2 Developing an IP Protection Strategy for Your Semiconductor Company – PART I

This Patent Stuff and My Semiconductor Business – Post 2

This is Part I of the second post about patents and chips. In this Part I give an introduction to IP protection, and discuss which strategies (trade secret vs publication) and tools might be best suited for your various semiconductor business concerns. In Part II, I discuss details about the tools that you have at your disposal.

This three-weekly series discusses various IP protection aspects from a patent and a business point of view. At the end of the article is a link to the earlier post. Thanks for reading, and don't forget to give feedback if you read via LinkedIn!

2.1 Introduction

There you are – your startup is on a roll, and you've been focused on the technology rather than on legal stuff. Now seems to be the time to start thinking about how to protect your innovations. You don't want to just do something because people expect you to do something–you want to know why you're doing what you're doing. Read on.

First question to yourself: is IP protection really a legal matter, or is it a business strategy?

Your shareholders may care about legalities, or not. But what they surely care about is if their investment is going to be successful. They don't want to fund your innovative work, and then see somebody else walk away with it. So, you decide that IP protection is a business strategy. That there may be some legalities involved is just a fact of life. I'm totally with you, so this post is about business, more than about laws. And anyway, laws vary from country to country. Semiconductor business varies, not so much by country, but by product and service.

Helicopter views show two situations for protecting IP: while publishing it, or by keeping it secret. If you can't be sure that you can keep your know-how secret, then you should consider protecting it while or by publishing it.

Let's find out first what your goals are for the IP protection, and what you'd want to do with it. Some situations point straight to a need for patents. See if one or more of the following scenarios is relevant for you:

- Your competitive advantage must be sustainable. Angels and VCs will not invest unless you can show how you keep your advantage, and what legal means you have if pirates go after your business anyway. With a high-quality patent, you go after them, and sue them.

- Your company is building a new technology. There is not one invention to be made, but dozens. If they are all coherent and relevant to building the company's product, then a patent portfolio will determine much of the company's value when it gets acquired by a larger corporation.
- There may be two ways to get your innovative advantage, but you're planning to use only one of them. The other way may be not quite as good, or may be just as good but only useful with a different architecture. In this case, a defensive patent could make it impossible for a competitor to get around you.
- You're not targeting to get acquired by a larger company. You may want to go public at some later time. However, you know that many other companies will want to build the system and architecture that you are pioneering. By having patents and trade secrets, you can license your technology to others and receive royalty income without the financial burden of having to build and exploit something yourself. You need a good set of patents for the part of your technology that can leak, and defensible trade secrets for the technology whose spread is in your control. The quality of the patents is important. You don't need patents for stuff that nobody will build, or that is easy to get around.
- Your ocean may be reasonably blue now, but it will turn red in the next 5 to 10 years (*Blue Ocean Strategy*, Kim & Mauborgne). When the other sharks come and start infringing your technology just because they can, they will claim that you are infringing some of their technology. They will flood you with infringement claims on a laundry list of patents. You must be able to flood them back with patents and infringement claims to be able to keep them off your back and to be able to negotiate some kind of truce. You need as many patents as possible. The quantity is more important than the quality. Although getting the low-quality patents is expensive (more haggling with the patent office), you save by spending relatively little on research and development for the ideas that you will glorify.
- You're receiving some government grant for R&D. The issuing body needs to show results of its investments, and requires that you get patents. They may even require that the patents also be in your country regardless of whether that makes any competitive sense.

If one of the above scenarios is valid for you, you will know that a patent should help, and also which way to go: patent quality versus patent quantity. But in relevant cases, you may consider keeping part of your technology secret.

Figure 1 shows an overview of what you are dealing with. At the left are tools at your disposal – divided into keeping things secret, and protected publishing. On the right are the various technology items you might want to protect, in other words, your business concerns. Let's first look at the tools. For keeping your innovations secret, you can use several tools: non-disclosure agreements (NDAs), circulation control, watermarking, and file protection. When you can't keep your information secret, use patents, copyright, and mask registration.

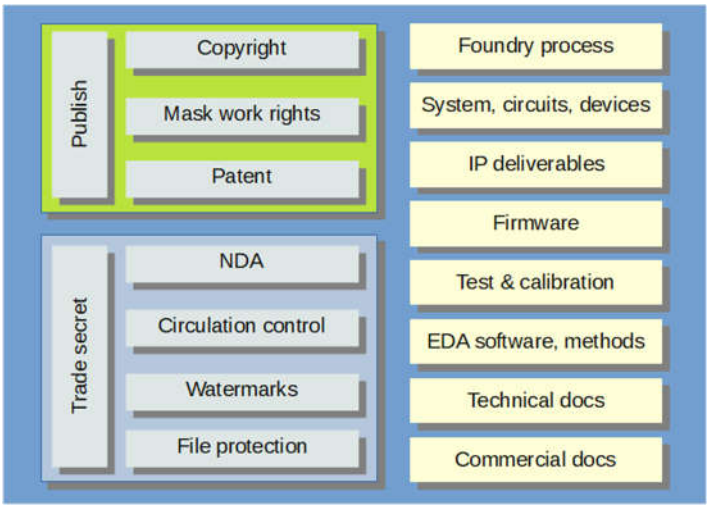

Figure 1 - IP protection tools and components

We'll start with a review of your business concerns.

2.2 Your Business Concerns

Let's now look at your business concerns (see Figure 2). You want to protect any of the following:

The foundry process – if you're the foundry, then you want to patent any innovation that you can. Your knowledge will end up in the hands of your competitors sooner or later. The cost of a patent is peanuts compared to the cost of developing a process and compared to the cost of lost market share if your strongest competitor can offer the same. Of course, not all foundries are billion-dollar investments, but even for a small foundry with some III-V or II-VII semiconductor the stakes are just too high. If you're not the foundry but a fabless semi, then your choice of foundry process may still be of strategic value to you. If there's really only one foundry that could offer the process that you need, for example because they have a unique feature not offered by anybody else, then you want to keep your choice a trade secret, if possible at all. If you can't, then you could maybe patent your innovation and include that unique feature in the patent. That way, you also include another foundry that perhaps in the future would offer the same feature. You could also weigh the cost of the patent over the lifetime of the product(s) and see if you can negotiate same kind of exclusivity with the foundry. That could be a complicated negotiation, though.

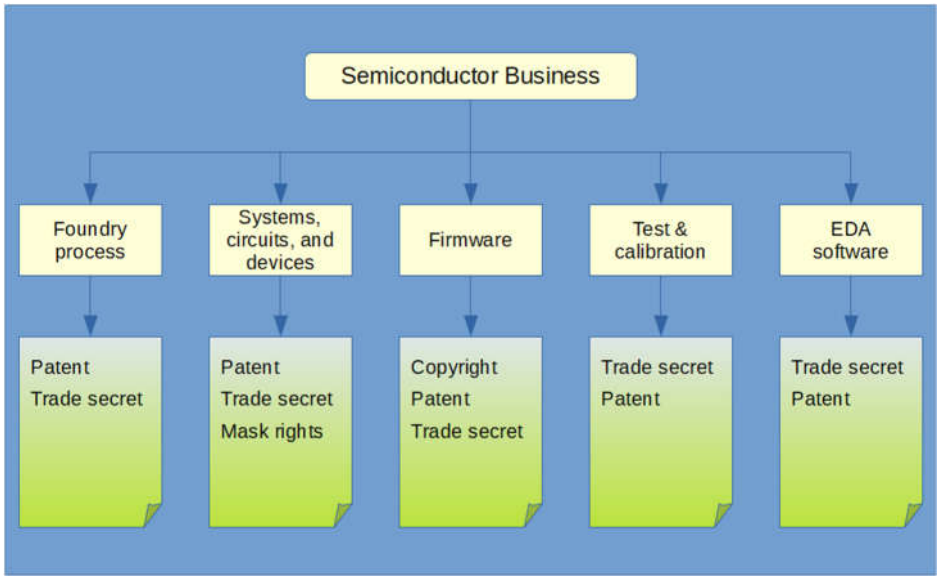

Figure 2: Protecting your semiconductor intellectual property

Your chip design (system architecture, circuits, and/or devices) – when you sell your chip product, you don't want a competitor or a pirate to copy it, or a part of it, and eat up your market share. Somebody can take your chip, send it to a company in China with a $50k payment, receive a set of GDS2 files and a netlist, and start outselling you. Your design may also be stolen by a disgruntled (or greedy) employee or by a rogue person working for a party that gets your design files legitimately. A patent gives the best protection, and you may complement it with some trade secrets for parts where a patent might turn out to be very narrow or too easily bypassed. For mixed-signal designs, you can get further protection by registering the mask work rights under the SCPA 1984 law (US, discussed in Part II), or a similar law outside the US.

Your firmware may be even easier to get to by pirates. Perhaps they can just read out a memory somewhere. The first layer of protection should always be copyright, which covers not only your innovations but also your hard work. If you do have valuable innovations in the firmware, particularly where it is a combination of software and some dedicated hardware, a patent can provide further protection.

Production test and calibration may be essential steps that elevate your product above those of competitors. You don't want your test program to leak and benefit your competitors. Maybe not too many people handle this, and you can just keep it secret? In general, keeping your production test vectors and programs, as well as your calibration procedures secret is a good business strategy. Again, if you have a particularly valuable innovation, you can consider obtaining a patent.

If you're an IP company, your IP deliverables may be in blackbox form (GDS and test vectors for a hard IP; or RTL, testbenches and timing constraints for a soft IP) or in whitebox form (the same, plus schematics, source files, design documentation). You're handing your crown jewels to somebody else—can you make sure they do only what you allow? Patenting may be the right strategy if you can build a portfolio of patents all related to the same technology. For example, for Perceptia Devices I have built a portfolio of about 20 patents all related to an architecture of digital phase-locked loops. The size and coherence of the portfolio make it rather valuable. However, if the inventions are all over the place and related to different types of systems, then the value of the portfolio as a total may be lower than the sum of its individual components, since few portfolio owners would be able to practice all the inventions. Thus, for an IP company it is important to consider if an invention is related to its core technology. If not, don't get a patent unless you already have somebody who is going to pay for it.

Your EDA software product may hide or show how exactly you're achieving a particularly valuable result. If the method you're using is unique and worth market share, you want to protect it in as many compatible ways as possible. Relying on secrecy may be risky and a patent could help fortify your strategic advantage. On the other hand, if you are applying an innovative design methodology or CAD methodology in your own chip design, a competitor may not be able to find out what you're doing, and keeping it as a trade secret is a very good option. In that case, at the very least you should copyright all your methodology scripts, and provide license information in them. Discuss this with your lawyer.

Whatever nature your semiconductor business is, you are likely to provide vendors, partners, and customers technical documents and commercial documents. There is plenty of material that you don't want to fall in the wrong hands. You may decide to provide technical reports and datasheets only under NDA, and provide product briefs without an NDA but only to qualified potential customers.

Keep in mind that in the sections above I'm generalizing and that your business case may be a bit different than the general case. Legal contexts are different in different jurisdictions, so you should still work with your lawyers to iron out the final plan, which may be different than what I'm proposing here. If you want to talk, feel free to contact me.

The second part of this article will come in three weeks, and discuss the various tools at your disposal.

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