# Muon DTs (trigger) link systems

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Muon DTs (trigger) links’ location

Detector in UXC

250 Chambers’ minicrates

TTC opto link to USC

Balconies in UXC

Counting room in USC
For each Trigger Server use a unique stream for $\phi$ & $\eta$:
- 80 bits (2 tracks)/BX @ 40 MHz

LVDS link on < 28m shielded copper cable:
- 2 cables/link (Ethernet class 5 FTP, 4 twisted pairs/cable)
- Chipset from National Semiconductors:
  a) Serializer 10-to-1 DS92LV1021 (8 chip/link)
  b) Cable equalizer CLC014 (8 chip/link)
  c) Deserializer 1-to-10 DS92LV1212A (8 chip/link)

Devices successfully tested @ 40 MHz & 28m with BER $<$ 10^{-11}

Jitter tolerance (on clock) to be verified.

Shopping list: 250 links/detector (2000 chipsets + 12 km of cable)
LVDS Trigger link test

- Links the Server Board to the Sector Collector;
- Designed with National parts: serializer DS92LV1021, equalizer CLC014, deserializer DS92LV1212A were tested with a cable of 28 m @ 40 MHz

100 Gbit as random patterns & 100 Gbit as physical patterns

NO ERRORS!

BER < 10^{-11}
LVDS Trigger link test setup

Pattern Units

TX

RX

28m Cable
SectorCollector to DT-TrackFinder opto-link

- $\phi$ stream: 110 bit (4 tracks)/sector/BX @ 40 MHz;
- $\eta$ stream: 42 bit (3 tracks)/sector/BX @ 40 MHz;
- Opto-link on < 90m fibers:
  - Hypothesis to use GOL @ 1.6 Gb/s (32 bits @ 40 MHz):
    - $\phi$ stream: 4 links/sector;
    - $\eta$ stream: 2 links/sector;
    - 360 links/detector;
  - Small number of links: open to any “CMS opto-policy”
SectorCollector to DTTF opto-link arrangement

**Wedge arrangement**

- **Sector Collector**
  - Wedge xx
  - Wheel –2 to +2
  - (5 board/wedge)

- **RJ45 for LVDS Rx**

- **6 GOL Tx / sector**

- **1 Plugin board/ DTTF φ**
  - 4 GOL Rx / board

- **DTTF φ**
  - Wheel –2 to +2
  - (6 board/wedge)

- **Same board-layout**

- **DTTF η**
  - Full Wedge
  - (1 board)

- **2 Plugin board/ DTTF η**
  - 5 GOL Rx / board

- **The two boards for wheel –0 and +0 share same inputs from SC of wheel 0**

- **DTTF crate-backplane**
1. RS232: asynchronous serial transmission on 90m dual fiber (full
duplex communication):
   a) *Amphenol* dual chipset Rx-Tx 269158-4 (10 Mbps);
   b) Total of **250 dual fiber links/detector** (delivered).

2. RS485 (control backup): asynchronous serial transmission:
   a) on 28m shielded copper from chambers to balcony. Each
      link connects in parallel all chambers (24) in half weel
      (daisy chain). In total: **10 copper daisy chain/detector**.
   b) At the end of each copper daisy chain (on balcony) there
      is an *Amphenol* dual transceiver 269158-4;
   c) From balconies to Counting Room via 90m single fiber. In
      total there are **10 dual fiber links/detector** (delivered).

• Transmission rate (RS232 & RS485) currently @ 9.6 Kbaud;
  expected limit @ 38.4 kbaud, due to microprocessor.