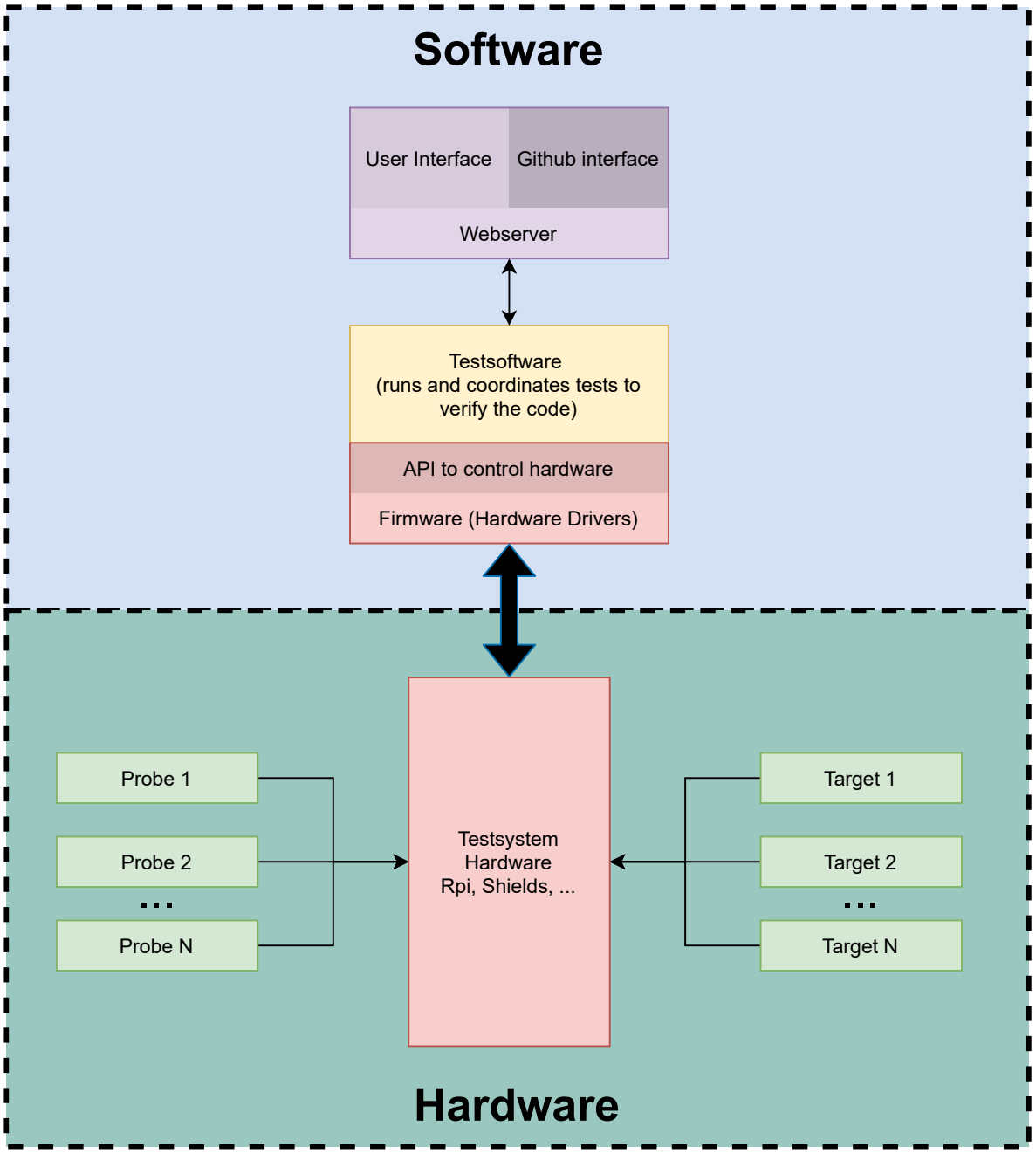
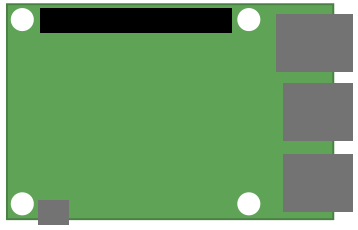

Software
User Interface
Github interface
Webserver
Testsoftware
(runs and coordinates tests to verify the code)
API to control hardware
Firmware (Hardware Drivers)
Probe 1
Probe 2
...
Probe N
Testsystem
Hardware
Rpi, Shields, ...
Target 1
Target 2
...
Target N
Hardware

Layout

1x
Raspberry Pi 4B

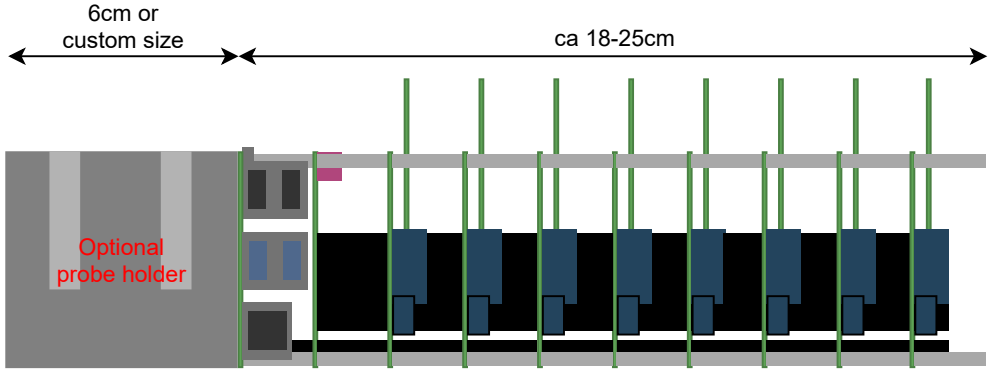


ETH **To user / To Cluster controller**

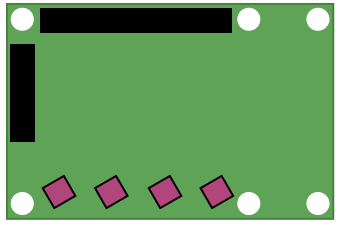
2x USB 3.0

2x USB 2.0

To probes



1x
Probe Shield

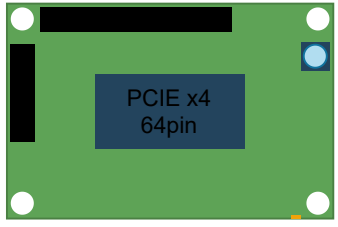


ARM 10 pin connector

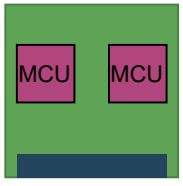
40 Pin 2.56mm GPIO Connector

20 Pin 2.56mm Probe Bus Connector

up to 8x
Target Stack Shield

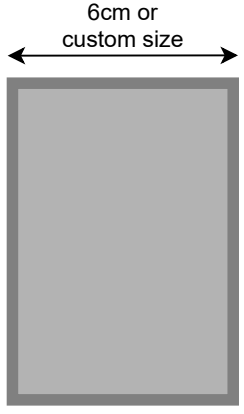


Target Daugtherboard



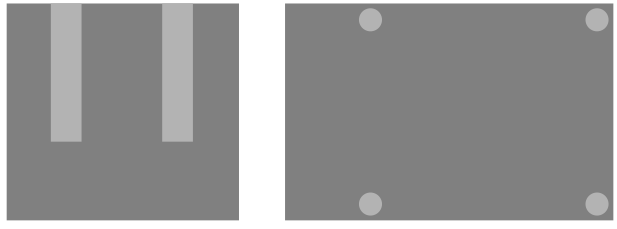
PCIE x4
64pin

Max 4 MCU per board



Optional:

1x
3D Printed probe holder

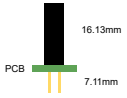


(US projection)

Connectors

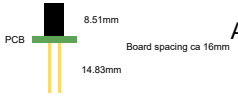
Possible GPIO shield / Probe shield pass through connectors:

ESQ-120-34-L/T-D (40Pin)
ESQ-110-34-L/T-D (20Pin)



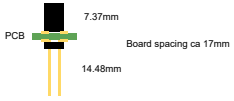
Price: ~8-10CHF
Availability: Non plated, mediocre

SSQ-120-04-L/T-D (40Pin)
SSQ-110-04-L/T-D (20Pin)



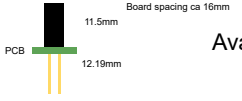
Price: ~3-6CHF
Availability: non plated ok

TSM-120-03-F/L-DV (40Pin)
TSM-110-03-F/L-DV (20Pin)
with
SSM-120-F/L-DV (40Pin)
SSM-110-F/L-DV (20Pin)



Price: ~9CHF per pair
Availability: ok

ESQ-120-14-L/T-D (40Pin)
ESQ-110-14-L/T-D (20Pin)



Price: ~4-7CHF
Availability: Non plated, good

Possible RPI to first shield connectors:

Adafruit 1112

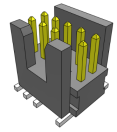
Price: ~2CHF
Availability: ok

ESQ-120-14-L/T-D

Price: ~7CHF
Availability: ok

Possible ARM 10pin debug connectors:

FTSH-105-01-F-DV-007-K



Price: ~3-4CHF
Availability: ok

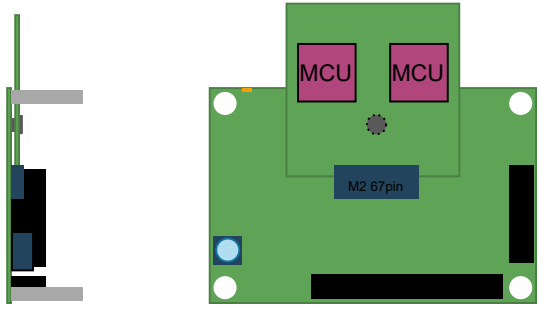
Daughterboard PCI options

PCIE 64pin

Samtec PCIE-064-02-F-D-RA
Price: ~5CHF

No additional mounting etc required, Daughterboard mountable without any disassembly of shields

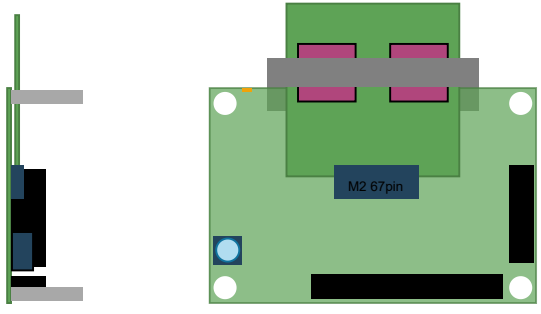
M2 64pin



TE Connectivity 2199119-1
Price: ~1CHF

Daughterboard needs to be mounted with a screw, due to little clearance between shields max 15-20mm the whole assembly needs to be dismounted on Daughterboard change.
Very little clearance for parts where Daughterboard and shield PCB overlap (~1.48mm)

M2 64pin with 3d printed clip



TE Connectivity 2199119-1
Price: ~1CHF

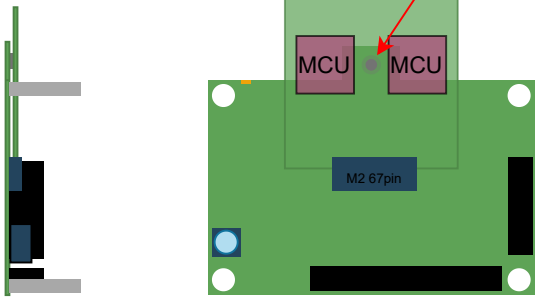
Daughterboard needs to be mounted with 3d printed clip, due to this no shields need to be disassembled during mounting/unmounting of daughterboards.
Very little clearance for parts where Daughterboard and shield PCB overlap (~1.48mm)

3d printed clip

(US projection)

Daughterboard PCI options

M2 64pin with magnet



TE Connectivity 2199230-3
Price: ~1.2CHF

magnets: max 1CHF

Daughterboard needs to be mounted with magnet, due to this no shields need to be disassembled during mounting/unmounting of daughterboards.
Good clearance for parts where Daughterboard and shield PCB overlap (~2.48mm) due to extra high connector

It needs to be tested how the magnets are best mounted/how many force is needed for the daughterboard to stay in place and make proper contact

Target Stack Shield

5V from GPIO shield connector

3.3V LDO 1A

3.3V stack shield power

1 GPIO Target Board Detect

Stack position selector
Rotary DIP or solder bridges

Address

GPIO shield connector

I2C from Rpi

I2C Address Translator

Optional in case IO expander does not support at least 8 different addresses

IO Expander 16 Bit

3 GPIO

OK
No Daughterboard
Error

Status LED

4 GPIO

Daughterboard 64Pin PCI connector

Target 0

Target 1

Target 2

Target 3

12-Bit combined Probe/GPIO bus

12-Bit Bus Switch

Required DO to control switching: 8

Switch concept

Target Channel Switches

Bus Channel Switches

GPIO Channel 0

Probe Channel 0

GPIO Channel 1

Probe Channel 1

GPIO Channel 2

Probe Channel 2

GPIO Channel 3

Probe Channel 3

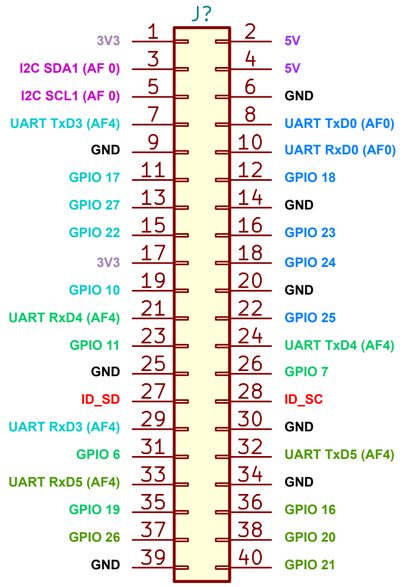
GPIO shield connector

Probe shield connector

4 GPIO

Raspberry 40pin connector config bcm2711 (rpi designations)

Per GPIO channel: 4x GPIO, 1x UART



I2C Bus: Controls all IO expanders on Target Stack Shields

3V3: Unused

5V: Power source for shields

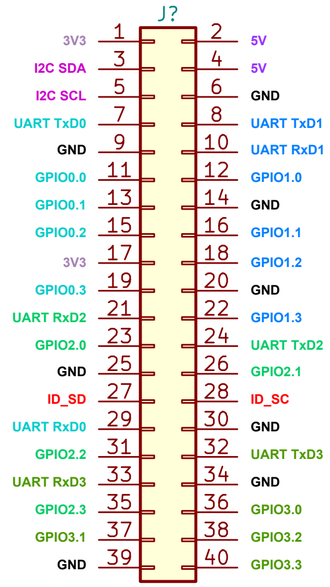
ID_XX: Unused

GPIO Channels:

- Channel 0
- Channel 1
- Channel 2
- Channel 3

GPIO shield connector (hive designations)

Per GPIO channel: 4x GPIO, 1x UART



I2C Bus: Controls all IO expanders on Target Stack Shields

3V3: Unused

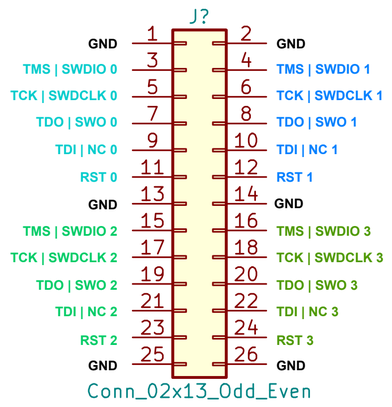
5V: Power source for shields

ID_XX: Unused

GPIO Channels:

- Channel 0
- Channel 1
- Channel 2
- Channel 3

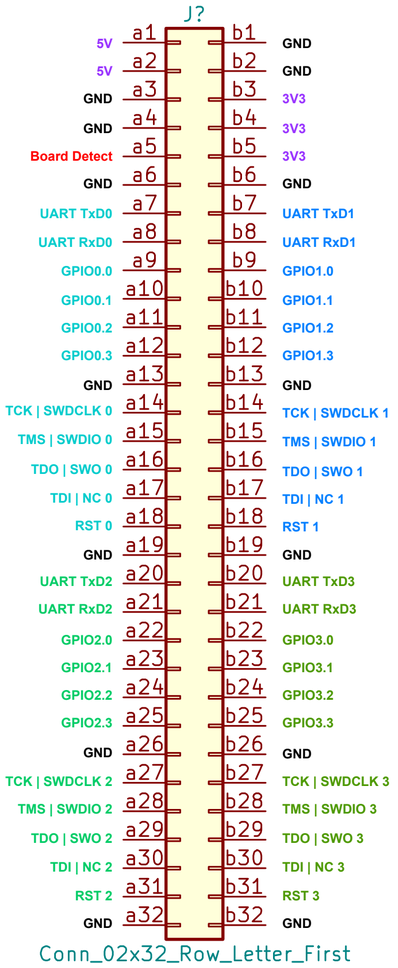
Probe shield connector (hive designations)



Probe Channels:

- Channel 0
- Channel 1
- Channel 2
- Channel 3

Daughterboard 64Pin PCI connector (hive designations)



3V3: 3.3V supplied from shield LDO. Not from rpi 3.3V!

5V: 5V supplied by power supply usb c rpi input

Board Detect: Needs to be connected together to 3V3 daughterboard, allows shield to detect if daughterboard is present

Channels:

- Channel 0
- Channel 1
- Channel 2
- Channel 3