

## ***The Chip Insider®***

**October 24, 2014 – *What's Happening:* Why IBM sold its semiconductor business to GLOBALFOUNDRIES. What's in it for GLOBALFOUNDRIES..**

### **Focal Points:**

- Why IBM sold its semiconductor business to GLOBALFOUNDRIES for a negative \$1.5B
  - The big surprise was that they would pay someone to take it
  - A look at the deal from IBM's perspective
  - IBM had a very complex set of issues to resolve, making it far more than just a simple sale of assets
  - Importance of scale
  - Ensuring IBM supply-chain continuity of parts
    - Critical to its mainframes and Unix-based server businesses
  - The reason for IBM to keep transistor research is three-fold ...
- What's in it for GLOBALFOUNDRIES beyond the \$1.5B
  - Sanjay Jha had far more than meets the eye to making this deal
  - He understood the value of IBM's IP more than anyone
  - Especially the esoteric areas of mobile IP
  - It makes GF the third largest holder of semiconductor IP in the world
  - \$1.5B is pocket change when it comes to semiconductors

**Why IBM sold its semiconductor business to GLOBALFOUNDRIES for a negative \$1.5B:** There are many who have believed that IBM would sell its semiconductor business someday. Some I know thought so in the early 2000s. The big surprise was that they would pay someone to take it. This has never happened in semiconductors and is extremely rare in business. The only one I know of was when Daimler paid Cerberus Capital to take Chrysler off its hands. There the business case was that it would have cost Daimler more to shut it down. But it would be hard to argue that this would be wholly the case for IBM. So let's look at the deal from IBM's perspective.

IBM had a very complex set of issues to resolve, making it far more than just a simple sale of assets. The basis for the sale had to be related to scale, or lack of it. While one can develop transistors at IBM's manufacturing scale, it's become ever harder to run down the learning curve. Today's IDMs run 10's of thousands of wafers each week to do this. One must have a lot of product to fill these production levels. Moreover there is a need for constant capital refresh due to Moore's Law. Capital that gets ever-more expensive. Worse, as processes become more complex, capacity shrinks once it becomes constrained by floorspace. This is the easy part to understand.

But why pay someone to take all the operations? After all, there's plenty of value in the tool base alone. Even in the 200mm tools at Essex Junction, Vermont due to the current upturn. Plus, Fishkill is still state of the art, being in volume manufacturing at 22nm with 14nm close behind and 10nm well along the way in development.

The reason for paying GLOBALFOUNDRIES is to ensure IBM supply-chain continuity of parts critical to IBM's System z™ mainframes and Power™ Unix-based server businesses. These businesses are still highly profitable to IBM, with differentiation based on proprietary architectures and silicon. Hardware may be in a slump for them, but it's not out of the ordinary for this sector. The world's banking system and more run on IBM mainframes. This is unlikely to change in sectors where reliable and secure systems are critical parts of the mission.

So while GF gets to be the exclusive supplier to IBM, IBM ensures that it will continue to get its exclusive silicon. This is classic IBM partnering for the long-term. IBM has always been a leader in the development of new partnering practices and this is no different. This is not a normal IDM-to-Fab-lite transition. It's different from the classic fabless/foundry relationship in that IBM will continue to do transistor research. There are only two places in the world today that do cutting-edge transistor research: IBM and Intel. IBM still owns Albany and will continue to do research there, so IBM still remains essential to the world's semiconductor research infrastructure.

The reason for IBM to keep transistor research is three-fold: First, carving it out of IBM Research would mean management had made a King Solomon's edict to split the baby in two. Transistor research is still critical to system architecture, as it's the platform from which all design starts. At IBM, the two are interwoven in ways that are not easily separated. Second, keeping it ensures there are fewer hiccups in future process developments, as it stands on the proven Common Platform approach which has been the flow mechanism from IBM's most basic research to its semiconductor partners. Third, keeping it ensures IBM remains strategically relevant to its partners and the industry.

Yet, keeping an IDM's research relevant to its foundry partners, means that its partners will have the burden of the costs associated with bringing developing processes up on their fabs. This is in addition the wide-window process flows that have to be developed for conventional foundry operations.

Understand these factors, and you can understand why IBM chose to structure the deal this way.

**What's in it for GLOBALFOUNDRIES beyond the \$1.5B:** Let's face it; \$1.5B is pocket change when it comes to semiconductors. Few would dedicate significant capacity for amounts in this neighborhood, as it's been said that Apple and Qualcomm have previously found out. Moreover, they should also be ahead of the game on the scale problem that IBM has had.

My bet is that Sanjay Jha had far more than meets the eye to making this deal go through. After all, the rumors have circulated through multiple CEOs, so why now? Chip manufacturing geeks tend to be digital bigots if they are at the leading edge (myself included). All the focus goes to transistors and nodes. Fall off the leading edge and you're in the Analog Abyss. With all due respect to those in Analog, we simply don't appreciate the value of this sector, in part because it's incredibly complex and diverse. So it's no surprise that rumors went on-and-off over the years.

What's different about Sanjay Jha is that he comes from Qualcomm and so he would have truly understood the value of IBM's IP more than anyone. He's spent his career in mobile, where normally esoteric areas like Power Amplifiers (PAs), transceivers, filters, the range of analog mixed signal IP and processes like SiGe and RF SOI are front and center. So he would understand what the value of IBM's IP portfolio would bring to GF more than anyone before him.

The IP portfolio that GF got in the deal amounts to more than 10K patents. It makes GF the third largest holder of semiconductor IP in the world. It gives GF more leverage to attract first-design silicon to it, instead of being a second-design to something and having to match what was done at TSMC first. It's first-design silicon where all the foundry profits are. But you have to know how and where the IP fits into a fabless company's design aspirations. So the value of the IP and Sanjay's understanding of it to GF is that it shifts the slope of the level-playing field in GF's favor.

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