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## Top 20 predictions for semis in 2009

By Mark LaPedus

Happy New Year! 2009 is just beginning to unfold in the electronics industry and there is already uncertainty in the air based on recent industry data.

Industry forecasters seem to have different opinions about the overall outlook for the semiconductor and IC-equipment markets in 2009 and beyond.

To help sort out the confusion in the market, I have released *my* own chip forecasts--and other predictions--for 2009.

### 1. Downturn or depression?

I've had the luxury of seeing what the other IC forecasters are saying for 2009. In my opinion, most of those forecasts are too optimistic. Unfortunately, I see a 25 percent decline in the IC industry in 2009. That's slightly better than the horrific downturn in 2001, but not much better. It will feel worse than 2001.

Like 2008, memory will drag the industry down in 2009. Memory, including DRAM, NAND and NOR, could see a staggering 40 percent drop in worldwide sales in 2009. There is still too much capacity in a slow demand cycle. The remaining markets--analog, communications, DSP, logic and others--could see flat growth in 2009.

Some see a recovery starting in mid-2009. I don't. I myself see pockets of growth: Aerospace/military. GPS. Sub-notebook PCs. But I don't see that elusive "killer app" that will dig us out of the hole. Plus, of course, the sub-prime mess, credit crunch, bank scandals, housing crisis, car bail-out fiasco, and other macroeconomic issues are not going away anytime soon. Job losses and poor consumer spending will dominate the headlines in 2009.

### 2. The (fab-tool) sky is falling

Hold on to your seats and buckle up. The semiconductor equipment industry could see its worst year ever in 2009. My prediction: Minus 50 percent! I don't want to spread the news, but leading IDMs are simply not going to expand their fab capacities to any great extent in 2009--and for good reason: The IC market is falling like a rock. The memory guys will continue to cut back their capex. So will the foundries. The question marks are Intel and Samsung. Don't look for any major fab spending sprees among those two companies.

The front-end equipment market could be bad, but the backend will be worse. Like the foundries, the subcontractors, such as ASE, Amkor, STATS and SPIL, are seeing a glut of capacity. I see a 20-to-30 percent decline in the foundry business and a similar drop in the IC-packaging and test market.

### 3. EDA--Down and out?

Our crack reporter, Dylan McGrath, made these predictions about EDA: Obviously, EDA vendors will face a painful year in 2009. They will say that design is always the last area to suffer in a downturn because chip vendors can't stop the bleeding without the design tools to innovate. This may be true, but the reality is that EDA vendors face declining sales as consolidation and job cuts by chip companies means fewer seats of software. Expect EDA revenue to decline about 10 percent next year, possibly more.

Many of the smaller EDA startups will not weather this storm. There is some speculation that this has already happened with at least two companies, [Blaze DFM](#) and [Knowlent Corp.](#) There will be others. But that happens in EDA, even in good times.

EDA's four large vendors will more than likely survive the year intact. Synopsys, which is still showing profits and predicting growth for 2009, is a lock. Mentor Graphics has been losing money but has a lot of momentum and seems a safe bet to survive. Cadence Design Systems and Magma Design Automation are facing tougher challenges, but it's hard to see them going away. Despite Cadence's play for Mentor last year, consolidation among the big four is unlikely because of too much product line overlap.

A more intriguing possibility is that a company from an adjacent industry, or a distantly related industry, might take advantage of the low market capitalizations of EDA vendors and acquire one to expand its portfolio. The idea that TSMC might buy Cadence (or another large EDA vendor) has been floating around for years. But now that Cadence is on the ropes, is it more realistic? Offering a suite of EDA tools would make TSMC even more attractive to customers. But could TSMC charge as much for the tools as a standalone vendor? Not likely. Customers would push for EDA tools to be thrown in as part of a deal. Before you know it, TSMC would be expected to take on the R&D costs associated with developing new EDA tools

as the price of doing business. The risk-reward dynamics don't seem to play out.

But what if a company from an entirely different space made a play for Cadence just to get its foot in the door in EDA? What if a software company like Autodesk or Oracle, both powerful and with historic ties to Cadence, decided to make a move? These companies and others continue to jump into new industries through acquisition. Why not EDA? Autodesk is a force in design software through many industries, and is already bumping up against Mentor and others in the automotive space. Could this happen? It makes for intriguing speculation, and it's not impossible. But it's a long shot at best. After all, who would want to get into the EDA business?

#### **4. Here comes the sun**

The growth prospects are enormous in solar, but I am a little disappointed with the adoption rates. In my opinion, green is somewhat overrated. Germany, Japan and a few other nations have embraced solar, but others, especially the United States, are still lagging. I see a 5 percent decline for the worldwide solar panel industry in 2009. For years, the problem in solar has been the polysilicon supply. Poly supply will shortly catch up with demand. But in 2009, growth will be stunted by the economic downturn. Corporations will slow their adoption of solar. Residences will continue to question the economics.

Here's what Robert Stone, an analyst with Cowen and Co., said in a recent report: "The global PV market outlook is uncertain. In our view, continued growth depends on: more stable Euro/USD, a rebound in project credit, new sources of tax equity, and continued government support. We surveyed 50 dealers in 19 states (in the United States). While 80 percent cited a negative impact from the credit crunch, 50 percent also said the tone of biz had improved recently, likely due to the ITC extension, mentioned as a positive by 72 percent. In 2009, 40 dealers expect to increase kW installations by an average (of) 79 percent, up from 30 and 71 percent this year; just 3 see a decrease in 2009 vs. 7 in 2008. Most see 2009 module supply as balanced (20) or tight (19), versus excess (5) or uncertain (6)."

#### **5. Bailout blues**

I see 2009 as the "Year of the Bailouts." U.S. car makers have already been successful in obtaining a bailout. So why not chip makers? In fact, the Taiwan DRAM houses, namely Powerchip and ProMOS, are seeking bailouts in one form or other from the island's cash-rich government. South Korea's Hynix claims it is not seeking a government bailout now, but it will over time. Hynix received a fresh infusion of cash from its creditors.

I see the bailouts going beyond Taiwan and Korea. Qimonda received a bailout. I even believe the European Union may have to intervene and provide cash infusions to NXP and ST. In China, I see a bailout for SMIC. I don't see a bailout in Japan, but rather look for more mergers in that nation. The same is true in the U.S., with the possible exception for Micron. As usual, Intel will rescue Micron. Every DRAM cycle, Intel funds Micron. This time, for DDR3.

So, in effect, will semis become a state-run enterprise?

#### **6. Memory lane**

Speaking of Micron, I am wondering who will survive the DRAM downturn. Samsung will survive, but it's unclear who else will make it. For the most part, Qimonda is dead. Taiwan's DRAMers, especially Powerchip and ProMos, will go under or will get acquired. Nanya could survive, but for how long?

I think Micron will survive, thanks to a possible cash infusion from Intel. That leaves Elpida and Hynix. I believe Hynix will get a government bailout in 2009, prompting a rash of anti-competitive and dumping suits against the company.

I don't know if Elpida will survive. It's 50/50 now. One thing is clear: Elpida will buy its Taiwan DRAM partner, Powerchip. Elpida is talking to ProMOS. I've heard that TSMC is interested in buying ProMOS, and shedding its memory business for the fabs.

#### **7. Flash dance**

NAND and NOR are messy markets. Too much capacity and not enough demand. And the losses will grow. So what will happen in NAND? Samsung will survive, but the rest of the landscape will change. Hynix? A government bailout. And perhaps by the end of 2009 or in 2010, I could see a merger between Hynix and Numonyx. Hynix and Numonyx are technology partners in NAND. Numonyx is a flash JV between ST and Intel.

There's no doubt that Toshiba will buy SanDisk in 2009. SanDisk will struggle all year. Don't look for Samsung to launch another takeover bid for SanDisk.

What about IM Flash, the JV between Micron and Intel? At some point, Intel will want out. Over the years, there have been rumors about a new partner for IM Flash. We've heard Seagate, and recently Toshiba. Time will tell. That leaves Spansion. At one time, Toshiba was looking at buying Spansion. I think Toshiba will re-examine Spansion and buy them for pennies on the dollar.

As for next-generation memories, phase-change will take forever to gain traction. Numonyx should see real traction for phase-change in five years. MRAM will find some niches. I see more hype than substance for "universal memory."

#### **8. Abu Dhabi vs. Intel**

By a major miracle in 2008, AMD was saved by the Abu Dhabi government. In 2009, Abu Dhabi will continue to pour a ton of cash into AMD. The question is who has better designs, more resources, and, more importantly, mindshare in the processor race. Easy prediction: Intel will continue to own 85-to-90 percent of the x86-based processor business in 2009. AMD, or Abu Dhabi Inc., will see red ink. I'm not convinced that Abu Dhabi Inc.'s 45-nm processor, codenamed Shanghai, is a winner.

#### **9. Foundry foils**

That leaves me to wonder what will happen to AMD's foundry spin-off, which is named The Foundry Company. Another easy prediction: They will struggle and will eventually merge with IBM Microelectronics. AMD and IBM Micro have close technology ties.

In fact, look for more consolidation on the foundry front. Struggling Chartered appears to be looking for a partner or new buyer. Not sure if Chartered is really happy being in IBM's "fab club." In 2008, Chartered and SMIC were talking about a merger. I'm sure those talks will resurface. But I see a UMC-Chartered merger as a better fit.

In 2009, I also see Samsung emerging as a foundry powerhouse, eventually pitting TSMC vs. Samsung as the leader in the arena. The rest of the leading-edge foundries, including UMC, Chartered and SMIC, must find niches and not chase after Moore's Law. It's getting too expensive to fund next-generation processes.

As for the rest, I see more consolidation, especially in China. I see SMIC making it, but scaling back its fab efforts. ASMC and Shanghai Belling will merge. Grace is a goner if it can't find a buyer. The same with He Jian. Maybe UMC will buy them. Maybe UMC already owns them. HHNEC will survive.

There are also too many analog/mixed-signal foundries. TSMC will eventually buy Vanguard. Tower will survive, but will shut down its Jazz unit. X-Fab will buy L Foundry. Dongbu will quietly thrive.

## 10. Analog ailments

For years, the analog community has been a proud group--if not a bit smug. They have seen decent growth and been somewhat insulated from the down cycles. Not this time around! We are seeing unprecedented declines in analog. So the first victims in the possible wave of a shakeout are the fabless guys (i.e. Analogic Technologies).

The big question is what will happen to the IDMs? I see the smaller players like Intersil looking for a buyer. Crazy prediction: Freescale CEO Rich Beyer sees the light at the end of the analog tunnel. He (Freescale) makes a bid for his former company, Intersil. This is a make or break year for Freescale. More about that later. ADI, Linear, Maxim, and, to a lesser degree, National, will weather the storm. What about TI? I see TI going on an acquisition spree again and looking for analog design houses. Then, eventually, TI will look at a possible tie-up with National.

## 11. FPGA vs. ASICs

I keep hearing that FPGAs are running out of gas from the ASIC camp and ASICs are running out of gas in the FPGA camp. The truth is in the middle. In ASICs and FPGAs, I see a definite slowdown in scaling. Customers are pushing out the need for next-generation designs. I also wonder how Achronix, Lattice and Silicon Blue will survive the downturn. Look for Altera to buy Achronix. Xilinx will buy Silicon Blue. That leaves poor Lattice. Wild idea: How about an Actel-Lattice merger?

In ASICs, IBM Micro will scale back its efforts to few accounts. The same with TI. The big ASIC houses-- NEC, Toshiba, and others--will spill more red ink. And the fabless guys--eASIC, eSilicon, Open-Silicon and others--will need to consolidate.

## 12. Who's on hot seat?

2009 is a make or break year for many companies. Freescale is at the top of my list. It's losing huge sums of money. It got rid of the wireless group. That's a good start, but what's next? Maybe a play for Intersil. In the distant future, I still see a mega-merger with Infineon and/or ST.

Europe's big IDMs are on the hot seat. Infineon must rid itself of Qimonda and get its house in order. I see a bailout coming for Infineon. NXP and ST are also on the hot seat. Is there an eventual merger in the works?

Renesas and NEC Electronics are on the hot seat. Can NEC Electronics weather the downturn? Look for more cutbacks and layoffs at NEC, which is still losing money. Ditto for Renesas. Customers love Renesas' solutions, but the MCU market is horrible. Will we see NEC Electronics and Toshiba merge? Or how about Renesas and Panasonic? It's interesting to think about.

Others on the hot seat: AMD, Atmel, Chartered, Cypress, Hynix, Micron, NXP, SMIC, UMC.

## 13. Who will not make it?

Every day, we are seeing mass layoffs and losses in the semiconductor equipment market. The question is who will survive the downturn -- and who will get acquired or go under? Here's my wild predictions: Aviza (bought by Applied or TEL); Axcelis (acquired by Sumitomo); ASM Pacific (good fit for K&S?); Credence-LTX (acquired by Teradyne or Verigy); Electroglas (acquired by Verigy); FSI (Applied or DNS); Mattson (maybe Applied is interested); Lam (Is TEL interested?); Nanometrics (acquired by KLA); Nova (KLA again); Novellus (Is this the year for the Lam deal?); Photonics (looking for buyer--DNP?); Tegal (will get bought by Aixtron); Ulvac (TEL to the rescue?); Yokogawa's ATE unit (good fit for Advantest).

## 14. Litho blues

Optical lithography continues to scale. 193-nm immersion, with double-patterning, will be used for the 22-nm node. At the 2009 SPIE event, the backers of EUV will continue to say that the technology is making "progress." But when will we see real progress for EUV? Not when ASML or Nikon ships a "pre-production" tool. We want real production.

Now, EUV will not be ready until the 16-nm node. Last year, I predicted the death of EUV. My prediction still stands. I see a major breakthrough in optical, which will enable 193-nm immersion to the 16-nm node.

ASML and Nikon will lead in optical litho. Canon will continue to fall behind in immersion lithography. For years, I have been calling for Applied and Canon to form a litho JV.

Look for consolidation in nano-imprint and e-beam lithography. Maybe ASML will buy Molecular Imprints.

Canon will buy Obducat. TSMC will continue to pump money into Mapper Litho.

#### 15. 450-mm conspiracy

In the corridors at a recent Sematech event, the chatter was centered on why we need 450-mm fabs. Economically, it doesn't make sense now. But Intel sees it differently. During this downturn, Intel believes it can take a bigger lead in the x86-based processor race if it moves ahead with 450-mm fabs. AMD, which breaking the company in two, has got enough on its hands and cannot afford to be preoccupied with 450-mm fabs. So when the upturn appears, Intel has a major lead in next-generation fabs.

Got some bad news for you Intel: AMD's foundry spin-off, The Foundry Company, is backed by Abu Dhabi. (The Foundry Company will make processors for AMD.) Cash-rich Abu Dhabi can already afford to build 20 450-mm fabs--and fund the equipment vendors as well. So, the joke is on Intel and the other backers of the 450-mm fab--TSMC and Samsung.

But here's a scary thought: What would the next down cycle look like with 5 or so empty 450-mm fabs?

#### 16. Throw in the towel

Give up Microchip. Atmel does not want to merge or sell its MCU business to you. Atmel will continue to dig in its heels. Microchip is in need of a 32-bit MCU offering. Microchip must go elsewhere. And what about Atmel? It will continue to plod along.

#### 17. Solar or bust

Applied will launch a hostile bid for Oerlikon, a supplier of solar gear. Applied sees its solar business taking off. Rival Oerlikon is also seeing the same thing. Solar is hot. Look for TEL to make a big play in solar.

#### 18. Semi IP is not a loser

Except for ARM, semi IP vendors will continue to lose money. Look for a wave of mergers in IP. How about a merger between MIPS and Virage?

#### 19. Fab vs. fabless

In the top-10 chip rankings in 2009, 5 out of the top 10 will end up being fabless. Qualcomm, Broadcom, MediaTek, Nvidia and perhaps another will be in the top 10. Global Unichip is an up and comer. The old line IDMs are sinking.

#### 20. Walmart rules

Retail giant Walmart, the world's largest company, will continue to outpace semis. In 2008 alone, Walmart had sales of \$374.5 billion. It expects an increase of 1-to-3 percent in 2009. In comparison, global chip sales are expected to fall to \$219.2 billion next year, a decline of 16.3 percent from what is likely to be achieved in 2008, according to market research group Gartner Inc.

In 2000, Walmart had sales of \$165 billion. In comparison, the IC industry had total sales of \$205 billion.

Can anyone explain that?



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