

A look at China's IC design houses

Amanda Liang, International News Center; Rodney Chan, DigiTimes.com [Friday 16 September 2005]

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Just two months after saying it might lift a ban to allow Taiwanese semiconductor makers to set up China fabs using 0.18-micron processes, the Taiwan government in early April said the ban would stay in effect. The decision disappointed many. As the fourth quarter begins, no progress has been made.

Powerchip Semiconductor Corporation (PSC) chairman Frank Huang, who then headed the Taiwan Semiconductor Industry Association (TSIA), described the government decision as "deeply unfortunate."

Taiwan Semiconductor Manufacturing Company (TSMC), with permission from the Taiwan government, already operates a plant in China using the 0.25 and 0.35 micron processes. However, its application with the Taiwan government for using the 0.18 micron process at its China facilities is stalled.

FC Tseng, vice chairman of TSMC, has revealed that 80% of its clients in China work on the 0.18 micron technology, and many are even migrating to the 0.13 micron process. However, Taiwan's regulations have tied TSMC's hands. Tseng said that although TSMC is still able to receive sizeable orders from China's major IC designers -- Datang Microelectronics Technology (DMT), Haier IC Design, and Vimicro -- part of their 0.18 micron and 0.13 micron orders have to be processed in Taiwan.

China-based Semiconductor Manufacturing International Corporation (SMIC) CEO Richard Ru Gin Chang has said that the proportion of IC design houses using the 0.18-micron-and-under processes will top 50% at the end of this year, compared to 20% at the end of last year. According to iSuppli predictions, more than 60% of China's IC design players will have adopted the 0.13 micron-and-under processes by 2008.

China's foundry sector has been in the spotlight since the country started stepping up the development of its semiconductor industry in 2000. China, not satisfied with its status as only the "world's factory," has also been grooming its IC designers.

A long road ahead

The China Semiconductor Industry Association (CSIA) has pointed out in a report that of the more than 400 IC design houses in China, only about 20 players have a significant place in the China market, and they can be divided into four groups according to their backgrounds:

- Companies who are employed in China government projects, such as DMT, CEC Huada Electronic Design (HED), Vimicro, and Hua Hong IC.

- Companies who have Silicon Valley partners or foreign investors. These include Spreadtrum Communications, Comlent Semiconductor, LHWT Microelectronics, and Opluan Technologies.

– Companies who work with domestic OEMs, such as Haier IC Design, Xinwei Telecom Technology, ZTE IC Design (ZTEIC), and Asic Microelectronics.

– Companies who work with Hong Kong or Taiwan partners. They include Silan Microelectronics, Actions Semiconductor, Semico, and SIM-BCD Semiconductor Manufacturing.

The chief players mostly provide solutions for telephone IC cards, handset SIM cards, IC ID cards, memory toys, remote controls, MP3 players, set-top boxes (STB), DVD analog ICs. Only a few of them develop solutions for high-end handsets, CMOS processors, and telecom chips.

Less than 10 IC design houses in China have annual revenues of more than 100 million yuan (US\$12.35 million) each. According to iSuppli, Datang topped fellow competitors with US\$60 million in revenue in 2003. The second to sixth were Silan, Semico, SIM-BCD, Vimicro, and Hua Hong. Their revenues ranged from US\$16-45 million.

Although the 2004 figures are not available, the IC design sector, one of the rising star industries of China, is expected to see huge growths this year. China's State Council (cabinet) has reportedly pledged strong government support for SIM-BCD, Silan, and Solomon Systech. The three companies' products chiefly cover three of the hottest areas – ICs for MP3 players, microprocessors, and LCD driver ICs. Their 2005 revenues are expected to reach one billion yuan each.

Fabless Semiconductor Association (FSA) has estimated that the IC design industry's worldwide production value in 2004 reached US\$33 billion, up 32% compared to 2003. Of the total, 75%, or US\$24.8 billion, was generated by players in North America. Taiwan's IC design houses came in second, with 19% or US\$6.6 billion.

Only nine players in the world made it to the "US\$1 billion club" in 2004: they were Qualcomm, Broadcom, ATI Technologies, Nvidia, SanDisk, Xilinx, Mediatek, Marvell, and Altera. Compared to these top players, China's IC design houses still have a long road ahead.

Capital, human resource, and market

As of the end of 2004, there were 460 IC design houses on record in China. However, only a few of them played a significant role in the market. The majority of them were hardly operational after exhausting their capital or government subsidiaries, and many had no more than five employees.

The lack of experienced IC design engineers is another problem for the China sector. It is estimated that by the end of 2003, China had about 7,000 IC design engineers. However, more than 60% of them had fewer than three years of experience. In general, an IC design engineer needs five years of experience to be really qualified for the job.

Another problem with China's IC design houses are that they have often targeted the wrong market. Many of them started off by targeting high-end products – such as microprocessors and handset digital signal processor (DSP) – that require complex IC designs. Very few China players have been able to master the complexity of these core logic ICs.

According to government-sponsored China Center for Information Industry Development (CCID), 90% of China's IC design houses may have to bow out because of their lack of capital and technology. The survivors, however, stand a good chance to become strong competitors for the players from North America and Taiwan.

Market potential

The operations of the top China players can offer a glimpse of where the country's IC design industry is heading:

- SIM-BCD and Semico play the low-cost-high-volume strategy, targeting the IC markets for MP3 and USB.
- Vimicro, which works closely with SMIC, mainly provides IC solutions for domestic handset OEMs.
- Datang is the leader in the China market for SIM card solutions. In close cooperation with the government, Datang will see its revenues soar when China issues new ID cards featuring IC chips.
- Haier has capitalized on the fast growing market for digital TV in China to become the top provider of STB IC solutions.

In the coming few years, China's players will be focusing on IC solutions for 3G mobile communications, digital TV, ID cards, and telecom ASICs. According to iSuppli's estimates, China's IC design production value will reach US\$1.16 billion in 2008. The sum, which is US\$400 million more than the production value of 2004, would represent a significant growth.

Outlook

The China IC design sector is still in its early stage of development. However, with fast growing domestic demand and strong government support, the sector stands a good chance.

In the past, China's OEMs were rather reluctant to work with domestic IC designers due to concerns over the quality of their products and their ability to meet deadlines. However, with their quick expansions in recent years, major OEMs such as Haier (the mother company of the namesake IC design house), ZTE (the mother company of ZETIC), and TCL, have included domestic IC designers as their solution suppliers.

China's IC design players are in fierce competition with their international and Taiwanese rivals for the China market. China's disadvantage in technology has restricted them to the low-end consumer electronics products market. The fierce competition is expected to take its toll on many minor companies, which will either fold or be taken over by stronger competitors. Only the strongest of the China players will be able to enter the high-end market.

Companies who can enter the high-end market may be ones with venture capital from Taiwan's design houses, or orders from China's telecom OEMs. Taiwan's IC designers, who had 19% of the worldwide market in 2004, lead their North America competitors in solutions for consumer electronics, PC hardware, and WLAN products. While the growth in Silicon Valley is slowing, Taiwan's venture capital is boosting the competitiveness of China's players.

The massive growth in China's telecom industry also promises to turn the IC design houses into a real threat to foreign rivals. In order to establish strong ties with the domestic telecom OEMs, some IC design houses are providing their clients with the system know-how, selling them both the software and firmware. They are also providing the clients with reference designs, and cutting short the time-to-market. Thanks to their partnerships with the telecom sector, these IC design players will widen their gap with fellow competitors in the next two years.

Three main markets

Analysts have identified three potential markets that China players will focus on before the 2008 Beijing Olympics: handset chips, digital TV and STB chips, and telecom chips.

For the handset industry, China is now both its biggest supplier and market. The 2004 handset demand in China amounted to 86 million units. Replacement needs and the fast growing 3G market are expected to boost demand to 102 million units in 2008. This offers huge business opportunities for such players as Datang and Vimicro.

China has also become the biggest production base for TV manufacturing. Digital broadcasting is expected to boost domestic demand for digital TVs, which in turn will boost IC designers' STB solution business. Haier IC Design is the leader in STB chips, with its shipments of the segment soaring recently.

The IC design arms of China's handset makers, ZTE and Huawei Technologies, are leaders in the telecom ASICs and have started mass production of the segment. There are other IC designers in the telecom chip market. Telecom chips, which require designs that can integrate massive amounts of data at high speeds, are a big challenge for designers. As many Silicon Valley engineers are moving to China, analysts say telecom ASICs will be the main battleground for China players and their foreign competitors.

China's IC design sector had stayed at the 0.35-1.0 micron processes until 2003 when Silicon Valley engineers began moving to China, helping it accelerate its migration to the next generation processes. According to iSuppli, by the end of 2004, 20% of China's players were able to use the 0.18 micron technology in their IC design, and 5% were even able to use the 90nm process.

Although iSuppli claims some China players might be exaggerating their technology know-how, SMIC CEO Chang has said that China's IC design sector will skip a whole generation of processes to directly migrate to the 0.18 micron or even the 0.13 micron technology. SMIC will reserve part of its capacities for China's IC design players, Chang says. For SMIC, it is a strategy for developing the domestic market; and for the IC designers, it offers a good chance for them to hone their skills. With closer cooperation between the foundry and design sectors, China is mounting a strong challenge to their competitors.

Remark: This article is based on a Chinese article that written on April 14, 2005. For any Taiwan listed companies' financial record updates, please refer to our finance section.

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