IEEE 1149.1 Boundary Scan Working Group Minutes

Date – 7/27/2070

Attendees: CJ Clark, Bill Tuthill, Craig Stephan, Ken Parker, Dave Dubberke, Wim Driessen, Carl Barnhart, Heiko Ehrenberg, Adam Cron, Adam Ley, Ted Eaton, Brian Turmelle, Carol Pyron, Francisco Russi, Roland Latvala,

Missing with pre-excuse:

Missing: Bill Eklow,

Agenda:
1)   Wrap up of weekend items on differential and BC_6 cell

2)   INIT BNF discussion/Loose ends

Minutes: called to order at 11:07
Discussion about the BC6/BC7 email thread
Carol agrees that BC7 will work better and will look to implement it on some differential bidirs

Do we want to put in CJ's figure into the standard as informational?
Can we leverage the low power mode? it might be better served to show power off state

Ted – Doesn't see this as the norm. Can have a cell to capture in EXTEST input mode and sample.
       What will it capture in EXTEST input mode? Will capture X in dot1 or dot6?

Ted – just looking at dot1 D-Flip Flop. Have no way of saying cell captures X.   Would rather have it capture the update value back like BC6.
Ken asked for a clarification of what Ted meant by "Capture X"
Ted's point was that you can't say capture X in BSDL cell definition.
Ken – if implementing this in an IC, there is no way to describe that there are on-chip capacitors. Or capture X
Adam C – If the device does have dot6 and does have the D cell will still capture X.
CJ – in this drawing the receiver is on same said of driver so it won't capture X. In input mode there is no way to describe BSDL that it is AC coupled and can't say that it will capture anything? Tools can look at the netlist and know what is going on. .once the caps are inside the device the tools can't detect the ac coupling.
       If it is BIDIR than there is something on the other side there is something connected to it and can drive into it.

CJ – if we take the switches out of the diagram, it's 1149.6. no solution in dot1.
Ken – if there are caps there and the switches are not there, then this can't be implemented in dot1.
Ted –if it is AC coupled on the board it will capture an X? But the tools can figure it out.

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Carol will talk to IO designers to understand what happens if the driver and receiver are turned on at the same time.

CJ – for test mode, you might want the receiver enabled.
CJ – might want to do this with low power mode and use "crummy" comparators.
Roland – quite often the caps are on the board. Could you still add the switches? This is partial solution. With external coupling you still have the problem?
CJ – 1149.6 can be used for External Caps on board. Business as usual
        There does seem to be a move to put the caps inside the devices. Is there a way to short out the caps and solve the problem back in a DC domain?
        Can test for shorts easier than through 1149.6

Adam C – Seems like a blackbox chip level standard. Is this really the way the standard is going to go or do we only talk about digital side? Seems like a solution to a problem, but it also seems like we are off on a tangent to solve chip designer problems.

CJ - If we remove the switches and extra stuff it is worth in the standard to show a BC7 with differential.
        We have removed BC6 from standard. Should we put it back in? or do we want a picture of the BC7 in the standard?   We should also point to 1149.6 if they are AC coupled.
Ken – 1 – we are talking about DC coupling only.We should ignore the caps and switches
        2- Would I take a diff receiver HSIO and feed it's determination of the differentials back to the flip. What should be the performance of that receiver during EXTEST?   Concern is the dead short across the IO pads. Will we have the false passing that we have seen elsewhere?
        Do we want to add hysteresis here?
        Don't want dead short across the receiver IO monitored as a passing condition.

Carl – what value resistance do you see for short?
Ken – Zero.
Carl – don't really see zero ohm shorts?
Ken – essentially zero ohms for solder splash across pins.
Ken – hysteresis will get rid of some of the fault tolerance. Would want to alert designer

CJ – this is where we were going in the low power mode.
Ken – agreed that we don't have to use mission driver to get 1's and 0's on those pins.
Carl – This was what CJ and Carl are talking about.
Ken – AC coupling is a red hearing that should be taken out of the conversation.
Carl – agreed.
Ted – what happens if on the differential receiver can't capture a known value.
Carol – agrees that this is a concern.
CJ – You don't have a bidir, you only have a transmitter.
Ted – Where do we capture from.
Ken – why bother with a BC6.   BC6 and BC1 are equivalently the same.

Ted – bread crumb to know that got a value at pin.
Ken – you are thinking chip testing rather than board testing
Ted – yes.
Carl – something more complicated going on. BIDR can either drive or receive but not both at the same time. Can receive when input. And will drive in output mode. but will not close loop when in output mode.
        Just doesn't have the feedback. .not just Transmitter only. But you can't do both RX and TX at the same time.
Carol- that is why the BC6 became interesting.
Roland – not reasonable to do self monitoring though
Carol – might be difficult to do TX AND RX.

Ken – There could be cases where the pin could TX or RX but not both. Brings us back to something that looks like BC6.
        Original 1990's version of standard showed Circuit that they used gating to steer input flip flop into the data rather than the pin.
        Nothing wrong with it but thought it was not the right thing to do - add gates and remove testability.

Ted – can we have user defined cell in BSDL.
Ken – yes can describe your own cell in your own package.

Roland – can designers turn on the receiver during JTAG?
Carol – haven't yet asked the question.
Ted - some IO's have 10 or 12 BiDIR pins that have to be set to a particular value to enable termination to be correct. Not a simple or best thing to do.   Have to way the pros and cons what is best for the device and for test
Ted – even with BC6 left out we can still describe a BC6 like cell with a user define cell which gives the functionality needed. Suggests leaving BC6 out of standard to not encourage the use of it.
Ken notes that the BC6 cell is still in the official package called out by standard. It has only been deprecated.
CJ – in the 2011 version it has been removed from the package.
Ken – May not be the best approach. Carol has pointed out a situation where there is a legit reason to have a BC6. Do we completely remove it or do we better explain why the BC7 case is better if you can use it.
Carol – Believes we should better clarify the reason why the BC6 has been deprecated in the standard. It was not very clear the way it is currently written
Ken – BC6 was strictly stated to capture the update flip flop. Carol might not want to do that.
CJ – would rather have someone make a user defined cell that mimics the BC6 than include it in the Standard.
Ken – we can do a better job with information in the standard to keep people from using the BC6 and point them towards the BC7.
Ken will edit the section in the standard to better describe the reasons for deprecating the BC6 cell.

BNF Discussion
Ken and Carol will take Carol's examples and run through BNF
Carol made some changes to examples since Friday to fix some typos and syntax.
        Pretty much have syntax down.

VHDL constructs
Carl – Has nothing new address at the moment. Will send out information later in the week.

Friday's meeting we will discuss BSDL hierarchy.

Meeting adjourned: 11:59 EST.

Next Meeting: 8/2/2010 11:00AM EST

Action Item by Carl to elaborate on concerns that he has with OO s on power pins and any rules that would need to be added to the standard to address those concerns.

Current Issues listed and who will champion that issue.
1   Observe only. –   Ken and Carl
1. Directionality linkage. - CJ
2. Power Pins. - Heiko
3. Pairing power pins with functional I/O - CJ
4. Sample / Capture. – Carol (Freescale) & Roland
5. TRST included in PCB level diagram. – Adam L.
6. Slow to Fall/Rise signaling issue – CJ
7. "No Connect" – Ken and Francisco.
8. Device ID – Still needs work
9. Low-Voltage self observe shorts coverage problem – JJ & Intel
10. Init – Carol & Carl

Action Items:
- CJ will post 1149.1 draft on website with line numbers to make it easier to refer to items in discussion
- Comment #10 CJ will take action to look at possibilities to add to the 1149.1WG website a document which shows which standards are based on 1149.1
- Comment #8 CJ will make changes to draft for observe only
- Comment #7 CJ will get in touch with Doug to get input regarding Comments
- Comment #5 CJ will Add a figure and little text to address TRST use with interconnection of components
- Comment #4 Adam L to add comment about TRST. Update figure 6.8
- Comment #3 Adam L will update language for any proposed change for this section.