Make a board to control 3x neopixel strips

Arduino IDE – compatible

Picked ESP32

Wifi

# Schematic Capture

power

* wired?
* Battery?
* energy harvesting?
* Multiple? What should the behavior be if it’s wired + battery?

Strong google-fu = strong circuit

* Ask specific high-level questions. Maybe there’s a chip out there that does everything you need all in one IC

make a symbol

* pin types
  + controlling
    - output, power output
  + vs using
    - input, power input
  + vs both
    - tristate, bidirectional
  + vs none
    - if redundant: passive + non-visible
    - if not connected: not connected
* “atomic” vs generic parts
  + Atomic are already finished – footprint already assigned & ready to go
  + Generic are just a symbol – have to pair to a footprint later

How to digital electronics

* Datasheet basics
  + Maxima
  + Typ
  + Footprint / “land pattern”
  + Pin diagram
  + Reel info
  + Cheat as much as possible – application layout, suggested layout, etc.
* Decoupling caps are the on & off ramps for power rails
  + 1uF + 100nF more than sufficient for most things, otherwise datasheet usually has recommendations

connectors

* sensors?
* controls
* communications (USB, I2C, SPI, etc.)

HMI

* buttons
* LEDs
* displays

uC

* IC, caps
* crystals, oscillator
  + pierce oscillator: c1 = c2 = [cL – (2 to 5pf) ]\* 2
* programming interface (USB, SWD, JTAG, UART?)

mounting

* enclosure?
* Screw hole sizes?
* Enclosure grounding?

Layout

Organize parts by sub-function (if not using hierarchical sheets)

Edge layer

component placement