RICH DCS status

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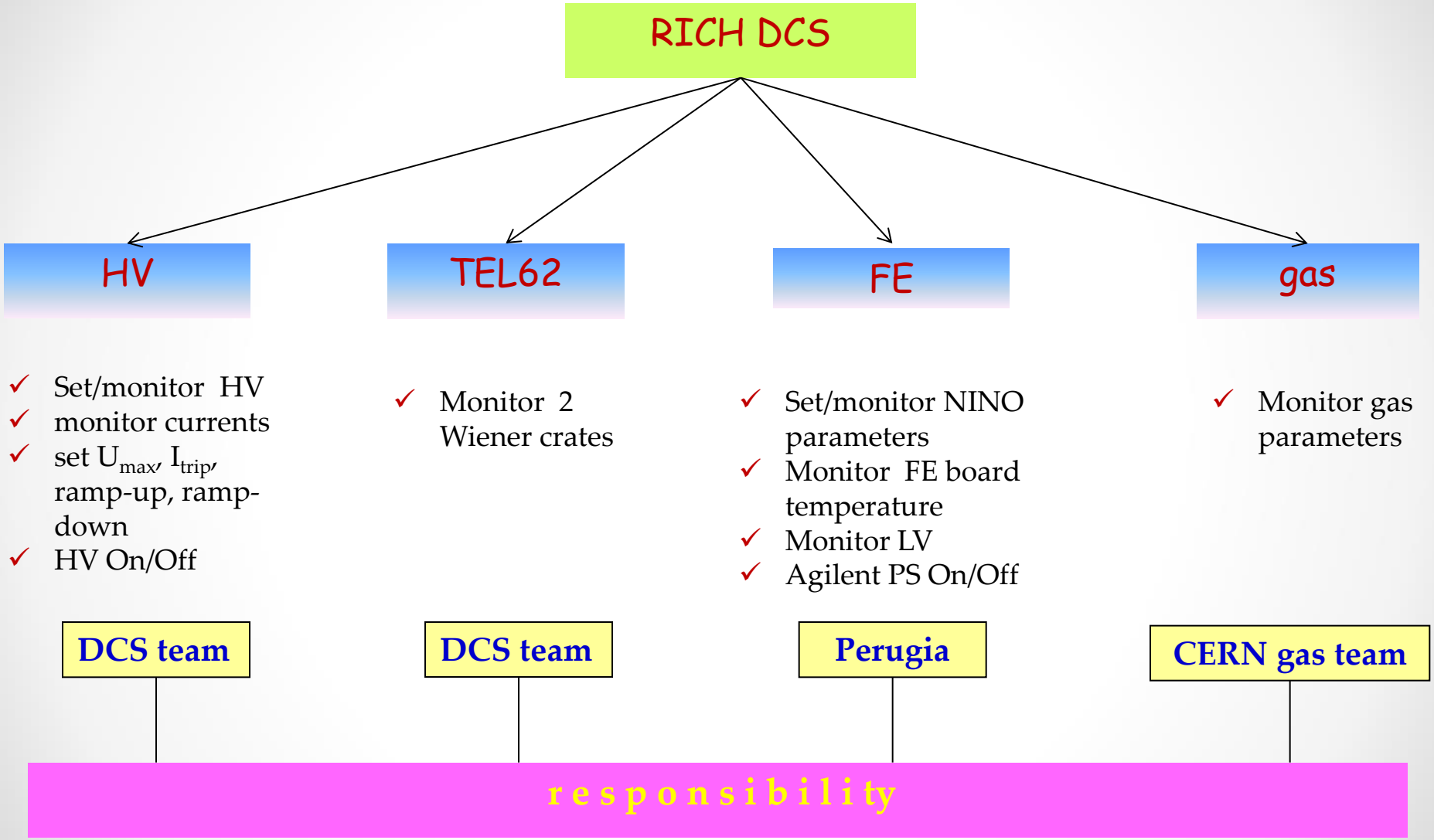
Simone Martini & Lippo Memmi – Annuncation

outline

1. DCS overview
2. HV control
3. TEL62 control
4. FE control
5. Tests in Perugia
6. Gas control
7. Conclusions

RICH DCS overview



HV control

Natural subdivision: **4 crates x 61 supercells/crate x 2 HV_channels/supercell**

- ✓ crates: JURA_UP, JURA_DOWN, SALEVE_UP, SALEVE_DOWN
- ✓ Supercell: 8 adjacent PMs
- ✓ HV channel: 4 PMs powered from one channel in the HV splitter board

Integration to the DCS:

- ✓ CAENs connected to the LAN with ethernet cables
- ✓ CAEN OPC server is used to communicate with DCS

Status:
✓ Fully integrated into the central DCS

TEL62 control

2 standard **Wiener crates** to be monitored:

- ✓ Jura crate (4 TEL62 for data) installed
- ✓ Saleve crate (1 TEL62 for L0 from NINO OR's) to be installed soon
- ✓ Wiener OPC server is used to communicate with DCS
- ✓ Integration to the central DCS: in queue

Thanks to Mauro Piccini for the pictures

FE boards in the DCS

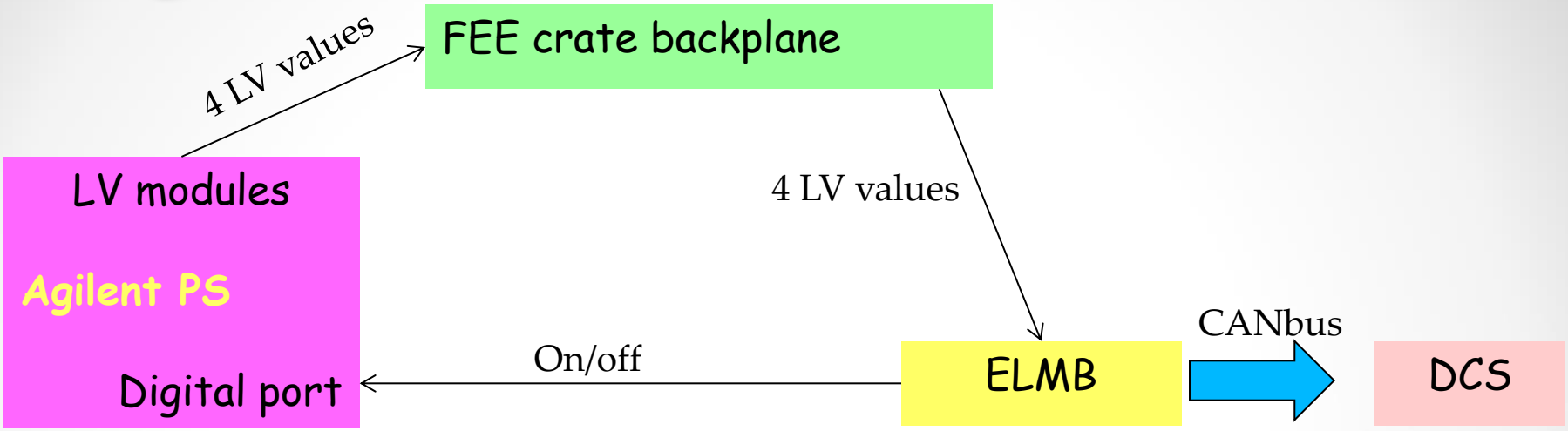
- ✓ 4 FE crates x 16 boards/crate x 32 channels/board
- ✓ Each FE board contains 4 amplifiers, 4 NINO discriminators (8 channels per NINO), 1 ELMB embedded (with minor changes wrt a standard ATLAS design)
- ✓ **ELMB communicates with DCS via CANBUS** (all boards are connected in a daisy chain)
- ✓ parameters to control/set by ELMB: thresholds (4), hysteresis (4), stretching (4), board temperature (1)

ELMB = embedded local monitor board (from ATLAS)

Status:

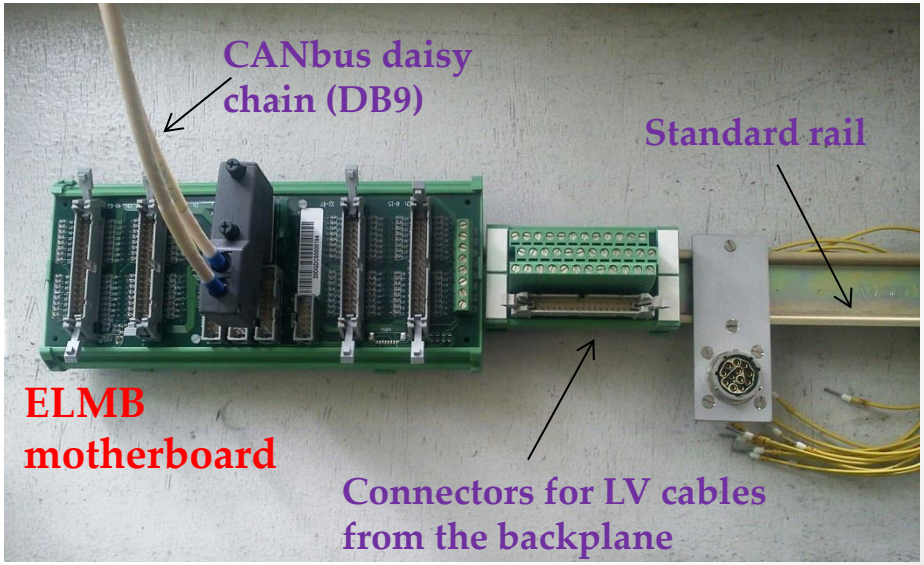
- ✓ Cables, connectors and patch panels for daisy chains ready (delivery at CERN: mid September)
- ✓ DCS infrastructure installation to be started after Ferrara meeting (waiting for FE boards)

Agilent LV PS in the DCS

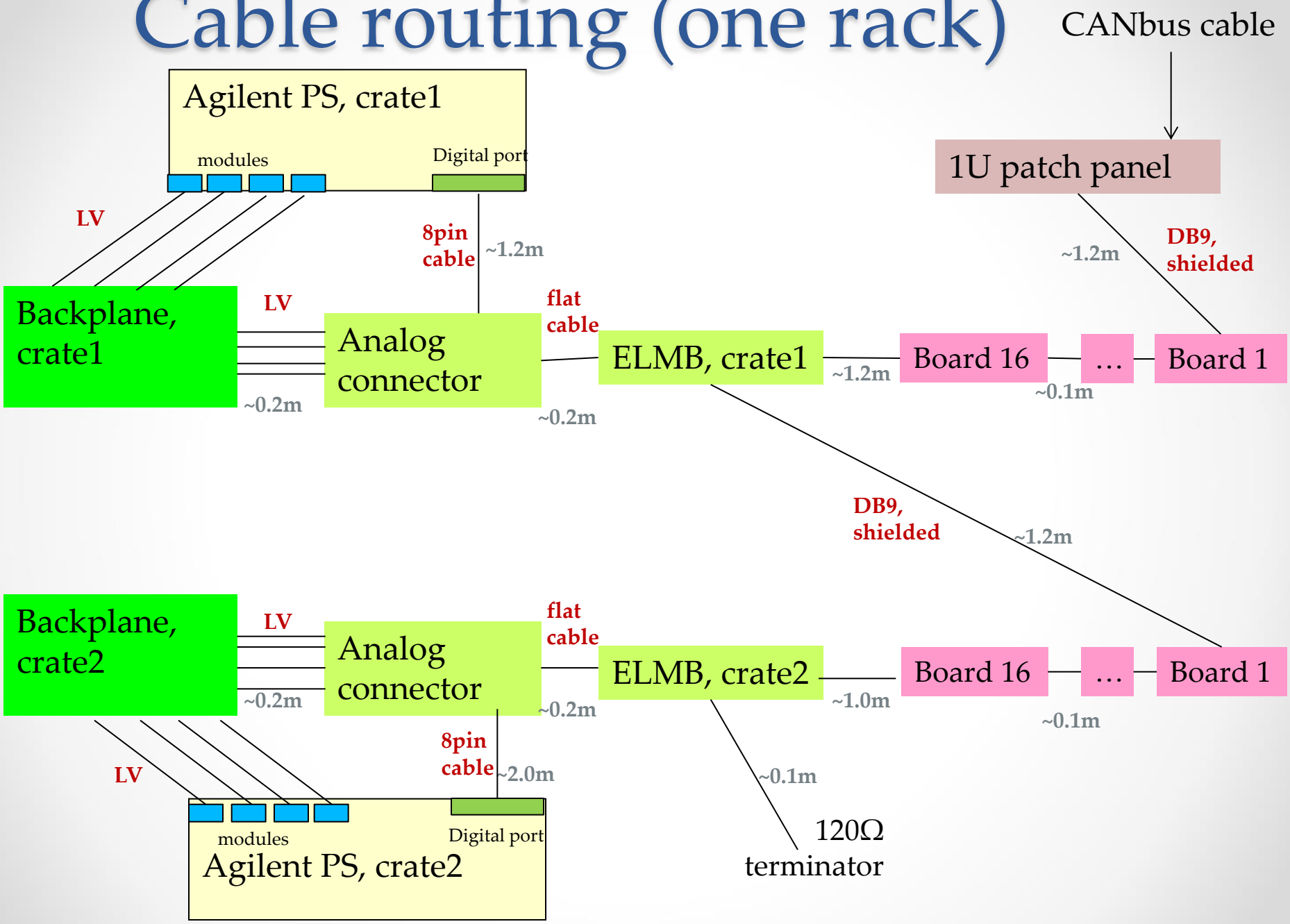


Simple solution:

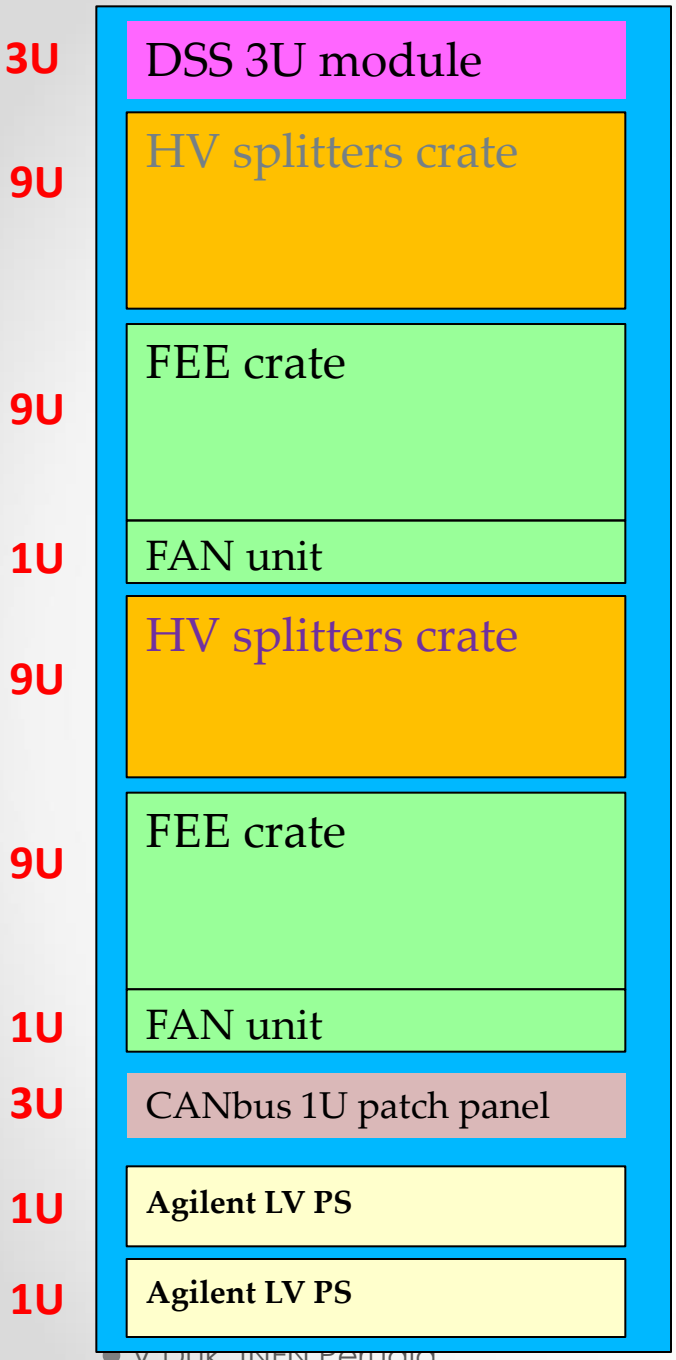
- ✓ Standard board (mother + ELMB) attached to the backplane on a standard DIN rail

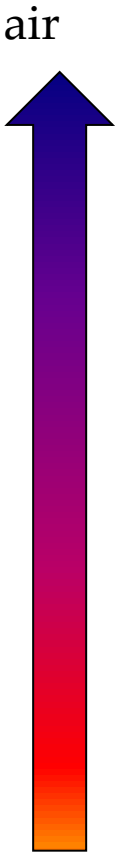


Cable routing (one rack)



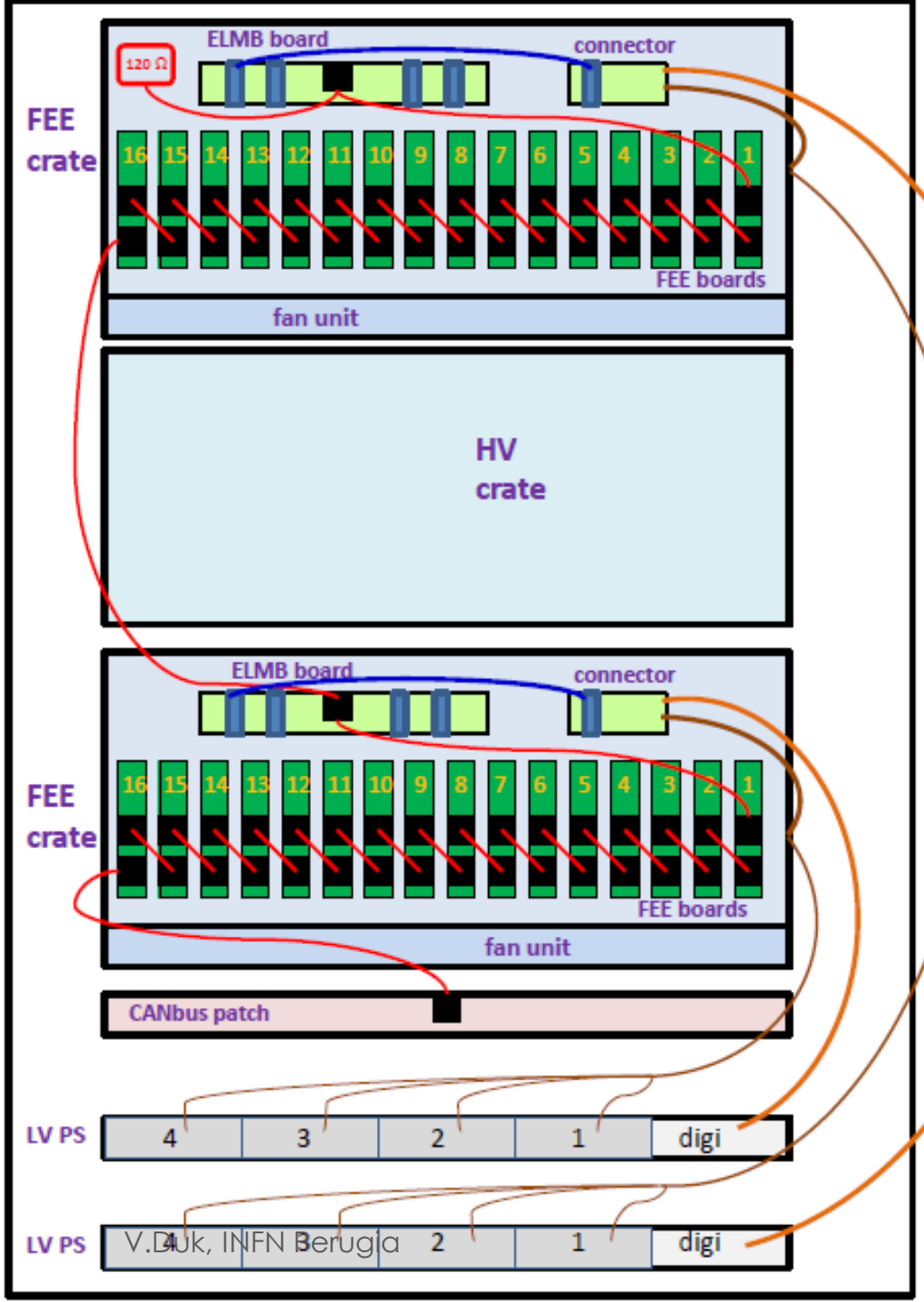
FE rack design





- ✓ DSS (detector safety system) needs air flow throughout the rack
- ✓ Agilent should not be too far from FEE
- ✓ RACK = 45U
- ✓ 44U occupied

RICH DCS Cable routing



34-pin flat cable

Daisy chain,
SCEM 04.21.60.430.5

from the LV PS digi port to the analog connector, 8 single wires (?)

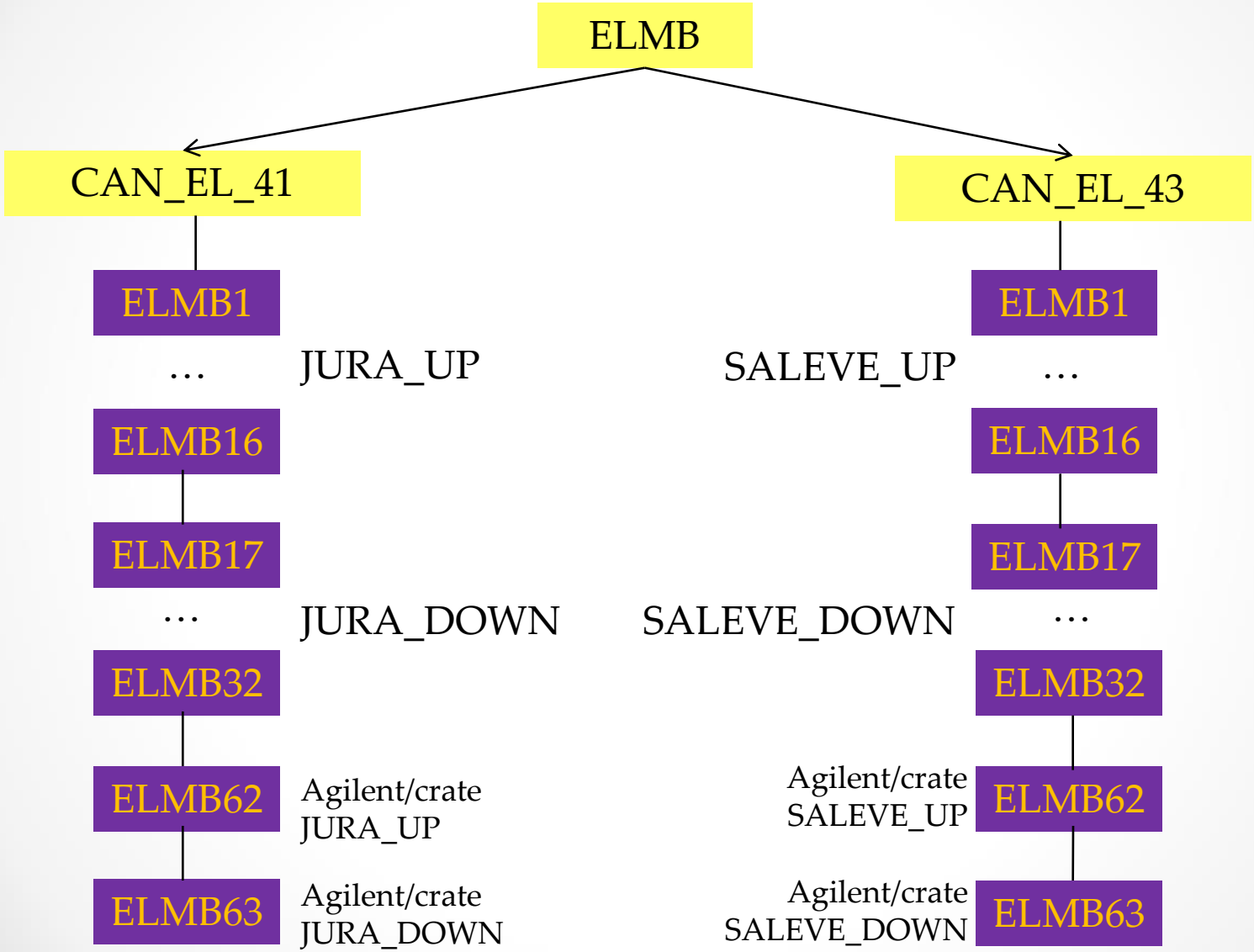
LV cable from the backplane to the analog connector, 5 single wires (?)

DB9 connector

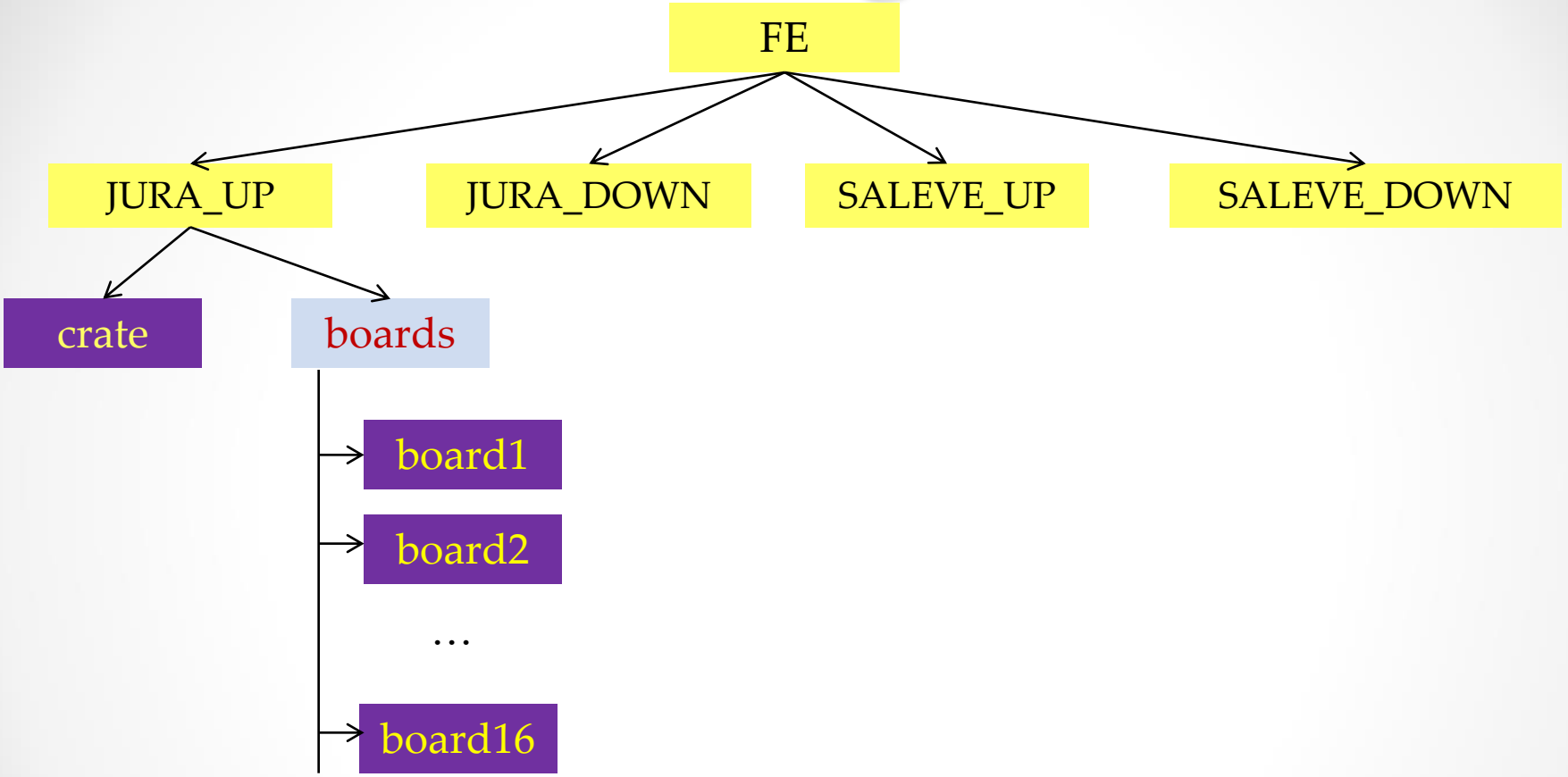
34-pin connector for the flat cable

RICH FEE rack (rear view)

FE DCS: hardware tree

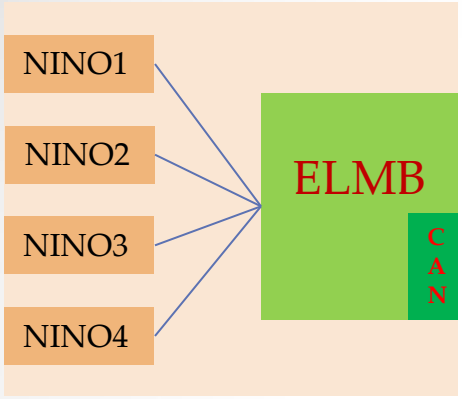


FE DCS: logical tree



FE board control

FE board



ai_00 : analog input ELMB channel

ao_00 : analog output ELMB channel

Thr : NINO discrimination threshold

Hyst : hysteresis (threshold_trailing – threshold_leading)

Str : stretch (additional TOT)

Temp : FE board temperature

Monitor

channel	parameter
ai_00	Thr_1
ai_01	Hyst_1
ai_02	Str_1
ai_03	Thr_2
ai_04	Hyst_2
ai_05	Str_2
ai_06	Thr_3
ai_07	Hyst_3
ai_08	Str_3
ai_09	Thr_4
ai_10	Hyst_4
ai_11	Str_4
ai_12	Temp

Set

channel	parameter
ao_00	Thr_1
ao_01	Hyst_1
ao_02	Str_1
ao_03	Thr_2
ao_04	Hyst_2
ao_05	Str_2
ao_06	Thr_3
ao_07	Hyst_3
ao_08	Str_3
ao_09	Thr_4
ao_10	Hyst_4
ao_11	Str_4

FE board control panel

Agilent/crate control

Monitor

channel	parameter
ai_00	LV1
ai_01	LV2
ai_02	LV3
ai_03	LV4

Set

channel	parameter
do_C_03	onOff

LV1 : +5 V, digital part

LV2: +5 V, NINO, amplifiers

LV3 : -5 V, amplifiers

LV4: +3.3 V, spare

ELMB voltage limit: 5 V
Improvement: HV dividers (factor 0.5, 100K+100K)
Status: PCB ready, mounting in process

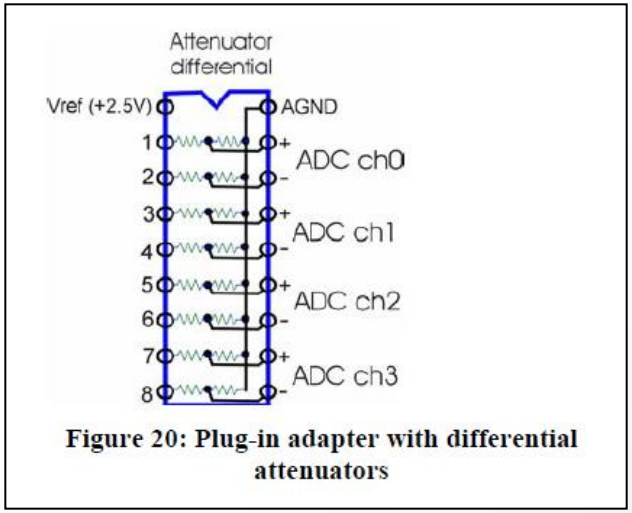
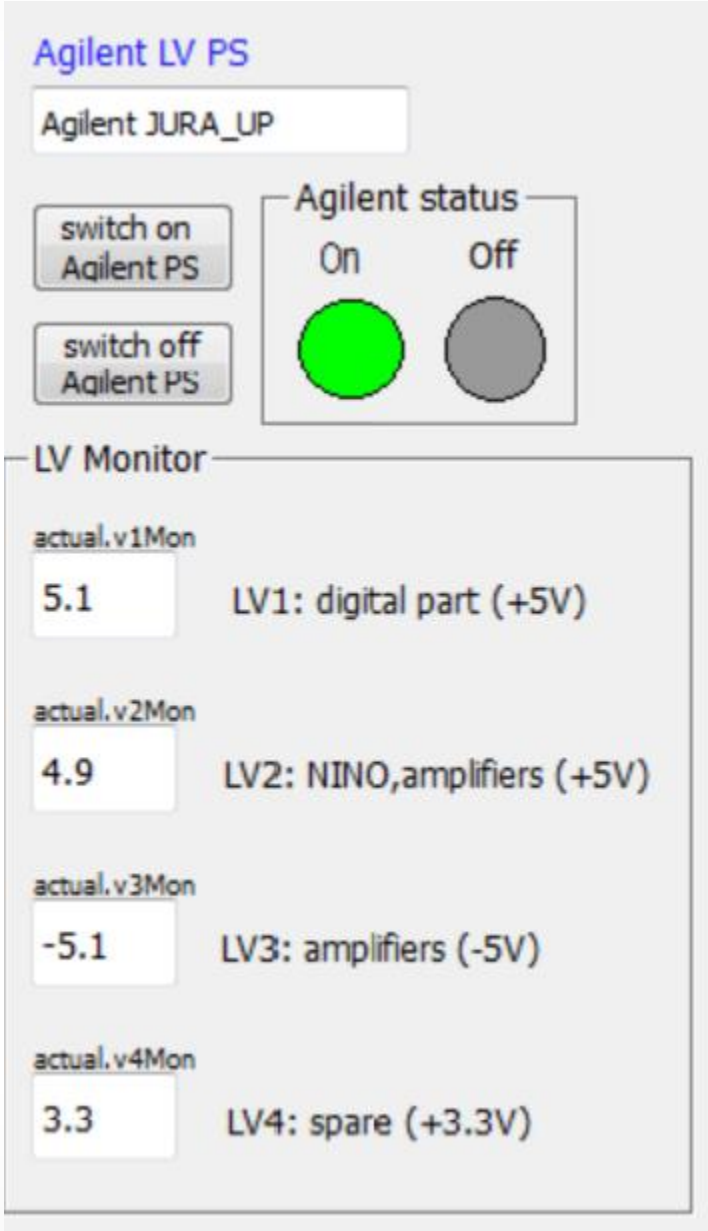
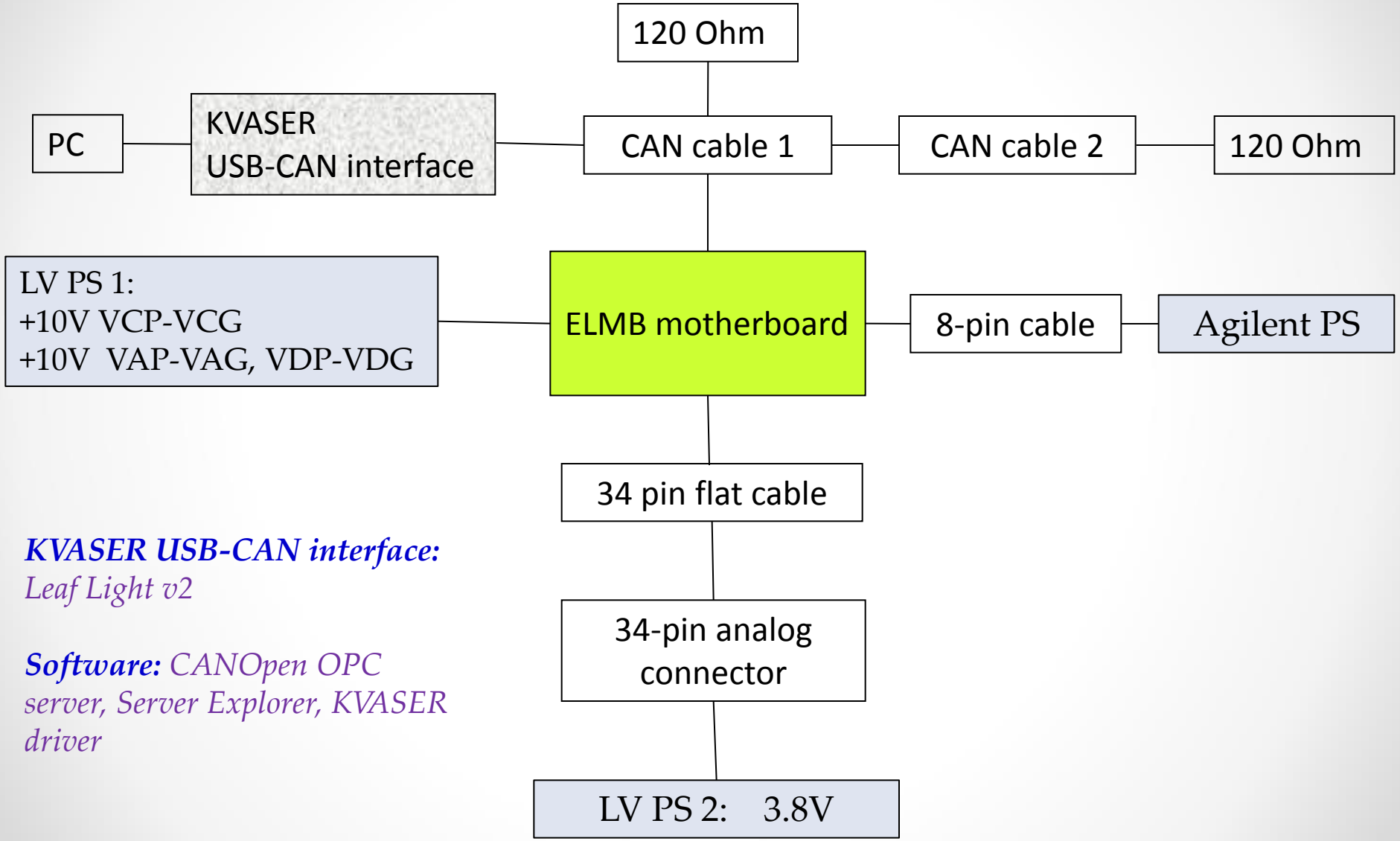


Figure 20: Plug-in adapter with differential attenuators

Agilent/crate control panel



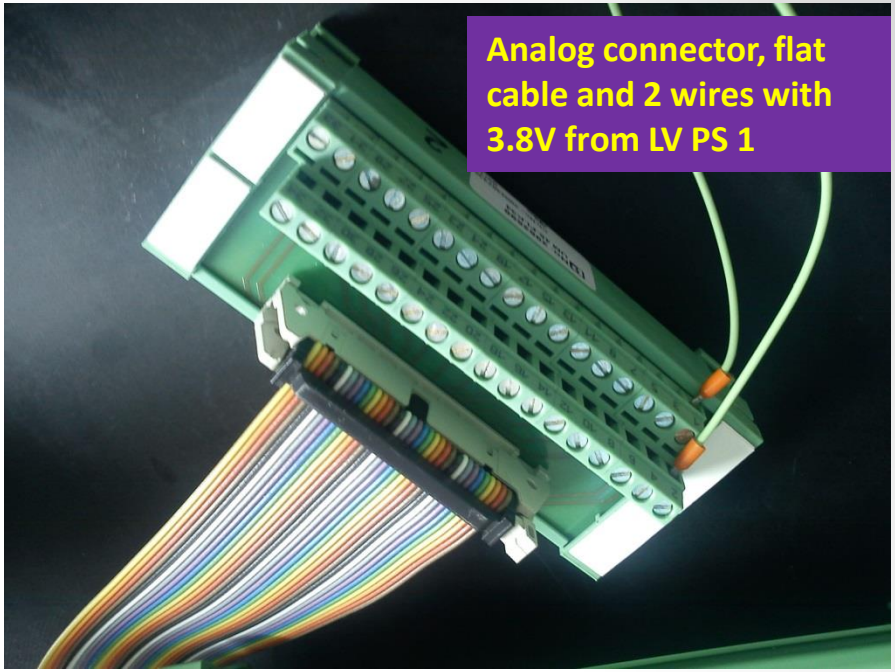
ELMB test setup in Perugia



KVASER USB-CAN interface:
Leaf Light v2

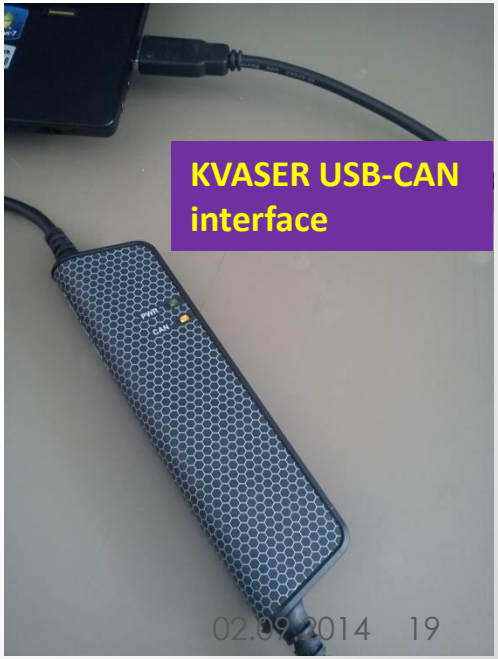
Software: *CANOpen OPC server, Server Explorer, KVASER driver*


ELMB motherboard
with all connections

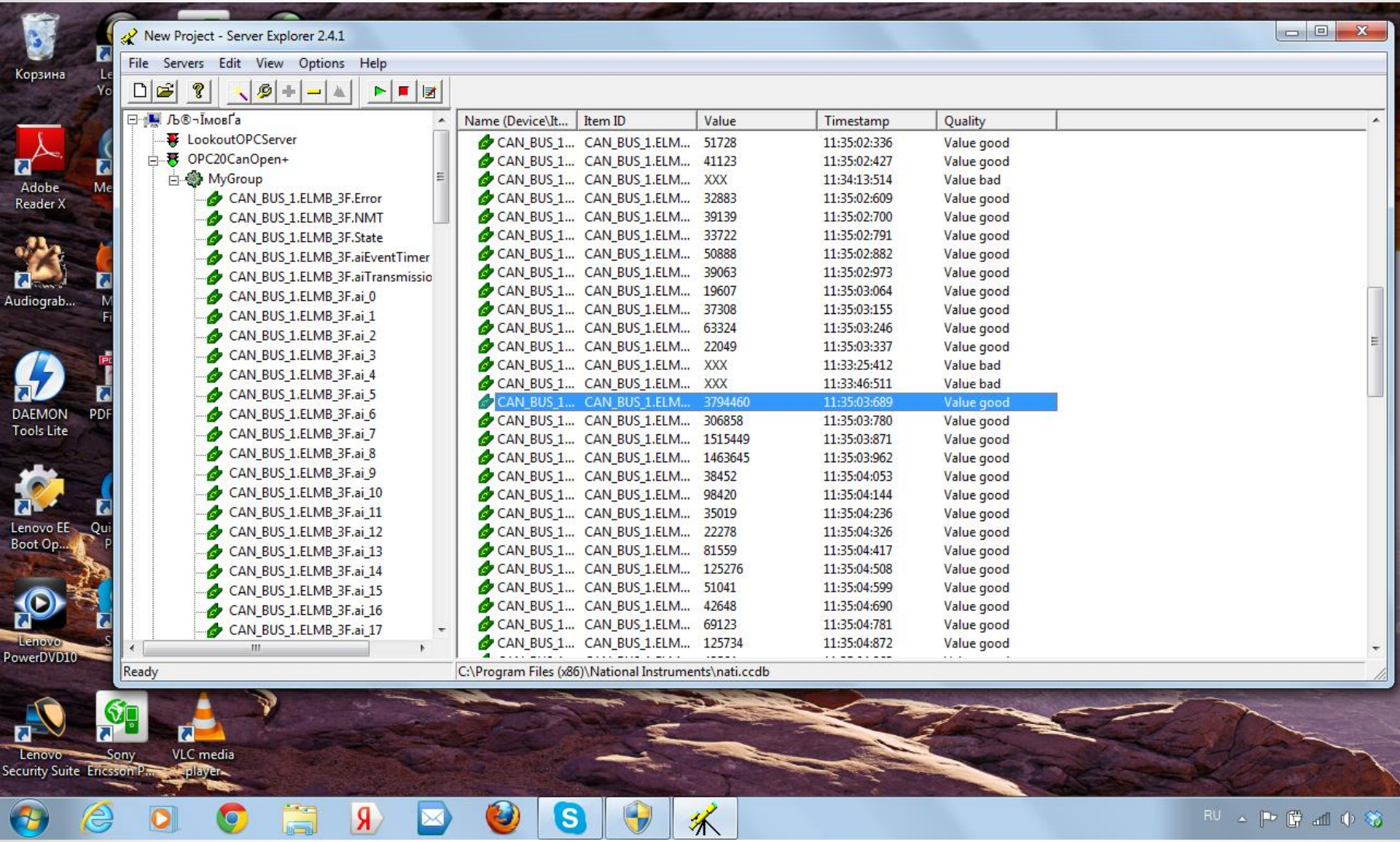

Analog connector, flat
cable and 2 wires with
3.8V from LV PS 1


QL355TP POWER SUPPLY
3.800
VOLTS
LV PS 2

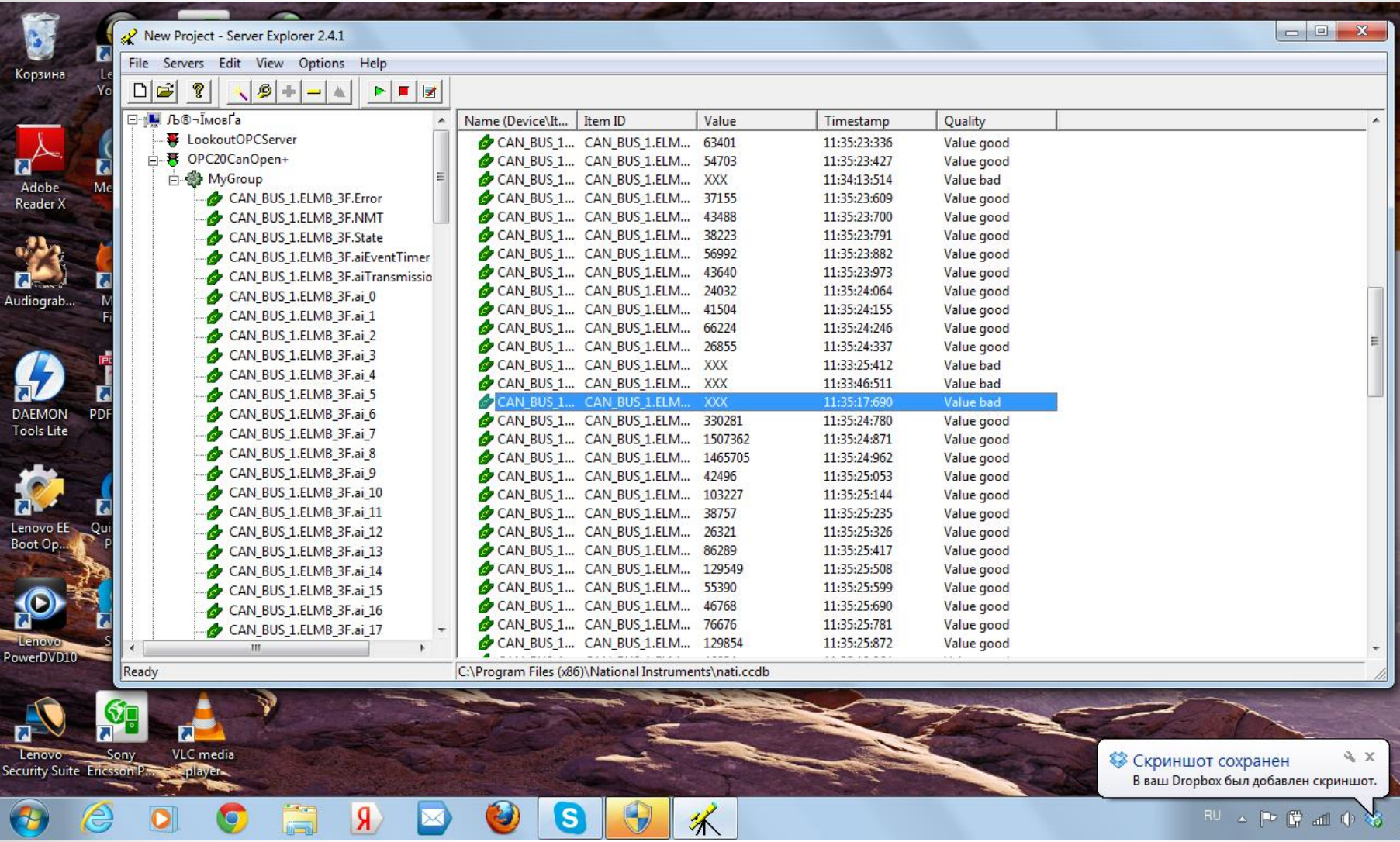

EUROTEK
PS-5305DS
DC POWER SUPPLY
0.03
10.1
0.04
10.0
CURRENT
VOLTAGE
CURRENT
VOLTAGE
SLAVE
TRACKING
MASTER
POWER
LV PS 1


KVASER USB-CAN
interface

Screenshot with 3.8V on (highlighted channel)



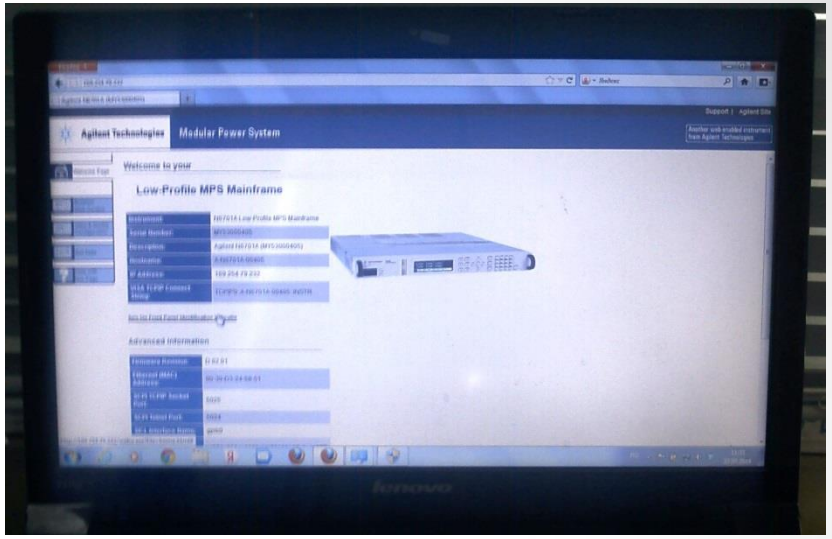
Screenshot with 3.8V off (highlighted channel)

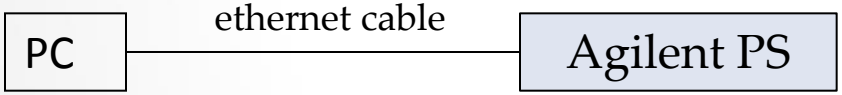


Hardware tests in Perugia

Main tests:
- 4 ELMBs for Agilent control
- All analog input channels (ai)
- All digital output channels (do, port A, port C)
- All cables
- Agilent digital port

Agilent Web Server main page





Agilent Web Server:
- Use IP to enter Web Server from CR
- Front panel operated by the mouse

Additional tests:
- PVSS/JCOP instead of Server Explorer (ai, do)
- Agilent Web Server
- Patch panels and thick ELMB cables (CERN, 07.2014)

Tests to be done at CERN:
- Tests with FE boards (full hardware tests)

gas

- ✓ Gas control will be done by CERN people
- ✓ Parameters to control: pressure
- ✓ gas chemical composition: intervention done 1-2 times a year (or on request)

Additional parameters

- ✓ Temperature(s) on the vessel?
- ✓ Easy to use ELMB with Pt-100 plug-in adapter

Conclusions

- ✓ RICH HV integrated in the central DCS
- ✓ Wiener crates for TEL62 are in queue
- ✓ FE boards and Agilent PS's will be controlled by ELMB
- ✓ FE DCS hardware: ready, installation in September
- ✓ FE DCS software: development in progress, run as a standalone project in 2014 run

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SPARES

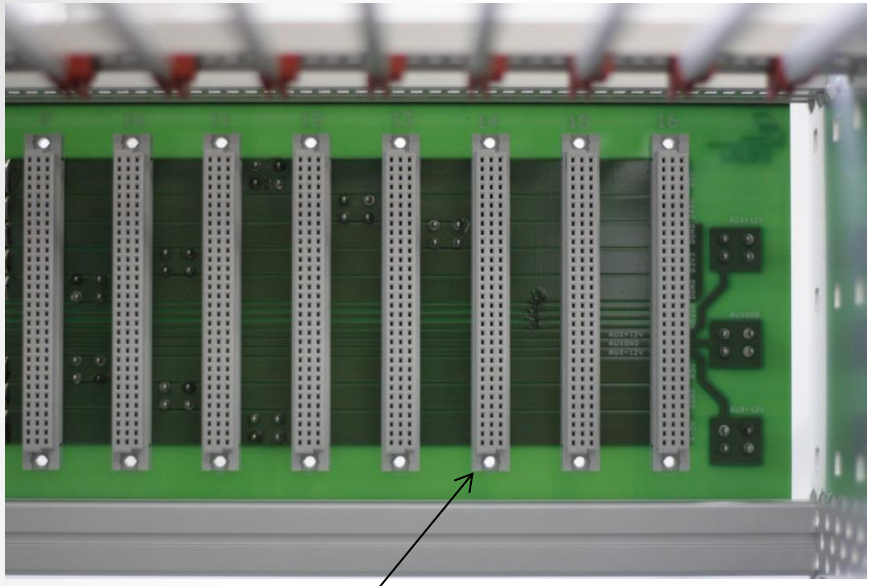
Agilent PS

4 pin output

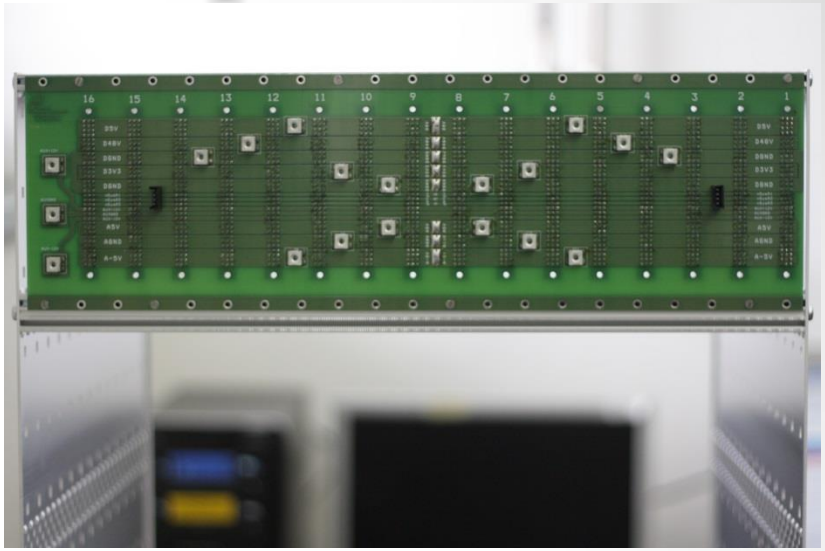
Digital port

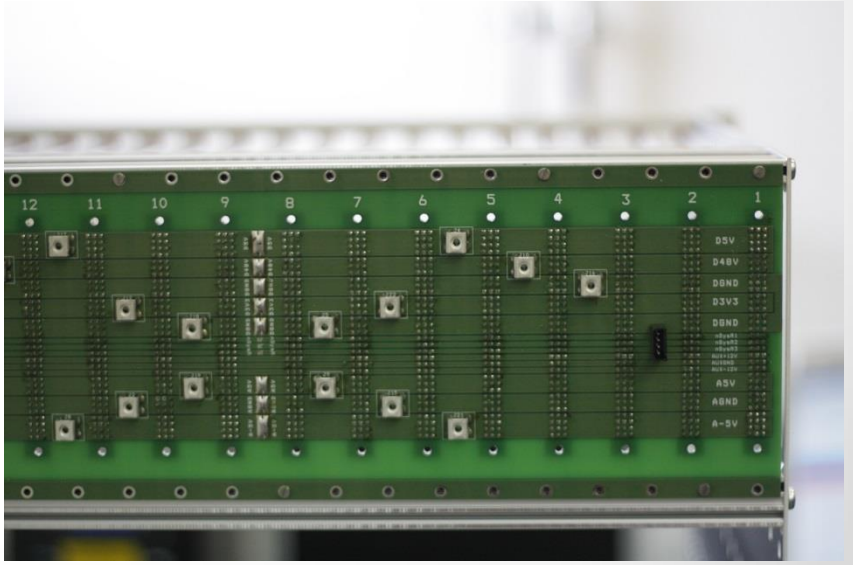
Agilent system

FEE crate: backplane

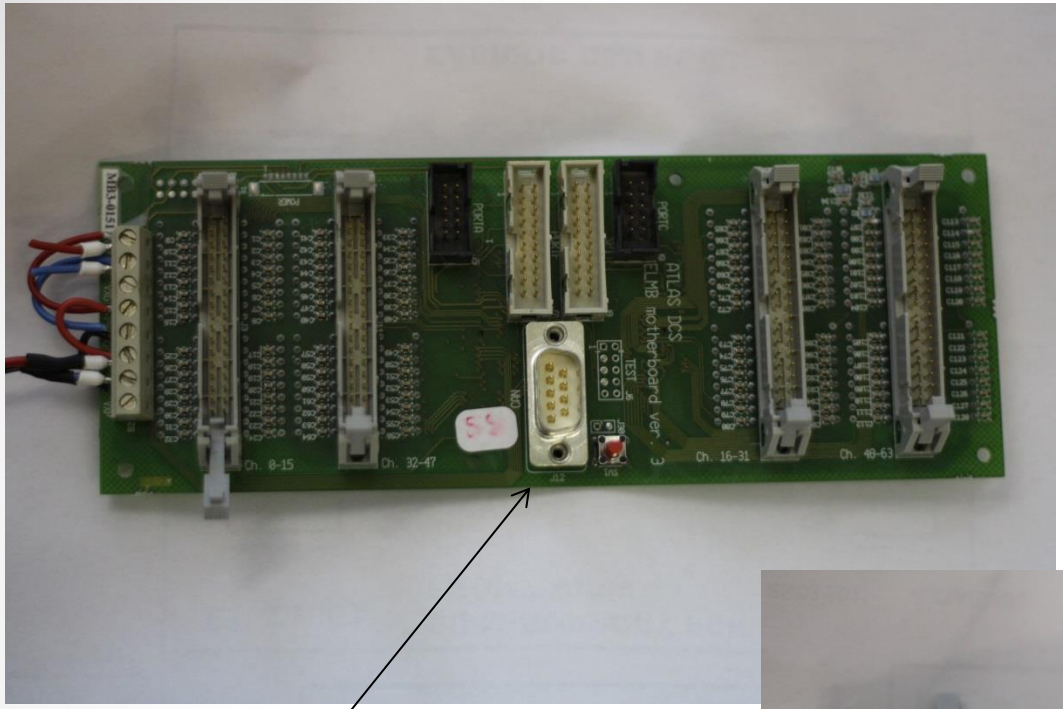


Standard VME
connectors (96 pins)

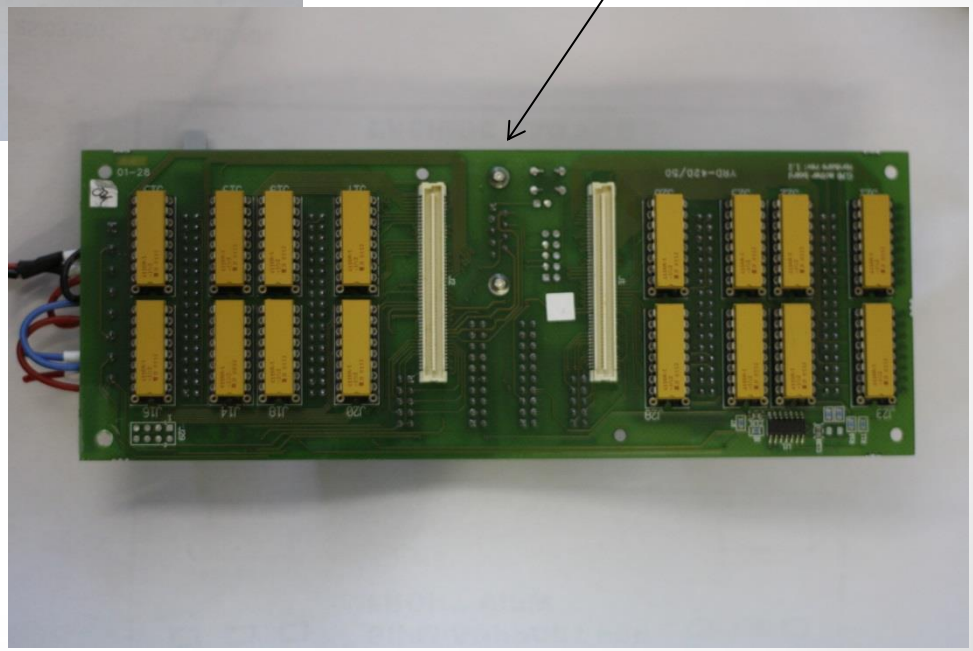




ELMB motherboard

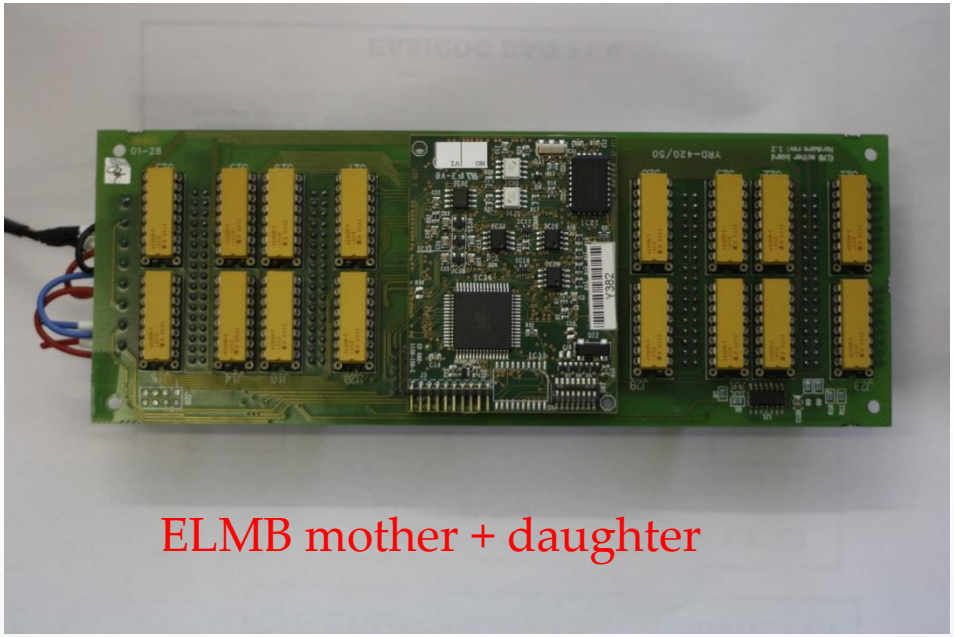


Place for ELMB



DB9 connector for CANBUS

ELMB



ELMB mother + daughter

FE DCS cables

Cable table

location	Cable type	length	Start connector	End connector	quantity
Agilent digi port 1 → analog connector	8 single wires ???	120cm	8pin phoenix	8 wires screwed	2
Agilent digi port 2 → analog connector	8 single wires ???	200cm	8pin phoenix	8 wires screwed	2
FEE backplane → analog connector	5 single wires ???	20cm	5 lugs (capocorde)	5 wires screwed	4
Analog connector → ELMB	flat	20cm	34pin	34pin	4
Burndy → DB9	ELMB thin cable*	40cm	Burndy male**	DB9 female	2
Patch panel → FEE board	ELMB thin cable*	120cm	DB9 male	DB9 male	2
FEE board → ELMB → FEE board	ELMB thin cable*	120cm+120cm	DB9 female (2 cables going out)	2xDB9 female	2
FEE board → FEE board	ELMB thin cable*	10cm	DB9 male	DB9 female	60
FEE board → ELMB → terminator	ELMB thin cable*	100cm+10cm	DB9 female (2 cables going out)	2xDB9 male	2

* ELMB thin cable: SCEM 04.21.60.430.5
** Burndy male: 19 pins Burndy connector (CERN store SCEM code 09.31.05.548.0)