

# GEM Readout: APV25 quantity

MPD/GEM readout chain:



GEn-RP GEM Equipment: MPD Readout & DAQ

988 APV25 chips

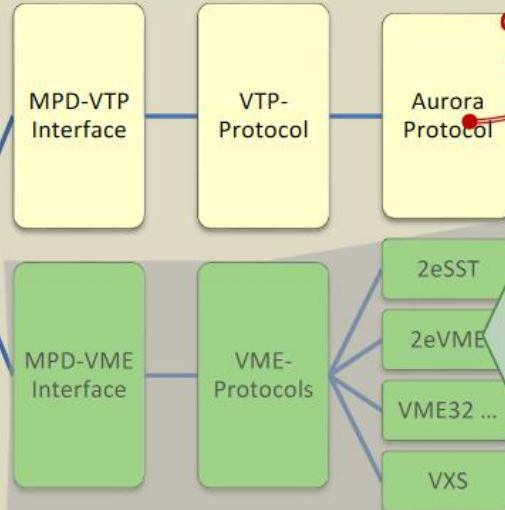


- 128 analog ch / APV25 ASIC
- 3.4  $\mu$ s trigger latency (analog pipeline)
- Capable of sampling signal at 40 MHz
- Multiplexed analog output (100 kHz readout rate)

	Channels	APV25	MPDs
UVa GEMs	113000	880	70
INFN GEMs	14000	108	8



**MPD Main Block**  
 Arriga GX FPGA  
 128 MB DDR2-RAM  
 Firmware V4.0 (74% resources):  
 # FIR Filter (16 param)  
 # Zero Suppression  
 # Common mode and pedestal subtraction  
 # Remote config,  
 #  $\approx 2$  ns trigger time resolution



# Data Rates & Backend Recommendations

- 988 APV25 \* 128 = 126464 strips
- SSP/VTP records 6 APV samples for each strip considered hit in event (2 hits per 32bit word => 12bytes per hit)
- Occupancy defined as average % of strips with hit in an event
- GEM data rate = trigger\_rate \* 988APV \* 128ch/APV \* 12bytes/hit \* occupancy
  - 2kHz trigger: 10% occupancy = 0.3GB/s      20% occupancy = 0.6GB/s      30% occupancy = 0.9GB/s
  - 4kHz trigger: 10% occupancy = 0.6GB/s      20% occupancy = 1.2GB/s      30% occupancy = 1.8GB/s

## Server & Network:

For >~1GB/s event builder:

- >=128GB system RAM
- >=32 physical cores
- dual hardware RAID controller/arrays+ backup server

(Contact Dave Abbott for further details - please confirm with him machine specs before ordering anything)

If event builder is operating over 0.5GB/s:

- 40Gbps Ethernet strongly recommended/required (keeping in mind: other systems are reporting data to event builder besides GEM, and network may be used to transfer data to permanent storage).

Network switch ports:

- multiple 40G (for servers) and 10G (for VTP, computing center, and any high data VME controllers)