
Subject: Is SADC data always time ordered ?

Posted by [Walter F.J. Müller](#) on Sat, 01 May 2004 19:18:48 GMT

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In the thread How to interface SADC to Time distribution the multiplexer module GESICA is mentioned by Igor.

Beyond the specifics of the time format, see separate thread, I wonder whether the hits are always time ordered. Or more specifically:

are hits always in ascending time order in the SADC output data stream

does the multiplexer combine the datastreams such, that the mux output is again in ascending time order

is there some sort of 'heart beat' or 'epoch marker' data in the output of the SADC, so that there are time marks at some minimal rate even in case there are no hits

Subject: Re: Is SADC data always time ordered ?

Posted by [Igor Konorov](#) on Tue, 04 May 2004 08:36:41 GMT

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1. the hits are in ascending order on the output of the SADC;
2. the multiplexer still has an old algorithm of sending data event wise. There are not hardware limitations to change the logic of the multiplexer but it needs some time for developing a new vhdl code
3. there is not yet 'heart beat' but I support this idea. This is a part of a system which monitors the system behavior. This is a special topic which should be developed and included in the specification for all frontends.

Subject: Re: Is SADC data always time ordered ?

Posted by [Walter F.J. Müller](#) on Tue, 04 May 2004 18:09:20 GMT

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Simple example:

two data streams with time ordered hits enter a multiplexer and the output should be one data stream with time ordered hits.

the obvious algorithm is to inspect both inputs, and copy the hit with the newest time stamp to the output.

In this scheme I have to buffer the data over a time given by the lowest hit rate of an input channel. So there is an obvious interest to guarantee a lower limit for the effective rate of time stamps coming in. So it is not just a question of monitoring system behaviour.

So I wonder how the multiplexing in strict ascending order is done. What happens, when one SADC doesn't have a hit for 10 seconds, while another runs at high rate ?

Subject: Re: Is SADC data always time ordered ?
Posted by [Igor Konorov](#) on Thu, 06 May 2004 14:30:43 GMT
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I agree that with the algorithm which you propose to order the hits the multiplexer should have a buffers which can store the data for a maximum time interval between hits or "heart beats". But the algorithm is enhanced by taking in to account maximum propagation time of the hits from SADC to multiplexer and then the heart bit is not needed for sorting. The longest propagation time occurs when the hit rate is high and all buffers are full . It can be calculated for this case:

$$\text{Prop.Time} = \text{BufferSize} / \text{Link Bandwidth}.$$

For SADC the maximum propagation time is about 500us.

For low hit rate the propagation time is few useconds.

The data flow , buffer size and sorting algorithm are subject of simulation and optimization .