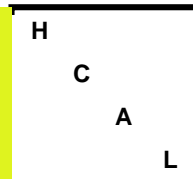




CMS HCAL

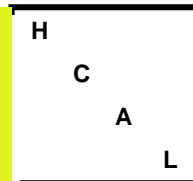


DCS Status

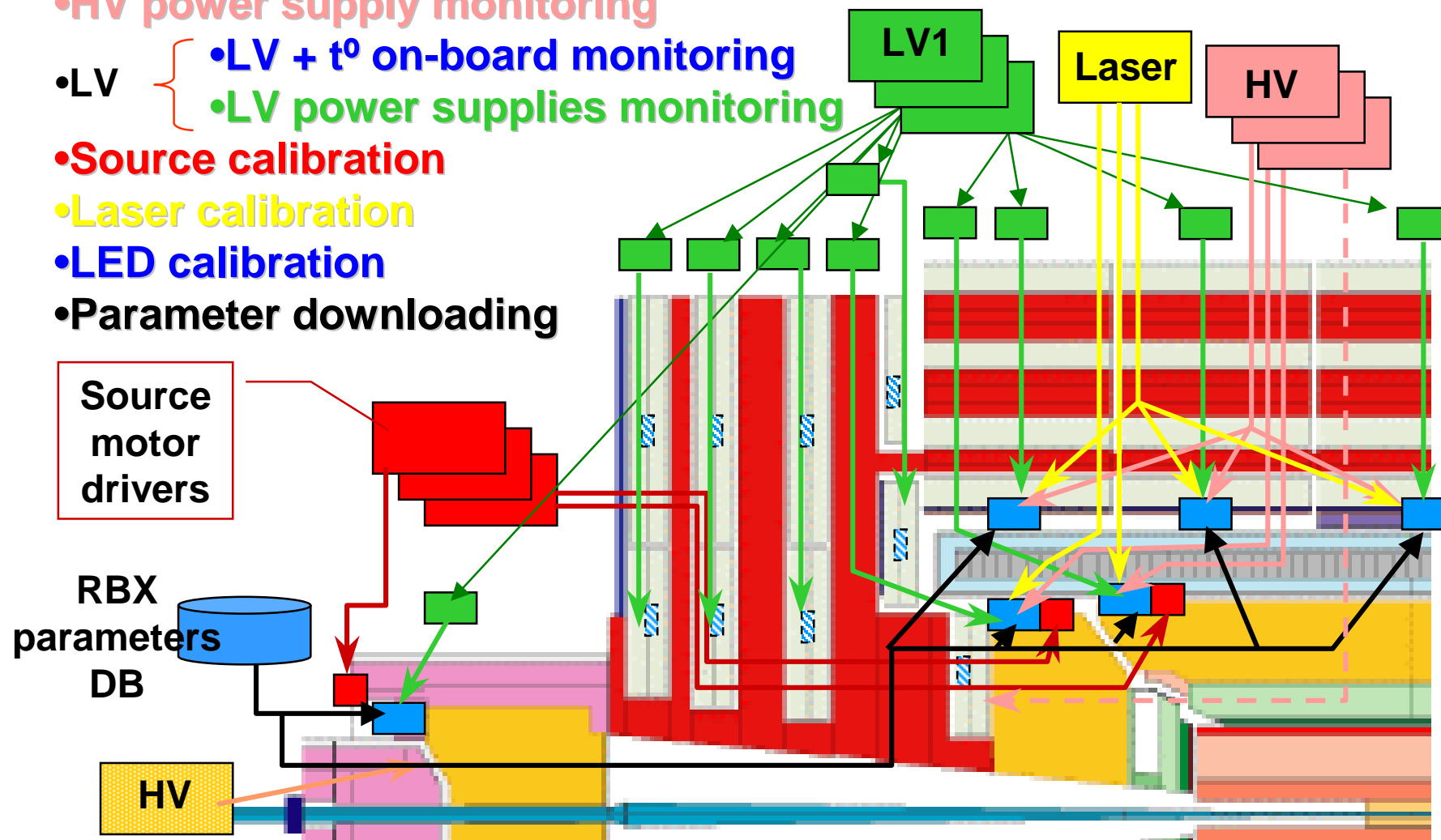
**S.Sergueev,
FNAL/JINR**



HCAL Monitoring

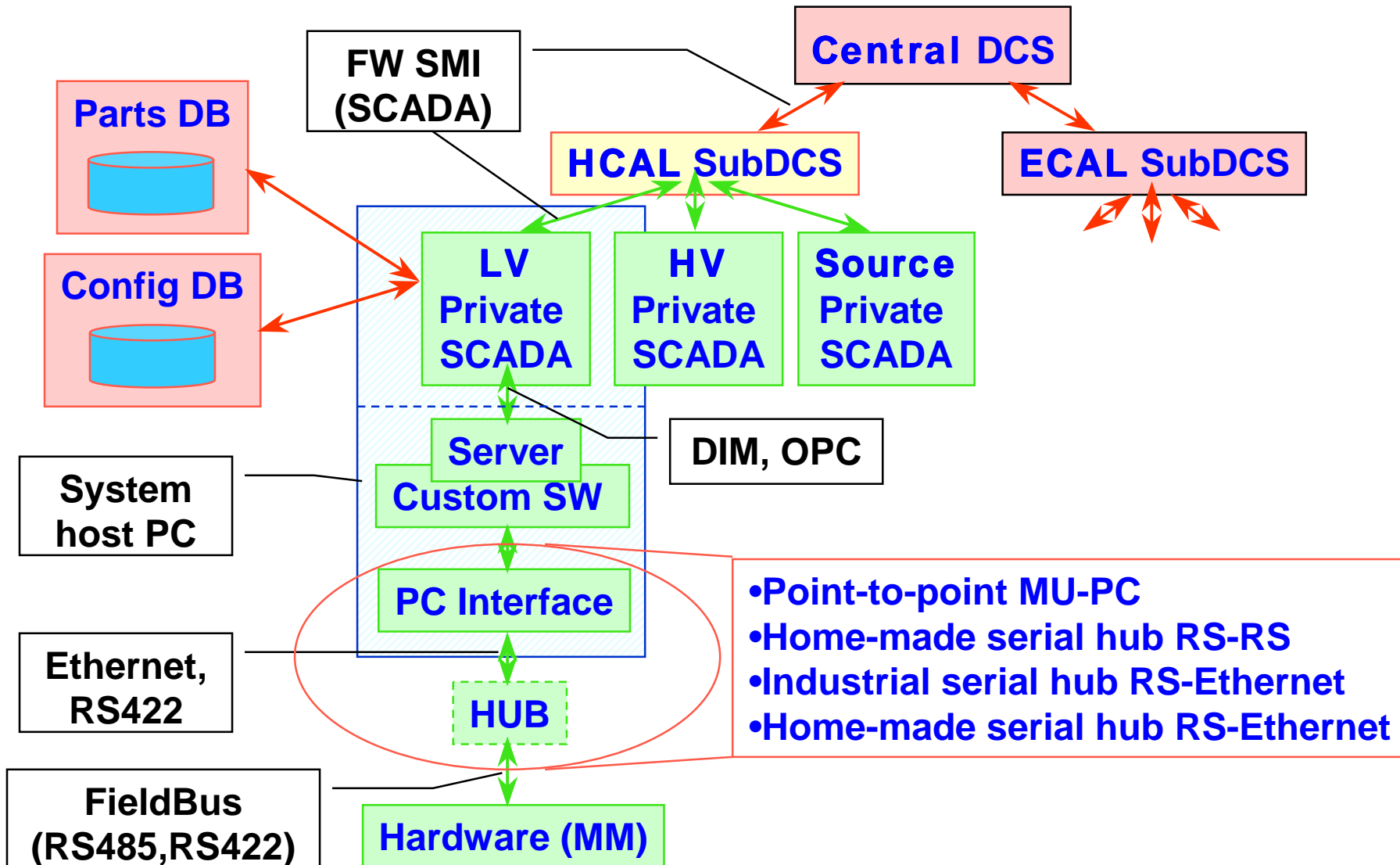
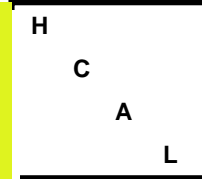


- HV power supply monitoring
- LV
 - LV + t⁰ on-board monitoring
 - LV power supplies monitoring
- Source calibration
- Laser calibration
- LED calibration
- Parameter downloading



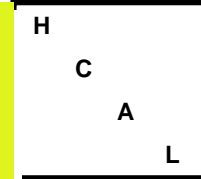


DCS structure





Serial communications



Standards:

- **Old serial communication standards**

- frame format,
- data transmission rates,
-

- **RS232 (point-to-point, duplex)**

- Signal +/- 15V

- **RS422 (point-to-point, duplex)**

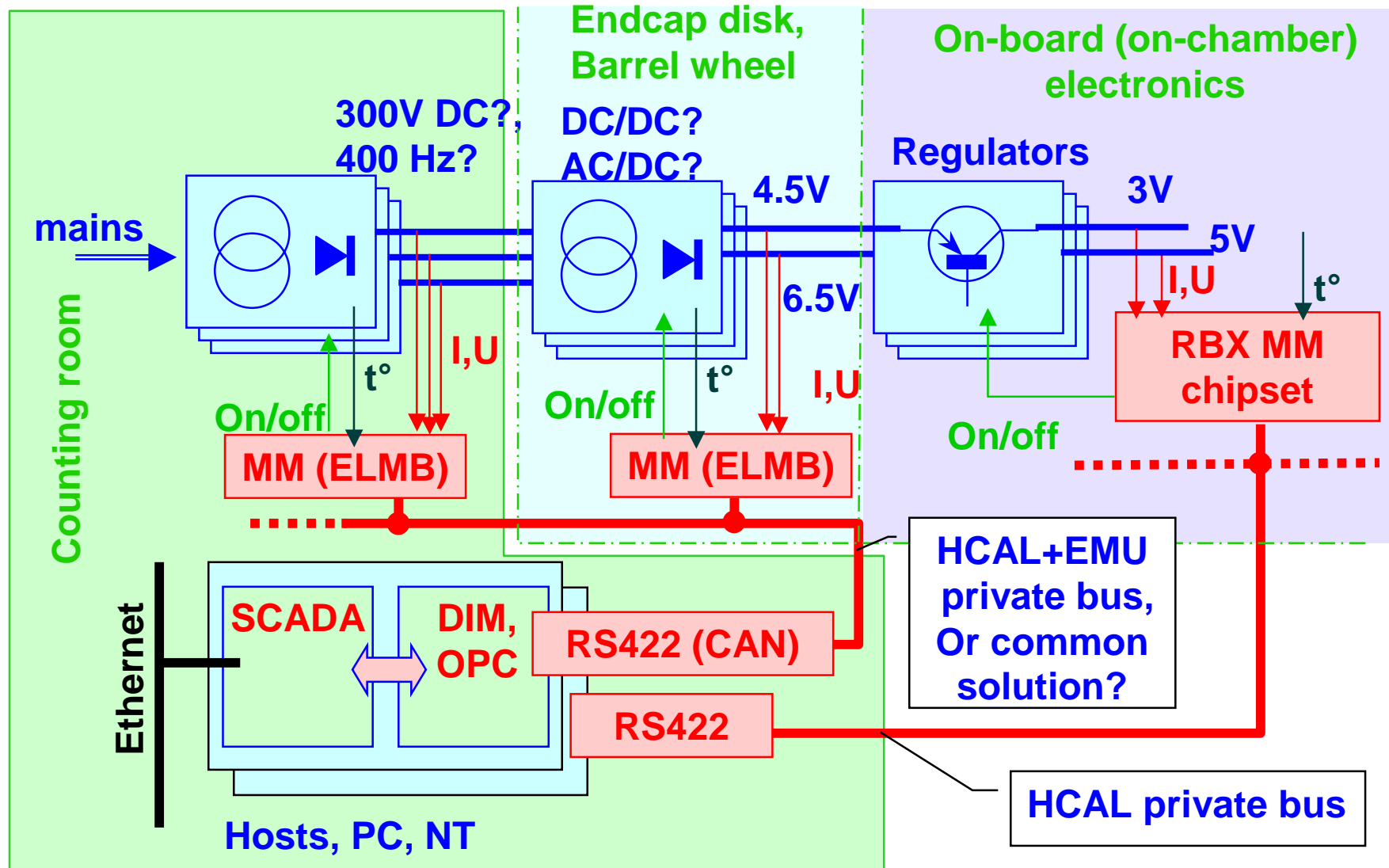
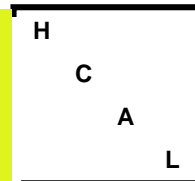
- Twisted pair (increasing line length, speed)

- **RS485 (multipoint, half-duplex)**

- Transmitter disabling

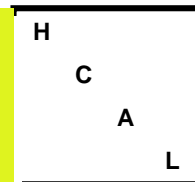


Low Voltage control system



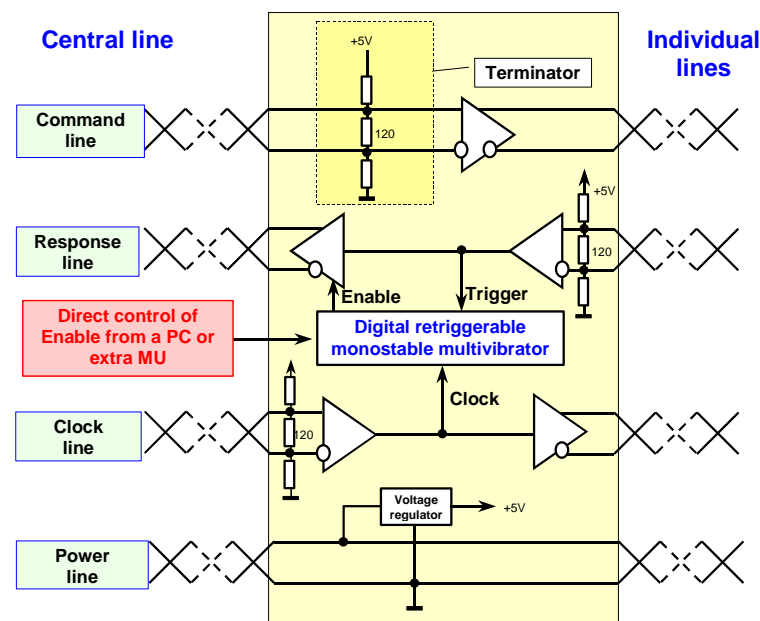
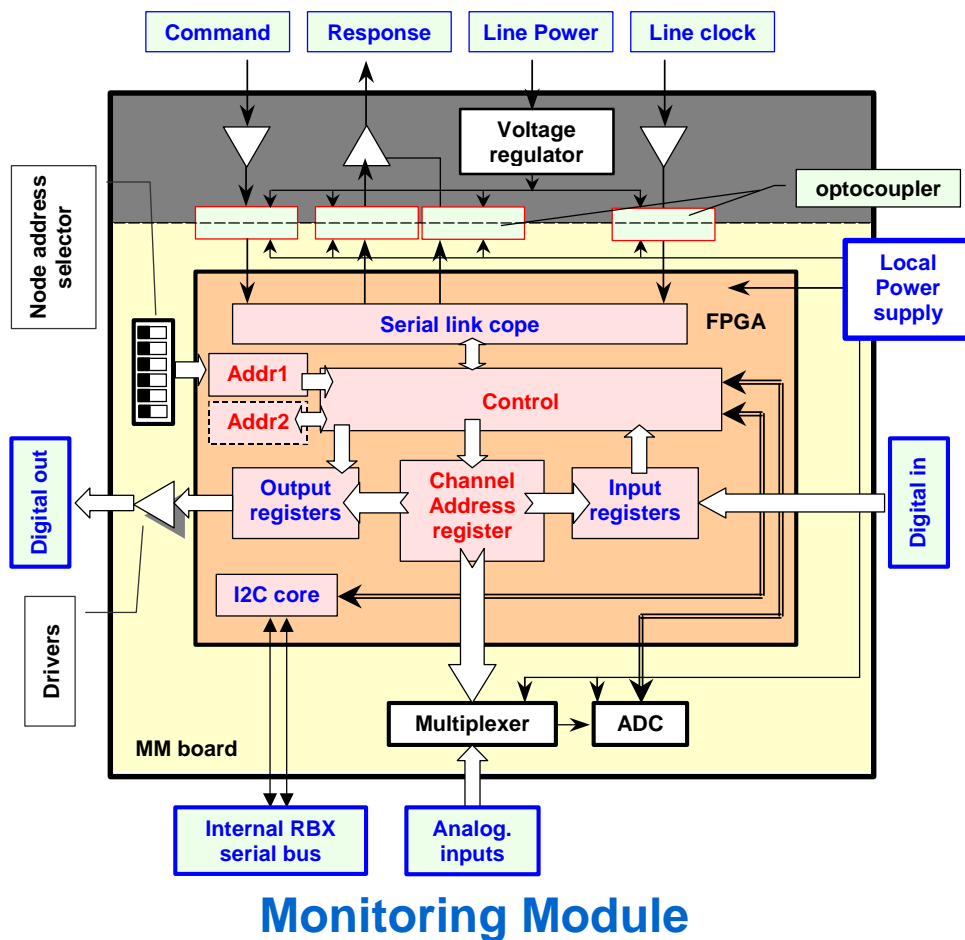


MM and Repeater



Point-to-point connection (RS422)

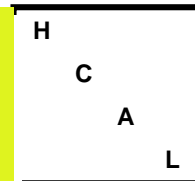
No need any more?



Repeater (Router)



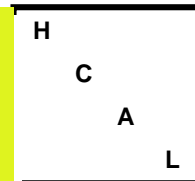
HW working conditions



- **Inside the detector**
 - High radiation levels
 - High probability of SEE
 - 4 Tesla magnetic field
- **Periphery of the detector**
 - Relatively low radiation levels
 - Probability of SEE
 - 1 KGs magnetic field => **No Ethernet**
- **Rack at the detector periphery**
 - Relatively low radiation levels
 - Probability of SEE
 - Low magnetic field (???)
- **Counting room**
 - Normal conditions



Industrial serial hub



Control



DeviceMaster
RTS 16-port
RJ45 Rackmount
98800-7, ~ 1600\$
(No power supply)

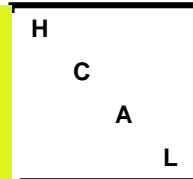
National Instruments



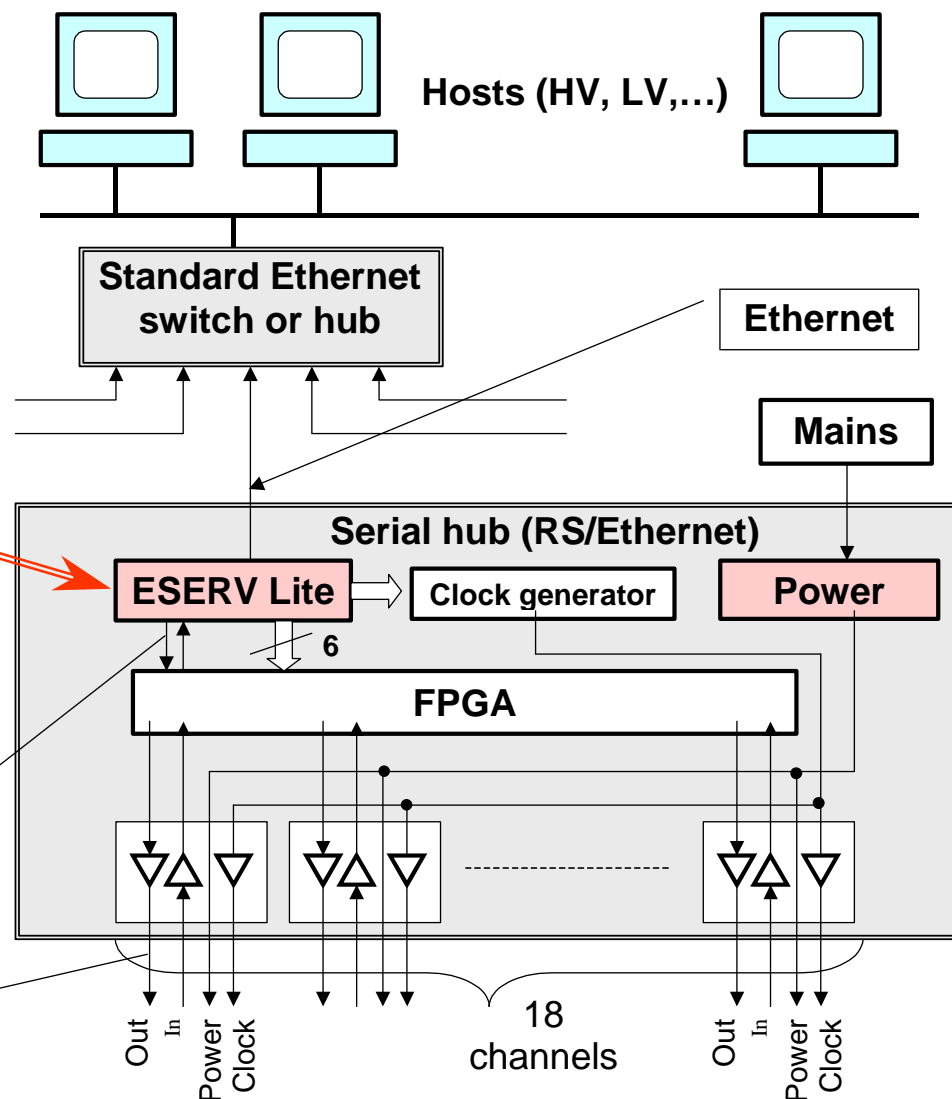
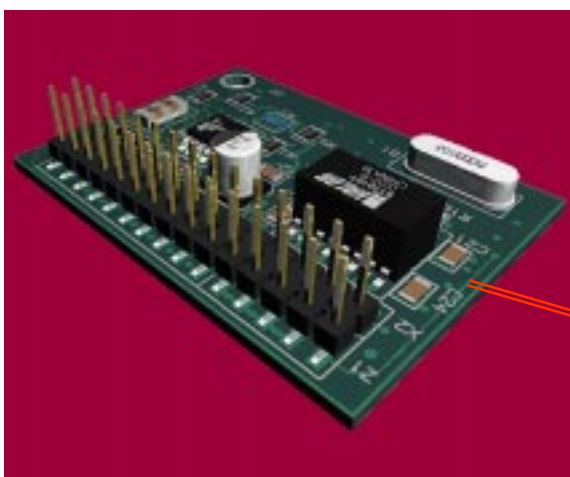
ENET-485/4,
4 ports, ~ 1300\$,
Needs Ethernet hub



Home-made serial hub I

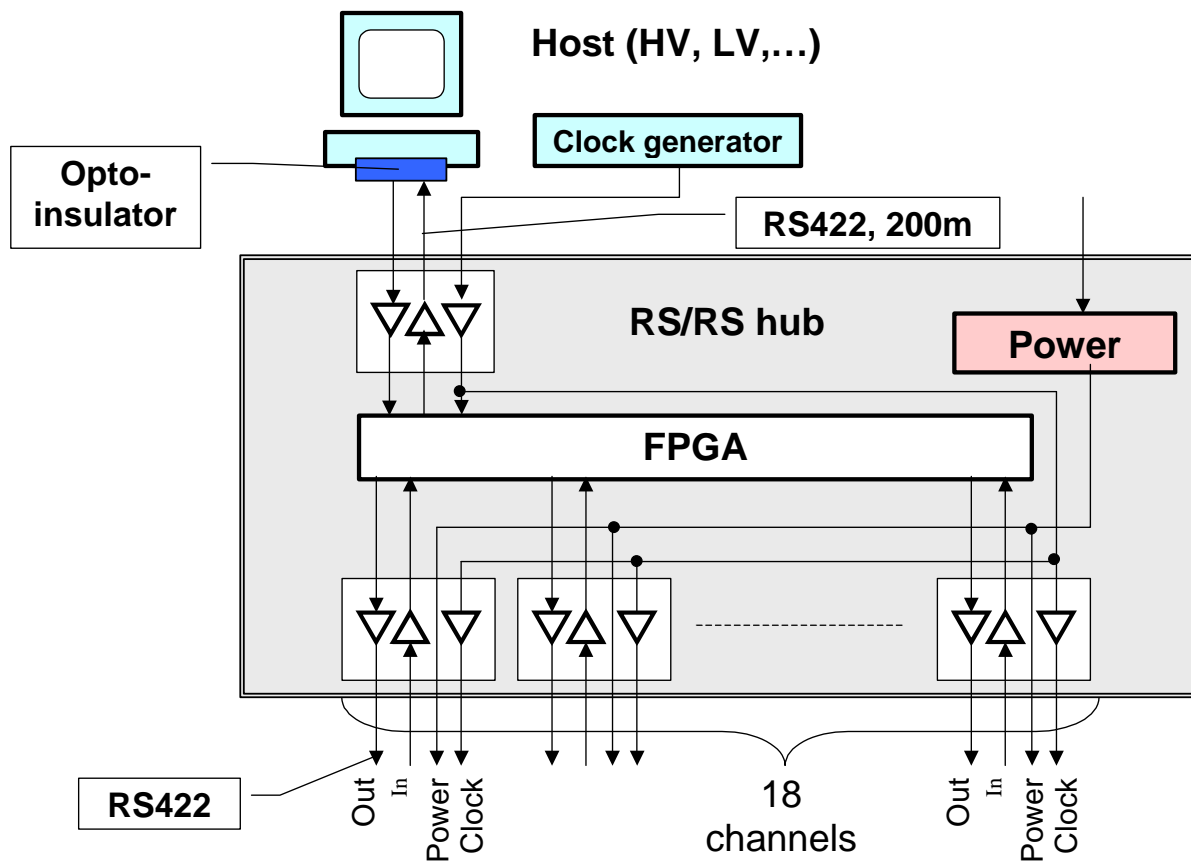
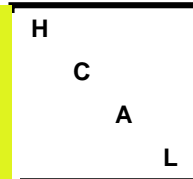


ESERV Lite, 50-100\$,
www.violasystems.com



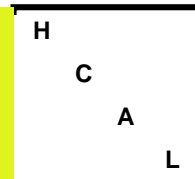


Home-made serial hub II





HW interfacing

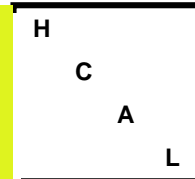


Possible solutions

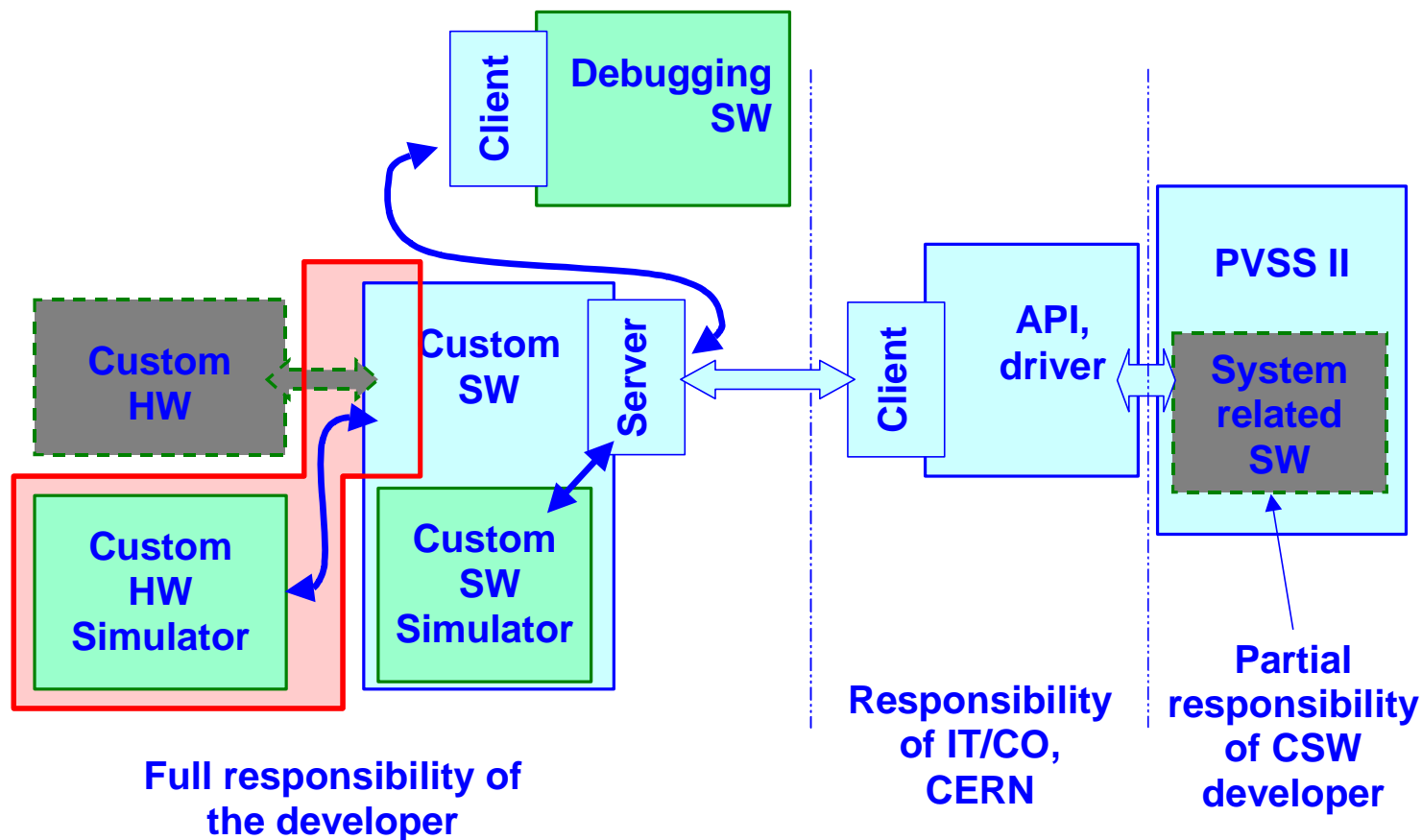
Type	Standard	Problems	Location	Cable length	Price, \$ (MM+cable+port cost)
PC RS interface point-to-point	RS422 / RS485		Counting room	200	250 (50+100+100)
Industrial serial hub	RS422 / Ethernet		Counting room, (rack?)	200 (20)	270 (50+100+120) 180 (50+10+120)
Home-made serial hub I	RS422 / Ethernet	Maintenance	Counting room, (rack?)	200 (20)	190 (50+100+40) 100 (50+10+40)
Home-made serial hub II	RS422 / RS422	Maintenance	Periphery, rack	20	70 (50+10+10)



SW for HV, area of work

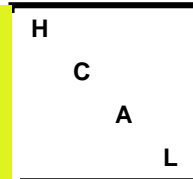


HV control system software architecture

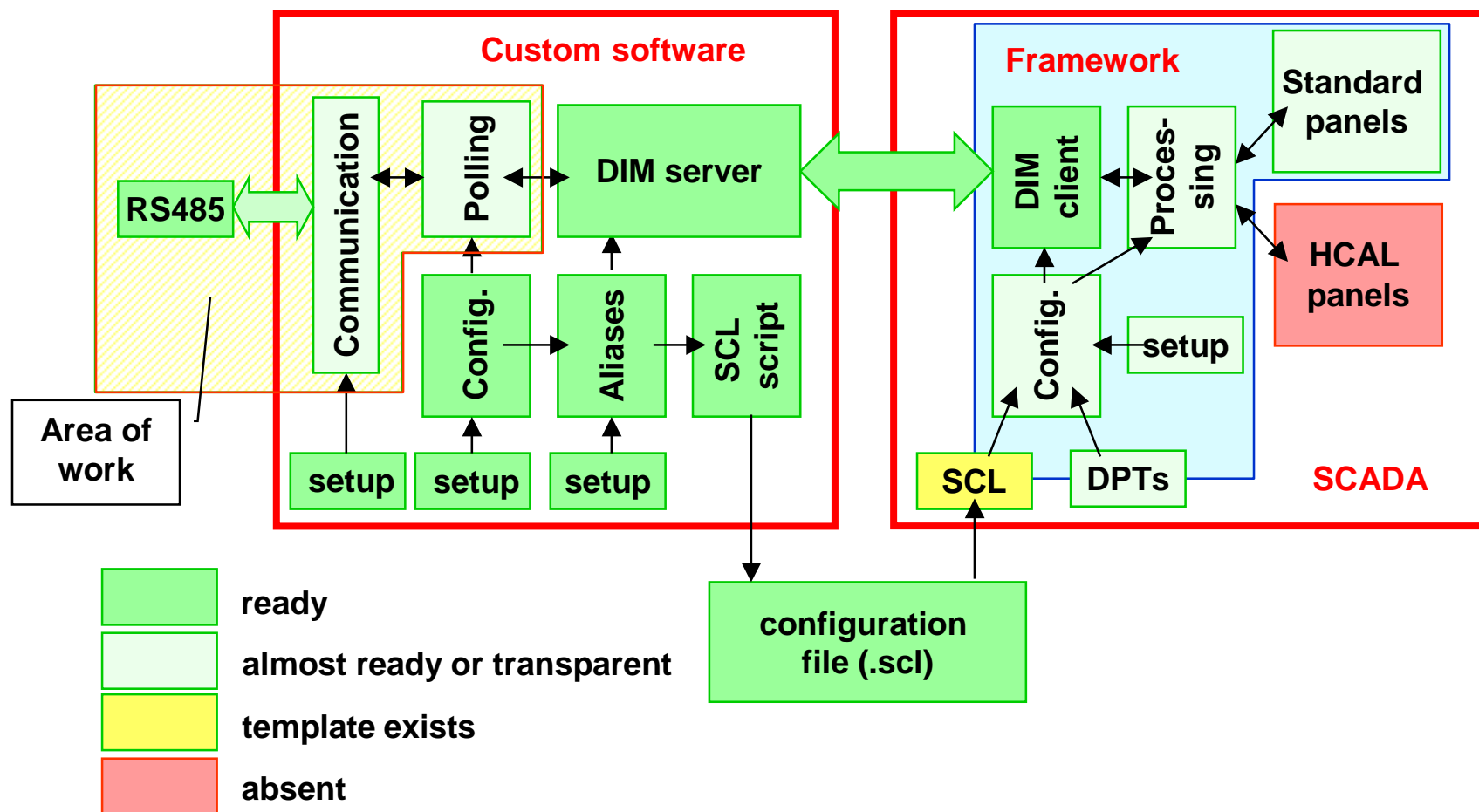




HV system structure

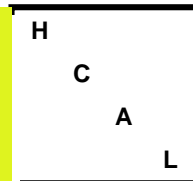


HV power supply software present status





HV hardware simulator



Work in progress ...

Drift/Deviation cycle: 1000 Deviation On Drift On I/O Close

Module0

	Original	Deviation %	Drift %	Actual	Defaul
VLim1	5000	0	0	5000	5000
ILim1	20	0	0	20	20
VLim2	4500	0	0	4500	4500
ILim2	15	0	0	15	15
RUUp1	300				
PUUp2	200				
RDn1	150				
RDn2	100				

Module0 ON

Status byte

On

Interlock Open

Communications

Show COM activ Exit Close

Crate: 1 1 2 3 4 5 6 7 8 9 10 11 12

Module: 0

Channel: 0 W 1 (57 03 01 55)

----- CRATE -----

- W - wake up crate
- D - store defaults as current v
- H - read crate config
- V - read crate attribs
- G - Go, start V setting
- O - End of crate communicati

----- MODULE -----

- U - read Vx

Select default system type

Crates in system: 3

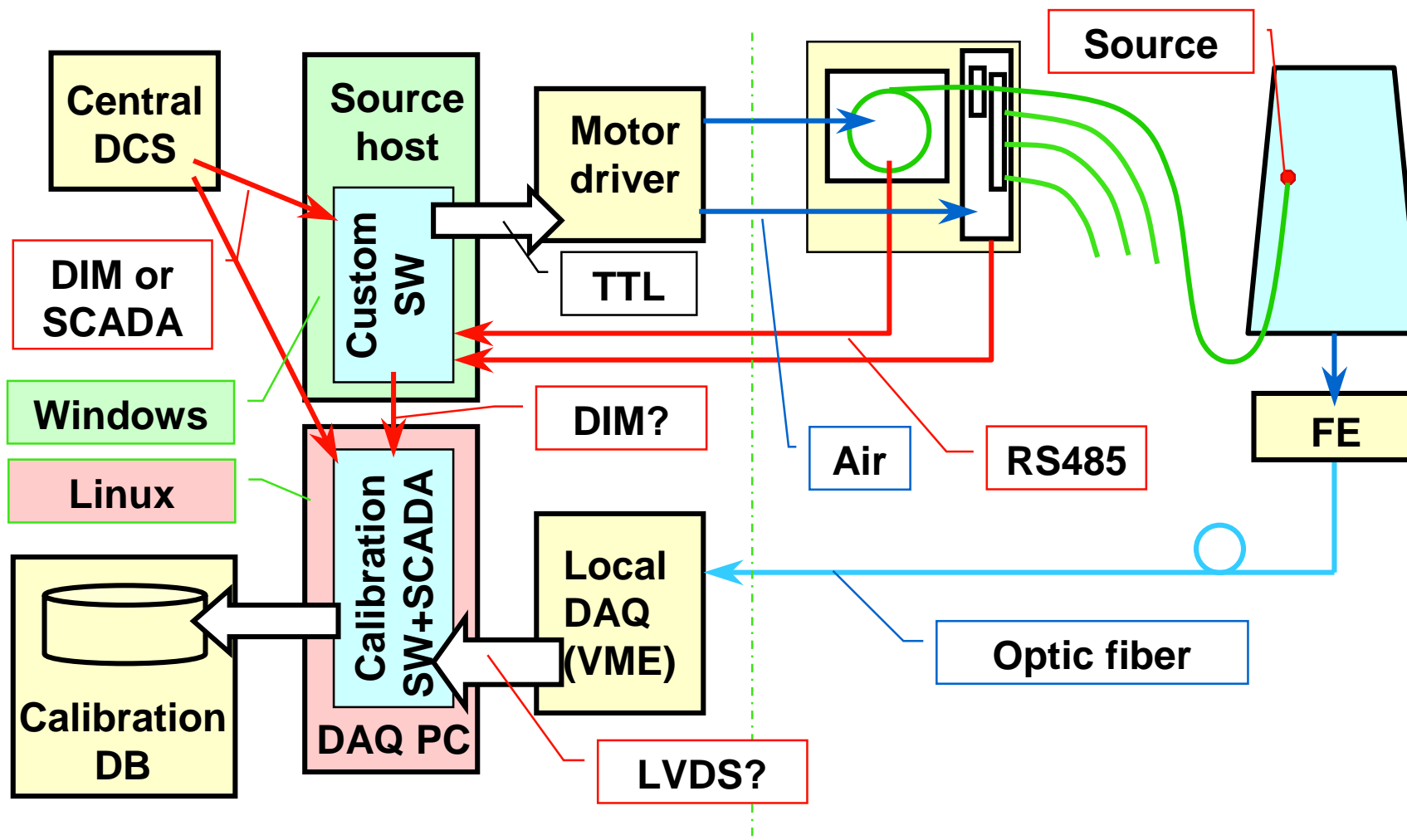
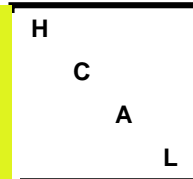
Power supply type

HCAL ME1/1

OK Cancel

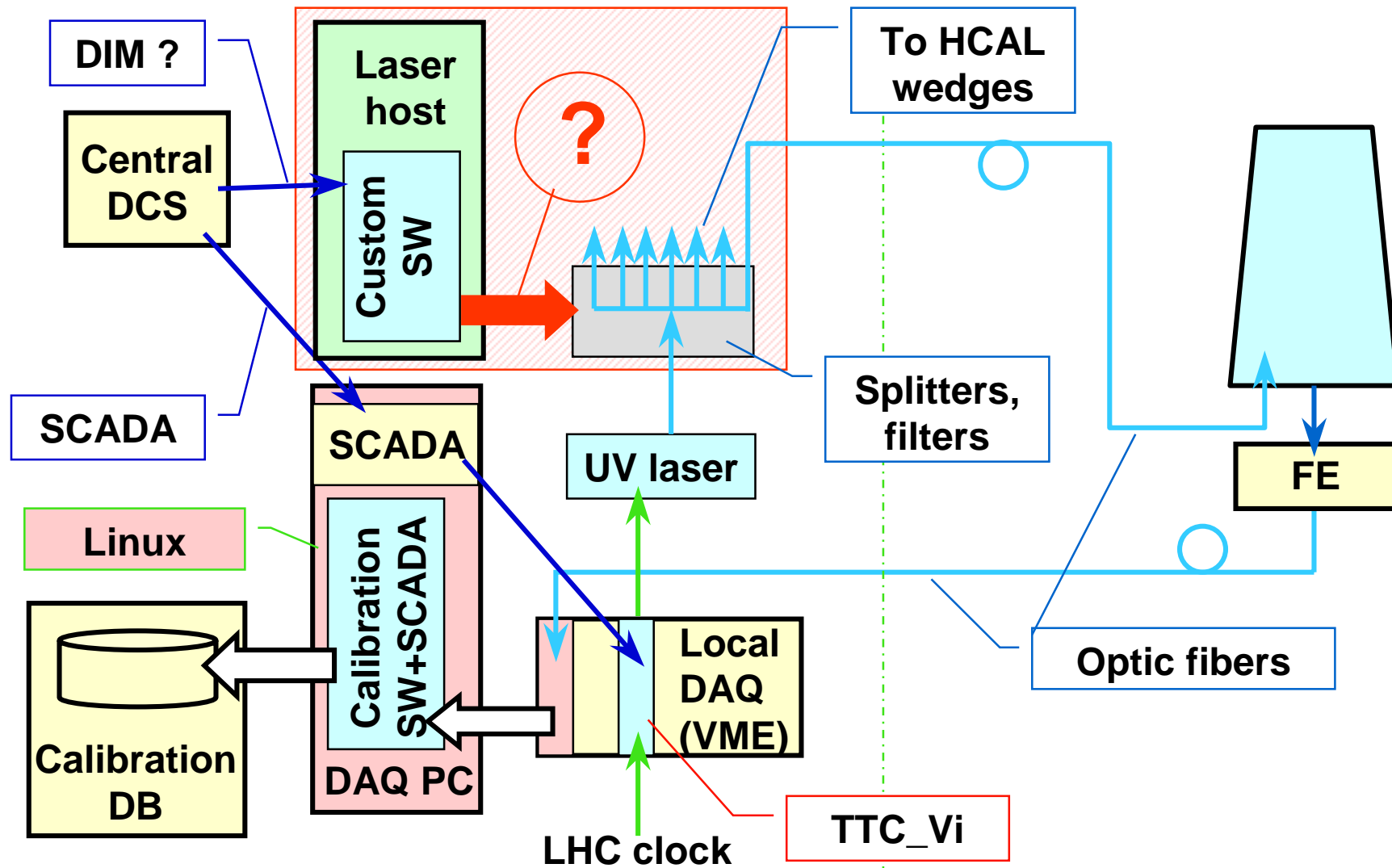
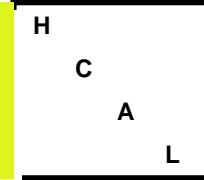


Radioactive source calibration



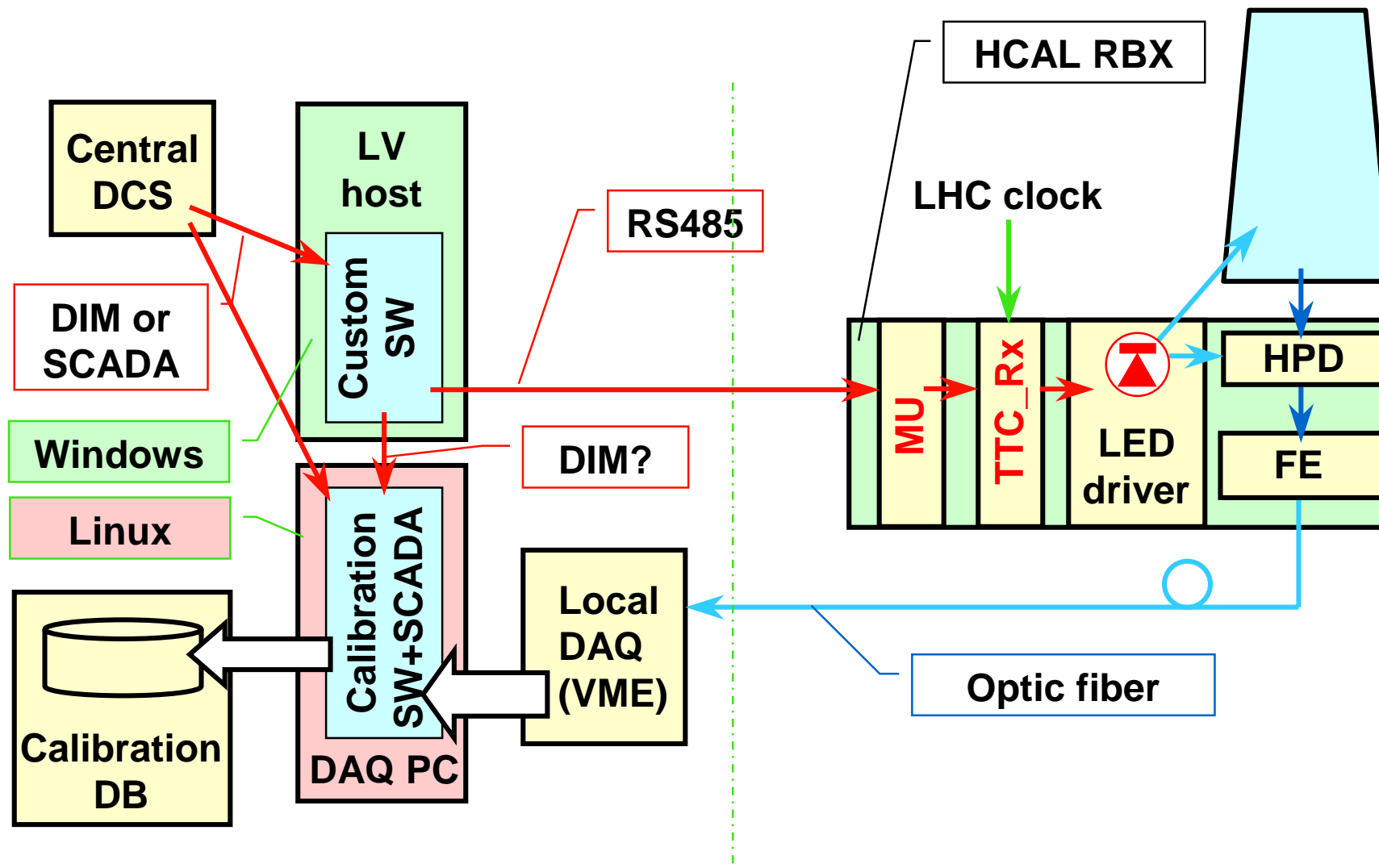
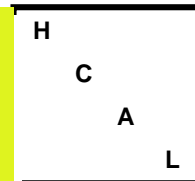


Laser calibration



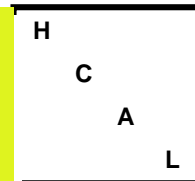


LED calibration





For beam-test 2002



Goals:

- Test HV power supply SW in real conditions
- Develop HCAL panels
- Get real practice with RS485

