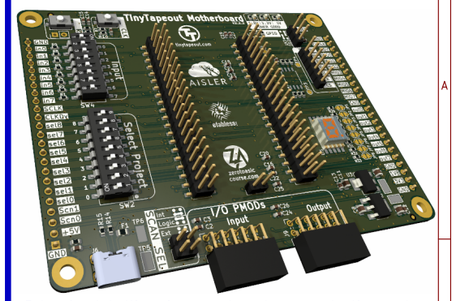
TinyTapeout 1/2/3 Motherboard

Version 2.2.2 Preview

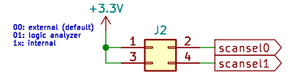


Extensive labelling, jumpers to set scan selection and clock source (on-board oscillator or manual/pico), DIP switches for inputs and selection, 7-segment display (remappable with jumpers) on outputs, full access to 8 in and out via PMODs, all pins broken out in breadboardable headers. Optional Raspberry Pi Pico, pads on underside.

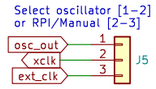
Power via +5V USB, or 5V breakout pin. On-board regulation to 3v3 and 1v8. VDDIO is 3v3, including on PMODs.

User Input + Config

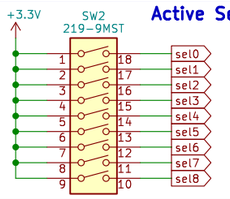
Scan Chain Driver Select



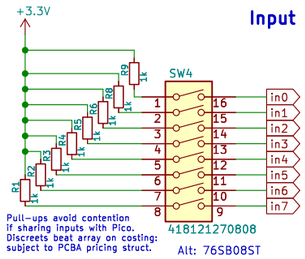
Clock Source



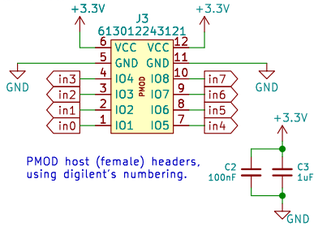
Active Select



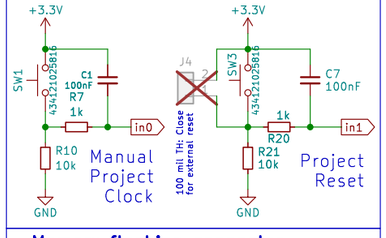
Input DIP



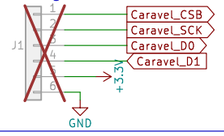
Input PMOD



Momentary Switches (debounced)

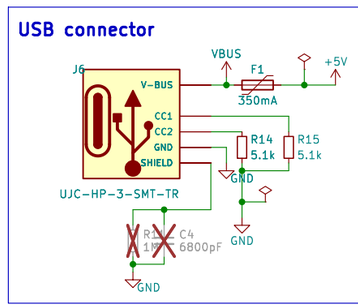


Memory flashing connector

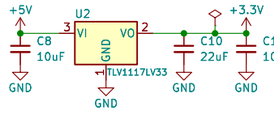


Power

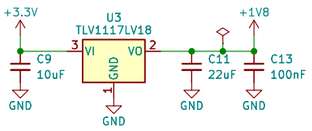
USB connector



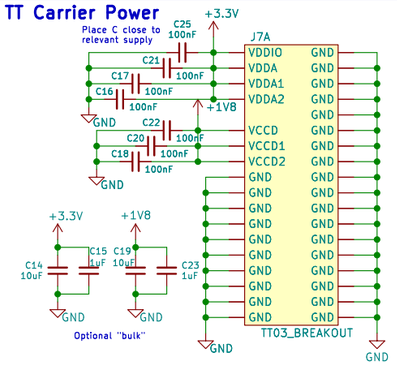
3.3V LDO



1.8V LDO

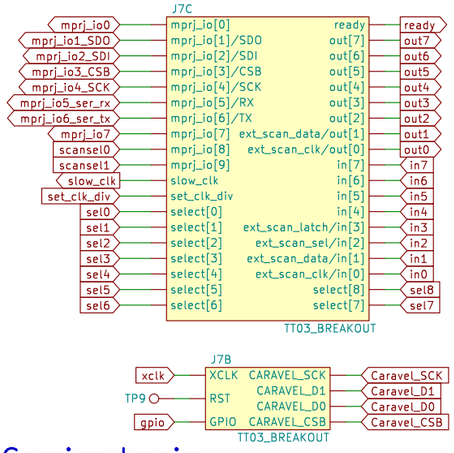


TT Carrier Power



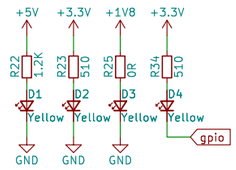
Note: All this decoupling should be amply handled by the carrier. Would rather DNP than regret.

TT Carrier Logic

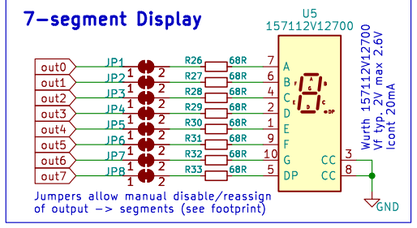


Outputs

LEDs (Power good, GPIO)

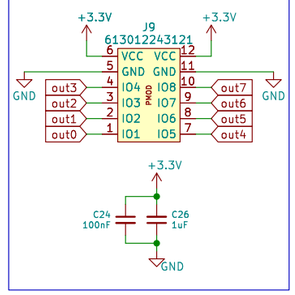


7-segment Display

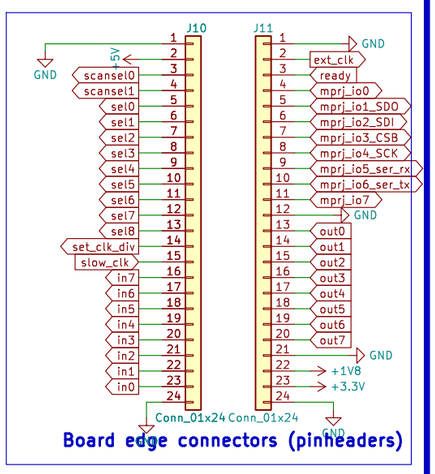


Jumpers allow manual disable/reassign of output -> segments (see footprint)

Output PMOD

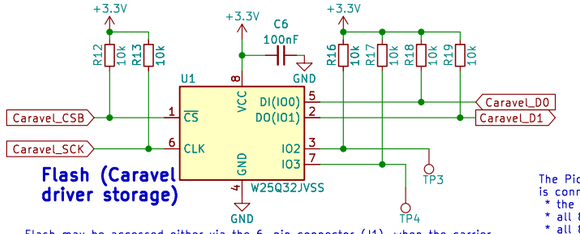


Board edge connectors (pinheaders)



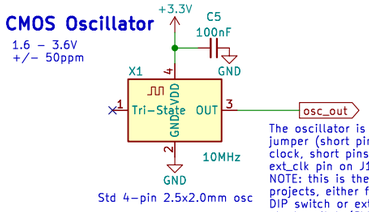
Peripherals

Flash (Caravel driver storage)



Flash may be accessed either via the 6-pin connector (J1), when the carrier is NOT loaded. When populated, it may be read and written to using the Caravel pass-through mode via the HK SPI.

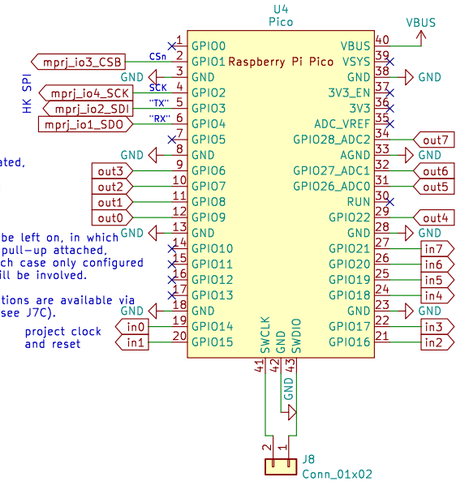
CMOS Oscillator



Std 4-pin 2.5x2.0mm osc

The oscillator is selected using the J5 jumper (short pins 1–2). To use an external clock, short pins 2–3 instead and feed into ext_clk pin on J11.
NOTE: this is the *caravel* clock. For projects, either feed in via in0 (PMOD or DIP switch or external header) or use the clock switch (SW1).

RPi Pico (optional)



The Pico, when populated, is connected to:
* the caravel HK SPI
* all 8 inputs
* all 8 outputs

Input DIP switch may be left on, in which case signal will have pull-up attached, or switched off in which case only configured caravel pull-downs will be involved.

NOTE: ext_scan_* functions are available via the project I/O pins (see J7C).

Misc Support

Mounting holes

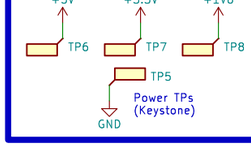
MT1 MT2 MT3 MT4

GND GND GND GND

Fiducials

FID1 FID2 FID3

Panel-level fids for prod but included for one-offs and testing.



Psychogenic Technologies

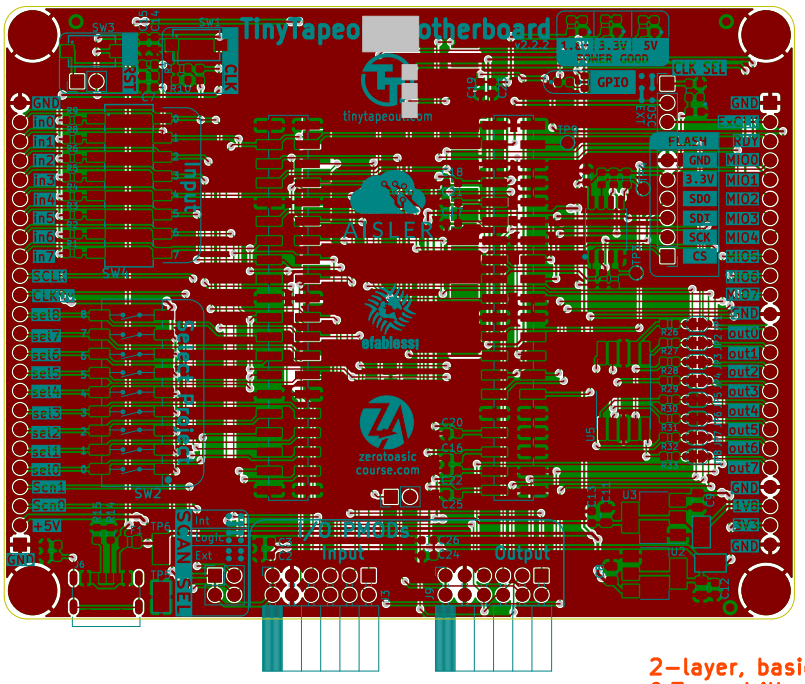
Sheet: /

File: mpw-mb1.kicad_sch

Title: TinyTapeout Motherboard

Size: A3	Date: 2023-10-05	**Rev: 2.2.2**
KiCad E.D.A. kicad 7.0.7-7.0.7~ubuntu22.04.1		Id: 1/1

TinyTapeout Motherboard
v2.2.2
tinytapeout.com
AISLER
efabless
zerotoasic
course.com
1.8V
3.3V
5V
POWER GOOD
GPIO
OSC EXT
CLK
RST
NO
ON
Input
Select Project
SW4
SW2
SCAN SEL
Int
Logic
Ext
I/O PMODs
Input
Output
GND
in0
in1
in2
in3
in4
in5
in6
in7
SCLK
CLKDv
sel8
sel7
sel6
sel5
sel4
sel3
sel2
sel1
sel0
Scn1
Scn0
+5V
MIO3
MIO4
MIO5
MIO6
MIO7
out0
out1
out2
out3
out4
out5
out6
out7
1V8
3V3
TP3
TP4
TP5
TP6
J6
J9
U3
U5
F1



2-layer, basic PCB
0.3mm drill min
>6mil traces

Psychogenic Technologies

Sheet:

File: mpw-mb1.kicad_pcb

Title: TinyTapeout 1,2,3 Motherboard

Size: User	Date: 2023-10-01	**Rev: 2.2**
KiCad E.D.A. kicad 7.0.7-7.0.7~ubuntu22.04.1		Id: 1/1