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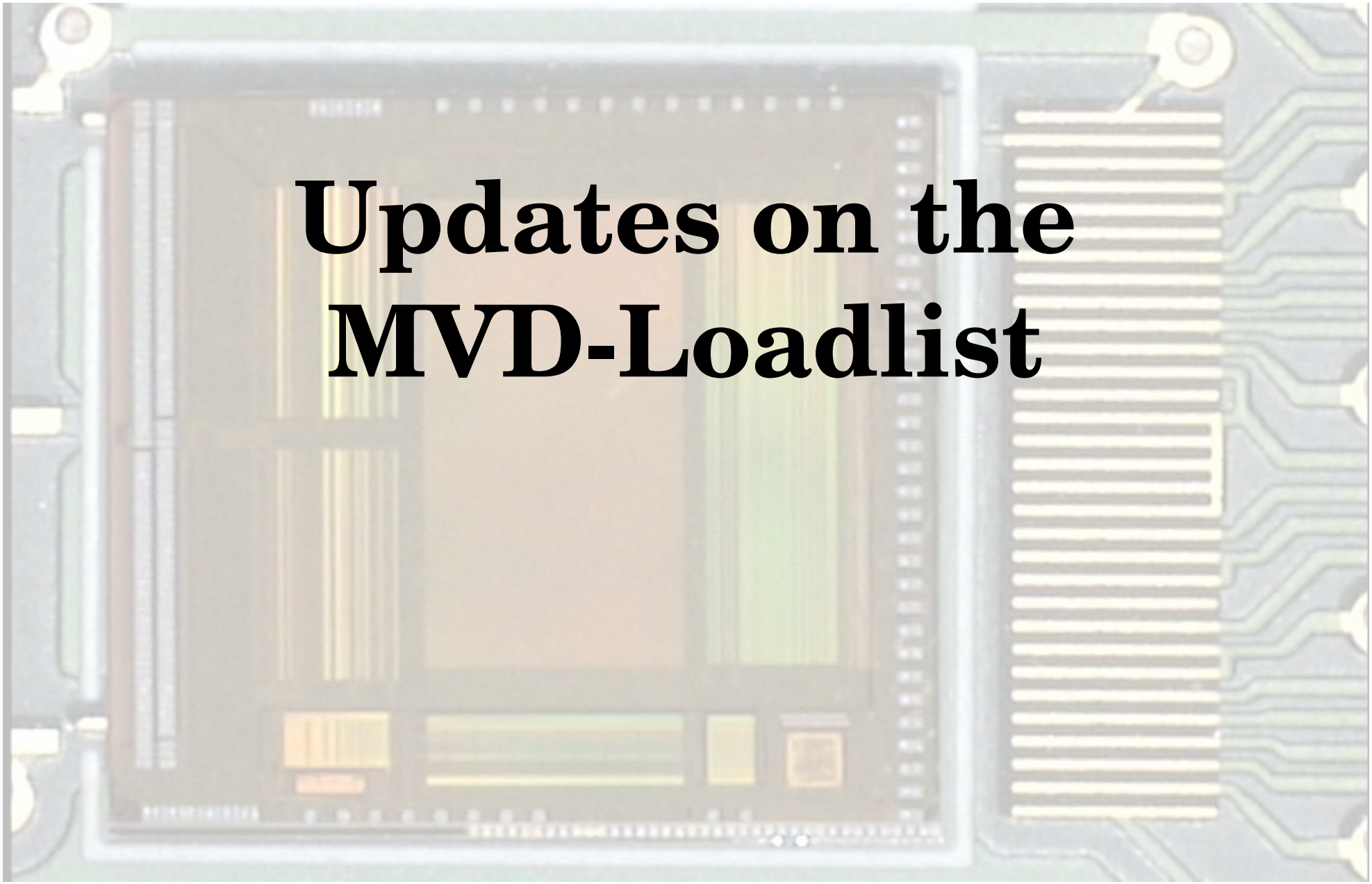

Updates on the MVD-Loadlist

MVD EVO, August 28, 2013

Considerations

- update on number of sensors and
- current considerations for the powering scheme

- LV- and HV-supply options considered:
  - CAEN SY4527 (successor of the CAEN SY1527)
    (19”, 8U mainframe for up to 16 HV/LV Modules)
  - WIENER MPOD LV and HV Power Supply System
    (19”, 9/10U mainframe for up to 10 HV/LV Modules)

MVD Strip-Detector laodlist

Part of the system	Comments	Partial	number of crates	Total	rack space
FE Module power supply strip part	number of primary DC-lines calculated based on powering scheme	*3.4 kW*	7	*23.8 kW*	70 U
HV power supply strip part	248 + 48 sensors	1.2 kW	2	2.4 kW	20 U

Rackspace / U

Part of the system	Comments	Partial		Total	
cooling plant (Pixel +Strips)	pump+vacuum pump+plc+controllers Chiller (400VAC tri +N) if not cool water from FAIR Heaters ((0.3-0.4 kW/ch) + transducers	10 kW 4 kW 26 kW		40 kW	
cooling system (x services)	chiller, pump,plc, controllers, transducers	10 kW		10 kW	
Part of the system	**Comments**	**Single**	**Quantity**	**Total**	
Power supply Low Voltage Pixel readout chips	176 digital channels + 176 digital channels power extrapolated from Topix3-> final Topix DC-DC efficiency ~60% cable losses- factor 2 + safety factor 2 13 kW as raw power (over exstimated) power supply - CAEN SY1527-16 boards A1513B board (6ch/board)	3.4 kW	4	13.6 kW	
Power supply High Voltage Pixel sensor	176 sensor channels CAEN SY1527- 16 boards A1510 board (12 ch/board) (100 V-limit)	3.4 kW	1	3.4 kW	
El/opt converter Pixel part	122 GBT channels DC-DC efficiency ~ 60% (50 boards) cable losses -factor 2 + safety factor 2 2.8 kW as raw power power supply - CAEN SY1527-16 boards A1513B board (6ch/board)	3.4 kW	1	3.4 kW	
electronics crate pixel part	on-detectors electronics, interlocks power supply controllers	3 kW	1	3 kW	
electronics crates-counting room pixel part	Optical receiver + data concentrator	3 kW	6	18 kW	
FE Module power supply strip part	254 modules, 15 W/module incl. Mod. Data Concentrator and GBT Interface, 0.6 DCDC-Efficiency power supply -CAEN SY1527-16 boards A1513B board (6ch/board)	3.4 kW	~~7~~ 6	20.4 kW	70
		1,2 kW		2,4 kW	
HV power supply strip part	254 sensors, CAEN power supply (see above)	3.4 kW	2	6.8 kW	20
El/opt converter strip part	254 GBT channels	3.4 kW	2	6.8 kW	
electronics crate strip part	on-detectors electronics, interlocks power supply controllers	3 kW	1	3 kW	
electronics crates-counting room strip part	Optical receiver + data concentrator	3 kW	6	18 kW	

① 248 + 48 Sensors

② number of modules/sensors does not correspond to number of DCDC-channels

③ CAEN SY1527 is now DISCONTINUED

→ New: SY4527 → 19", 8U mainframe for up to 16 LV/HV-Modules
using A1511B or A1512 (12 chn floating 500V) (30mV pp ripple, current mon. 10/100µA)
requires 25 Modules for barrel and disk HV supply (2 crates with 16U total)

→ Or: Wiener MPOP → 19", 9U/10U mainframe for up to 10 HV-Modules
using ISEG EHS high precision with single floating ground (16 chn, 500V) (5mV pp, 50pA)
requires 19 Modules for barrel and disk HV supply (2 crates with 18/20U total)

• LV

- number of primary supply lines?

"worst case scenario": - p- and n-side of all sensors individually
(MDC supply referred to p-side)
- DCDC-FE-n-D and DCDC-FE-n-A,
DCDC-FE-p-D and DCDC-FE-p-A and DCDC-MDC
can be fed by one primary supply line (each)
→ 2 primary supply lines per sensor
→ 496 LV channels for barrel part
→ 96 LV channels for disk part
Σ = 592 chn

→ 56 U CAEN
→ ~~70~~/63 U Wiener

(Wiener: 8 chn/mod)

CAEN Floating Low Voltage Modules feature 6 channels per Module ! (≈ 28 W/ch)
→ ≈ 100 Modules !! (7 crates) (very low load per channel, inecconomical)
(74 Wiener) (7 crates)

• "best case scenario": - p-side of ~~all~~ one stave at one ground + MDC's
n-sides individually, but DCDC-FE-n-D and
DCDC-FE-n-A one source at each

→ p-side primary supply lines correspond to number of staves
= 46 LV channels for barrel part + 24 LV channels for disk part (1 per sup mod)
→ n-side primary supply lines correspond to number of sensors
= 248 LV channels for barrel part + 48 LV channels for disk part

Σ = 366 chn → 32 U CAEN
45/50 U Wiener

- 61 modules with CAEN, 46 with Wiener (MPV 8xxx: 40-50 W/chn.)
(4 crates) (5 crates)

(very low load at n-side channels, (too) high load at p-side channels?
(1 stave: 20 FEs + 6 MDCs + transmission loss
+ conversion efficiency → 30... 40 W)