1. I2C Address of LED matrix
   1. 000 左邊鼻子 NOSE\_L
   2. 001 右邊鼻子 NOSE\_R
   3. 010 左邊眼睛 EYE\_L
   4. 011 右邊眼睛 EYE\_R
   5. 100 嘴巴左前 MOUTH\_F\_L
   6. 101 嘴巴右前 MOUTH\_F\_R
   7. 110 嘴巴左後 MOUTH\_B\_L
   8. 111 嘴巴右後 MOUTH\_B\_R
2. 線色
   1. Neopixel
      1. Vcc => Red
      2. Din => Blue
      3. GND => Black
      4. Dout => White
   2. LED Matrix
      1. Vcc => Red
      2. GND => Black
      3. SDA => Blue
      4. SCL => White
   3. PCB 8pin molex
      1. neopixel => Gray
      2. fan => Gray
      3. BZ => Gray
      4. 3V3 => Red
      5. SCL => White
      6. SDA => Blue
      7. GND => Black
      8. Vcc => Red
3. <https://github.com/2dom/PxMatrix> library for RGB matrix
4. E\_can
   1. ~~風扇至於槍管中段，槍管前段放所有電路，握柄放電池~~
   2. 功能
      1. 螢幕
      2. 鋰電池電壓偵測/警告 (電壓偏低 風扇停轉，電壓過低關機)
      3. ~~紅外線搖控(發射/接收)~~
      4. BLE
      5. 風扇
         1. <https://goods.ruten.com.tw/item/show?21733934233853>
         2. BEC電調
      6. ~~繼電器開關(風扇+總開關)~~
      7. 按鈕 \* 5
      8. 編碼器 \* 1
      9. ~~DC-DC降壓至5V(LDO add??)~~
      10. 振動馬達 <https://www.sparkfun.com/datasheets/Robotics/310-101_datasheet.pdf>
   3. 開關機方案
      1. ~~單鍵開機，常按/選單關機(繼電器自保磁)~~
      2. [~~https://www.mouser.tw/datasheet/2/378/835-1146852.pdf~~](https://www.mouser.tw/datasheet/2/378/835-1146852.pdf)
      3. 上電開機，偵測電池電壓足夠即開機，六秒後才可控風扇
      4. ~~長按Return 2秒關機~~
   4. 按鈕配置
      1. enter
      2. return
      3. FAN trigger
      4. X
      5. Y
      6. 編碼器 <https://tech.alpsalpine.com/prod/c/pdf/encoder/incremental/ec10e/ec10e.pdf>
   5. [TTGO T-display](https://github.com/Xinyuan-LilyGO/TTGO-T-Display)
5. To Do
   1. faceture dittering fuction
      1. even when blinking
   2. Bz music
      1. Driver
      2. makefile
         1. 簡譜填寫
         2. 轉成陣列
   3. Vocal sencing
      1. LM386
      2. speaker
   4. offline operation
      1. offline saving
         1. only save remote/gun relate setting
      2. offline reset
         1. only reset remote/gun relate setting