

Protect Your Intellectual Property



You need to know the types of protection available to protect your intellectual property.

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Like it or not, engineers are now responsible for much of the success of a product. You can expect this trend to continue in the electronics industry, so engineers must become more involved with documenting and promoting the protection of intellectual property (IP) associated with a given product. Intellectual property includes, among other things, designs, software listings, manufacturing techniques, and testing procedures.

Even people in the electronics industry may not realize how much companies rely on IP. But a quick look at the number of patents issued by the United States Patent and Trademark Office (USPTO) (www.uspto.gov) in the areas of semiconductors and electronics shows rapid growth in the past decade (Fig. 1).

Engineers need to think more about how they can help protect IP by using one or more legal means—patents, copyrights, trademarks, and trade secrets. Each type of protection offers its own advantages and disadvantages. To start, you can think of the range of protection as forming a pyramid (Fig. 2).

At its base, the IP protection pyramid rests on trade-secret law. The Uniform Trade Secrets Act defines trade secrets as:

“... information including a formula, pattern, compilation, program, device, method, technique or process that derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means...”

Although trade secrets provide broad protection, they have severe limits. The information must in fact be secret and the owner must take action to preserve this secrecy. Although trade secrets have some use in the electronics industry, they offer weak protection, because most engineers move from job to job during their careers. And they take what they have learned with them.

Copyrights Don't Protect Ideas

Moving up the IP pyramid leads to copyrights, which cover works of authorship in program listings, graphic designs, schematic diagrams, and so on. A copyright gives the copyright owner an exclusive right to:

- reproduce the work,
- prepare derivative work,
- distribute copies of the work, and
- display the work in public.

You can obtain a copyright by filing an application and paying a \$25 fee to the US Copyright Office at the Library of Congress (Washington, DC) (lcweb.loc.gov/copyright). Although the rights to a copyright in a work start from the “fixation” of the work in a tangible medium, the copyright owner must hold an official copyright registration before he or she can sue someone who infringes on the copyright. For works created after January 1, 1978, copyrights generally run from creation for the

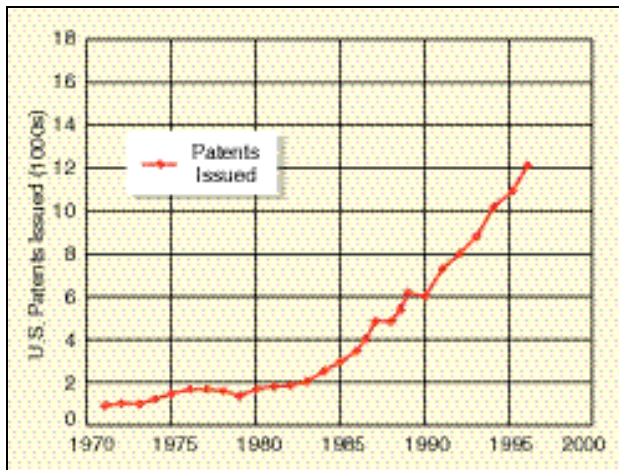


FIGURE 1 The number of patents granted by the USPTO in the fields of electronics and semiconductors has grown considerably during the last 15 years.

life of the author plus 70 years; for anonymous works, pseudonymous works, and works for hire, the copyright spans the earlier of 95 years from first publication or 120 years from the date of creation.

Unfortunately for the electronics industry, copyright protection does not cover any idea, procedure, process, or concept described or illustrated in the copyrighted work. Thus, while copyrights may protect actual PLD or FPGA source code, schematics, program listings, and so on, a copyright won't protect the ideas in these documents.

Because copyright laws restrict the protection of ideas, for many years designers could not protect IC masks or layouts, because they were considered functional in nature. The Semiconductor Chip Protection Act of 1984

(SCPA) was an attempt by Congress to thwart what was then perceived as widespread duplication of US semiconductor mask designs by foreign semiconductor companies.

Although some engineers may complain about the incomplete nature of protection under the SCPA because it doesn't protect the actual circuit or design, they still consider it a useful IP-protection tool in the semiconductor arts.

Brand Your Property

If you can't protect your ideas with a copyright, you might at least consider how to brand, or mark them, so people know they originate from your company. A copyright protects only direct copying of an original artistic work, whereas a trademark can protect names, symbols, or other indications of a product's source or quality. By obtaining a

trademark, the owner obtains the right to exclude others from using marks which might tend to confuse the public. The use of a similar, deceptive, or misleading mark may lead to legal action by the trademark owner.

Unfortunately, most engineers in the electronics industry fail to recognize that a trademark may provide the distinction that helps customers recognize a product and thus push it to the forefront in a market. The formalities involved with obtaining federal trademark registration are minimal.

The major requirement for filing a trademark application is that you actually USE the mark in interstate commerce or that you have a *bona fide* intention to use the mark in interstate commerce. Beyond the \$245 filing fee, trademark registration consists of filling out a simple form and providing samples of the mark as it is used in commerce. Because trademark rights exist by virtue of the mark's use, in theory a trademark may last forever. There are some post-registration formalities that you must go through to keep a trademark, but in general the protections that the courts afford a mark stem from use of the mark, whether or not you have officially registered it with the USPTO.

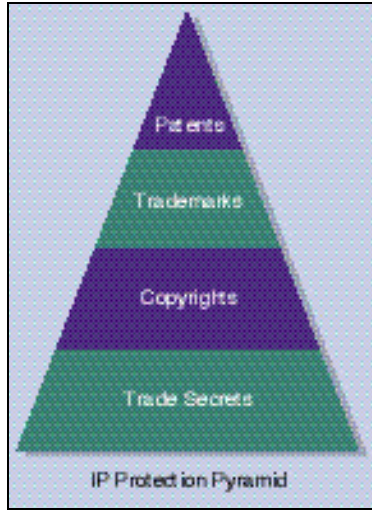


FIGURE 2 The intellectual-property protection "pyramid" illustrates the levels of protection from the lowest—trade secrets—to the highest—patents.

Table 1. Test and Reliability IP Checklist

Item to Check	Patent Classification			Specialty Area			Registration Type (Note1)		
	Design Patent	Utility Patent	Process Patent	Chemical or Materials	Electrical, Software, or Math	Mechanical	C	M	R
Special test-mode software		✓	✓		✓		✓		✓
Special test-mode circuits		✓	✓						
User-mode test interface		✓	✓				✓		✓
Special handler		✓	✓		✓			✓	
Sensor stimulation		✓	✓		✓			✓	
Overvoltages or undervoltages		✓			✓				
Test-mode protocols		✓	✓		✓				
Self-test features		✓	✓		✓				
Self calibration		✓	✓		✓				
Calibration procedures		✓	✓		✓				
Burn-in modes		✓	✓		✓				
Burn-in circuits		✓	✓		✓			✓	
ESD protection		✓			✓			✓	
EEPROM reliability testing			✓		✓				
Custom test instruments		✓			✓			✓	

Note 1:
C = Copyright registration M = Mask registration R = Trademark registration

Table 2. Intellectual Property Protection

Type of Protection	Protection Term	Protection Method	Applicable Law	Example
Trade secret	As long as the information remains secret	Take measures to protect the secret. Obtain contractual rights to protect the secret.	State/Federal Trade Secret Law	Soft-drink formula
Copyright	Life of the author plus 70 years	Rights accrue on "fixation" of the work. Copyright registration	Federal Copyright Law, Title 17	Software in a BIOS ROM
Trademark	For as long as the mark is used in commerce	Rights accrue on use of the mark. Additional rights available upon USPTO registration.	Federal Trademark Law, Titles 15 and 18	Brand name for a make of a computer
Patent	20 years from the date of patent filing	Rights accrue at the time the USPTO issues the patent. USPTO may accelerate a patent application if a competitor is currently infringing on a pending patent.	Federal Patent Law, Title 35	DRAM cell configuration

Notes:

1. Work-for-hire protection is the earlier of 95 years from first publication or 120 years from date of creation.
2. The trademark must not fall into common use as a generic identifier for the product itself.

Patents Provide the Best Protection

For the ultimate in protection of IP, you'll need to rely on a patent. Patents represent the top of the IP pyramid because they provide for the prohibition of the sale, manufacture, import, or use of a device that is covered by the patent. To provide as much coverage as possible, a well-written patent stakes out as broad an area of product coverage as possible. The key to a broad patent is a properly written technical description, or disclosure, of the invention.

The disclosure should include sufficient detail for a person skilled in the pertinent art to make and use the invention, but the disclosure does not have to include a complete set of blueprints or source code. Flowcharts, block diagrams, and functional data-flow diagrams, along with text describing each step of the process or how the invention works, suffice to "enable" the invention in the patenting sense. For most inventors, writing the disclosure proves somewhat difficult, since they know too much about their invention. Assume that someone with a basic technical background will read the disclosure and write your disclosure at that level.

To a large extent, the increase in the number of software patents represents most of the growth in patents in the electronics industry. Like it or

not, the US Supreme Court has given the USPTO the mandate to permit software-related patents. Many test functions, test methods, and failure-analysis systems all depend on software, so manufacturers will use patents to protect their investments in software development. Therefore, any engineering product-development program should include steps to obtain patents to protect software.

Polish Your Disclosure-Writing Skills

The patenting process begins with the preparation and filing of a patent application, which includes drawings and a written description of the invention as well as claims that distinctly point out what the invention includes. After you file this application and a \$760 filing fee at the USPTO, you'll receive a foreign filing license that permits you to file foreign patent applications if you so desire. The USPTO then examines the application and issues an office action that typically includes objections to the application form and rejections of various claims.

This first office action can occur anywhere from six months to *three years* from when you file the original application. You can argue the merits of the claims that were rejected. If all goes well, the USPTO then issues a notice of allowance that indicates the

patent is ready to be issued. You must pay a \$1210 fee to the USPTO to have the patent issued. The patent rights terminate 20 years after the *filing* of the patent application. After issuance, the USPTO requires payment of maintenance fees at regular intervals to keep the patent in force.

Probably the most confusing aspect of patent protection centers around the rights that a patentee has and when these rights exist. Generally, a *patent application* provides no protection—the rights to sue accrue once the USPTO issues a patent. Once the USPTO issues a patent, you can obtain an injunction to prevent infringement of the patent, and you can seek damages with a lawsuit.

The names on a patent, or the person or company assigned the patent, determine who has the rights to exclude others from infringing the patent. Without any agreement to the contrary, joint owners of a patent may make, use, or sell the patented invention *without the consent of and without accounting to the other owners*. Therefore, you should have a written agreement between individual inventors who collaborate on a patent to ensure that proceeds get equitably distributed to all the inventors.

Many people complain about the cost of the patenting process—in

