

Raspberry PI 4B 上如何使用 DIDO 模板

一、启用 SPI 接口

sudo raspi-config

```
1 Change User Password Change password for the current user
2 Network Options      Configure network settings
3 Boot Options         Configure options for start-up
4 Localisation Options Set up language and regional settings to match your location
5 Interfacing Options  Configure connections to peripherals
6 Overclock            Configure overclocking for your Pi
7 Advanced Options     Configure advanced settings
8 Update               Update this tool to the latest version
9 About raspi-config   Information about this configuration tool

P1 Camera             Enable/Disable connection to the Raspberry Pi Camera
P2 SSH                Enable/Disable remote command line access to your Pi using SSH
P3 VNC                Enable/Disable graphical remote access to your Pi using RealVNC
P4 SPI                Enable/Disable automatic loading of SPI kernel module
P5 I2C                Enable/Disable automatic loading of I2C kernel module
P6 Serial             Enable/Disable shell and kernel messages on the serial connection
P7 1-Wire             Enable/Disable one-wire interface
P8 Remote GPIO        Enable/Disable remote access to GPIO pins
```

二、安装 piface 软件支持包（此方法亦适用于 PI4B 之前的硬件）

Debian Stretch 以及之后版本 软件源未对相关软件进行收录，无法使用 apt-get 工具进行安装

需要自行手动安装

方式 1:

使用 wget 在 raspberry pi 上在线下载 deb 包

```
wget https://github.com/piface/pifacecommon/releases/download/v4.2.1/python3-pifacecommon_4.2.1-1_all.deb
```

```
wget https://github.com/piface/pifacedigitalio/releases/download/v3.1.0/python3-pifacedigitalio_3.1.0-1_all.deb
```

方式 2: pc 端下载 deb 包后复制到 raspberry pi

安装:

```
sudo dpkg -i python3-pifacecommon_4.2.1-1_all.deb
```

```
sudo dpkg -i python3-pifacedigitalio_3.1.0-1_all.deb
```

三、设定 SPI 通信口时钟频率

在新固件中默认 spi 时钟频率过高需要做调整，不同固件版本设置文件路径可能稍有不同。以 raspberry pi 4B 最新版 Raspbian Buster 为例

```
sudo vim /usr/lib/python3/dist-packages/pifacecommon/spi.py
```

找到

```
# create the spi transfer struct

    transfer = spi_ioc_transfer(
        tx_buf=ctypes.addressof(wbuffer),
        rx_buf=ctypes.addressof(rbuffer),
        len=ctypes.sizeof(wbuffer)
    )
```

添加一行默认频率设定

```
# create the spi transfer struct
```

```
    transfer = spi_ioc_transfer(
        tx_buf=ctypes.addressof(wbuffer),
        rx_buf=ctypes.addressof(rbuffer),
        len=ctypes.sizeof(wbuffer),
        speed_hz=ctypes.c_uint32(100000)    #设置默认频率
    )
```

通过以上步骤模块即可正常使用

关于后续 PCB 布局的调整：

由于 Pi4 B 以太网口移到 PCB 上侧和 DIDO 模块有冲突，不做处理则无法和插针紧密连接，DIDO 模块 PCB 右侧长度需减少 1.5mm 左右，铜柱安装孔位置不变。

接口布局：

PI 3 及以往



PI4 B



参考资料:

Piface GitHub:

<https://github.com/piface>

<https://github.com/piface/pifacecommon/releases>

<https://github.com/piface/pifacedigitalio/releases>

SPI 频率设定:

<https://www.raspberrypi.org/forums/viewtopic.php?t=170606>

<https://raspberrypi.stackexchange.com/questions/67028/piface-digital-2-and-raspberry-pi-3?rq=1>