CIB (Common Interface Board)

- Frank asked about a code name, at the moment I think that no one is using anything from the Cephalopod family.

- The main CIB board will therefor be "Mimic Octopus", giving plenty of space in the naming convention for product specific I/O boards etc.

- Currently the CIB is designed round the requirements of the CCB, FDC 1.0 and FDC 2.0 product lines.

- There is provision for support for ISOMON, and partial support for the ACB.

- Further support can be built in once basic testing of the current draft is completed and the development has been shown to work with the 0.1 V hardware.

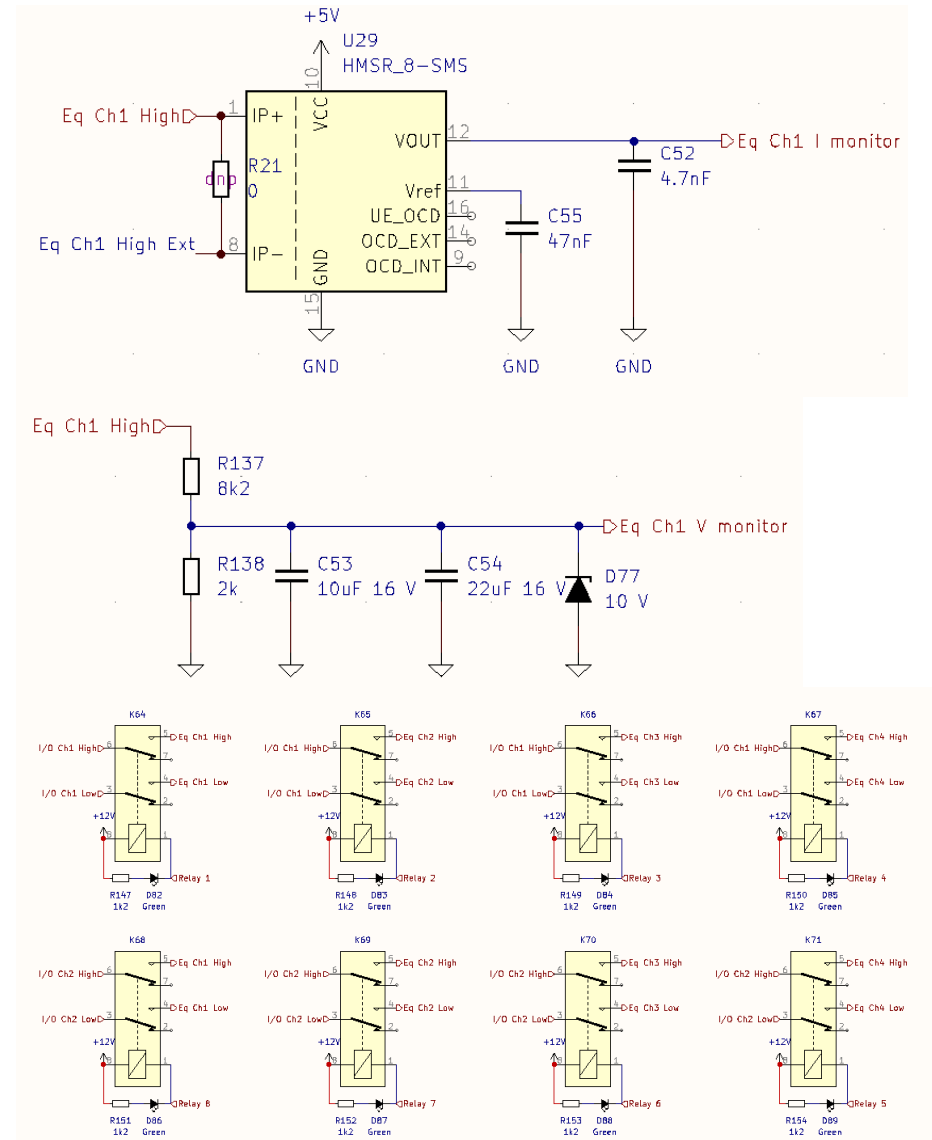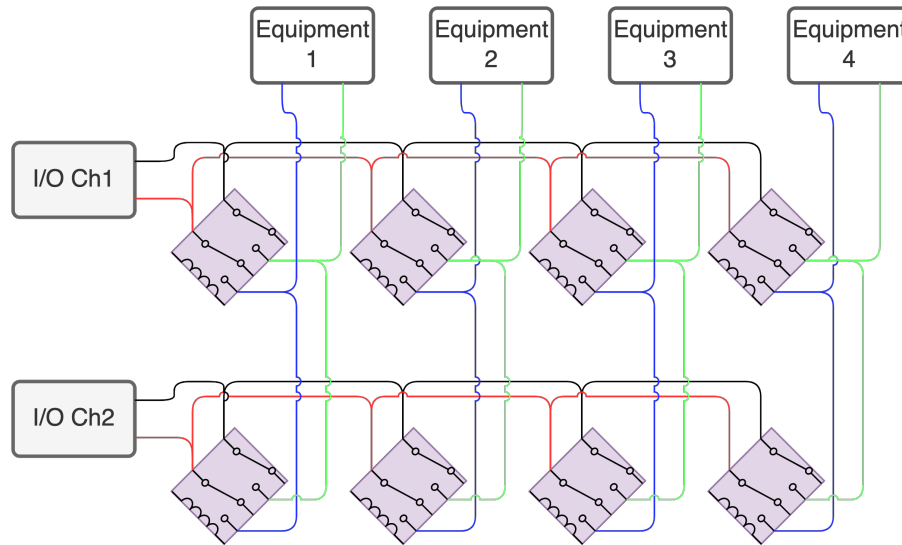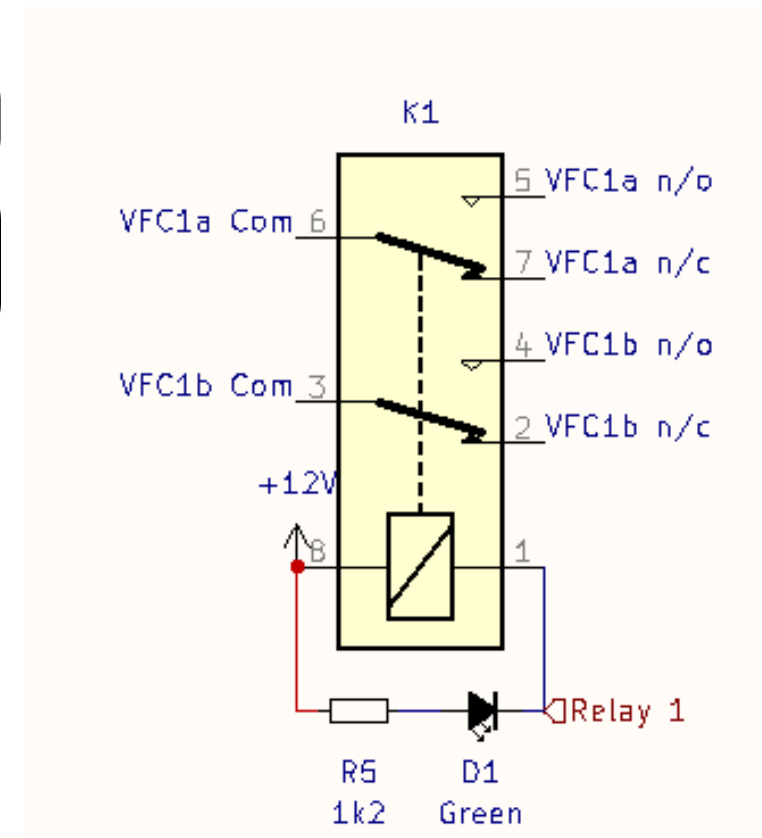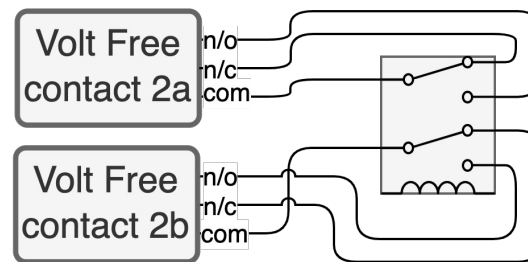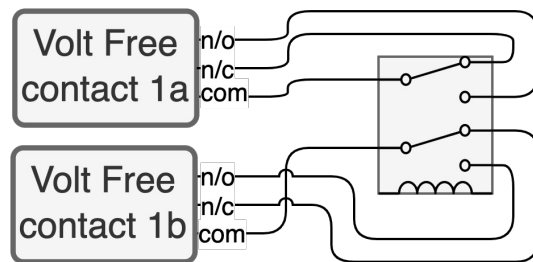- The CIB will be interfaced via SCPI commands

Basic I/O

- 2 x Pulse counter inputs (more tbc)
- 16 x ADC (0-5 V 10-bit successive approximation) channels
    - Provision for more ADC channels via mux (such as DG408)
    - Provision for addition ADCs
- 4 x 24 CPM (channel cross point matrix)
    - 4 x 16 A, 12 x 8 A, 8 x 1A measurement channels
    - 4 x current measurements on the CPM
    - 4 x voltage measurements on the CPM
- 2 x Semi-independent DUT PSU inputs
- 8 x pairs of volt free contacts
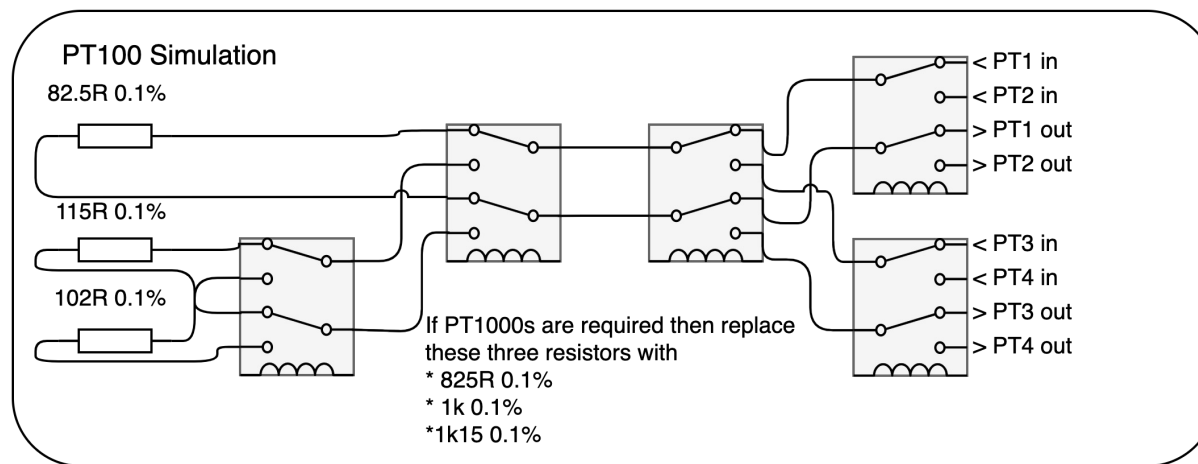
Cross Point Matrix

(first two channels shown for clarity)
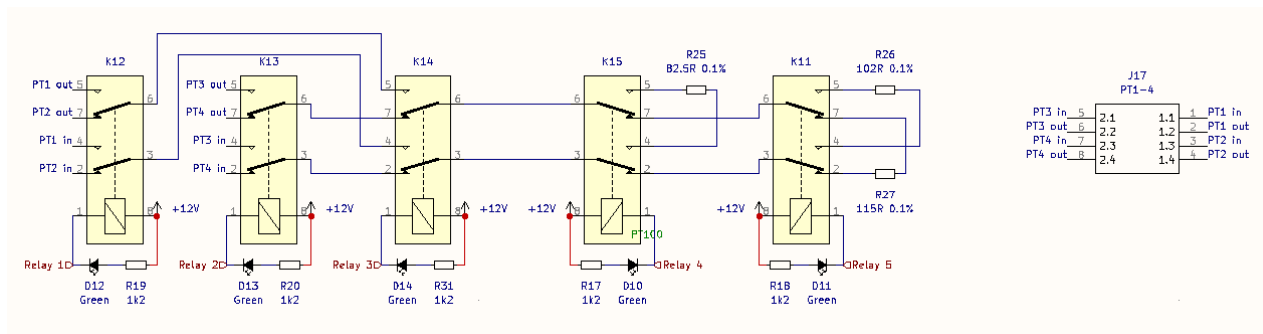
Volt Free Contacts

PT100 Simulation

PT100 Simulation

82.5R 0.1%

115R 0.1%

102R 0.1%

If PT1000s are required then replace these three resistors with
* 825R 0.1%
* 1k 0.1%
*1k15 0.1%

< PT1 in
< PT2 in
> PT1 out
> PT2 out

< PT3 in
< PT4 in
> PT3 out
> PT4 out

K12
PT1 out 5
PT2 out 7
PT1 in 4
PT2 in 2
Relay 1
D12 Green   R19 1k2

K13
PT3 out 5
PT4 out 7
PT3 in 4
PT4 in 2
Relay 2
D13 Green   R20 1k2

K14
Relay 3
D14 Green   R31 1k2

K15
R25 82.5R 0.1%
+12V
PT100
R17 1k2   D10 Green
Relay 4

K11
R26 102R 0.1%
+12V
R18 1k2   D11 Green
Relay 5
R27 115R 0.1%

J17 PT1-4
PT3 in 5   2.1   1.1   PT1 in 1
PT3 out 6   2.2   1.2   PT1 out 2
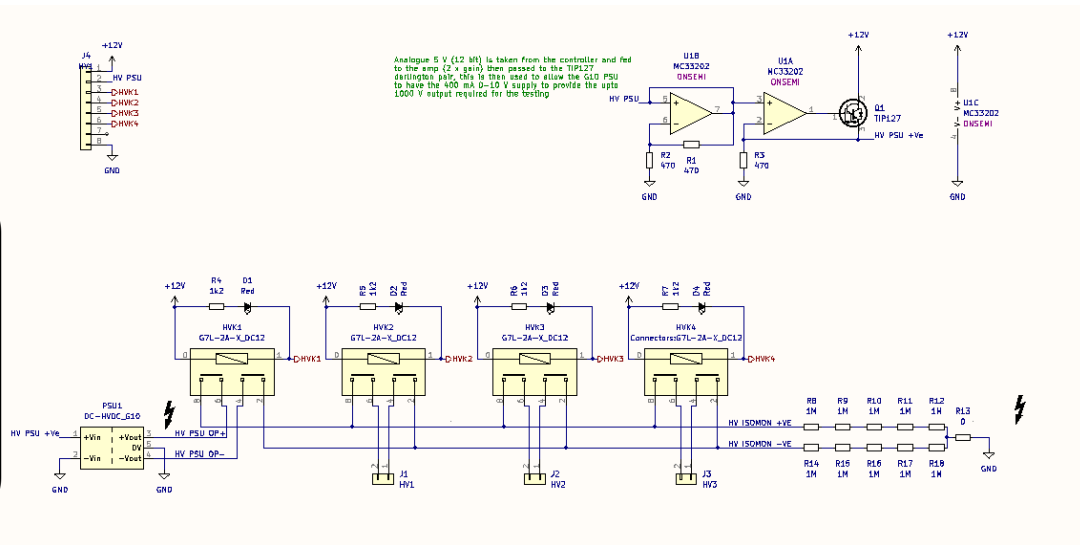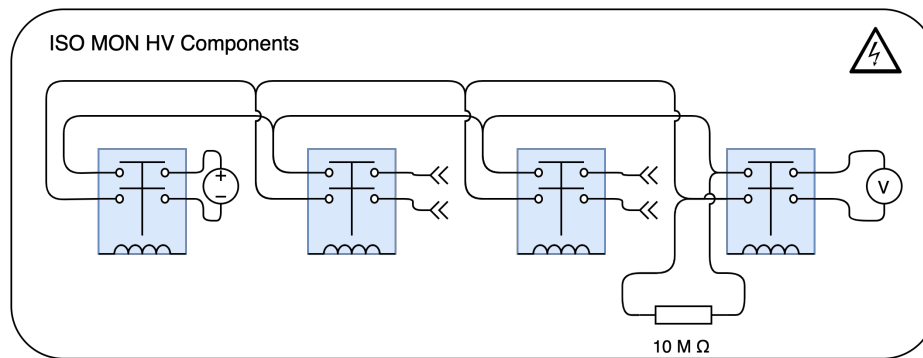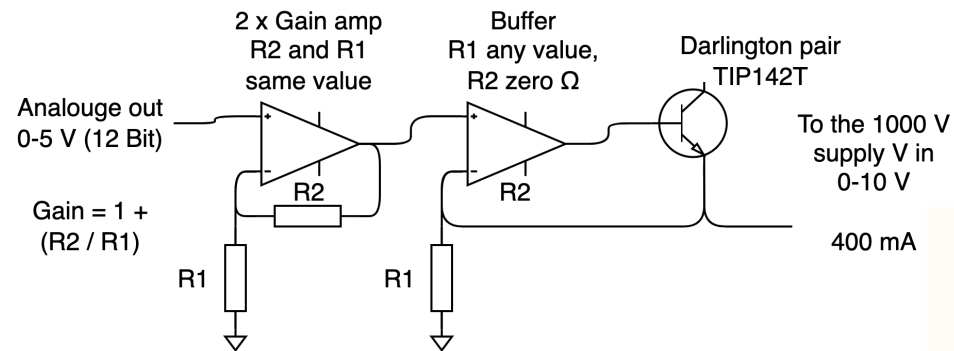PT4 in 7   2.3   1.3   PT2 in 3
PT4 out 8   2.4   1.4   PT2 out 4

This is based on the work of Ken Smart:

https://chargepoint.atlassian.net/wiki/spaces/EN/pages/2363396879/FDC+FCT+PVT+-+Functional+Test+Specification#RTD-Temperature-Sense-Circuits

https://chargepoint.atlassian.net/wiki/spaces/EN/pages/2707457600/FDC+FCT+PVT+-+Custom+Circuits+RTD

ISO MON CIB Components

2 x Gain amp
R2 and R1
same value

Buffer
R1 any value,
R2 zero Ω

Darlington pair
TIP142T

Analouge out
0-5 V (12 Bit)

To the 1000 V
supply V in
0-10 V

$$\text{Gain} = 1 + (R2 / R1)$$

R2

R2

R1

R1

400 mA

ISO MON HV Components

10 M Ω

Connector Choice

Where most appropriate I have chosen to specify the Phoenix Contact SKEDD family connectors, specifically:

- SDDC 1,5/{position count}-PV-3,5

- SDC 2,5/{position count}-PV-5,0

These connectors are rated for 8 A and 12 A, a populated connector can be inserted into and removed from a PCB without the use of tools, the wires are retained in the connector with a spring clip (crimp version is available).
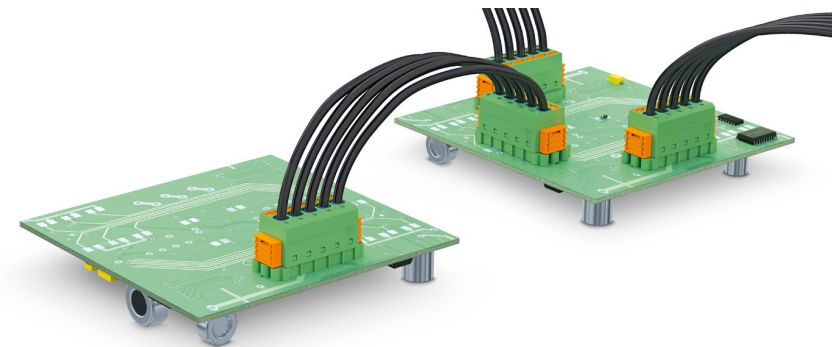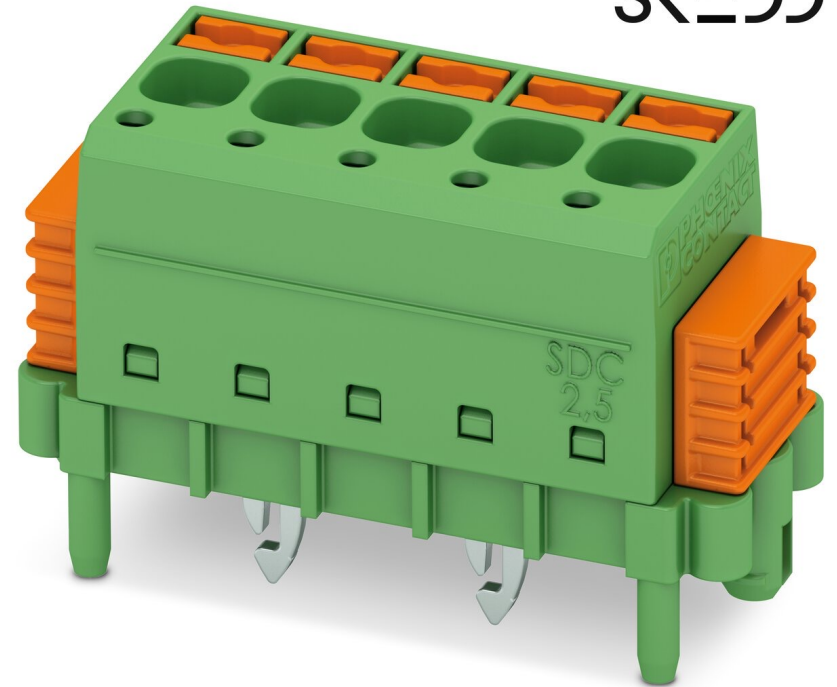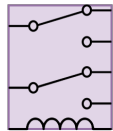
Relay Key
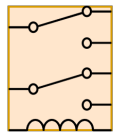
12 V Coil DTDP Relay (High power <30 A)

These relays are capable of switching up to 30 A
Finder Realys, Inc. PN# 66.22.9.012.0000
Digikey PN# 2066-66.22.9.012.0000-ND
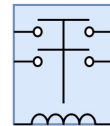Relay 30 A DPDT (2 Form C) 12VDC Coil

12 V Coil DTDP Relay (Signal only <1 A)

These relays are capable of switching up to 1 A
Omron PN# G6K-2P DC12
Digikey PN# Z117-ND
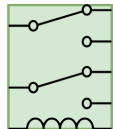Relay 1A DPDT (2 Form C) 12 VDC coil

12 V Coil DTDP Relay (Med power <16 A)

These relays are capable of switching up to 16 A
Picker Components PN# PC375-2C-12S4-X
Digikey PN# 2634-PC375-2C-12S4-X-ND
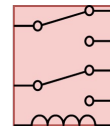Relay 16 A DPDT (2 Form C) 12 VDC Coil

12 V Coil Contactor (High Voltage 1000V)

These relays are capable of switching up to 20 A (1000 V)
Omron PN# G7L-2A-X-L DC12
Digikey PN# Z6087-ND
Relay 20 A DPST (2 Form A (Form X)) 12 VDC Coil

12 V Coil DTDP Relay (Low power <8 A)

These relays are capable of switching up to 8 A
Omron PN# G2RL24CFDC12
Digi-Key PN# Z3088-ND
Relay 8 A DPDT (2 Form C) 12 VDC Coil

48 V Coil DPDT Relay

These relays are capable of switching up to 8 A
Relpol PN# RM84-2012-35-1048
Digikey PN# RM84-2012-35-5048-ND
RS PN# 134-8378
Relay 8 A DPST (2 Form C) 48 VDC Coil