Data Link

The data stream uses 8b/10b encoding to transmit one byte per one *fast_clock* cycle. The standard comma mechanism is used for word alignment, with K28.5 used as the comma character. The timing data stream consists of a sequence of synchronous packets, asynchronous packets, and idle packets, in that order of priority.

• Synchronous packets begin with a *Start_of_packet_delimiter* (/S/=K27.7), and are of fixed four-character length. Synchronous packets may interrupt other traffic at any time, and carry synchronous informations that are guaranteed to be issued at endpoints in the correct order, and with a fixed timing relationship to the master synchronization source *ref_clock*. Synchronous packets retransmit CTRL state all over the system. Synchronous packets ends with *End_of_packet_delimiter* (/T/=K29.7).
• Asynchronous packets are of arbitrary length, begins immediately on the first non-comma character encountered in the data stream, and ends with a comma character (/C/=K28.5). Asynchronous packets carry general control information to endpoints, that is not guaranteed to arrive with a fixed latency.
• Idle packets are a particular type of asynchronous packet, transmitted when no other packet information is queued or during the link idle. They consist of a comma character (/C/=K28.5). Idle packets also issued for rapid link alignment.

Protocol

Synchronous packets are broadcast packets and received on every timing endpoint. Asynchronous packets may be broadcast or unicast in order to it's appointment. Asynchronous packet format is proprietary. Every timing endpoint may be configured with a address mask, such that it accept asynchronous packets addressed only to selected groups or single endpoint. This allows flexible partitioning of the system, fiber length compensation and precision endpoints synchronization.

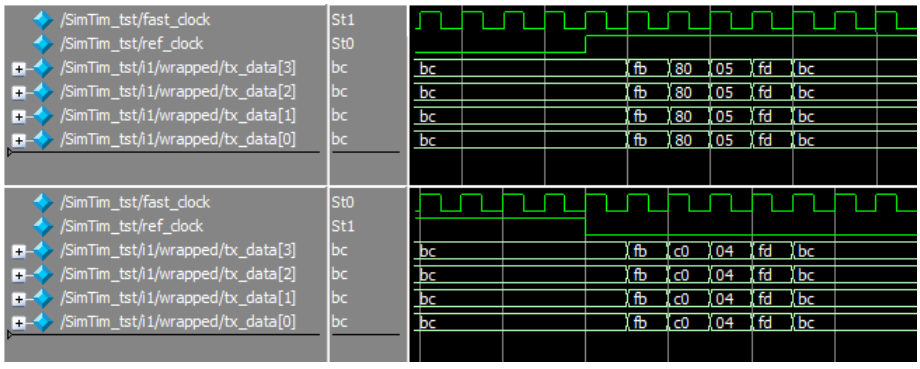
Table 1: Synchronous packet format

Byte	Value	Content
0	K27.7	Start_of_packet_delimiter
1	Table 2	Sync_data
2	0...255	Sync_packet_counter
3	K29.7	End_of_packet_delimiter

Table 2: Sync_data-byte format

Sync_data	
Bit	**Content**
7	CTRL state
6	SYNC rise/fall state
5-0	SYNC shift counter (0..63)

Figure 1: Example timing data stream. Reference clock rising and falling edges.



Error conditions monitored by the endpoint decoder include:
• 8b/10b decoder errors
• Counter-out-of-sync error
• CDR/PLL lock timeout