RTOS SDK Hello world

2022 年 5 月 21 日 星期六

上午 12:37

Install dev-tools

```
$ sudo apt-get install gcc git wget make libncurses-dev flex bison gperf python2 python-serial
# 可能需要安装 python2 版本的 pip 工具
```

Toolchain Setup

```
$ mkdir -p ~/esp
$ cd ~/esp
# 解压工具链到当前(~/esp)文件夹
$ tar-xzf~/Downloads/xtensa-lx106-elf-linux64-1.22.0-100-ge567ec7-5.2.0.tar.gz
$ export PATH="$PATH:$HOME/esp/xtensa-lx106-elf/bin"
```

SDK Setup

```
# 解压 SDK 到当前(~/esp)目录
$ unzip ESP8266_RTOS_SDK-v3.4.zip
$ export IDF_PATH="$HOME/esp/ESP8266_RTOS_SDK"
$ python -m pip install --user -r $IDF_PATH/requirements.txt
```

Build Setup

```
$ cd ~/esp/hello_world
$ make menuconfig
$ make all
```

镜像文件

```
python $IDF_PATH/components/esptool_py/esptool/esptool.py --chip esp8266 --port /dev/ttyS4 --
baud 115200 --before default_reset --after hard_reset write_flash -z --flash_mode dout --
flash_freq 40m --flash_size 8MB 0x0
/home/wnavy/esp/hello_world/build/bootloader/bootloader.bin 0x10000
/home/wnavy/esp/hello_world/build/hello-world.bin 0x8000
/home/wnavy/esp/hello_world/build/partitions_singleapp.bin
```

Flash 分区

默认生成 **bootloader.bin**, **hello_world.bin**, **partitions_singleapp.bin**

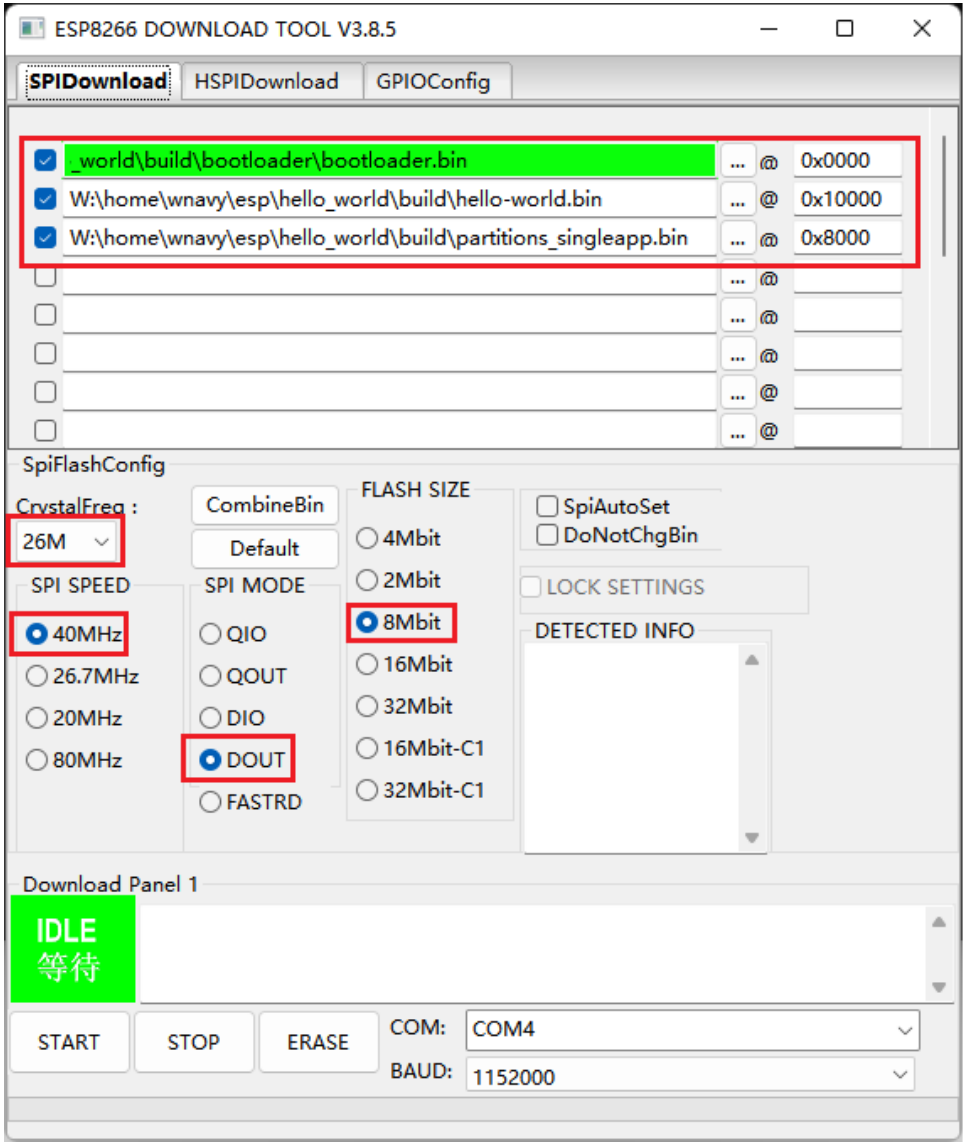
bin 文件	烧录地址	说明
bootloader.bin	**0x1000**	二级 boot 程序，由 SDK 代码编译生成 (/build/bootloader/bootloader.bin)
partitions_singleapp.bin	**0x8000**	分区信息，由代码自动生成(build/partitions_singleapp.bin)
Hello_world.bin	**0x10000**	用户主程序，由代码编译生成 (build/hello-world.bin)

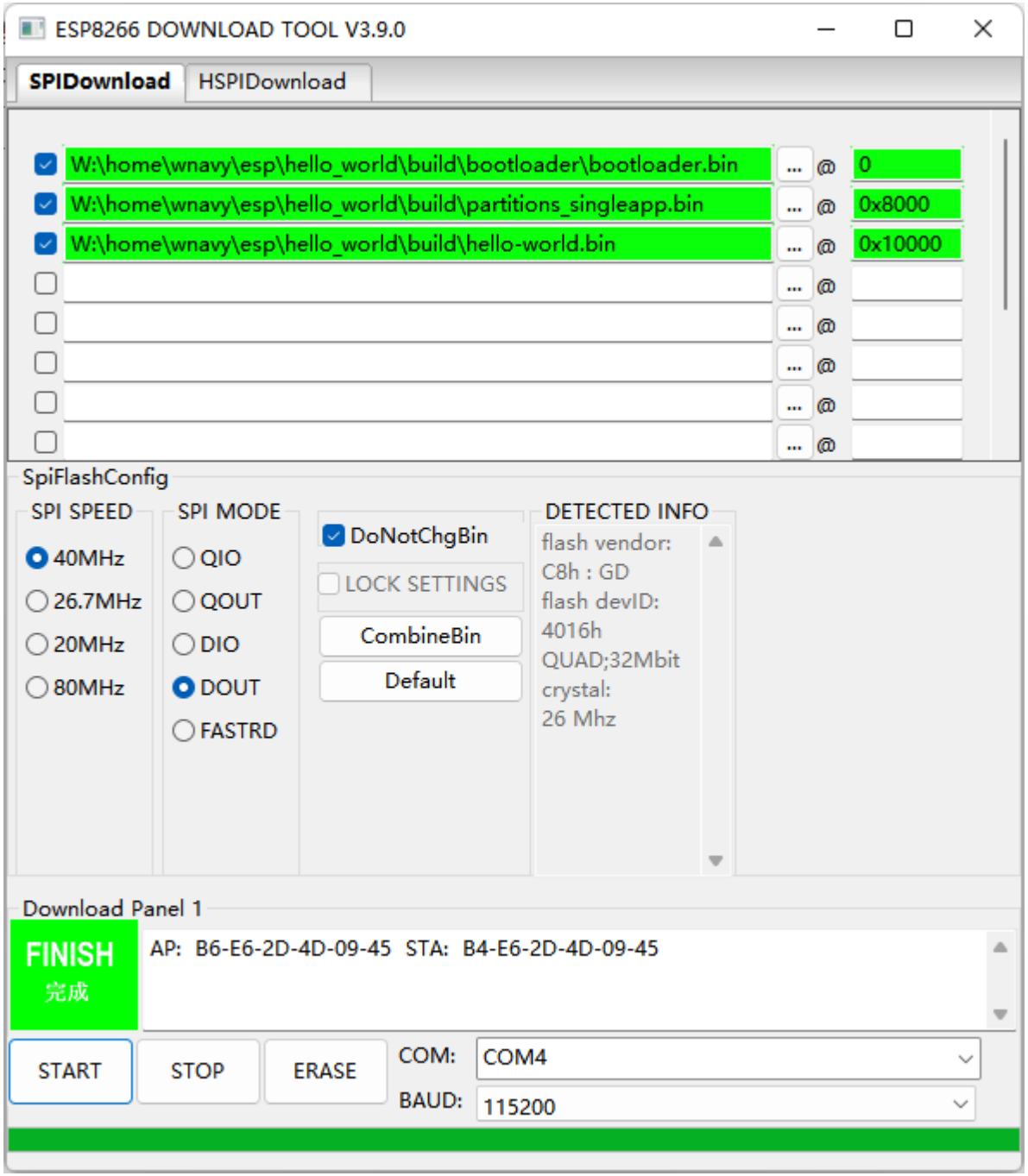
下载模式

1. 首先确保模组可以正常运行工作，发送 AT 指令可以有回复 AT OK（即确保电源和串口连接正常）；
2. **拉低 GPIO0**，打开串口工具，在波特率 **74880** 下观察模组的启动或复位后的打印信息；
3. 若出现以下红色字符则认为模组已经进入了下载模式（后面的 7 数值不用理会），可以去正常进行下载。

```
ets Jan 8 2014,rst cause 1, boot mode:(1,7)
```

Flash Tools


ESP8266 DOWNLOAD TOOL V3.8.5
SPIDownload
HSPIDownload
GPIOConfig
_world\build\bootloader\bootloader.bin
@ 0x0000
W:\home\wnavy\esp\hello_world\build\hello-world.bin
@ 0x10000
W:\home\wnavy\esp\hello_world\build\partitions_singleapp.bin
@ 0x8000
SpiFlashConfig
CrystalFreq :
26M
CombineBin
Default
SPI SPEED
40MHz
26.7MHz
20MHz
80MHz
SPI MODE
QIO
QOUT
DIO
DOUT
FASTRD
FLASH SIZE
4Mbit
2Mbit
8Mbit
16Mbit
32Mbit
16Mbit-C1
32Mbit-C1
SpiAutoSet
DoNotChgBin
LOCK SETTINGS
DETECTED INFO
Download Panel 1
IDLE
等待
START
STOP
ERASE
COM:
COM4
BAUD:
1152000


ESP8266 DOWNLOAD TOOL V3.9.0
SPIDownload
HSPIDownload
W:\home\wnavy\esp\hello_world\build\bootloader\bootloader.bin
@
0
W:\home\wnavy\esp\hello_world\build\partitions_singleapp.bin
@
0x8000
W:\home\wnavy\esp\hello_world\build\hello-world.bin
@
0x10000
SpiFlashConfig
SPI SPEED
40MHz
26.7MHz
20MHz
80MHz
SPI MODE
QIO
QOUT
DIO
DOUT
FASTRD
DoNotChgBin
LOCK SETTINGS
CombineBin
Default
DETECTED INFO
flash vendor:
C8h : GD
flash devID:
4016h
QUAD;32Mbit
crystal:
26 Mhz
Download Panel 1
FINISH
完成
AP: B6-E6-2D-4D-09-45 STA: B4-E6-2D-4D-09-45
START
STOP
ERASE
COM:
COM4
BAUD:
115200

上电时乱码

ESP8266 芯片本身支持 26MHz 和 40MHz 的晶振，若使用 40MHz 晶振，则默认波特率为 115200，若使用 26MHz 晶振，则 UART0 上电后的波特率=**26*115200/40=74880**，安信可的 ESP8266 系列模组均使用 26MHz，由于一般的串口工具不会支持这个波特率，所以上电时会有打印乱码。

可使用安信可串口助手通过配置波特率 74880 查看启动信息。注意：部分 USB 转 TTL 不支持 74880 波特率，电脑自带 RS232 转 TTL 也不支持 74880 波特率，推荐使用 FT232、CP2102、CH340 等芯片。

Hello World

```
 ets Jan  8 2013,rst cause:2, boot mode:(3,6)

load 0x40100000, len 7032, room 16
tail 8
chksum 0x5b
load 0x3ffe8408, len 24, room 0
tail 8
chksum 0x72
load 0x3ffe8420, len 3312, room 0
tail 0
chksum 0x31
csum 0x31
I (80) boot: ESP-IDF v3.4 2nd stage bootloader
I (80) boot: compile time 00:22:20
I (80) boot: SPI Speed      : 40MHz
I (90) boot: SPI Mode       : DOUT
I (102) boot: SPI Flash Size : 1MB
I (115) boot: Partition Table:
I (126) boot: ## Label            Usage          Type ST Offset   Length
I (149) boot:  0 nvs              WiFi data        01 02 00009000 00006000
I (172) boot:  1 phy_init         RF data          01 01 0000f000 00001000
I (195) boot:  2 factory          factory app      00 00 00010000 000f0000
I (219) boot: End of partition table
I (232) esp_image: segment 0: paddr=0x00010010 vaddr=0x40210010 size=0x1b2a4 (111268) map
```

```
I (333) esp_image: segment 1: paddr=0x0002b2bc vaddr=0x4022b2b4 size=0x06ef4 ( 28404) map
I (353) esp_image: segment 2: paddr=0x000321b8 vaddr=0x3ffe8000 size=0x00554 (  1364) load
I (356) esp_image: segment 3: paddr=0x00032714 vaddr=0x40100000 size=0x00080 (   128) load
I (384) esp_image: segment 4: paddr=0x0003279c vaddr=0x40100080 size=0x04f6c ( 20332) load
I (423) boot: Loaded app from partition at offset 0x10000
Hello world!
This is ESP8266 chip with 1 CPU cores, WiFi, silicon revision 1, 8MB external flash
Restarting in 10 seconds...
Restarting in 9 seconds...
Restarting in 8 seconds...
Restarting in 7 seconds...
Restarting in 6 seconds...
Restarting in 5 seconds...
Restarting in 4 seconds...
Restarting in 3 seconds...
Restarting in 2 seconds...
Restarting in 1 seconds...
Restarting in 0 seconds...
Restarting now.
```

```
 ets Jan  8 2013,rst cause:2, boot mode:(3,0)

load 0x40100000, len 7032, room 16
tail 8
chksum 0x5b
load 0x3ffe8408, len 24, room 0
tail 8
chksum 0x72
load 0x3ffe8420, len 3312, room 0
tail 0
chksum 0x31
csum 0x31
I (43) boot: ESP-IDF v3.4 2nd stage bootloader
I (43) boot: compile time 00:22:20
I (43) boot: SPI Speed      : 40MHz
I (48) boot: SPI Mode       : DOUT
I (54) boot: SPI Flash Size : 8MB
I (60) boot: Partition Table:
```

```
I (66) boot: ## Label            Usage          Type ST Offset   Length
I (77) boot:  0 nvs              WiFi data        01 02 00009000 00006000
I (88) boot:  1 phy_init         RF data          01 01 0000f000 00001000
I (100) boot:  2 factory          factory app      00 00 00010000 000f0000
I (111) boot: End of partition table
I (118) esp_image: segment 0: paddr=0x00010010 vaddr=0x40210010 size=0x1b2a4 (111268) map
I (180) esp_image: segment 1: paddr=0x0002b2bc vaddr=0x4022b2b4 size=0x06ef4 ( 28404) map
I (193) esp_image: segment 2: paddr=0x000321b8 vaddr=0x3ffe8000 size=0x00554 (  1364) load
I (194) esp_image: segment 3: paddr=0x00032714 vaddr=0x40100000 size=0x00080 (   128) load
I (205) esp_image: segment 4: paddr=0x0003279c vaddr=0x40100080 size=0x04f6c ( 20332) load
I (227) boot: Loaded app from partition at offset 0x10000
Hello world!
This is ESP8266 chip with 1 CPU cores, WiFi, silicon revision 1, 8MB external flash
Restarting in 10 seconds...
Restarting in 9 seconds...
Restarting in 8 seconds...
Restarting in 7 seconds...
Restarting in 6 seconds...
Restarting in 5 seconds...
Restarting in 4 seconds...
Restarting in 3 seconds...
Restarting in 2 seconds...
Restarting in 1 seconds...
Restarting in 0 seconds...
Restarting now.
```

来自 <https://docs.espressif.com/projects/esp8266-rtos-sdk/en/latest/get-started/index.html#build-and-flash>