

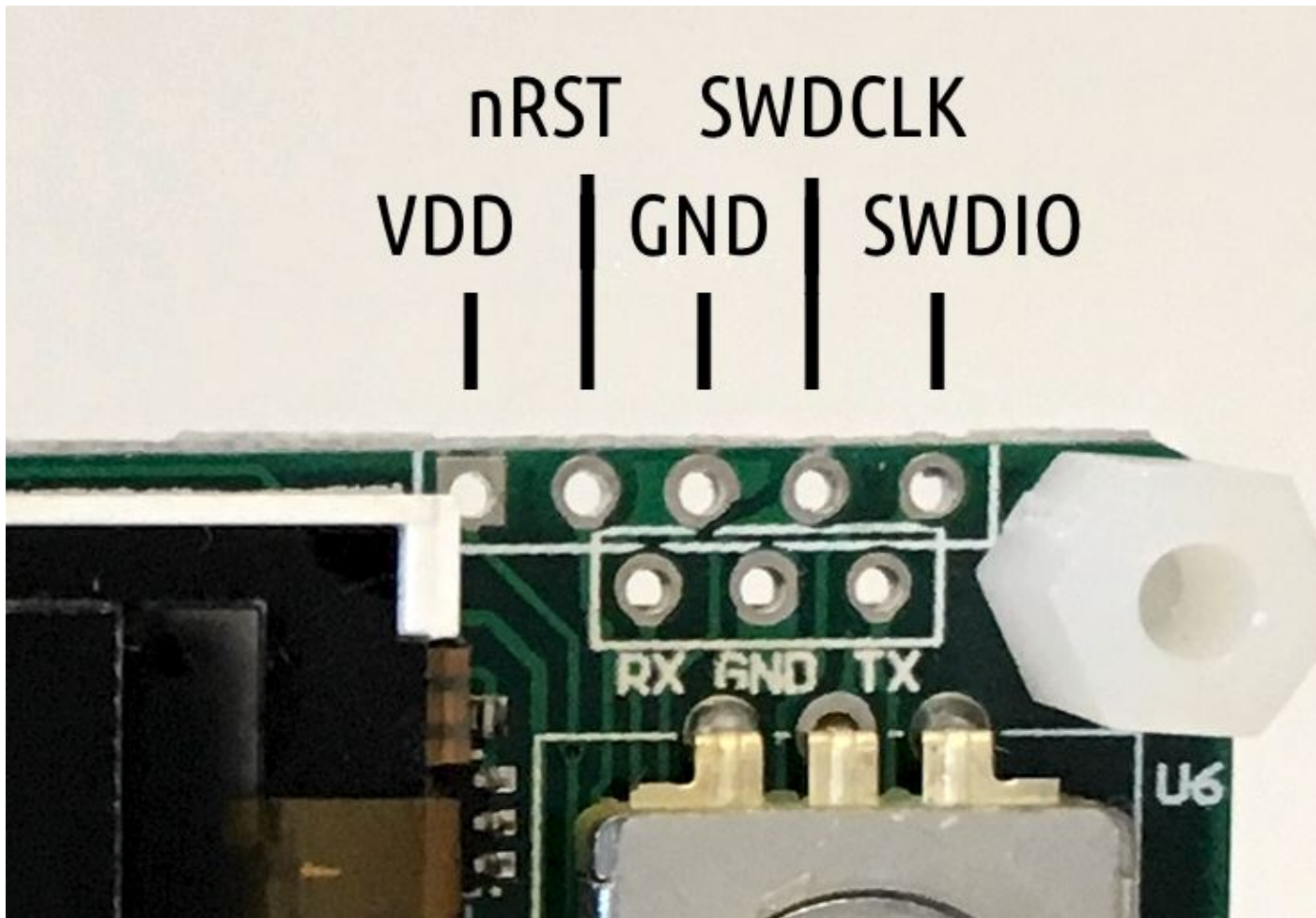
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OpenDPS

- <https://johan.kanflo.com/hacking-the-dps5005/>
- <https://johan.kanflo.com/opendps-design/>
- <https://johan.kanflo.com/upgrading-your-dps5005/>

pinout



upgrade to opensource firmware

<https://github.com/kanflo/opensdps.git>

```
dpavlin@nuc:/nuc$ git clone --recursive https://github.com/kanflo/opensdps.git
dpavlin@nuc:/nuc$ cd opensdps/
dpavlin@nuc:/nuc/opensdps$ make -C libopenm3
dpavlin@nuc:/nuc/opensdps$ make -C opensdps
```

st-link

connecting rst pin to unpowered st-link stops dps5005 from booting

<https://johan.kanflo.com/upgrading-your-dps5005/>

openocd

```
pi@pihmi:~$ sudo openocd -f interface/stlink-v2.cfg -f target/stm32f1x.cfg
Open On-Chip Debugger 0.10.0+dev-01489-g06c7a53f1-dirty (2020-11-14-15:21)
Licensed under GNU GPL v2
```



```
V_in      : 10.78 V
V_out     : 1.73 V
I_out     : 0.001 A
```

```
pi@pihdmi:/nuc/opendps/dpsctl $ python3 ./dpsctl.py --device /dev/ttyUSB2 --query
Func      : cv (off)
  voltage : 5000
  current : 1000
V_in      : 10.78 V
V_out     : 0.01 V
I_out     : 0.000 A
```

serial upgrade

```
pi@pihdmi:/nuc/opendps/dpsctl $ python3 dpsctl.py --device /dev/ttyUSB2 -U ../opendps/opendps_DPS
Download progress: 2% Error: timeout talking to device /dev/ttyUSB2.
```

SEL on power-on to stay in bootloader

```
# it bricked my board first time I tried it
```

esp8266

I had trouble finding toolchain which works with it, I ended up using <https://github.com/pfalcon/esp-open-sdk>

```
dpavlin@nuc:/nuc/esp8266/esp-open-sdk$ git remote -v
origin  https://github.com/pfalcon/esp-open-sdk.git (fetch)
origin  https://github.com/pfalcon/esp-open-sdk.git (push)
```

I also needed to replace esptool, since this machine requires python3 version of it

```
ln -s /nuc/esp32/esptool/esptool.py /nuc/esp8266/esp-open-sdk/xtensa-lx106-elf/bin/esptool.py
```

wifi config

```
dpavlin@nuc:/nuc/opendps$ ls -al esp8266-proxy/esp-open-rtos/include/private_ssid_config.h
-rw-r--r-- 1 dpavlin dpavlin 60 Aug  4 10:21 esp8266-proxy/esp-open-rtos/include/private_ssid_con
dpavlin@nuc:/nuc/opendps$ vi esp8266-proxy/esp-open-rtos/include/private_ssid_config.h
```

build

```
dpavlin@nuc:/nuc/opendps$ cd esp8266-proxy/
dpavlin@nuc:/nuc/opendps/esp8266-proxy$ cat env.sh
```

```
export EOR_ROOT=`pwd`/esp-open-rtos
export PATH=/nuc/esp8266/esp-open-sdk/xtensa-lx106-elf/bin:$PATH
dpavlin@nuc:/nuc/opendps/esp8266-proxy$ . env.sh
```

```
dpavlin@nuc:/nuc/opendps/esp8266-proxy$ make
```

```
Merged 1 ELF section
```

flash

```
dpavlin@nuc:/nuc/opendps/esp8266-proxy$ make flash
esptool.py -p /dev/ttyUSB0 --baud 115200 write_flash -fs 16m -fm qio -ff 40m \
    0x0 esp-open-rtos/bootloader/firmware_prebuilt/rboot.bin 0x1000 esp-open-rtos/bootloader/
WARNING: Flash size arguments in megabits like '16m' are deprecated.
Please use the equivalent size '2MB'.
Megabit arguments may be removed in a future release.
esptool.py v3.2-dev
Serial port /dev/ttyUSB0
```

```
pi@pihdm1:/nuc/opendps/esp8266-proxy $ /nuc/esp32/esptool/esptool.py --port /dev/ttyUSB3 write_fl
esptool.py v3.2-dev
Serial port /dev/ttyUSB3
Connecting....
Detecting chip type... ESP8266
Chip is ESP8266EX
Features: WiFi
Crystal is 26MHz
MAC: 5c:cf:7f:c2:6b:19
Uploading stub...
Running stub...
Stub running...
Configuring flash size...
Flash will be erased from 0x00000000 to 0x00000fff...
Flash will be erased from 0x00001000 to 0x00001fff...
Flash will be erased from 0x00002000 to 0x000043fff...
Compressed 3104 bytes to 2169...
Wrote 3104 bytes (2169 compressed) at 0x00000000 in 0.3 seconds (effective 79.1 kbit/s)...
Hash of data verified.
Compressed 2048 bytes to 23...
Wrote 2048 bytes (23 compressed) at 0x00001000 in 0.1 seconds (effective 132.3 kbit/s)...
Hash of data verified.
Compressed 268660 bytes to 195361...
Wrote 268660 bytes (195361 compressed) at 0x00002000 in 18.0 seconds (effective 119.6 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
```

test

reset board and verify that it's connecting to wifi

```
pi@rpi4:/nuc/opendps/dpsctl $ microcom -p /dev/ttyUSB0 -s 9600
connected to /dev/ttyUSB0
Escape character: Ctrl-\
Type the escape character to get to the prompt.
2dnÜ%î¿%bdbl¿î¿%$î¿%`dlî¿%î¿%x$2î¿%+`b: `:rî¿%pdî¿%zt {î¿%[î¿%8)lJî¿%î¿%î¿%î¿%î¿%î¿%: sta(4c:11:ae:0
```

```
add if0
scandone
add 0
aid 16
cnt

connected with dreamhouse, channel 10
dhcp client start...
ip:192.168.3.111,mask:255.255.255.0,gw:192.168.3.1
```

now test client

```
pi@rpi4:~ $ /nuc/opendps/dpsctl/dpsctl.py -S
192.168.3.111
^C

pi@rpi4:~ $ export DPSIF=192.168.3.111

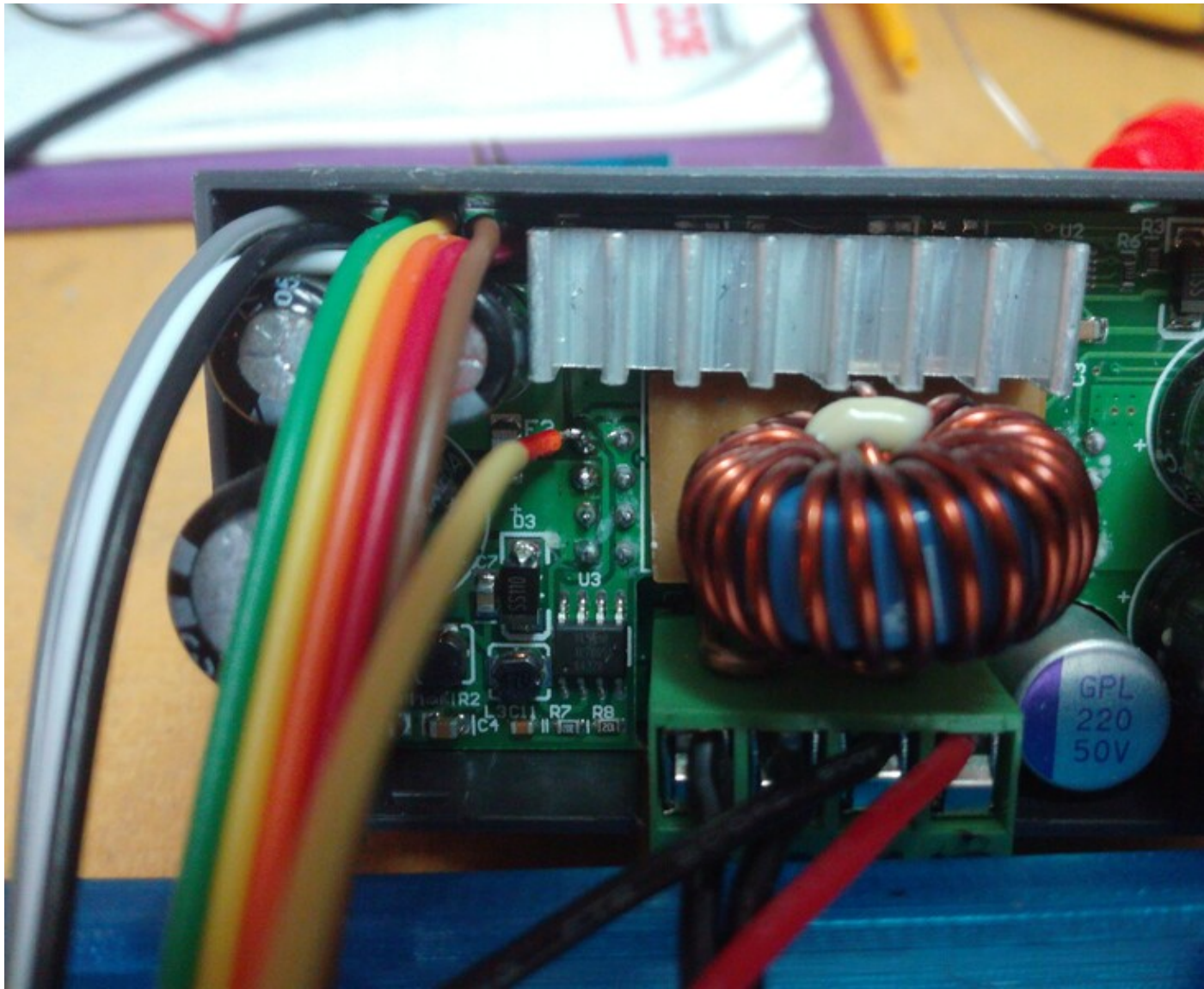
pi@rpi4:~ $ /nuc/opendps/dpsctl/dpsctl.py -q
Func      : cv (off)
  voltage  : 5000
  current  : 1000
V_in      : 9.71 V
V_out     : 0.00 V
I_out     : 0.000 A
```

powering esp8266

3.3v voltage is available at jtag pins, but it can't supply enough current to run esp8266

There is 5v pin from buck converter on top-left pin of 2x4 pins on left side of board (when looking from back side of module)

```
5v gnd
o o
o o
o o
o o
```



power drain from input voltage is roughly doubled when powering esp8266 from 5v rail

t=0x9d711c8		
input voltage	no esp8266	with esp8266
7.68 v	55 mA	110 mA
9v	46 mA	97 mA