

Data Links in the L2STT System

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Inputs

Trigger framework to FRC

- Serial command link¹.
- One cable per FRC.

L1CTT to FRC

- G-link, 16 bits at 53 MHz.
- One fiber per FRC.
- Transmit²
 - L1CTT header - 128 bits (contains L1_BX)
 - L1CTT data - 32 bits/track
 - L1CTT trailer - 32 bits

SMT to STC

- G-link, 16 bits at 53 MHz.
- Four fibers, each transmitting data from two HDIs, per STC.
- Transmit³
 - Sequencer ID - 8 bits
 - HDI ID, status - 8 bits
 - Chip ID - 8 bits
 - Byte of zeroes - 8 bits
 - Channel ID - 8 bits
 - Data - 8 bits
 - Channel ID - 8 bits
 - Data - 8 bits
 - ...
 - end of event (hex C0)

Internal Links

Buffer Control

- From FRC to TFC (only board with 16 event buffers)
- Bus on J3 backplane.
- 12+2(?) bits⁴.

FRC to STC, TFC

- LVDS serial link, 32 bits at 26 MHz.
- One cable per STC, TCF, and ZVC(?).

¹ <http://www-ese.fnal.gov/d0trig/default.htm>

² http://d0server1.fnal.gov/users/manuel/Protocols/Final_version/final_stt.pdf

³ <http://d0server1.fnal.gov/www/silicon/svxseqdoc.pdf>

⁴ http://www.nevis.columbia.edu/~evans/stt/talks/fnal0899_comm.pdf

- ❑ Transmit⁵
 - L1 SCL (L1_TURN, L1_QUAL) - 32 bits
 - Number of tracks - 32 bits
 - L1CTT header - 128 bits (contains L1_BX)
 - L1CTT data - 32 bits/track
 - L1CTT trailer - 32 bits
- ❑ Track ID generated at receiving ends.

STC to TFC

- ❑ LVDS serial link, 32 bits at 26 MHz.
- ❑ One cable per STC (possibly two if some STCs serve SMT channels in different sectors).
- ❑ Transmit
 - Header with crossing ID
 - Road ID
 - Centroids, amplitude for clusters in road
 - Road ID
 - ...
 - End of event

STC to ZVC

- ❑ LVDS serial link, 32 bits at 26 MHz.
- ❑ One cable per STC.
- ❑ Transmit
 - Header with crossing ID
 - Centroids for all 90-degree clusters
 - End of event

ZVC to ZVC

- ❑ LVDS serial link, 32 bits at 26 MHz.
- ❑ One cable per ZVC except for the ZVC that receives all the data.

Outputs

TFC to L2CTT

- ❑ Cypress hotlink, 16 Mbytes/s.
- ❑ One cable per TFC, but not more than two cables per crate.
- ❑ **Question:** send L1CTT data in a separate stream or merged?
- ❑ Transmit⁶
 - L1CTT header - 128 bits (contains L1_BX)
 - L1CTT data for track 1 - 32 bits
 - L2STT data for track 1 - 64 bits
 - L1CTT data for track 2 - 32 bits
 - L2STT data for track 2 - 64 bits
 - ...
 - L1CTT trailer - 32 bits

⁵ http://www.nevis.columbia.edu/~evans/stt/talks/fnal0899_comm.pdf

⁶ Manuel Martin (http://d0server1.fnal.gov/users/manuel/Protocols/Final_version/final_stt.pdf), John Hobbs

ZVC to L2CTT or L2 Global

- ❑ Cypress hotlink, 16 Mbytes/s.
- ❑ One cable.

STC to L3

- ❑ VME bus via VBD.
- ❑ Transmit
 - Header with crossing ID
 - [All information received from FRC]⁷
 - [All information received from SMT]⁸
 - All axial clusters (or only axial clusters in roads)
 - All 2-degree clusters
 - All 90-degree clusters
 - End of event

TFC to L3

- ❑ VME bus via VBD.
- ❑ Transmit
 - Header with crossing ID
 - [All information received from FRC]⁹
 - [All information received from STC]¹⁰
 - for all roads:
 - all hits in physical coordinates
 - map of hits used in fit
 - results of fit
 - end of event

ZVC to L3

- ❑ VME bus via VBD.

⁷ only for diagnostic and monitoring purposes on selected events

⁸ only for diagnostic and monitoring purposes on selected events

⁹ only for diagnostic and monitoring purposes on selected events

¹⁰ only for diagnostic and monitoring purposes on selected events