Final design of the readout system for Triple-GEM detectors for the CMS forward muon upgrade

3072 channels/detector  
442k channels in GE1/1

VFAT3 chip on hybrid:  
- Binary output, CFD  
- 320 MHz  
- L1 latency: up to 12 µs  
- Slow control: ePort, GBT compatible  
- Trigger data:  
  1 bit = OR of 2 strips (+DDR option)

AMC = CTP7 from CMS Trigger upgrade

Cooling pipes  
Readout board  
GEM foil  
Drift board  
Optical board  
Power supply  
LVDS Interface

2-pieces GEB v3 (1.2m)  
Opto-hybrid v3 (OH)  
Virtex-6  
3 GBTx  
2 VTXx  
3 VTXx [5]  
2 VTXx

Tracking data  
3 x GBT – 4.8 Gbps [3]  
LV  
VFAT3 & OH

VFEAT DC-DC  
[4]

Trigger data  
[3.2 Gbps – 10b/8b]