Magnet field- and Radiation Tolerant New Power Supply System PL500F8-12 MARATON

MDT System Proposal

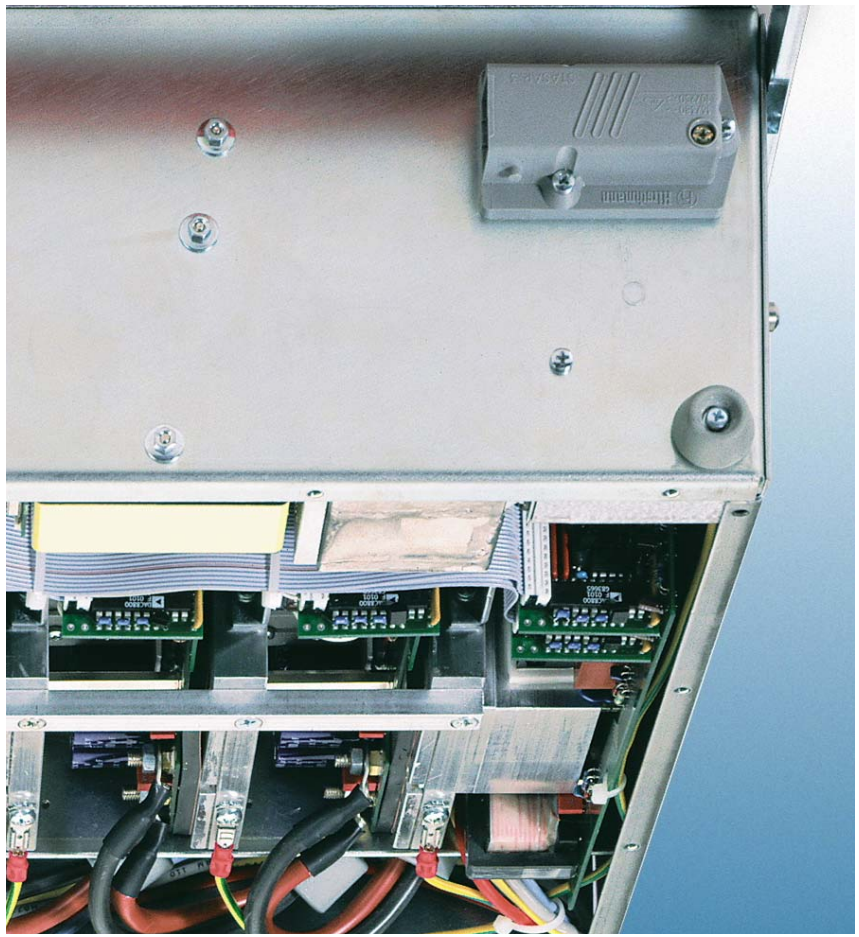
Water-cooled Floating Power Supply with

Monitoring & remote control

plugged in 19‘‘ Power Bin

Modular Floating Power Supply

- 12 independent potential free outputs, floating in 3U format
- Sensing possible
- DC output power 2,2kW at 250VDC per 3U box (depends on installed modules)



Modular Floating Power Supply

- CE conform EN 50 081/82 part 1
- Safety according to EN 60 950
- Water cooled
- Optional
  Easy insertion / extraction locking lever and carrying handle

Modular Floating Power Supply

- Power box for 6 modules, dual output
- Type PL 500 for long distance to load, slow regulation
- PL 6021 fast regulation for short distance
- Floating Range min. ca. 1,5 x Uout
- Universal DC- AC input allows use in labs with 230VAC
- RF filter reject any distortion from long power cables

Magnetism and Radiation Tolerant Power Modules

Magnetism (>100mT) and Radiation tolerant optionally
(2- 7V Dual Modul 20A successful tested in Cern with 115mT !)

Adjustable Values on Front panel :

- Output Voltage, with test bushes and Status LED
- Current Limit, with test bushes (for current equivalent voltage)
- max. Module Voltage (OVP), with test bushes

manual trimming

Radiation Tested Modules of PL 500

W - ie - Ne - R
Plein & Baus GmbH

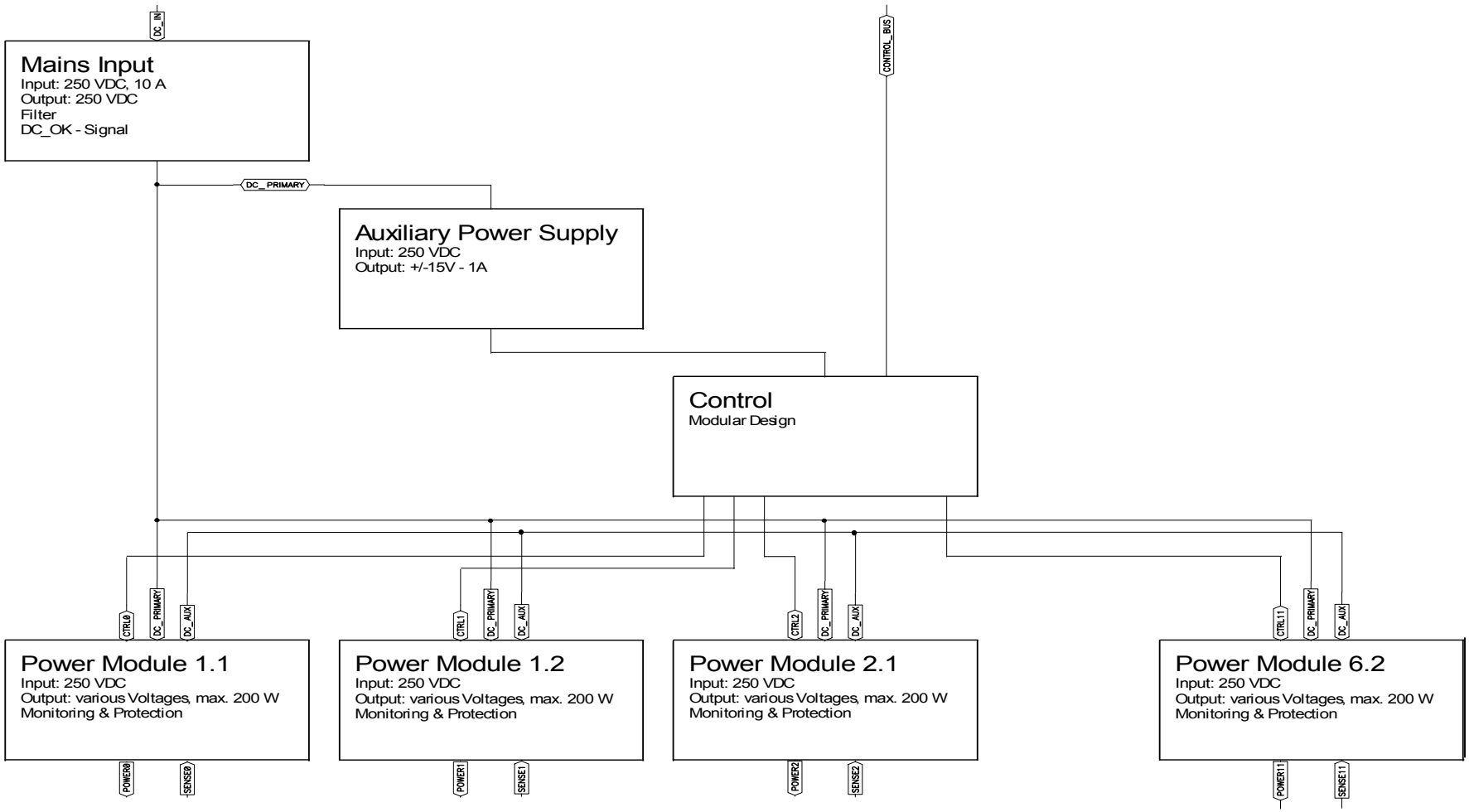
Radiation Tested Components of PL 500 Power Supplies

Facility	Year	Mains Input MNE Module	2-7V/100A MEH Module	+/-5V/30A (2-7V) MDH Module 2x2-7V/20A	+/-12V/10A MDL Module	+/-15V Aux-Power MUH Module	Controller Board Micro Processor
A	2000	passed	passed	passed	passed	fails	passed, excl. CAN
B	2002	passed	passed	passed	passed	New Module passed	fails after 417Gy
C	2002	New Module fails after 4.0E+10 p/cm²	passed	passed	passed	not tested	not tested
D	2002	New Module passed	not tested	not tested	not tested	passed	fails first time after 3,1krad needs 3x Power Cycle to pass incl. CANbus!

A	**TCC2**	**722Gy**	**7.99E+12 n/cm²**
B	**TCC2**	**417Gy**	**7.69E+12 n/cm²**
C	**Louvain SEE**		**1.0E+11 p/cm²**
D	**PSI SEE**	**14krad**	**1.0E+11 p/cm²**

All tests under responsibility of Cern Member

Principle of Modular Structure



Monitor and Control Board (simple)

- One analog output for each voltage & current
  (2 * 12 lines + return)
- Inhibit input for each channel (12 lines + return)
- Connection to external control via 50-wire flat cable
  (i. g. to EMLB)

  (available for 8 channels, 12 channel development within 2 month)

Intelligent Monitoring Board

Mostly requested version is the integrated intelligent build in controller.

- Evaluation Phase is finished.

- After clarification of charge bearing (WIENER is ready to develop:

Redundant Radiation tolerant micro controller system

(Efforts: 2 man month + radiation test)

Redundant micro controller system

- Automatic Reset of the failing Processor
- Measurement of Voltages, Currents, Temperatures
- Status Monitoring with programmable trip thresholds: Over- Undervoltage, Temperature and Current Limits
- Overcurrent Mode: Either trip off or constant current
- Inhibit & Switch Off of each channel possible (this feature must be activated with a jumper)
- Connection to external control via 2-wire CAN-Bus
- Problem Report in case of malfunction

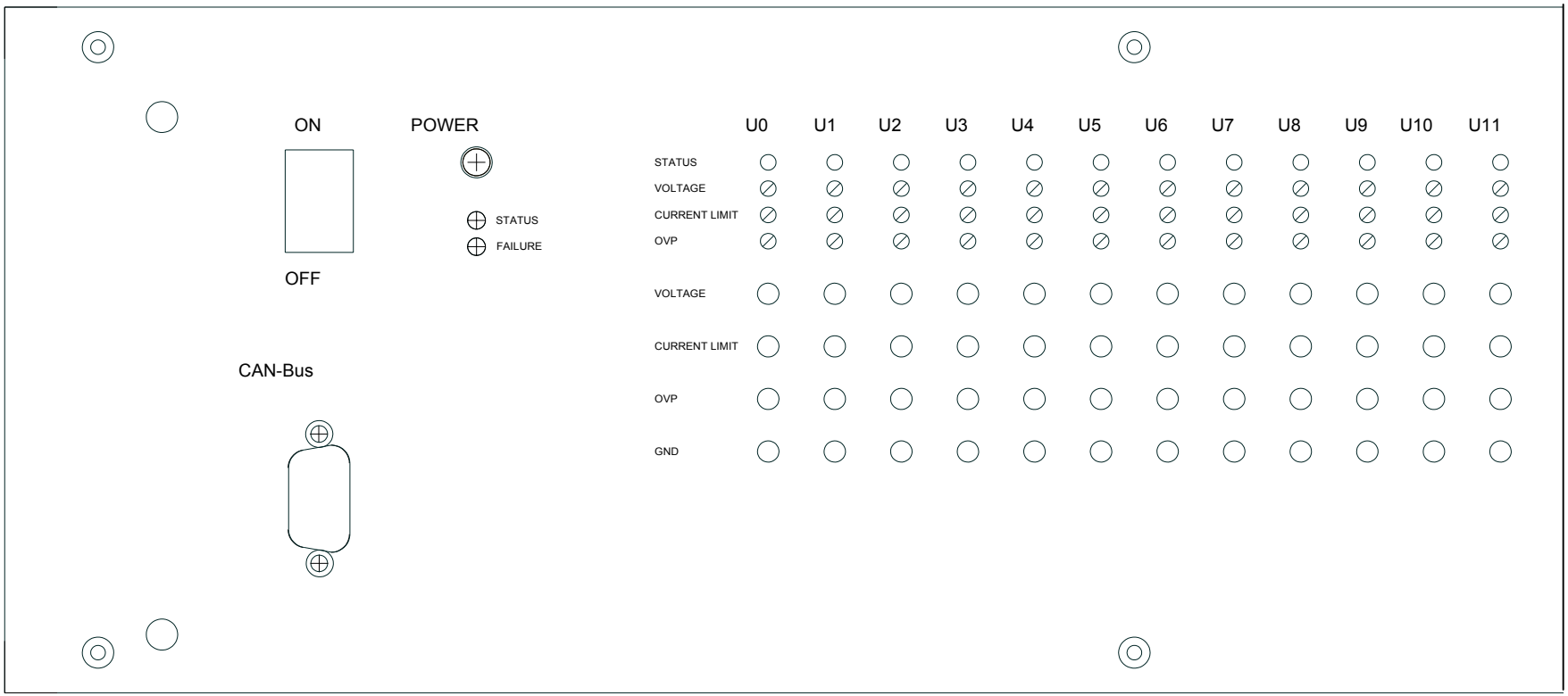
MDT LV System

- Range 2-7V per channel Dual Output Module
- Peak current per output: 20A 140W@7V
- Nominal current 10A 70W@7V
- 6 Modules (12 ch.) fit in one 3U power box 1680W peak
- Nominal output for 12 channels 840W
- Input power 1050W nominal at 80% Efficiency
- DC Input 250-300V / <4,2A (230VAC for Test purpose, too)

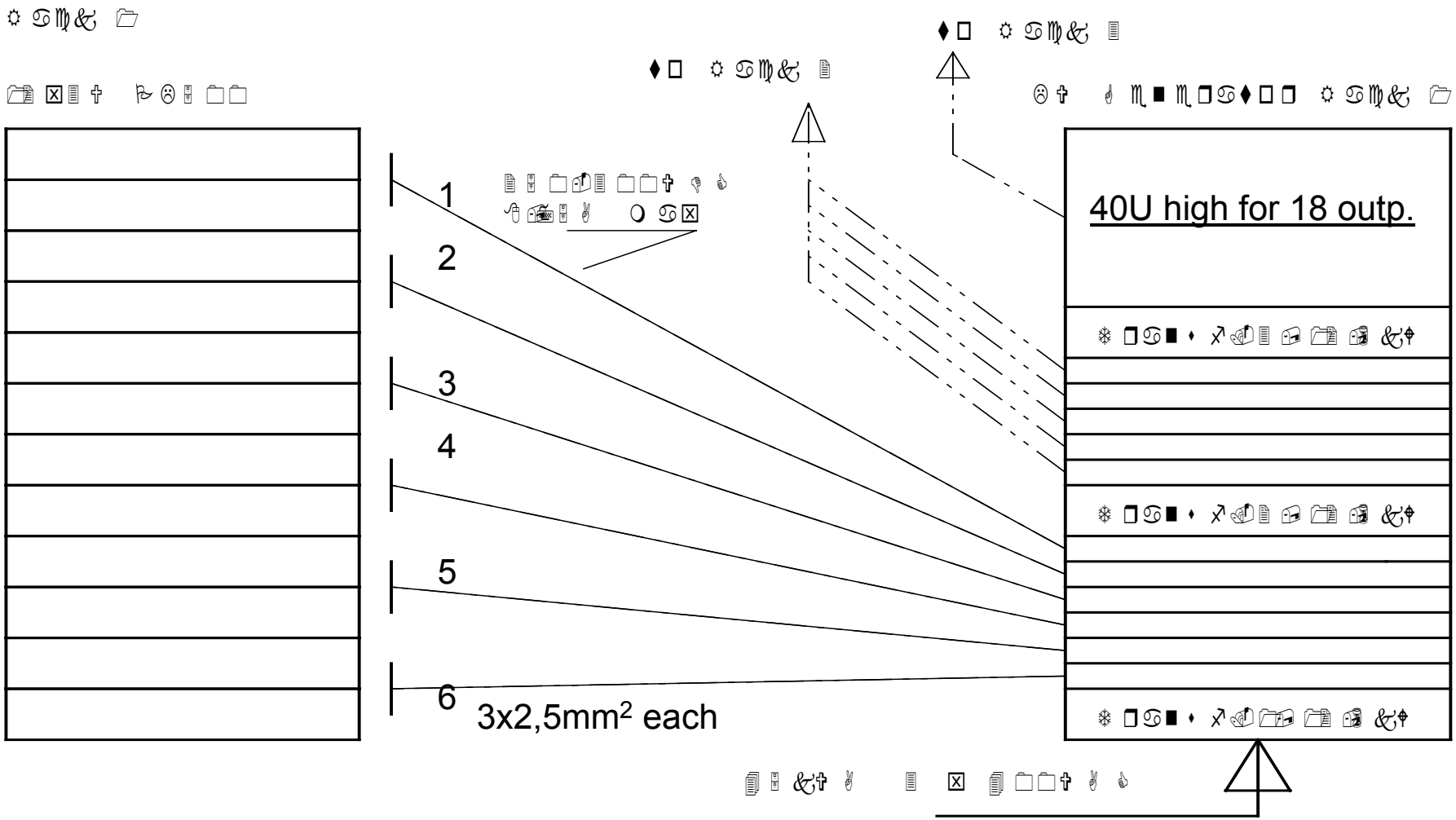
Voltage trimmable manually at front panel. Setting range limiting <2-7V is recommended for better precision !

Testpoints and Adjustments

Front panel partial view



Generator Rack and Cable



CANbus & OPC server

- Access to all monitoring information and control function
- Can handle up to

  63 Power Supplies with 16 channels
- One Address may use for “emergency”
- Indicates each faulty detail

Canbus Interface for Crate Remote Control

Wiener CANbus Interfaces can control and monitor

- Power Supplies systems
  - voltages, currents, temperatures, failure reports

Canbus Interface for Crate Remote Control

CANbus Controller

- Conforms CAN specification 2.0A (11-bits identifier)
- 9-pin male DSUB connector (CiA DS102-1 Specification)
- Opto-isolated transceiver , unshielded cable can be used with at least 110 nodes for high speed (1 Mbaud) bus

Custom OPC Server

- **Features:**

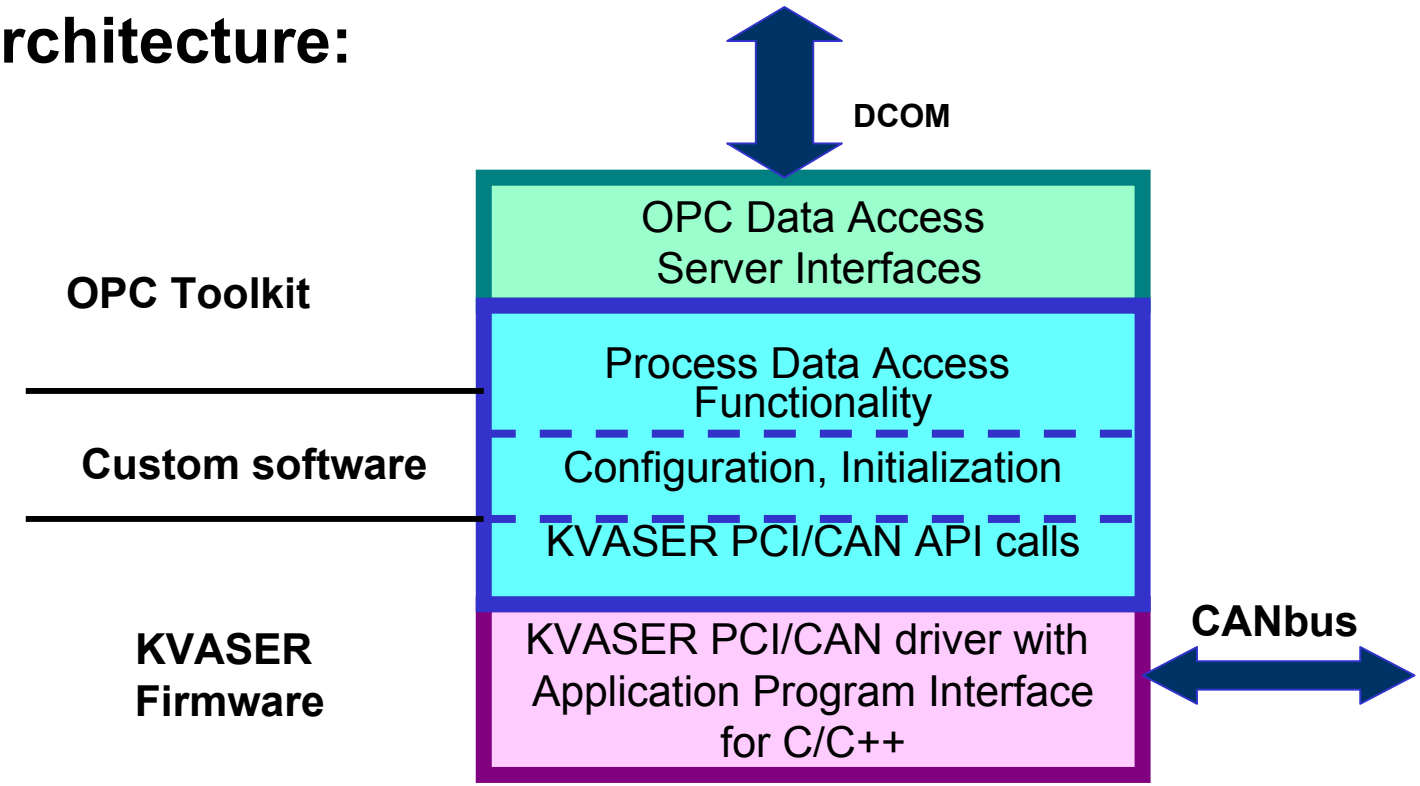
✓ Supports only one type of devices (i.E. WIENER only)

✓ Is dedicated to one type of PCI CAN I/F card (API library) – presently **Kvaser Card**

✓ Needs to be redesigned if one of above changes

Custom OPC Server

- **Architecture:**



Network configuration example

(variable namespace)