

Minutes
TMAG Test Economics Meeting
17 December 2009
Minutes by Scott Davidson, 12/17/09

Attendees:

CJ Clark
Scott Davidson
Thomas Neal
Louis Ungar

Summary:

After a brief general discussion, we focused on the area of board bring-up. It appears that DFX methods can have a significant impact on reducing time to debug, and in many cases the effort is done by development engineers, so the pain of inserting DFX would be offset by the gain in debug. At the moment, for various reasons discussed below, the benefit is not seen. A benefits model for debug might help the designers to quantify the benefit, and also be applicable to higher level managers. Thus, our next effort should be focused in this area. It also has the benefit of restricting the domain for a pilot model to a reasonable arena, and not having the issues of how to quantify field benefits involved.

Scott's request: We should begin by quantifying the stages of the debug process, so all those with experience in this area are asked to sketch a debug process flow chart.

We began with a discussion of how designers get measured. CJ said that designers should get bonuses after yield ramp, not tapeout.

Scott: Tony's input included morale of users. How to put morale into dollars?

Thomas: morale problems during manufacturing might let bad product escape to the next step.

Louis: Time to market is the most important factor.

Scott: Time to market is often more about debug. He has seen DFT problems ignored in order to ship products, with board level DFT rules violations getting waivers.

Thomas: Development engineers don't care that much about debug until the end.

Scott: What is the board process?

CJ: The first milestone managers look at is when layout is completed. A better one is when the first board has been built and is in the lab. An even better one is when components are on the board. It is possible for there to be a prolonged amount of time when the board is in the lab getting debugged. Usually one board only is produced, to make sure everything is ok before the really expensive components are inserted. Then a larger sample run is done.

Thomas and CJ: Designers are heavily involved in debug. Some don't understand the benefit of DFT (like JTAG) for bring-up. Some depend on functional test. Need major domain expertise to even write the functional test, not to mention debugging it. Also, at bring-up you often don't have all the pieces, since

some components aren't there, which is a great argument for structural test. CJ also said that we should use DFX instead of DFT here, since many design modifications are for purposes beyond simply testing. Read DFX for DFT throughout these minutes.

CJ: The old ICT mentality is still there, when people only did ICT test development at the last minute to avoid building fixtures which would have to be tossed out. Not true anymore.

Thomas: Most people think about the test stuff until the end, when it is too late.

CJ: Structural tests, especially when designed to standards, don't require domain expertise, which lets more people do them, (including CMs) and is cheaper.

Louis: How to quantify the savings?

There was a brief discussion on whom we should be addressing. CJ said that the C level executives are the ones who care about profitability and can see the big picture. Louis said we need to focus on the designers who will design in DFT. Eventually we agreed that both these audiences should be addressed. CJ and Thomas both have seen that designers are doing the bring-up, not test engineers. Louis has had test engineers in his class who have done it.

It seems that the real issue with getting DFX accepted is that every problem is considered unique by the design engineers, so that even if DFT would help for the current problem, the next generation won't have it. Thus they are unwilling to add it.

CJ: What exactly do we mean by DFT? Boundary scan, certainly. Direct access? Help in partitioning? Scott responded by saying that the purpose of the model is to allow a DFX proponent put in any proposed technique and see what the benefits are. Producing them in dollar terms should help in selling them to top management. While some companies are bottom up, in that a manager won't enforce methods designers want, others are top down.

Summary: We will focus on this part of the process, since if we can justify this for manufacturing, it can also be used in the field. CJ pointed out that some companies don't reuse DFX in the field, but Scott said the defense community does. (Even if not all that well.)