

**Date – 08/19/2011**

Minutes of the IEEE-1149.1 Working Group Friday meeting

**Attendees:**

Brian Turmelle  
Carol Pyron  
Roger Sowada  
John Braden  
CJ Clark  
Dave Dubberke  
Ken Parker  
Craig Stephan  
Adam Ley  
Wim Driessen  
Josh Ferry  
Heiko Ehrenberg  
Francisco Russi  
Roland Latvala  
Carl Barnhart

**Meeting called to order at 8:35 am MST**

**Current Draft:** [P1149 1 Draft 20110722.pdf \(\\_clean.pdf\)](#)

**Agenda/Overview:**

Continued discussions on PULL Up/Down, and FLOAT 0/1

**Minutes:**

**Carol opened today's meeting with discussion of this week's email thread on programmable PULL s and the discussions also proceeded into the FLOAT 0/1 topic:**

CJ – Structural tests with init\_setup to turn on PULLs. Program thru init-data register

Carl – We are not changing the things we code in the BSDL

CJ – What I'm saying is we are programming the io for extest already.

Carl – I hadn't seen any discussion of programming the digital function of the io.

CJ – Without programming the io, the BSDL doesn't match.

John – There has always been an assumption about 'being ready for test' for BSDL to work.

CJ – The issue of programmability of pull up/down from init\_setup should be considered.

Carol – The pull in BSDL wouldn't apply to SAMPLE mode so would be illegal per the Std today. There is nothing that says pulls don't have to work in SAMPLE mode.

CJ – Have folks been following the emails on Float?

Carol – Everyone in general follows them.

**As part of the discussion CJ presented .ppt slides of “Comparison of draft figure and WEAK1’**

CJ - Bidir pin with Z has minimal value. We would rather it pull to 0 or 1

Carol – Yes but Z is often the most accurate description of what the bidir is doing

CJ – Yes, respectfully disagree. The pin will always have some current and pull one direction or the other

Carl – Random leakage, we don’t know what Z will do.

Carol – Pulls provide a weak current to pull to a 1. ‘A driver’

CJ – Not a driver. The weak path of current flow, diodes or leakage. I disagree with Carl. We should be able to determine what the Z behavior will be.

Carol – For a given insitu it may have a strong tendency one way or the other

**CJ showed another slide ‘Open on CMOS input’**

CJ - Float1 can improve diagnostics

Carol – Where is the open relative to the input?

CJ – That’s not the scenario. Compound fault?

**CJ showed another slide ‘no title’ showing open on pin 2 of IC2.**

Ken – You will get bad data ‘failing net’, a constant1, constant0, or failing net random data

CJ – Correct – If you specify FLOAT0 or FLOAT1 you eliminate 2 of the possibilities

CJ –

Carl – As an IC designer, if I didn’t have a spec that required a pull0/1, I would not code the BSDL to predict one or the other.

Carl – We do not code PULL0 or PULL1 unless there is an active or passive circuit element in the pad cell.

CJ – There are technology biases that would predict an io will float one direction or the other.

CJ – Inputs will tend to float one direction. It’s not random. I agree there are pin types

Carl – We should allow float0, float1, and float X

CJ – What prevents the BSDL from showing all float X?

Carl – If the cell designer specifies a pull up or pull down capability.

Carl – Recommend all input should have a pull up or pull down.

CJ –

Carl – If there is a tendency to float one direction it should be documented.

Carl – Today cmos models don’t predict this.

CJ – Can we educate that inputs are expected to be driven, or if they float they will oscillate. IC designers need to document this.

**Ken asked direct question of chip vendors:**

**“For the IC community, if the concept of float was only when nothing was connected to the pin, can you live with this?”**

Ken – If the pin is truly open can we predict it will be a zero? Or if the defect on the board is close to the pin we can predict a 0. Essentially by float we are asking how will the pin behave in presence of an open.

Carol – That can be spiced. But vt / process variations can change this.

Ken/Carl – a by design pull. An unconnected pin pulls to a 0.

Ken – I’ll have to predict a Z when unknown.

CJ – I think you are right on for float0 float1 this is only or the unconnected pin.

Carl – I differ with you. I want float0 float1 on and input should be predictable like pull0 and pull1 on an output. Pulls are treated as weak drivers. Active pulls are drivers.

Carl – I object to the word ‘float’ it should be ‘pull’.

John – What if you have multiple devices on a net.

Carl – Yes

CJ – No. It doesn’t. We are not using the float0/1 for a stuckat test. We are using it for checking an open at the inputs.

Carl – If open was at the driver, not at the input then it cannot be a reliable test.

CJ – What are you asking?

Carl – If the open were at the output rather than the input then float does not help you.

Ken – Due to a defect at the driver?

Carl – Yes

Ken – True if I see weird data at IC2 pin2 it is bad data. If pin2 is floating it will float0.

CJ – Some random value, then you are back to square one.

Ken – A good board would not be influenced by the float. I wouldn’t use float for upstream tri-stated faults.

CJ – Without the float constructs no options are available. With them there would be choices to act on float or not.

**Meeting adjourned: 10:15am MST**

**Action Items:**

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**Next Friday Meeting:**

- Next week Friday Aug 26, 2011