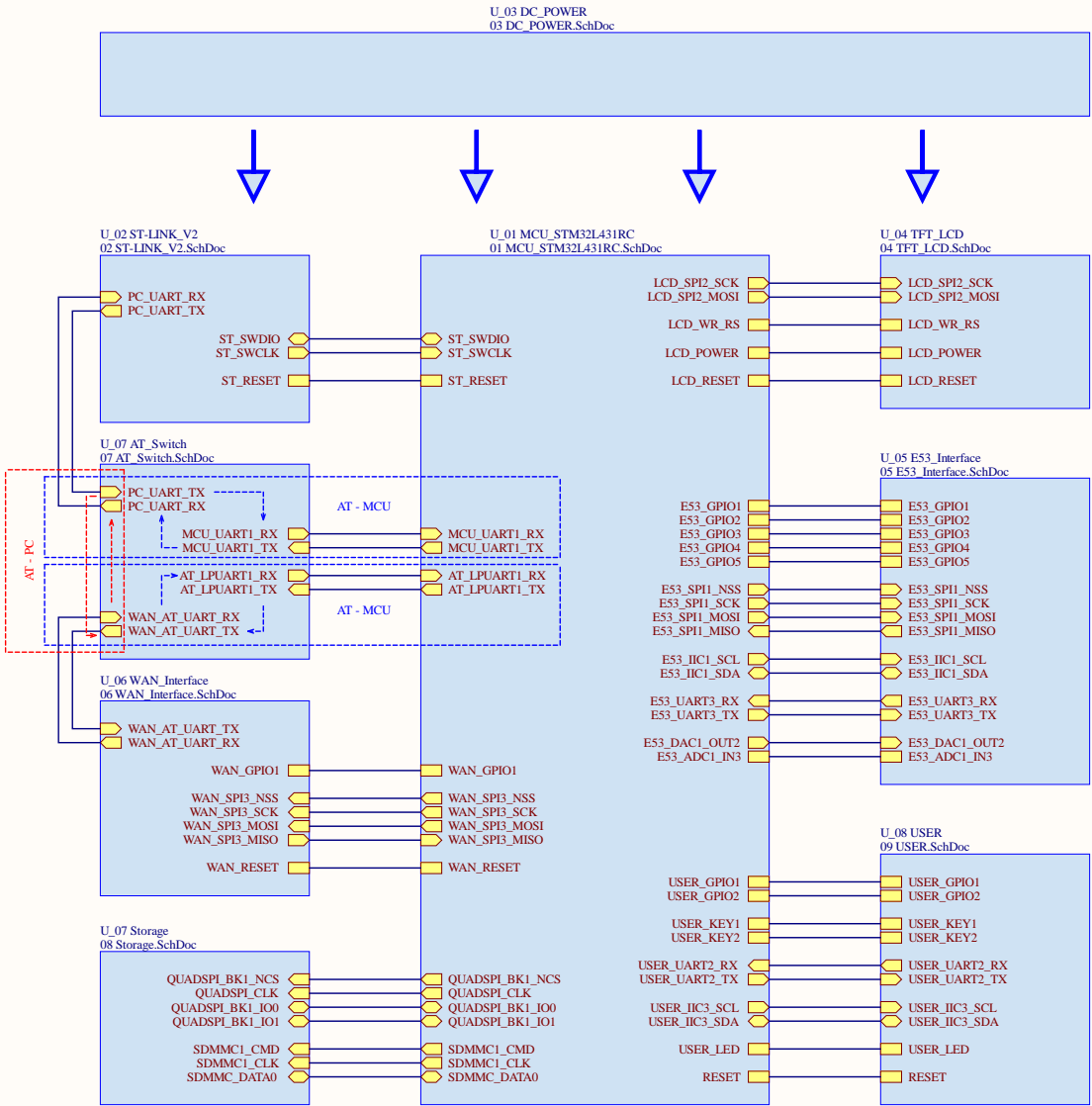
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框架说明

- BearPi-IoT Std开发板总体上由以下功能模块构成
- 01 存储部分，通用TF卡接口
 - 02 存储部分，板载64M QSPI-FLASH
 - 03 5V电源输入，通过降压电路降为3.3V，为整个开发板供电
 - 04 电源指示灯
 - 05 E53接口，遵循物联网俱乐部E53接口标准而设计，为开发者提供快捷的案例扩展方式
 - 06 液晶显示屏部分，搭载1.3寸TFT 液晶显示屏，为开发者提供一个直观的交互界面
 - 07 主控部分，为整个开发板的核心，相当于整个开发板的大脑
 - 08 用户按键部分，包含两个用户按键，方便开发者进行二次开发
 - 09 复位按键，可对开发板进行复位
 - 10 WAN接口，同样遵循物联网俱乐部WAN网络接口标准而设计，为开发者提供快捷的通讯扩展方式
 - 11 AT模式切换开关，可在PC-扩展板、MCU-扩展板两种模式下进行切换
 - 12 烧录下载部分，为用户烧录、下载、仿真程序提供一个快捷的方式



BearPi-IoT Std Overview



STM32L431RCT6 IO部分

U2A

Pin	Function	Pin	Function
14	E53 GPIO1	8	AT_LPUART1_RX
15	E53 SPI1_SCK	9	AT_LPUART1_TX
16	USER_UART1_TX	10	E53_ADC1_IN3
17	USER_UART2_RX	11	LCD_SPI2_MOSI
20	E53 SPI1_NSS	14	E53_UART3_TX
21	E53 DAC1_OUT2	15	E53_UART3_RX
22	E53 SPI1_MISO	17	LCD_WR_RS
23	USER_IIC3_SCL	18	LCD_RESET
41	E53 GPIO4	19	SDMMC1_DATA0
42	MCU_UART1_TX	20	E53_GPIO5
43	MCU_UART1_RX	21	WAN_SPI3_SCK
44	USER_GPIO2	22	WAN_SPI3_MISO
45	E53 SPI1_MOSI	23	SDMMC1_CLK
46	STLK_SWDIO	25	USER_LED
49	STLK_SWCLK	26	OSC32_IN
50	WAN_SPI3_NSS	27	OSC32_OUT
26	QUADSPI_BK1_IO1	26	SDMMC1_CMD
27	QUADSPI_BK1_IO0	5	OSC_IN
28	USER_KEY1	6	OSC_OUT
29	USER_KEY2	60	
56	USER_IIC3_SDA		
57	WAN_SPI3_MOSI		
58	E53 IIC1_SCL		
59	E53 IIC1_SDA		
60	E53 GPIO3		
61	E53 GPIO2		
29	QUADSPI_CLK		
30	QUADSPI_BK1_NCS		
31	USER_GPIO1		
32	LCD_SPI2_SCK		
33	WAN_GPIO1		
34	LCD_POWER		

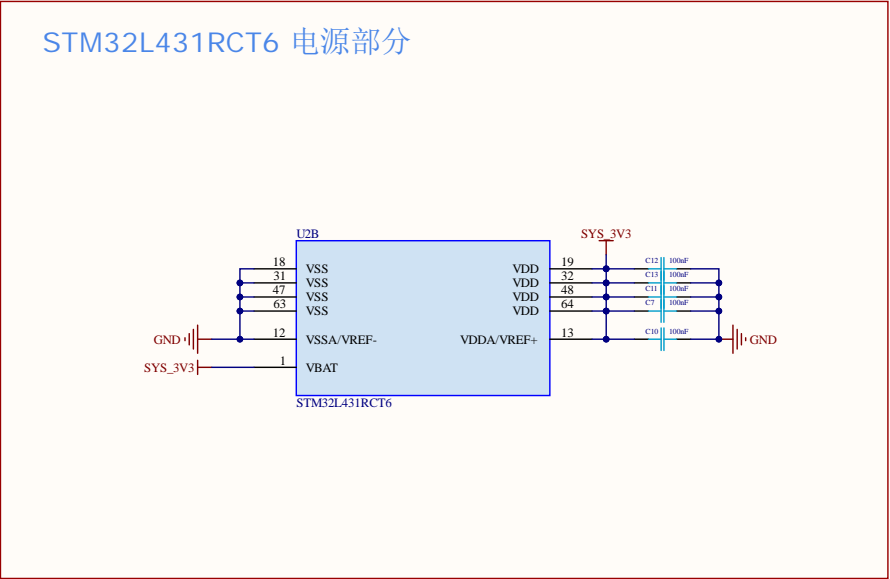
STM32L431RCT6

PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14-OSC32_IN
PC15-OSC32_OUT
PD2
PH0-OSC_IN
PH1-OSC_OUT
PH3/BOOT0
NRST

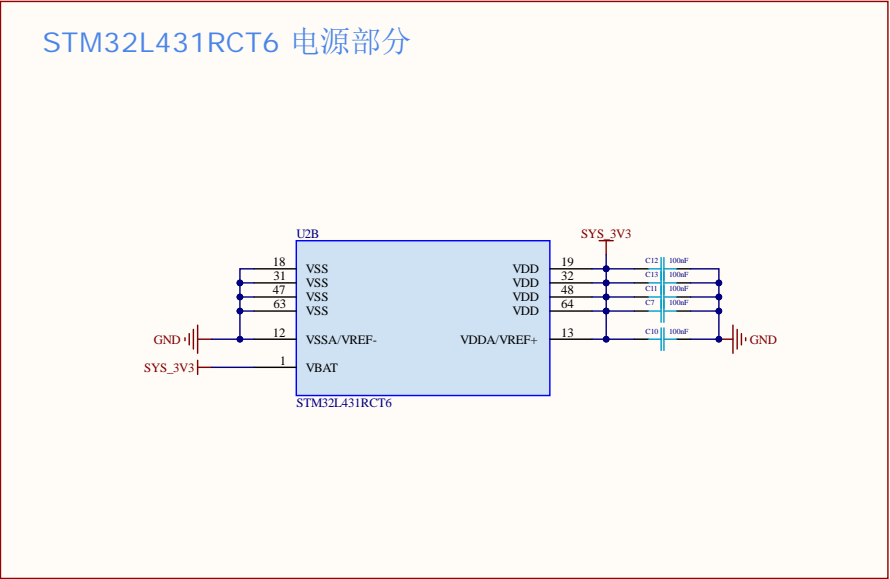
AT_LPUART1_RX
E53_ADC1_IN3
LCD_SPI2_MOSI
E53_UART3_TX
E53_UART3_RX
LCD_WR_RS
LCD_RESET
SDMMC1_DATA0
E53_GPIO5
WAN_SPI3_SCK
WAN_SPI3_MISO
SDMMC1_CLK
USER_LED
OSC32_IN
OSC32_OUT
SDMMC1_CMD
OSC_IN
OSC_OUT

10k

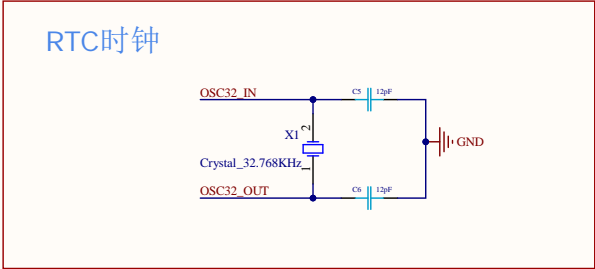
GN D



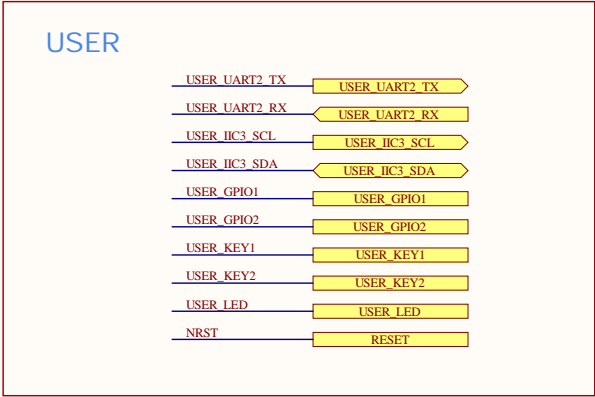
STM32L431RCT6 电源部分



主时钟

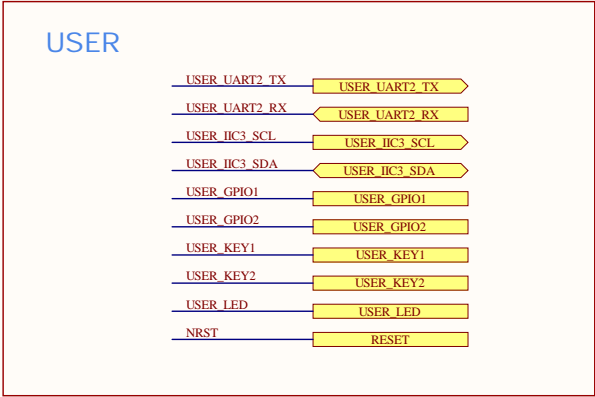


RTC时钟




USER

USER_UART2_TX	USER_UART2_TX
USER_UART2_RX	USER_UART2_RX
USER_IIC3_SCL	USER_IIC3_SCL
USER_IIC3_SDA	USER_IIC3_SDA
USER_GPIO1	USER_GPIO1
USER_GPIO2	USER_GPIO2
USER_KEY1	USER_KEY1
USER_KEY2	USER_KEY2
USER_LED	USER_LED
NRST	RESET



QSPI FLASH



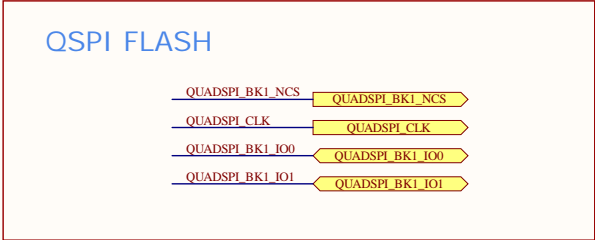
The diagram illustrates the QSPI FLASH signals. It consists of four horizontal signal lines, each represented by a blue line with a small vertical tick at the left end. From top to bottom, the signals are: QUADSPI_BK1_NCS, QUADSPI_CLK, QUADSPI_BK1_IO0, and QUADSPI_BK1_IO1. Each signal line is connected to a yellow arrow-shaped box pointing to the right. The boxes are labeled: QUADSPI_BK1_NCS, QUADSPI_CLK, QUADSPI_BK1_IO0, and QUADSPI_BK1_IO1.

QUADSPI_BK1_NCS

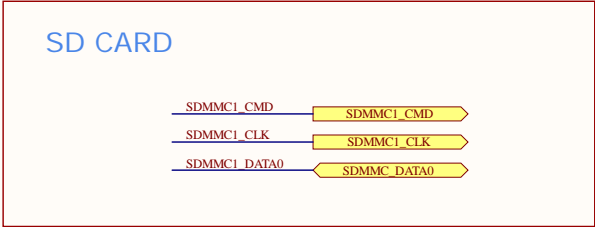
QUADSPI_CLK

QUADSPI_BK1_IO0


QUADSPI_BK1_IO1



SD CARD

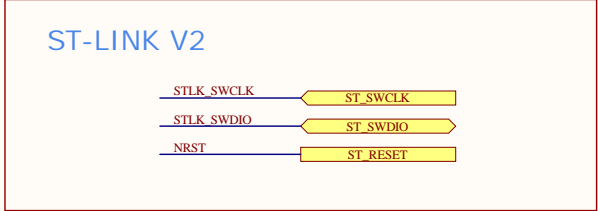


ST-LINK V2



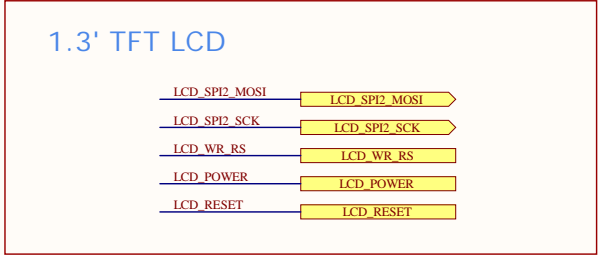
The diagram illustrates the connections for the ST-LINK V2 interface. It features three horizontal blue lines representing the connection wires. The top line is labeled 'STLK SWCLK' on the left and connects to a yellow box labeled 'ST_SWCLK'. The middle line is labeled 'STLK SWDIO' on the left and connects to a yellow box labeled 'ST_SWDIO'. The bottom line is labeled 'NRST' on the left and connects to a yellow box labeled 'ST_RESET'.

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graph LR; A[STLK SWCLK] --- B[ST_SWCLK]; C[STLK SWDIO] --- D[ST_SWDIO]; E[NRST] --- F[ST_RESET];
```



1.3' TFT LCD

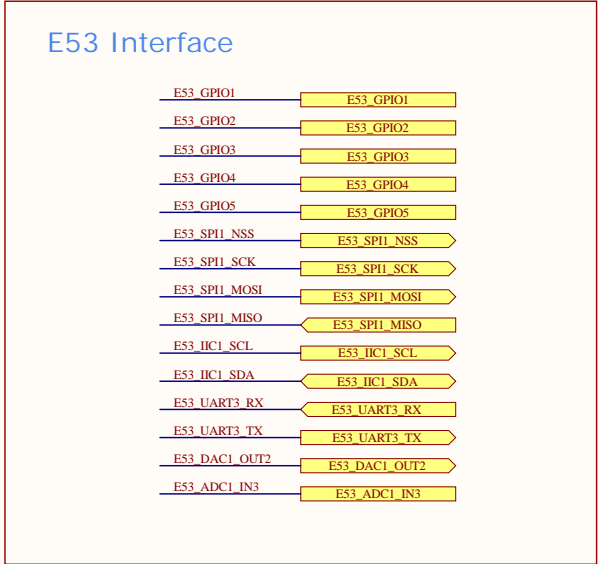
Pin	Label
LCD_SPI2_MOSI	LCD_SPI2_MOSI
LCD_SPI2_SCK	LCD_SPI2_SCK
LCD_WR_RS	LCD_WR_RS
LCD_POWER	LCD_POWER
LCD_RESET	LCD_RESET



E53 Interface

The diagram illustrates the E53 interface pins and their connections. It consists of two columns of pins, each with a yellow rectangular label. The left column labels are connected to the right column labels by blue lines. The connections are as follows:

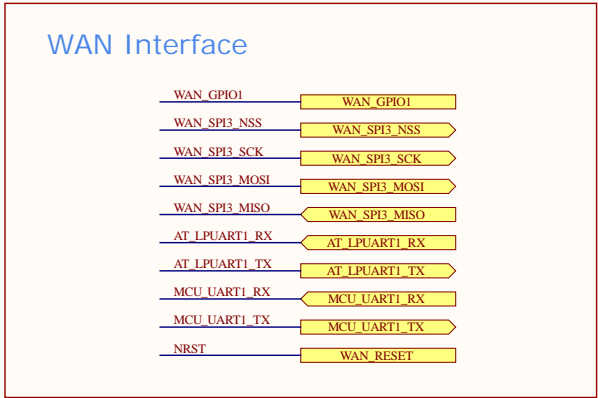
Left Pin Label	Right Pin Label
E53_GPIO1	E53_GPIO1
E53_GPIO2	E53_GPIO2
E53_GPIO3	E53_GPIO3
E53_GPIO4	E53_GPIO4
E53_GPIO5	E53_GPIO5
E53_SPI1_NSS	E53_SPI1_NSS
E53_SPI1_SCK	E53_SPI1_SCK
E53_SPI1_MOSI	E53_SPI1_MOSI
E53_SPI1_MISO	E53_SPI1_MISO
E53_IIC1_SCL	E53_IIC1_SCL
E53_IIC1_SDA	E53_IIC1_SDA
E53_UART3_RX	E53_UART3_RX
E53_UART3_TX	E53_UART3_TX
E53_DAC1_OUT2	E53_DAC1_OUT2
E53_ADC1_IN3	E53_ADC1_IN3



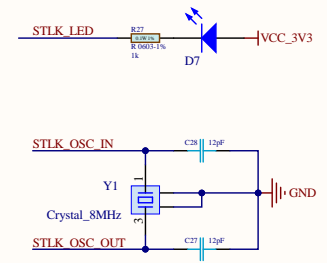
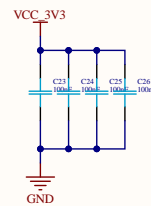
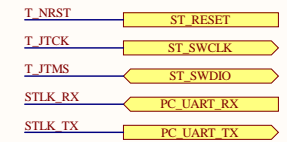
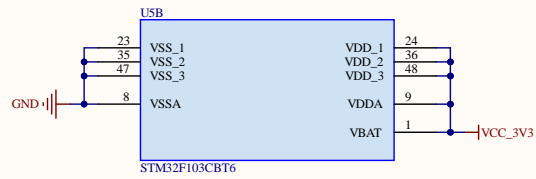
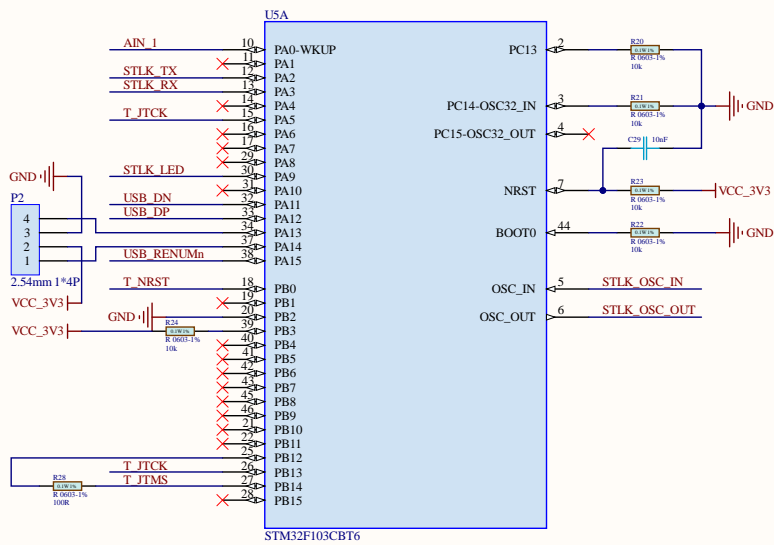
WAN Interface

The diagram illustrates the pin connections for a WAN interface. On the left, a microcontroller pinout is shown with labels: WAN_GPIO1, WAN_SPI3_NSS, WAN_SPI3_SCK, WAN_SPI3_MOSI, WAN_SPI3_MISO, AT_LPUART1_RX, AT_LPUART1_TX, MCU_UART1_RX, MCU_UART1_TX, and NRST. On the right, a WAN module pinout is shown with labels: WAN_GPIO1, WAN_SPI3_NSS, WAN_SPI3_SCK, WAN_SPI3_MOSI, WAN_SPI3_MISO, AT_LPUART1_RX, AT_LPUART1_TX, MCU_UART1_RX, MCU_UART1_TX, and WAN_RESET. Blue lines connect the corresponding pins between the two components.

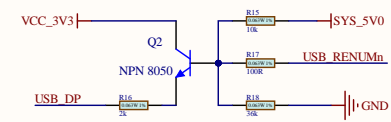
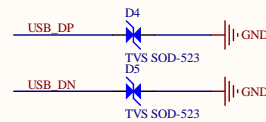
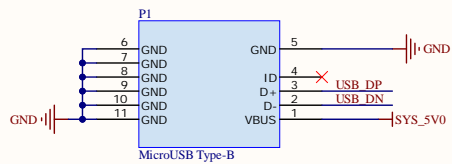
Microcontroller Pin	WAN Module Pin
WAN_GPIO1	WAN_GPIO1
WAN_SPI3_NSS	WAN_SPI3_NSS
WAN_SPI3_SCK	WAN_SPI3_SCK
WAN_SPI3_MOSI	WAN_SPI3_MOSI
WAN_SPI3_MISO	WAN_SPI3_MISO
AT_LPUART1_RX	AT_LPUART1_RX
AT_LPUART1_TX	AT_LPUART1_TX
MCU_UART1_RX	MCU_UART1_RX
MCU_UART1_TX	MCU_UART1_TX
NRST	WAN_RESET



ST-LINK V2

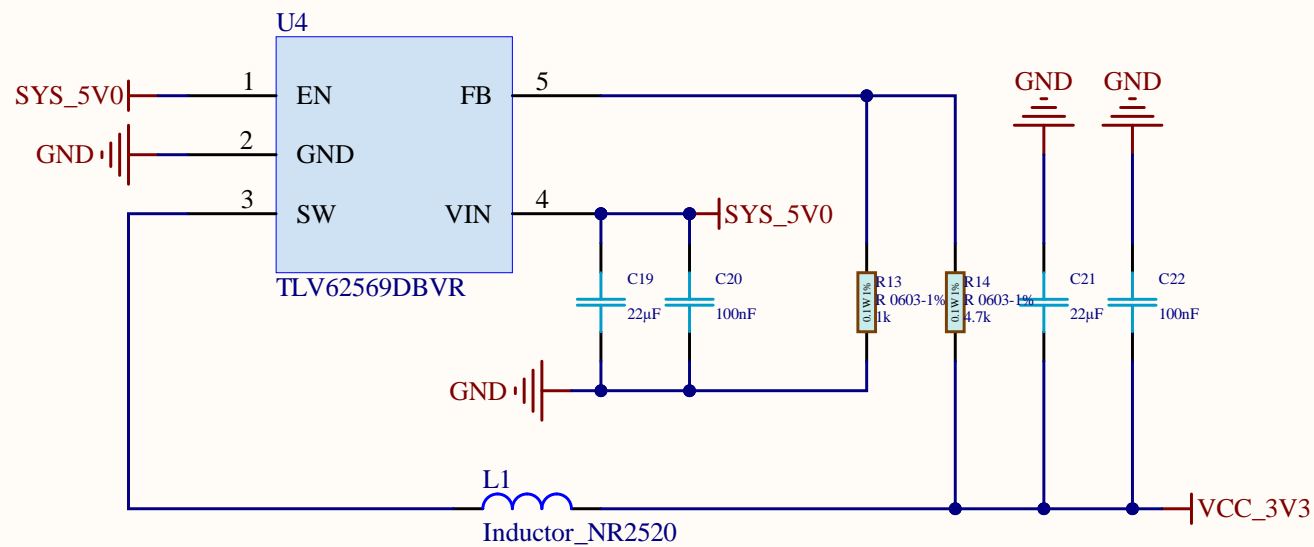


Micro USB

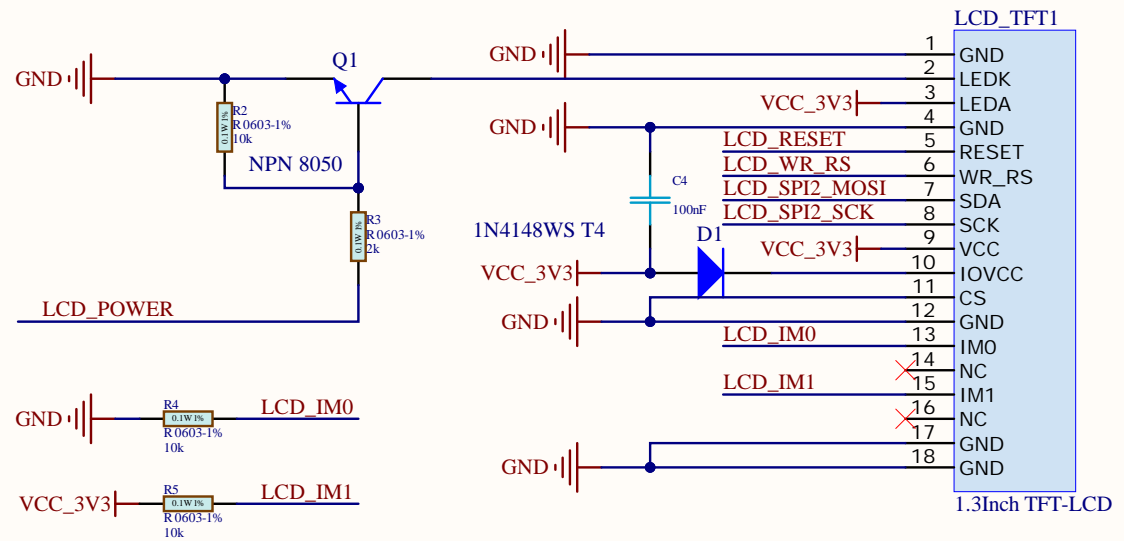
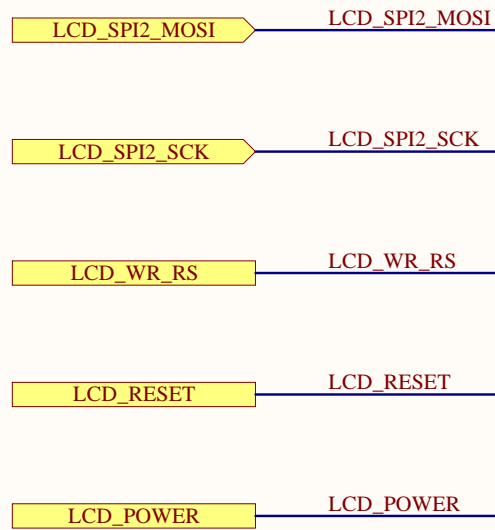


DC POWER

△ DC-DC降压电路，由Micro USB输入5V电压，通过该降压电路将5V降压至3.3V，从而向MCU等电路送电

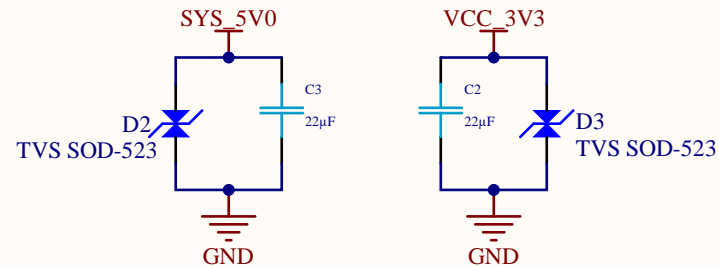
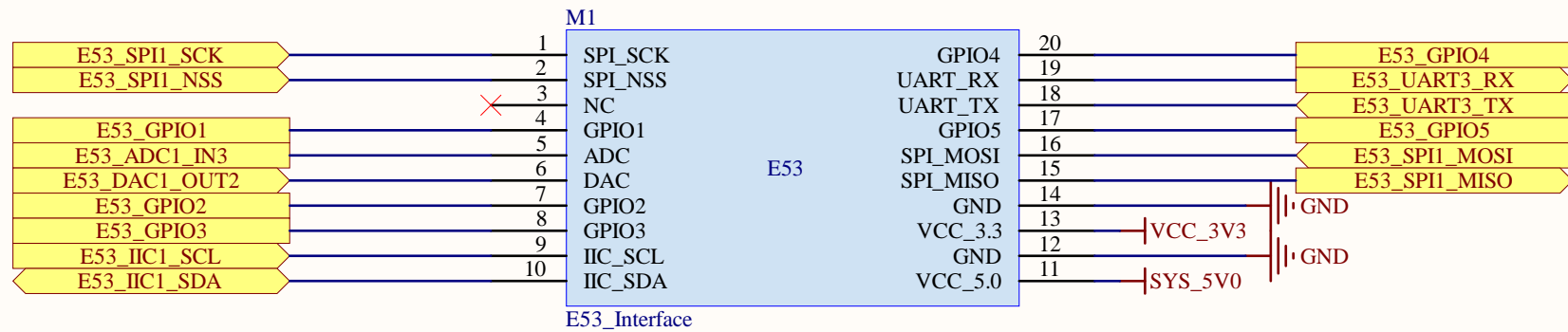


1.3' TFT LCD



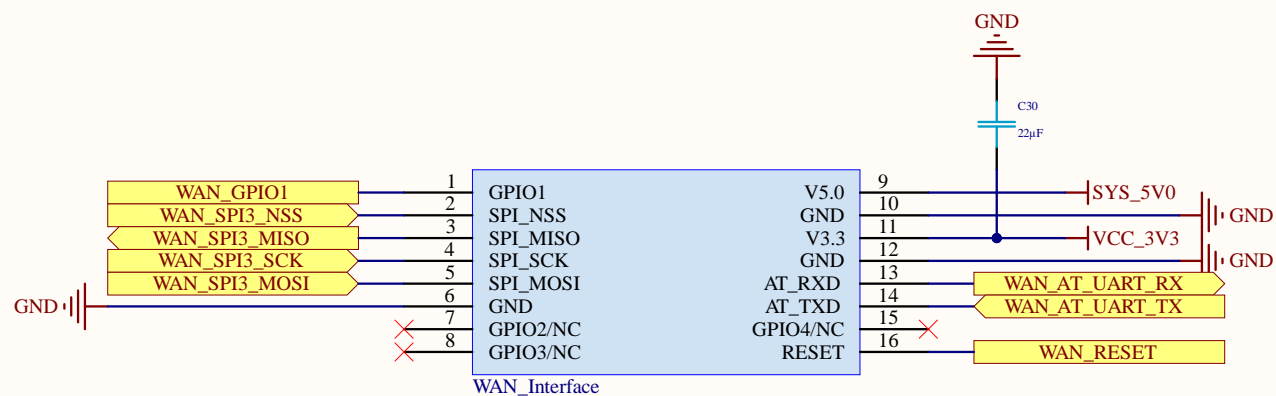
E53 Interface

E53案例扩展接口，遵循物联网俱乐部E53接口标准，可接入已有的E53_SC1、E53_SC2、E53_ST1、E53_SF1、E53_IA1、E53_IS1等案例扩展板



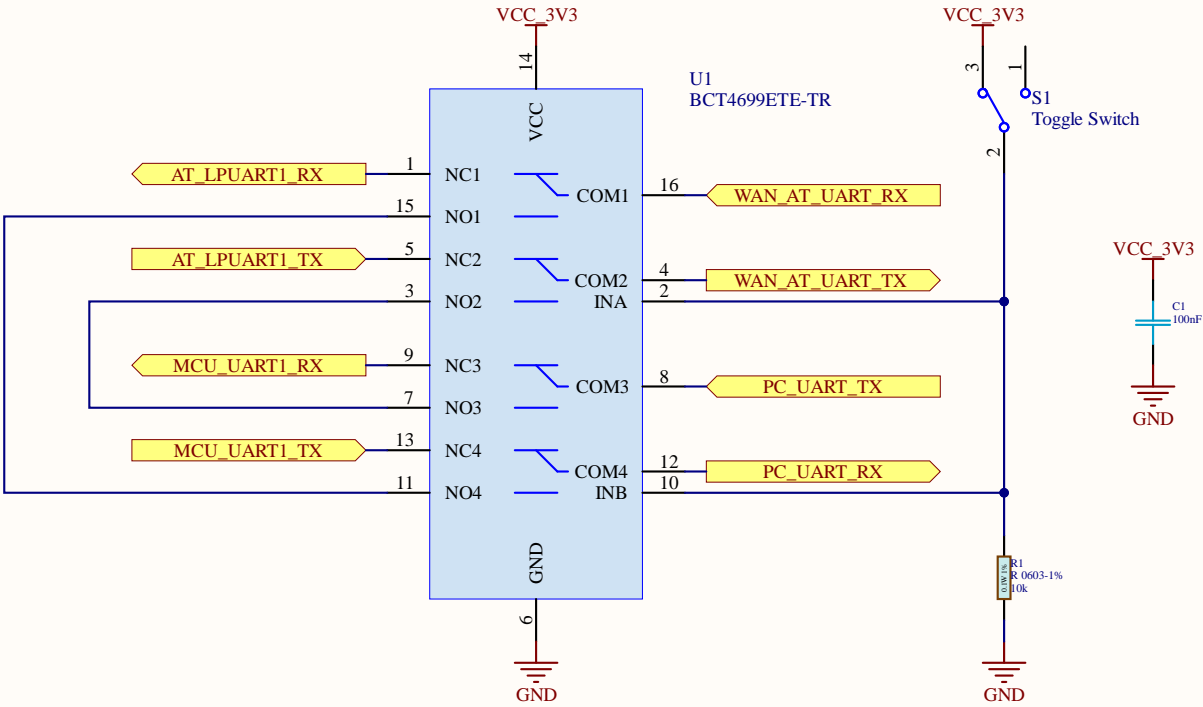
WAN Interface

△ WAN通讯扩展接口，遵循物联网俱乐部WAN网络接口标准，可接入已有的NB35-A、NB28、WIFI8266、G2 6、4G600S等通讯扩展板

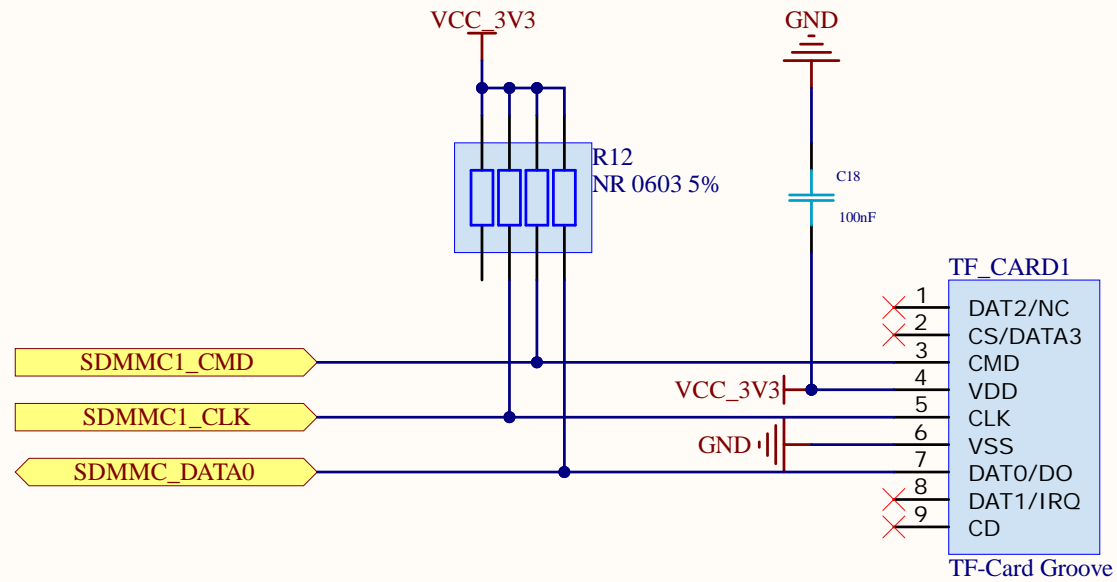


AT SWITCH

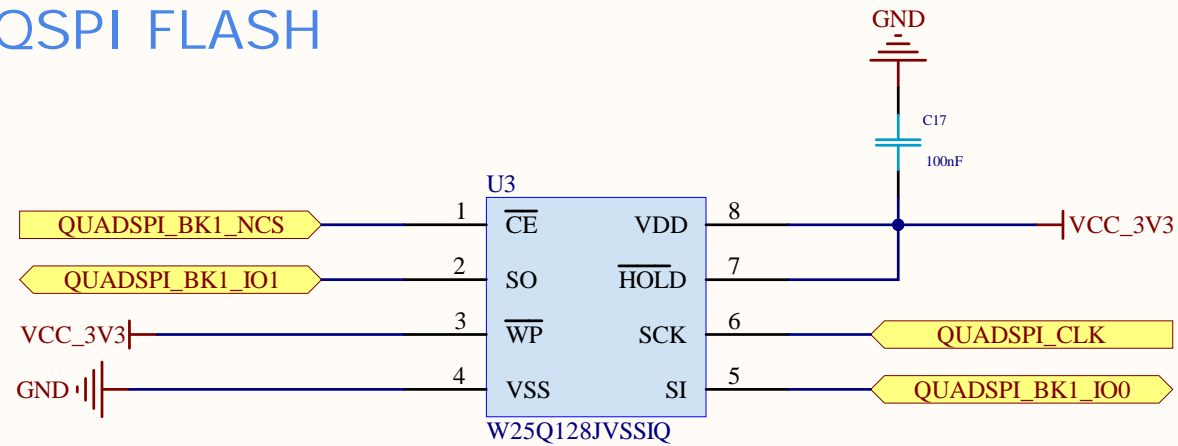
△ AT模式切换开关，可在PC-扩展板、MCU-扩展板两种模式下进行切换



SD Card

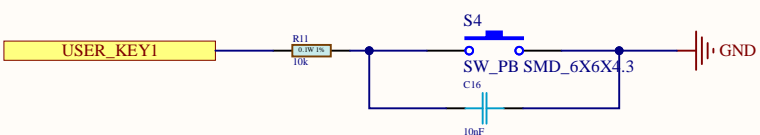
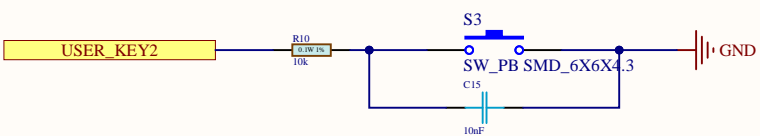
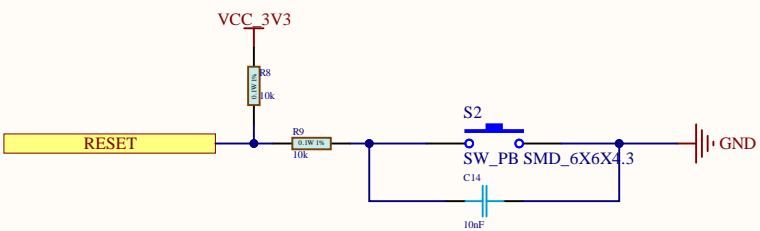


QSPI FLASH



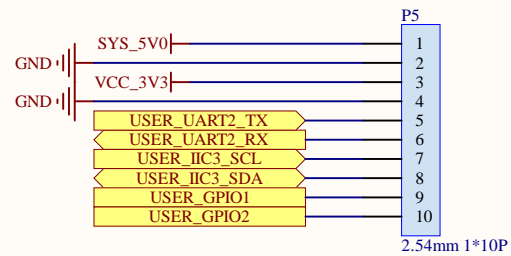
USER KEY

用户按键，包含一个复位按键和两个可编程按键



RESERVE

保留接口，包含一组串口，一组IIC接口和两个可编程GPIO



USER LED

