

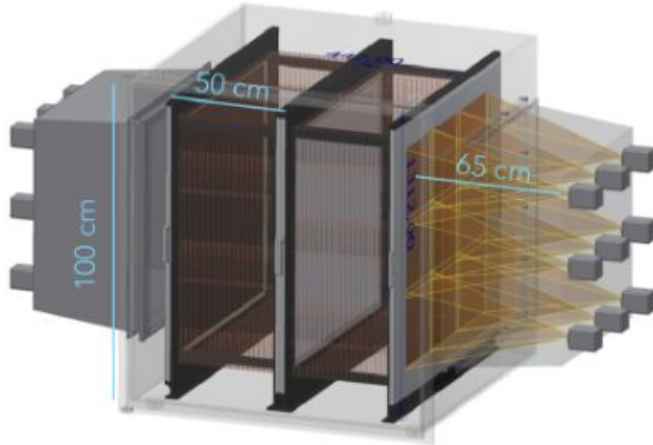


CYGNO DAQ proposal

ROMA1 - LNF - CBPF - UFJF

Detector overview

* gammas & neutrons shielding not shown but present



18 cameras monitoring
330*330 mm each

System composition:

- The detector is composed of 18 readout regions, each equipped with 1 sCMOS sensor and 4 Photomultipliers.
- TOTAL: 18 sCMOS sensors and 72 Photomultipliers.

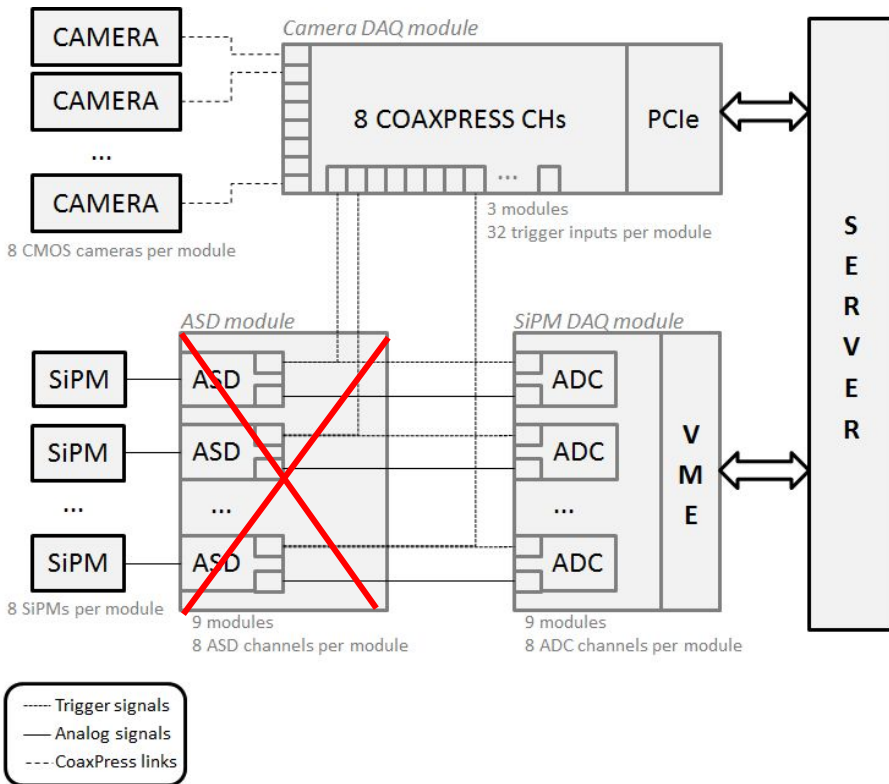
Components definition:

- sCMOS sensor (ORCA Fusion)
- PM model (? H3695-10, H10721-4, others)
- GEM readout needed? (**YES**)
 - Signal characteristics?
 - Number of channels?
 - 1 per region?
 - Needed information?
 - integrated charge?
 - Used for Trigger?

Important characteristics:

- Max. image acq. rate = 10 Hz
- Sampling rate = 500 MSPS (PM signal)
- Dynamic range from -1 to 1 V (PM signal)

DAQ proposal



Defined issues:

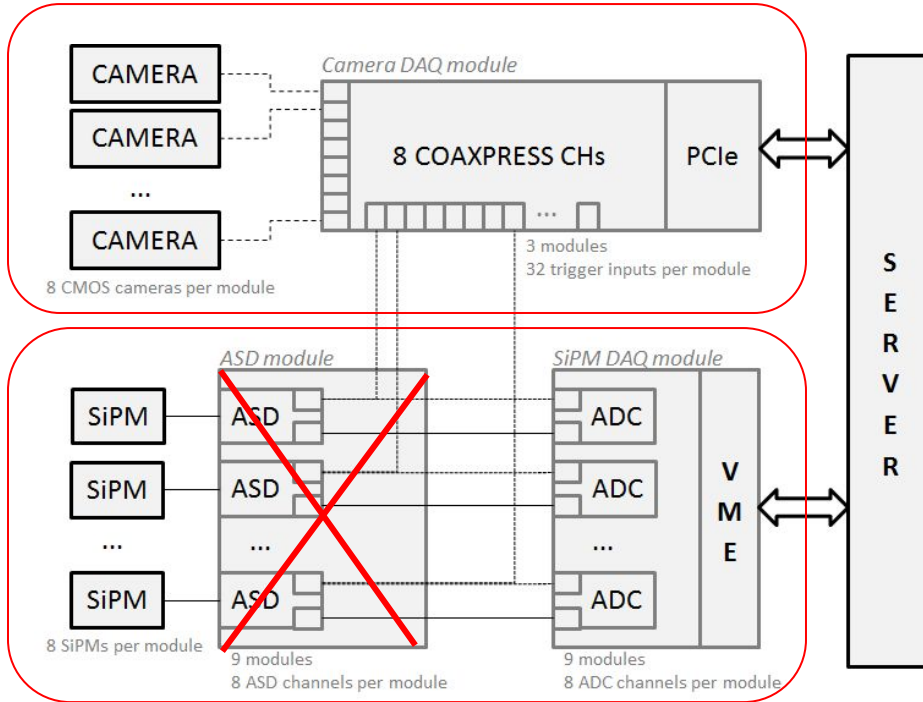
- PM acquisition electronics - custom solution
 - CBPF (has started development)
- Camera readout - commercial solution
 - UFJF-CBPF (components being defined)

Open issues:

- Amplifier module needed? (**PROBABLY NOT**)
 - Depends on PM amplitude range and signal duration
 - ROMA1 - UFJF (under study)
- Image-based trigger - custom GPU server
 - Depends on compatibility with software algorithms
 - UFJF - ROMA1 (under study)
- GEM readout needed? (**YES**)
 - ROMA1 - LNF
- Hardware integration
 - Trigger, Time and Control signal distribution
 - Deadtime, Busy signal distribution
 - Event building
- Software integration
 - Framework: MIDAS preferred (experienced manpower; dedicated and easy to integrate slow-control electronics is available); decision to be taken soon to order appropriate electronics.
 - ROMA1

DAQ proposal

Two systems needed: one for Rome and one for UFJF.

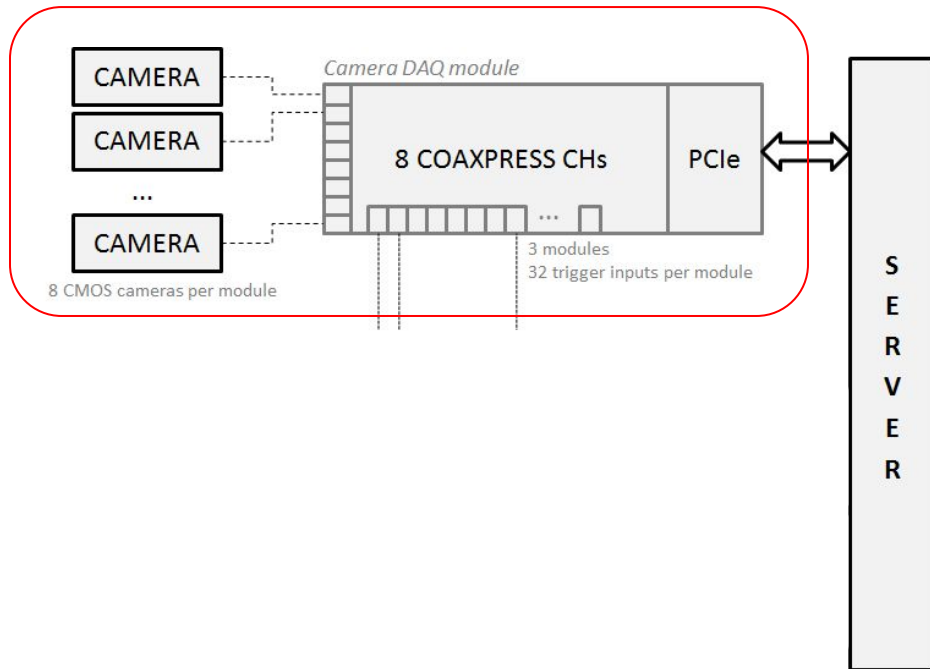


FOR DEVELOPMENT...

In the beginning only one system at CBPF (during development). Versions of the first prototype can be sent to Rome.

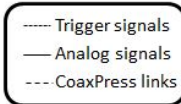
DAQ proposal Camera readout

Two systems needed: one for Rome and one for UFJF

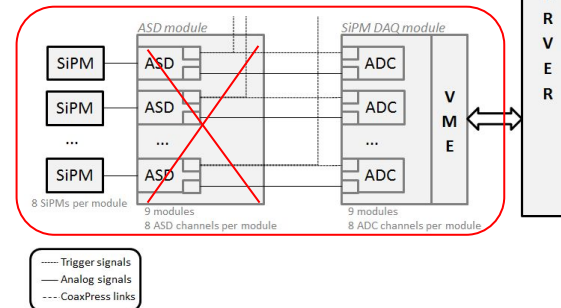


Equipment to start tests and development:

- sCMOS camera
 - ORCA Fusion (? USD)
- Framegrabber
 - KY-FGK-801 Komodo 8 RX Channels (~2k USD)
- GPU card
 - NVIDIA GP100GL Tesla P100 12GB (~4.2k USD)



DAQ proposal PM readout



	Mouser #	Mfr. #	Manufacturer	Description	Qty	Price (USD)	Ext.: (USD)
1	810-MMZ2012Y601BT000	MMZ2012Y601BT000	TDK	Ferrite Beads 600 OHM 25%	1	\$0.10	\$0.10
2	538-67643-3911	67643-3911	Molex	USB Connectors USB REC 4P RA SHLD TYPE A 30AU	1	\$1.62	\$1.62
3	673-J3011G21DNL	J3011G21DNL	Pulse	Modular Connectors / Ethernet Connectors SMT 1X1 TAB UP 4CORE	1	\$8.00	\$8.00
4	200-MUSB05FBMSMA	MUSB-05-F-B-SM-A	Samtec	USB Connectors Mini USB 2.0 Interface	1	\$1.02	\$1.02
5	579-MZ2048EFH144IPH	PIC32MZ2048EFH144-I/PH	Microchip	32-bit Microcontrollers - MCU 32-BIT MCU 2048KB FL 512KB RAM, No Crypto	1	\$12.62	\$12.62
6	579-LAN8740AI-EN-TR	LAN8740AI-EN-TR	Microchip	Ethernet ICs Small Footprint MII/RMII 10/100 Energy Efficient Ethernet Transceiver	1	\$1.63	\$1.63
7	579-MCP2221-I/ML	MCP2221-I/ML	Microchip	USB Interface IC USB to I2C Bridge Device	1	\$2.33	\$2.33
8	595-TPS2051BDBVR	TPS2051BDBVR	Texas Instruments	Power Switch ICs - Power Distribution Sngl Current Ltd Pwr Dstrbtn Sw	1	\$0.83	\$0.83
9	579-T26VF032BA104IMF	SST26VF032BA-104I/MF	Microchip	NOR Flash 32Mb 2.7V-3.6V SQI Flash Memory	1	\$1.76	\$1.76
10	581-CX3225SB24DFPLCC	CX3225SB24000D0FPLCC	Kyocera	Crystals AEC-Q200 24000kHz 8pF 3.2x2.5mm	1	\$0.79	\$0.79
11	815-ASEMB-50MHZ-LC	ASEMB-50.000MHZ-LC-T	ABRACON	Standard Clock Oscillators 50.000MHZ 50ppm -40 + 85C	1	\$2.07	\$2.07
12	584-AD9694BCPZ-500	AD9694BCPZ-500	Analog Devices Inc.	Analog to Digital Converters - ADC Quad 14b 500MS/s ADC	2	\$619.04	\$1,238.08
13	937-MABA007159000000	MABA-007159-000000	MACOM	Audio Transformers / Signal Transformers 4.5-3000MHz IL 2dB Impedance Ratio 1:1	18	\$2.40	\$43.20
14	584-ADCLK905BCPZ-R2	ADCLK905BCPZ-R2	Analog Devices Inc.	Clock Buffer 1:1 ECL, 7 Gbps CLOCK/DATA BUFFERS	2	\$11.06	\$22.12
15	523-2985-6004	2985-6004	Amphenol	RF Connectors / Coaxial Connectors SMA F PCB Thru-Hole Conn, 50-OHMS 1000	8	\$40.24	\$321.92
16	579-DM320007	DM320007	Microchip	Development Boards & Kits - PIC / DSPIC PIC32 Starter Kit with FPU (EF)	1	\$128.55	\$128.55