

# Présentation PFE

Clonage d'une calculatrice open-source  
NumWorks

# Plan

- Introduction
- Cahier des charges
- Travail réaliser
- Perspectives
- Conclusion

# Introduction

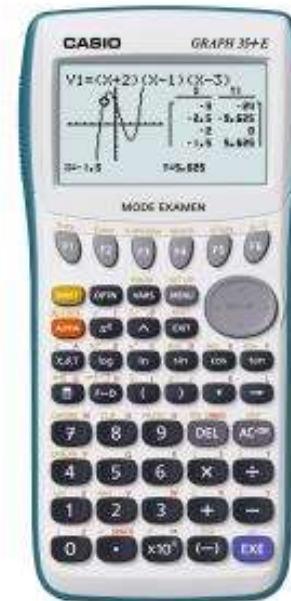
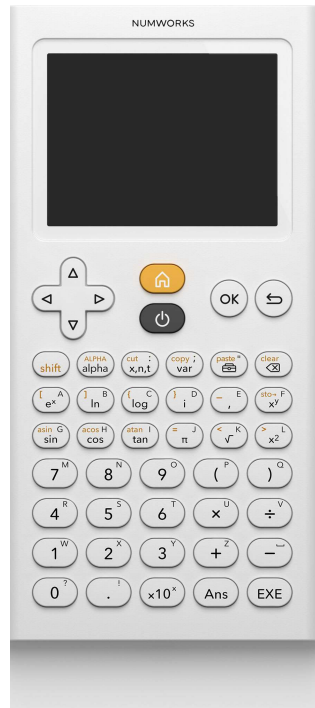
## Mode examen

Autorisée au Baccalauréat 2019.

Elle dispose du mode examen obligatoire aux examens officiels de l'Éducation Nationale, dont le Baccalauréat.



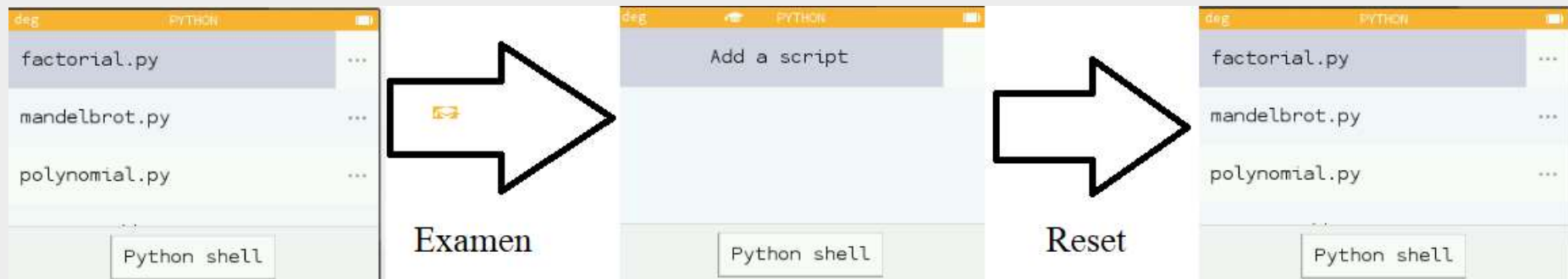
# Introduction



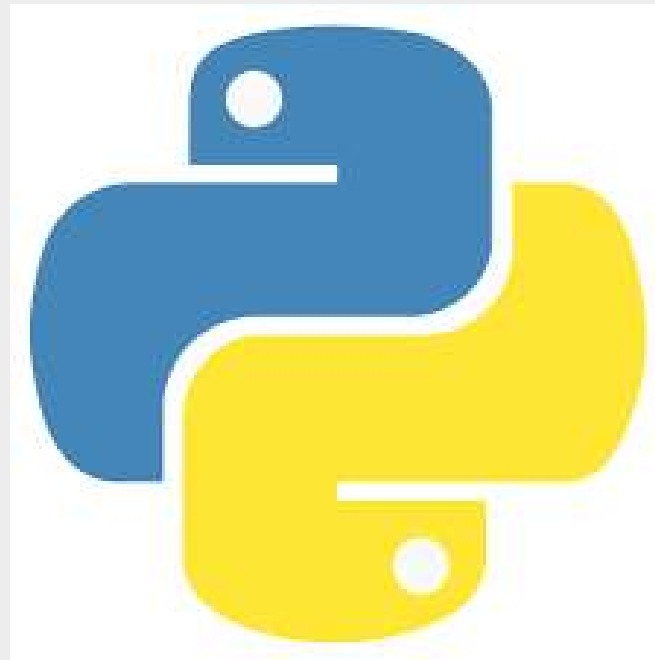
# Cahier des charges

Travail réaliser

# Travail réaliser

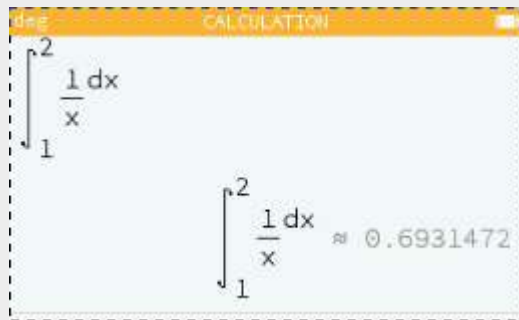


# Travail réaliser

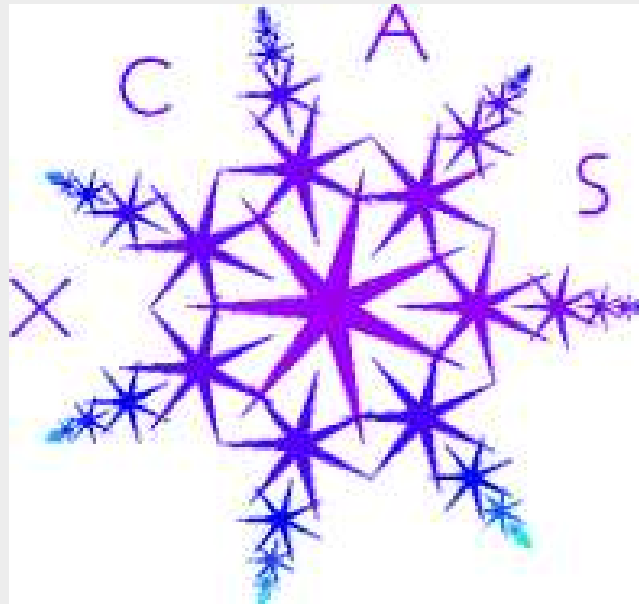




# Travail réaliser



A screenshot of a calculator interface titled "CALCULATOR" in orange. The display shows the definite integral  $\int_1^2 \frac{1}{x} dx$  on the left. On the right, the result is shown as  $\int_1^2 \frac{1}{x} dx \approx 0.6931472$ .



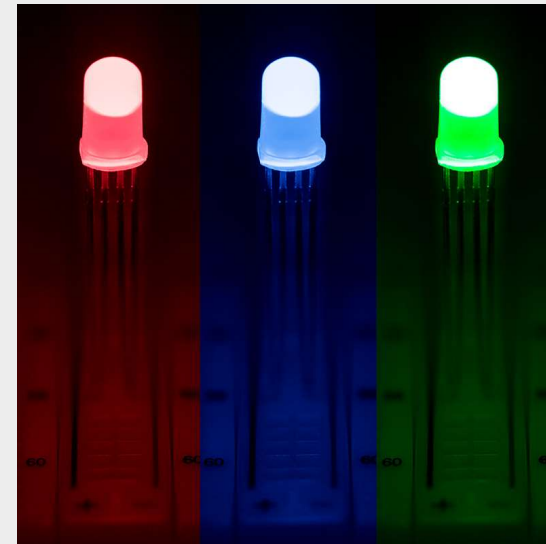


A screenshot of a calculator interface titled "CALCULS" in orange. The display shows the definite integral  $\int_1^2 \frac{1}{x} dx$  on the left. On the right, the result is shown as  $\ln(2)$ .

# Travail réaliser



# Travail réaliser



# Travail réaliser

Vendor ID (hex):

Runtime mode

Transfer Size:

DFU mode

Firmware Download (write to USB device)

Firmware Upload (read from USB device)

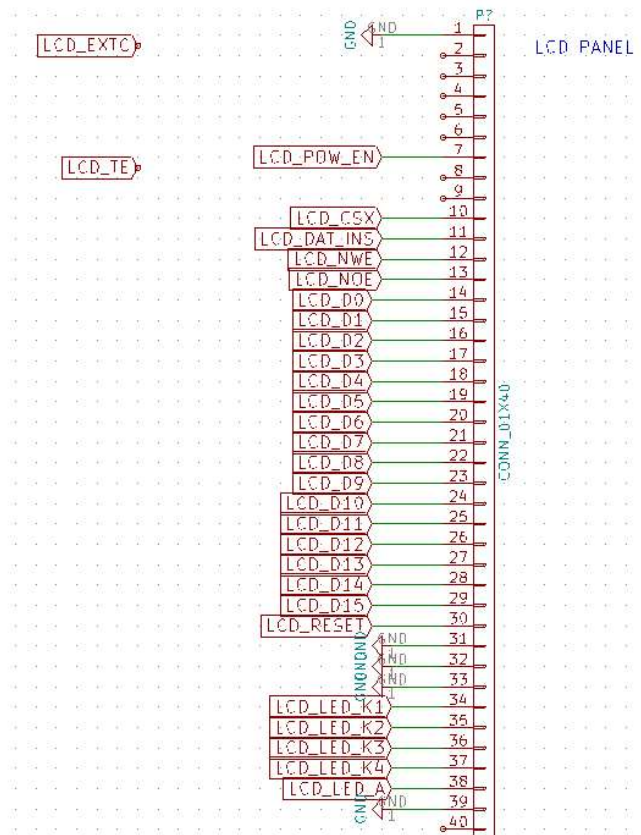
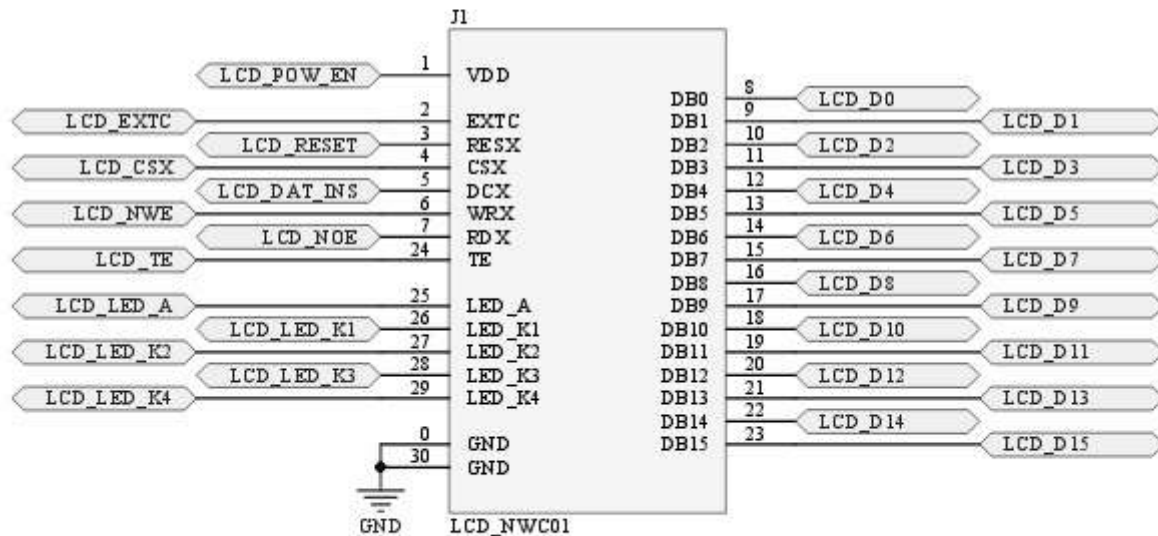
# Travail réaliser



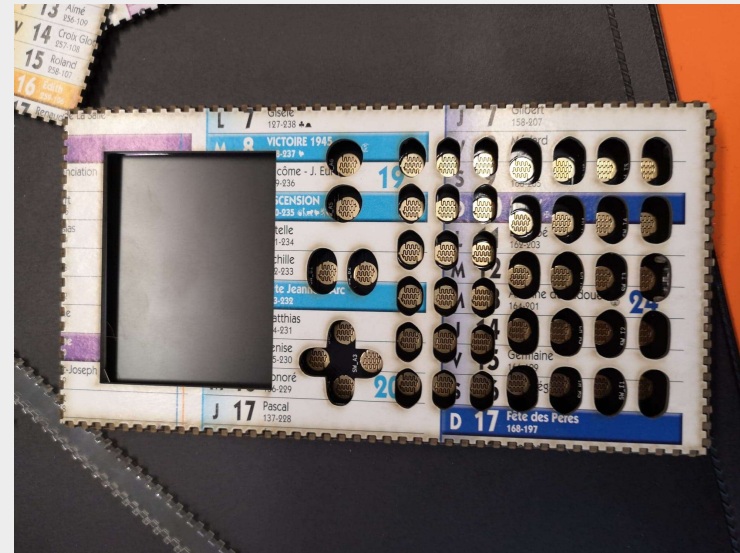
# Travail réaliser

## LCD panel

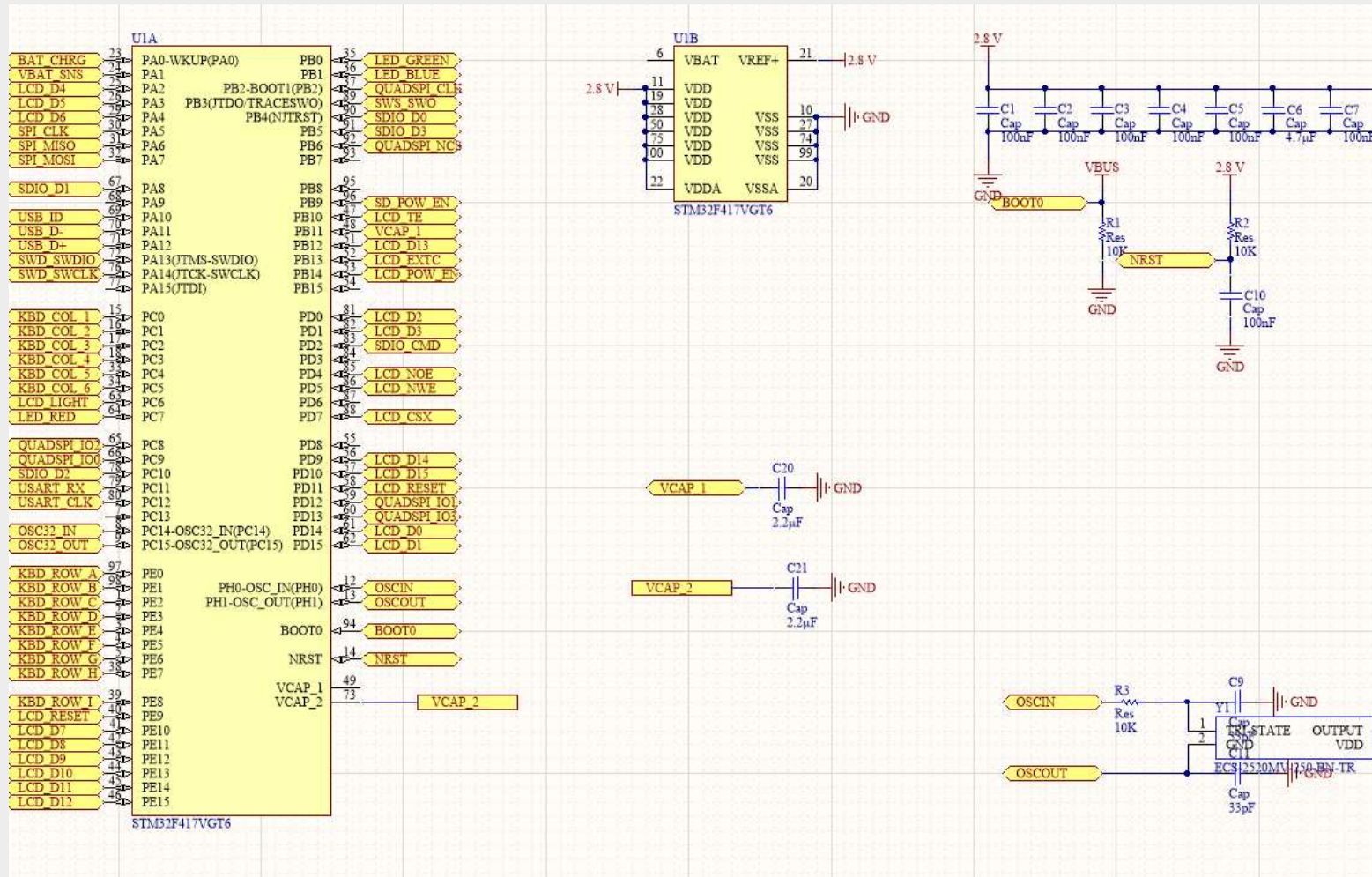
ST7789V draws a max intensity of 7 mA, and STM32 can provide up to 20 mA per pin. That's why we're powering the LCD controller directly from the MCU.



# Travail réaliser



# Travail réaliser



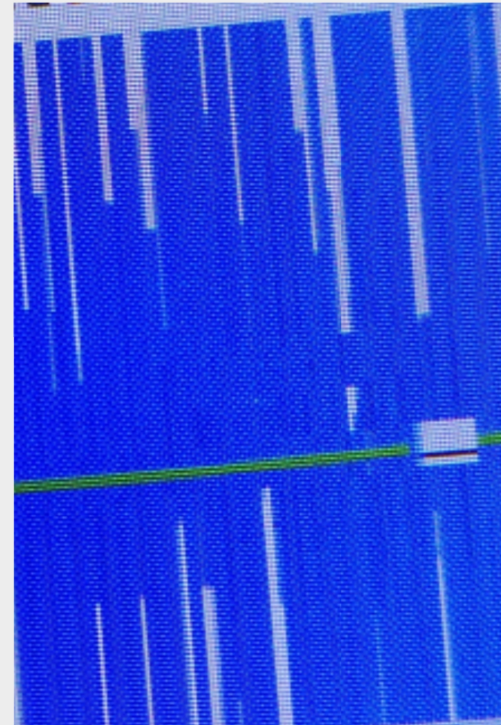
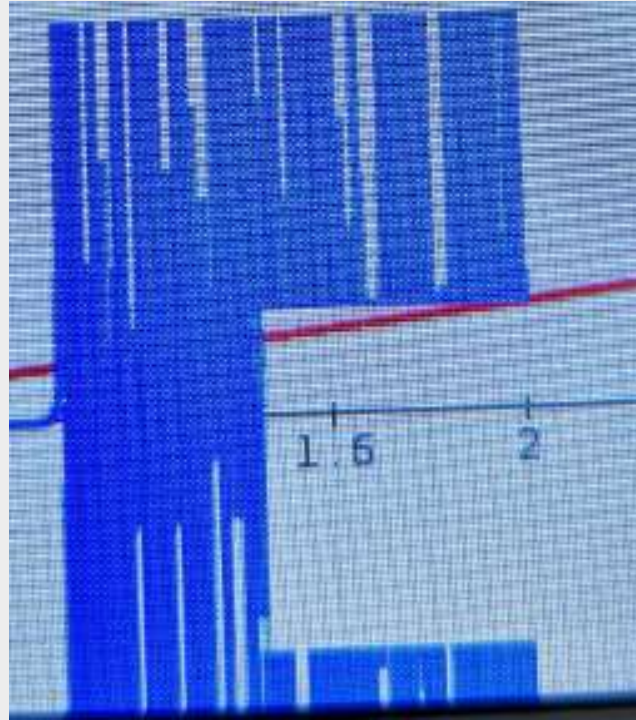
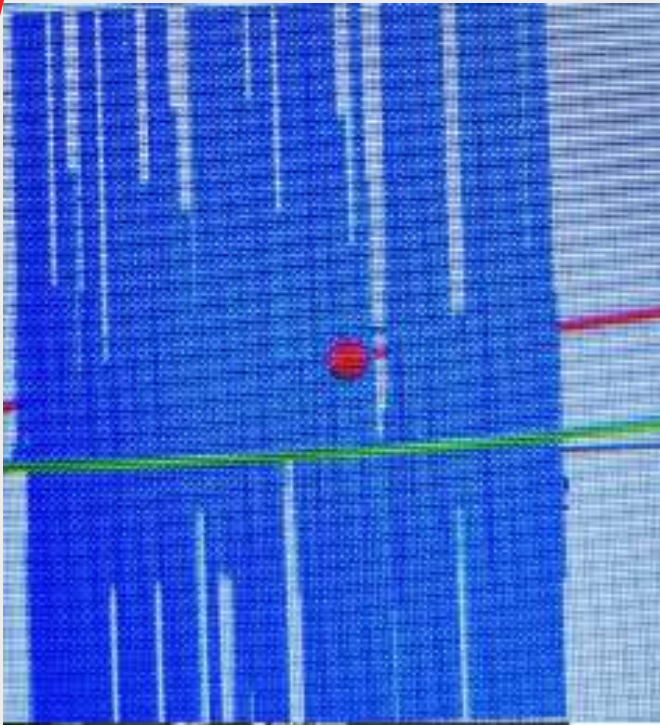


# Perspectives

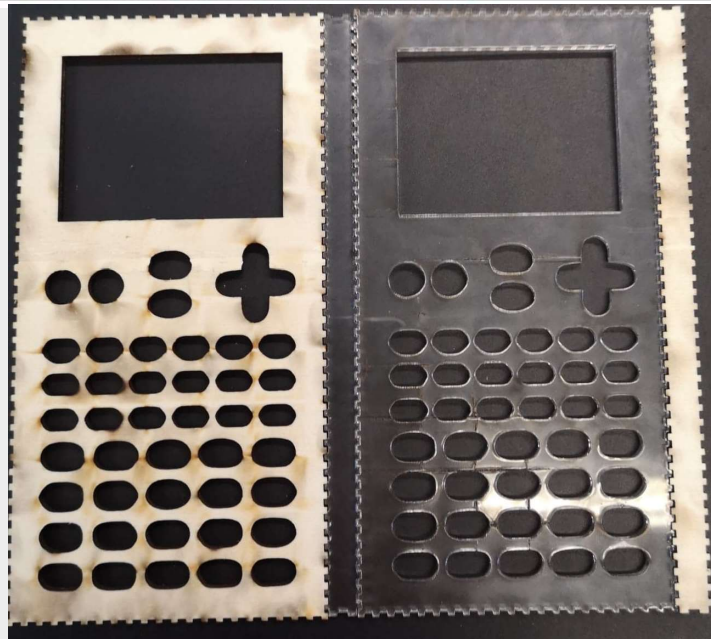
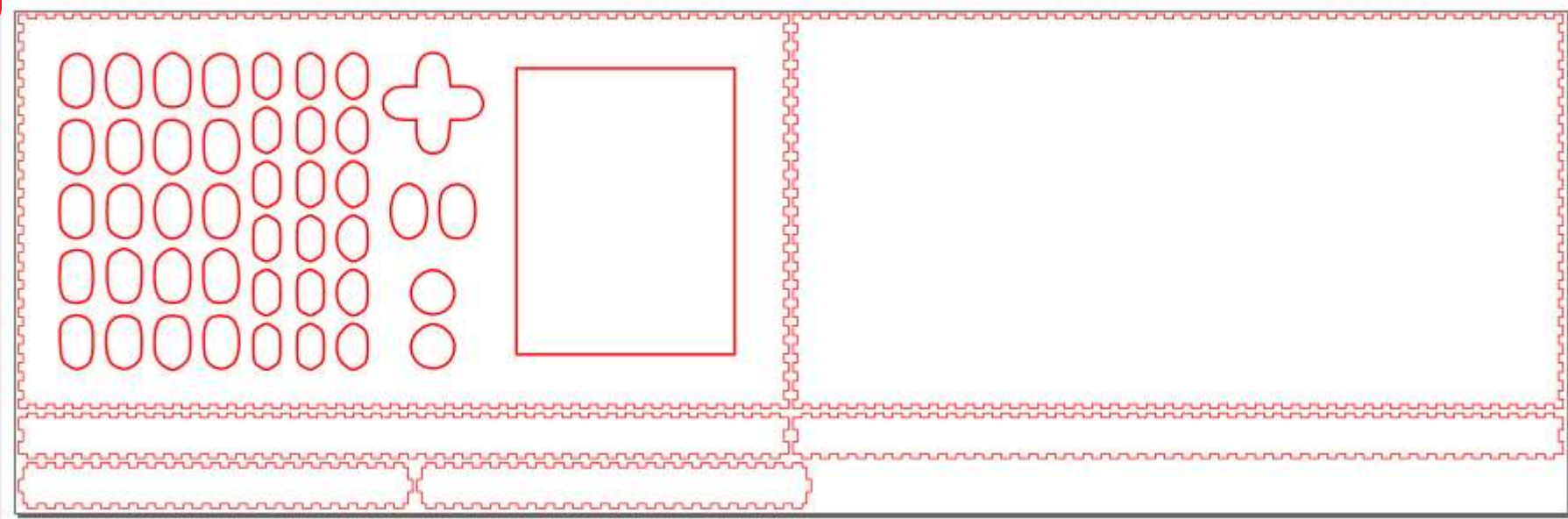
# Conclusion

# Annexes

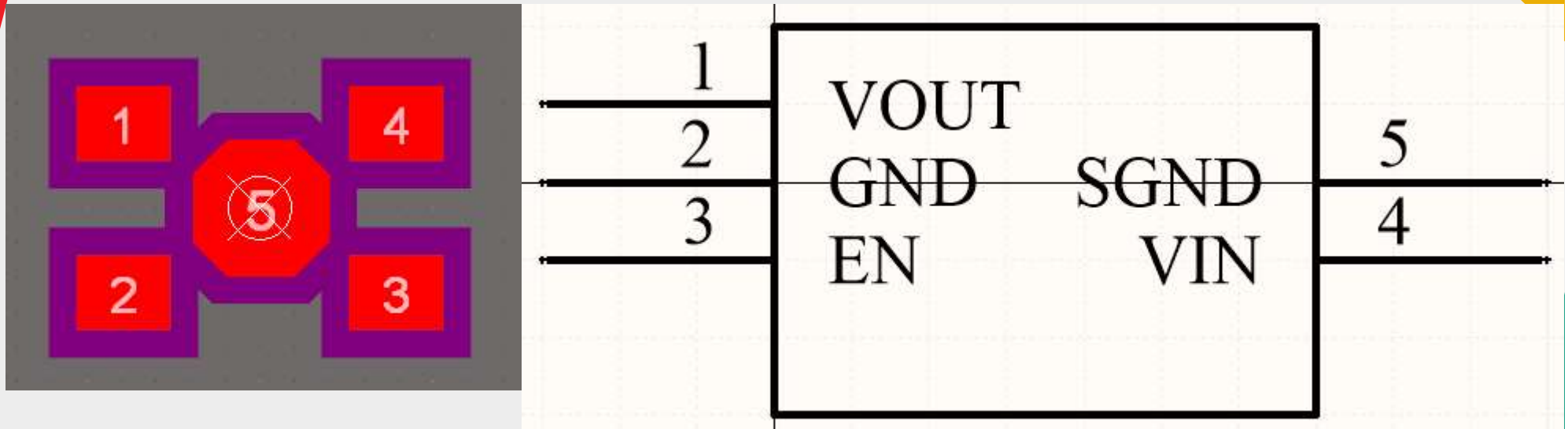
# TE



# Autre modèle



# Création de composant



# Flash externe

```
root@zabeth16:/home/pifou/Documents/Numwork/Giac/epsilon-giac# make app_extflash
OBJCOPY app-extflash.bin
flashrom v1.0 on Linux 4.9.0-6-amd64 (x86_64)
flashrom is free software, get the source code at https://flashrom.org

Using clock_gettime for delay loops (clk_id: 1, resolution: 1ns).
serprog: Programmer name is "zardam's serprog"
Found Adesto flash chip "AT25SF641" (8192 kB, SPI) on serprog.
serprog: requested mapping AT45CS1282 is incompatible: 0x1080000 bytes at 0x00000000fef80000.
serprog: requested mapping MX25L25635F is incompatible: 0x2000000 bytes at 0x00000000fe000000.
serprog: requested mapping MX66L51235F is incompatible: 0x4000000 bytes at 0x00000000fc000000.
serprog: requested mapping MX25U51245G is incompatible: 0x4000000 bytes at 0x00000000fc000000.
serprog: requested mapping N25Q256..3E/MT25QL256 is incompatible: 0x2000000 bytes at 0x00000000fe000000.
serprog: requested mapping N25Q512..3E/MT25QL512 is incompatible: 0x4000000 bytes at 0x00000000fc000000.
serprog: requested mapping S25FL256S.....0 is incompatible: 0x2000000 bytes at 0x00000000fe000000.
serprog: requested mapping W25Q256.V is incompatible: 0x2000000 bytes at 0x00000000fe000000.
===
This flash part has status UNTESTED for operations: PROBE READ ERASE WRITE
The test status of this chip may have been updated in the latest development
version of flashrom. If you are running the latest development version,
please email a report to flashrom@flashrom.org if any of the above operations
work correctly for you with this flash chip. Please include the flashrom log
file for all operations you tested (see the man page for details), and mention
which mainboard or programmer you tested in the subject line.
Thanks for your help!
Reading old flash chip contents... done.
Erasing and writing flash chip...
Warning: Chip content is identical to the requested image.
Erase/write done.
rm app-extflash.bin
```

```
root@zabeth16:/home/pifou/Documents/Numwork/Giac/epsilon-giac# make app_flash
OBJCOPY app.bin
DFU app_flash
INFO About to flash your device. Please plug your device to your computer
using an USB cable and press the RESET button the back of your device.
DFU app_flash
dfu-util 0.9

Copyright 2005-2009 Weston Schmidt, Harald Welte and OpenMoko Inc.
Copyright 2010-2016 Tormod Volden and Stefan Schmidt
This program is Free Software and has ABSOLUTELY NO WARRANTY
Please report bugs to http://sourceforge.net/p/dfu-util/tickets/

dfu-util: Invalid DFU suffix signature
dfu-util: A valid DFU suffix will be required in a future dfu-util release!!!
Opening DFU capable USB device...
ID 0483:df11
Run-time device DFU version 011a
Claiming USB DFU Interface...
Setting Alternate Setting #0 ...
Determining device status: state = dfuERROR, status = 10
dfuERROR, clearing status
Determining device status: state = dfuIDLE, status = 0
dfuIDLE, continuing
DFU mode device DFU version 011a
Device returned transfer size 2048
DfuSe interface name: "Internal Flash "
Downloading to address = 0x08000000, size = 804076
Download [=====] 100% 804076 bytes
Download done.
File downloaded successfully
Transitioning to dfuMANIFEST state
rm app.bin
```



# Mode test

