

Case Study: Aplus Flash Technology Shanghai Foreign IP Moving Into Foreign Lands Christine Lee, Aplus Flash

Why China?

As a fabless design house, Aplus has partnered with various semiconductor foundries to manufacture its memory products and its customers' products (in which designs are embedded). Previously, there were limited foundry choices for fabless companies, a majority of which were located in Taiwan. With the recent buildup of pure-play foundries worldwide (Korea, Singapore, China, Malaysia, Japan, U.S., etc.) there are more and more lower-cost options for fabless companies needing manufacturing sources. These new foundries are focused on providing a variety of manufacturing services, and are all focused on varying technologies and products. Their existence and production ramp up has increased competition in the foundry industry and has given fabless companies options in their manufacturing choices, thereby lowering costs and increasing efficiency in the semiconductor supply chain.

Particularly in China, there has been booming growth in the technological capabilities of the semiconductor industry. With the government fully supporting IC development and its strong backing of Chinese foundries such as SMIC, GSMC, CSMC, Belling, etc, Aplus saw many opportunities for the company in all areas of its business, from potential customers, to a reduction in labor and operating costs, to improving time and cost efficiency with partners in its supply chain.

Entering China: Issues encountered

Initial Investment

To establish an office, it is necessary to invest capital into China, which is not conveniently removable from China once invested. Thus, companies with limited cash, or companies not yet generating consistent revenue, need to evaluate how much capital they can afford to strategically invest into China. Chinese investment law makes it easy to add capital to the amount you've invested, but it may be difficult to take this capital back out. A smart investor will start out with enough to maintain their desired level of operations, and add capital as the company grows. In addition, the business itself may generate cash flow for the business. There is also a decision to be made concerning where the investment will come from, whether it's your current headquarters, a holding company or other company source. Common practice is not to directly invest.

Branch Office Vs. Liaison Office

Depending on the type of activities (sales, marketing, research and development, etc.) that your company needs to engage in while in China, this will affect the type of office to set up. As an IP company, Aplus makes money through up-front non-recurring engineering (NRE) licensing fees, royalties or through its turnkey wafer sales model. For customer flexibility, this requires Aplus to issue invoices through its China office, which a liaison office can't do. Liaison offices can perform some promotional and coordination activities, but can not engage in any business activities such as price negotiation, contract signing, invoicing, setting up bank accounts, etc. Also, there are some domestic Chinese customers that cannot pay in foreign currency. A bank account is necessary to receive cash income in domestic currency (RMB). Setting up a branch

office may possibly be a more lengthy procedure because further certifications need to be applied, but it will serve as a fully functional subsidiary of a headquarters/holding company.

Type of Product Sold

In China, depending on whether you are selling a product/hardware, or regarded as selling a service, the tax levied is different. Service business such as software development or design services, where there is no product transfer, are subject to a business tax. If your company sells its product or hardware to another company, this is subject to the value-added tax (VAT). If you pay one tax, you don't pay the other.

Quirky Logistical Name Issues

To submit a Chinese company name for approval, it's best to submit a list of possibilities, so you can quickly finish this portion of the process if any of them get rejected. For each submission, it takes about three days to know whether they have been approved or rejected, so this can be time consuming if a company's chosen name doesn't get approved right away. In addition, if a company plans to have the word "technology" in its name, this actually requires a lengthened approval time, as more documents and government approval are needed.

Considerations as an Intellectual Property (IP) Provider and Designer

As an IP provider, there are several unique considerations when licensing and selling IP in China. These considerations range from collecting payment from IP licensees to protecting IP.

Payment

Usually, contact comes in two areas – with an IP company's foundry partner and with its customers. Because foundries are often large, international corporations, there usually aren't as many payment issues on the foundry side. On the customer side, companies creating chipsets are often dealing with several IP providers, for logic, analog, CPU, memory and even system architecture. As an IP provider, the product that a company sells is only a portion of its customers' entire product(s). Particularly in China, the value of IP is often also difficult to translate into high initial NRE fees. With China often seen as a place to focus on producing low-cost ICs, companies are resistant to spend tens or hundreds of thousands of dollars to acquire an IP. To counter this cost barrier, Aplus had to implement various different business models in licensing its IP, including the implementation of payment installments, royalties, recurring licensing fees and revenue sharing with its foundry sources through its turnkey services. These alternatives were its way of being able to competitively enter the China market while generating enough revenue to sustain its substantial design efforts.

Aplus also found that many companies had difficulty paying in U.S. dollars, and would only have RMB. Then, another problem appeared of how to transfer money out from China once it is paid. If a U.S. office needs the revenue stream, then how to move the money out of China is important. This can be a long process (from three to six months) that requires various levels of approval from the Chinese government. Also, if a company's license hasn't been granted yet (because it can't operate its branch before its license is granted) it won't even be able to accept the RMB. Without a license, a company can't get a bank account, and without a bank account, it can't receive money. Proper planning and timing is key to ensure that payment issues don't hamper the timeliness and success of business negotiations and contracts.

Human Resource Considerations

As an IP provider and designer focusing on a niche market of non-volatile memory, difficulties also arose in finding suitable labor resources to match Aplus' needs. Aplus saw China as a way to lower company operating costs throughout all departments, from engineering to sales and marketing.

However, finding matching candidates for its field was more difficult than planned. According to various industry reports, there is a large shortage of experienced IC designers in China. Compounded with the highly confidential and proprietary nature of its IP design, as well as the technical difficulty, it is necessary (as with most companies) that Aplus retain its personnel as long as possible to protect proprietary design technology, as well as to recoup training investment in its staff. It was also necessary to budget for long training periods before its China staff could be considered fully functional and able to relieve the burden of its U.S. engineering staff.

In addition, at the same time that Aplus needed the China office to be able to relieve the heavy burden that was on its U.S. engineers, it was also difficult to decide which projects should be handled by which office, for both logistical and confidentiality reasons. As an IP company, Aplus' livelihood depends upon its proprietary design technology and its various circuit design and layout tactics – so, the technical design knowledge it passes on to employees is highly confidential. In addition, due to the fact that Aplus performs embedded memory designs for its customers, it also comes into contact with a great deal of its customers' proprietary technology. This requires large levels of trust and loyalty in employees, as well as the knowledge that government laws and regulations will protect Aplus in any legal disputes. While this fact holds true no matter the country or region, as a new entrant into the China market, Aplus wanted to protect itself as best it could while maintaining cost-effectiveness in its resource allocation.

Creating a secure IP environment in any country requires proper implementation of technical tactics, legal IP protection, employee loyalty and incentive programs and technology transfer discretion. Technical tactics such as logo stamping, design-in of security bits, encryption, etc, all help to create technical roadblocks to IP piracy. Actively maintaining patents and the signing of non-disclosure agreements (NDAs) in China, as well as in the U.S. gives security to pursue legal action if necessary. Creating an environment where employees' goals are in line with company goals is also a very good security tactic – by giving employees incentives to see the company succeed and to remain with the company for a long time (fair salary compensation, stock incentive programs, etc.), the risk of IP leakage becomes smaller. Discretion in the type of technology transferred between companies is also a good tactic – by controlling what kind of IP is made available, and in what form, also creates a more secure environment.

Because Aplus' major manufacturing partners and a large number of customers are located in China, it was also cost-effective for it to conduct a large portion of its non-technical business in China. Aplus' manufacturing and production control, as well as its sales and marketing, could be cost-effectively handled in China. These types of activities are also not as technical or confidential in nature.

IP Security

As part of the supply chain, and as a turnkey solutions provider, there are several layers (some more useful than others) to creating a more secure IP environment for your company while operating in China.

- Making sure that all key patents are maintained for their patent life worldwide
- Using technical “tricks” to prevent copying, pirating or reverse engineering
- Signing NDAs with all companies you deal with
- Ensuring that the licensing contracts you sign with your customers and other supply chain providers protect your design IP
- No release of your database: engage in “black box” licensing to limit number of database transfers
- Maintaining a close relationship with your manufacturing partners
- Retaining IP in your own company (no library transfer to foundry partners)

The last three tactics are actually well suited for the China business environment. Because China is focused on serving as a cost-down resource, most customers prefer accepting less technology transfer for a break in price. Using a black box licensing model, Aplus maintains more IP security, while its customers are happy because it charges less than if it had done a complete database transfer. Because the foundries in China are also focused on providing low-cost wafers to their customers, they have no budget or technical expertise to maintain their own internal design team, or to maintain a library. Thus, Aplus acts as their internal design partner, taking care of all customer interface, design discussion, design and layout, etc. This allows the foundries to maintain a lower wafer cost while also offering the full design services that China design houses need. This also allows Aplus to control its own database and library, giving the company more security and control than if it had transferred its entire library to the foundry.

As a turnkey solutions provider, the partners and companies you work with in the China market must also be at same quality caliber as your company. Although China is a great place to find cheaper labor and services, as with any case, it’s important to ensure that it’s not at the price of security or quality. Clear definitions of responsibility and costs involved are crucial to determining liability in case anything unexpected happens.

IP in China and Its Process Technology

In China, there are currently many opportunities for IP providers. Due to the relatively “young age” of the Chinese design industry, IP providers that have built up a great deal of experience in their field have a valuable technical skill and service that they provide to IC designers in China. To build up their expertise, Chinese design houses are mainly focused on higher process technologies like 0.25-micron and 0.35-micron. Although the process geometries are bound to shrink to be more competitive, there is still a market for these older technologies, which will still exist on parallel with the advanced geometries.

These are technologies that Aplus is focused on for its embedded design. OTP does not shrink past 0.35-micron process technology, and a large portion of its customers utilize its embedded OTP in their designs. 0.35-micron EEPROM is also a widely used IP in China due to its common widespread use of smart cards, telephone cards, security cards, etc. Aplus is improving designs

and technology along with the foundry growth in China – it has included Flash + EEPROM for next-generation smart card and cellular applications to meet the demands of the end market.

However, for IP providers, one thing to realize is that although there are many opportunities in China due to the lack of design experience, this also presents kinks in the simple “IP transfer-licensing model.” Companies need much more technical support and guidance than a simple IP transfer. For companies making application-specific ICs (ASICs), digital signal processors (DSPs), MCUs, etc., their ultimate success (and yours as their IP provider) depend on the success of their end product, not just yours. Some of the companies Aplus encountered had trouble designing their own parts, or were indecisive on which products to pursue, whether it was logic, CPU, etc. In addition, due to their fairly new entry into the IC design industry, they were also unfamiliar with working with an embedded memory. Aplus would have to spend additional portions of time and energy to work with its customers to ensure how its embedded memory worked with their part.

The additional support needed by Chinese customers coupled with their need for low-cost IP, augments the need to find a business model and licensing terms that fairly compensate IP providers/designers for their extended efforts. Otherwise, your resources may get drawn into time-consuming issues with each customer.

China: Challenging Opportunities Ahead

There are obviously many opportunities for IP companies in China. The need to bring products to the market faster, cheaper and better, make IP purchase and licensing the most efficient solution, particularly as system-on-chip (SOC) solutions become more and more popular and feasible.

The expertise that foreign companies can bring to the China market in design and technology make them invaluable resources for Chinese companies. However, business models are still being firmed up as to the best way to deal with the need for cost-down, especially when it comes to IP solutions. A need to team up with other companies in the supply chain to provide a complete solution is also necessary and an advantage when dealing with customers that have lesser experience or knowledge in the field. By being able to help them every step of the way along their design, your service becomes more and more invaluable, not only in design but also in connecting them with any other third party providers they may require.

Also, as with any foreign business, knowledge of the language and culture and previous business experience is always beneficial to business negotiations. Aplus was able to make quick headway into the Chinese market and gain name recognition with customers due to its experience and success in the Taiwan and U.S. markets. Also, its familiarity with the language and culture of Chinese business was also an asset to its marketing and sales efforts. In addition, the infrastructure does not always operate the same way as in the U.S. – rather than voice mail, many companies use line operators to take messages. Email is standard in most companies, but in developing areas it may not be as reliable.

Aplus foresees large opportunities for IP companies with strong technical expertise in China. Because the China IC industry is still developing, companies that can provide valuable design

knowledge and cost-efficient services and designs will be in a good position to contribute to China's IC growth. Although the embedded IP market size is difficult to forecast, the growth of the applications in which embedded memory is present should give a good idea of the market's potential. However, there are still many nuances to the China market and environment such as the heavy government regulation, various taxes and the restrictions that need to be navigated through when entering the China market. But with proper planning and clear objectives, foreign companies can successfully foray into China's potentially lucrative IP market.

Company Overview

Aplus Flash Technology is a fabless IC design company specializing in embedded non-volatile memory (NVM) intellectual property (IP), with over 20 years of high-voltage design experience in this particular field, which includes ROM, one-time programmable (OTP), numerous-time programmable (NTP), EEPROM, Flash and 100% memory compatible SRAM (a volatile memory). Aplus also designs and manufactures its own stand-alone NVM components. Aplus has filed over 60 U.S. patents (39 granted, 22 pending) that showcase its emerging technology and breakthroughs in the embedded NVM IP market. These non-volatile memories cover a broad range of applications from video games, personal digital assistants (PDAs), microcontrollers, smart cards, phone cards, cellular phones and other mobile, wireless devices. Aplus also offers embedded EEPROM + ROM, EEPROM + Flash (our patented MaxFlash™) and SRAM for a complete, one-chip solution for 3G cellular phones and next-generation smart cards. Our NVM IPs are offered in process geometries from 0.8-micron to 0.18-micron and below.

Aplus focuses on providing a complete range of NVM IP and customized design services, and also sells memory components. Aplus handles customers' design needs from beginning to end, from finalizing specs, circuit design and layout, testing and production flow, wafer sales, back-end testing and assembly (if needed), etc. Our customers have found, that by outsourcing their embedded NVM design to Aplus, they are able to reduce their product development time, improve their chip performance and reduce their die costs, manufacturing and time-to-market. And because Aplus does not manufacture its own microcontroller products, our customers can use our services with confidence that their proprietary technology will not be compromised. Our clients span the global market and include companies such as UMC, Mosel-Vitelec, Winbond, Syntek, Elan, Sharp, Sonix, Synaptics, Novatek and more.