

Timing and Control Signals in the Run IIB Level 1 Calorimeter Trigger

D-Zero Trigger

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The purpose of this talk was just to continue the discussion about the generation and distribution of Timing and Control Signals to all the crates in the Run IIB L1 Calorimeter Trigger.

- Classes of Timing and Control Signals:
 - Signals that always repeat the same pattern every tick, i.e. every 132 nsec.
 - Signal that do something special for just some ticks, e.g.
 - * L1 Accept
 - * Insert Test Pattern on this tick
 - * Capture Monitor data on this tick
- How to implement:
 - What pins on what connector ?
 - What signal levels ?
 - How to fanout ?
- Specification of signal quality:
 - How much jitter can you stand (and still operate your serial links) ?
 - How stable wrt the beam crossings ?
 - How isochronous must all the crates be ?
- Sources of the Timing and Control Signals:
 - SCL Receiver
 - Common Control and Fanout Module ?
- Uses of the Timing and Control Signals:
 - Support normal Physics Triggering operation of the L1 Cal Trig
 - Support testing of the L1 Cal Trig
 - Support separate testing of the ADC part and the Digital part ?

SCL Receiver Mezzanine Card Showing Its I/O Connections

SCL Receiver Mezzanine Card	Link Management and Status	----1---->	Serial Command Link Ready Status
		----1---->	Serial Command Link Error Flag
		<---1---<	Acknowledge & Clear SCL Link Error
		----1---->	54 MHz Clock
		----1---->	7.5 MHz Clock Tick Clock
	From or Directly Controlled by the Master Clock		Geo Section Beam Crossing Number
		----16---->	Current Turn Number
		----8---->	Current BX Number in this Turn
		----1---->	First Period in a Turn Marker
		----1---->	Period with real Beam Marker
		----1---->	Sync Gap Marker (no L1 Accepts)
	----1---->	Cosmic Gap Marker (Cosmic L1 Acpts)	
	----1---->	Spare period marker	
SCL <->	----1---->	Period with L1 Accept Issued Advisor	
	----1---->	L1 Accept to This Geo Section Indicat	
		Geo Sect L1 Trigger Number	
From the L1 & L2 Frameworks	----16---->	Level 1 Turn Number	
	----8---->	Level 1 BX Number in this Turn	
	----16---->	L1 Accept Qualifiers	
		Geo Sect L3 Transfer Number	
	----1---->	Period with L2 Decision Issued Advisr	
	----1---->	This Geo Section L2 Reject Indicator	
	----1---->	This Geo Section L2 Accept Indicator	
	----1---->	Initialize Geographic Section Flag	
	<---2---<	Busy L1 and Busy L2 Status	
To the L1 & L2 Frameworks	<---2---<	Error L1 and Error L2 Flag	
	<---1---<	Init_Ack Signal to Hub-End Flag	
	<---2---<	Spare Status Signals to Hub-End	

There are two basic documents about the SCL. The description of the information that is sent over the SCL is in:

http://www.pa.msu.edu/hep/d0/ftp/scl/scl_description.ps

The other document is:

<http://d0server1.fnal.gov/users/baldin/public/gspec1.eps>

This explains the "operating rules" that all Geographic Sections (i.e. crates that plug into the SCL) must follow.

The electronics details about such things as the SCL Receiver can be found at:

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