MADE IN CHINA

Land of Opportunity?

by **Kevin Parmenter**
Director of Field Applications Engineering,
ON Semiconductor

Switching Power Magazine

1

Many picture China as a traditional land of quaint villages with remnants of bygone dynasties. In reality, it is an enormous melting pot of commerce. North American and European companies dot the hillsides of China with manufacturing plants. Western industry, as we once knew it, has moved to China. Lower rent. Lower labor. Higher return.

How does this affect the power electronics industry? This depends on your point of view. As with any fundamental change, where there are threats, there are also opportunities. Let's explore some aspects of doing business in China.

China is considered by many in our industry to be the world's largest manufacturing economy. The latest buzz indicates that they are expected to become the largest consumer economy as well. If this is true, then successful companies will, inevitably, have a presence there. Nortel Networks recently announced, in CNEWS Tech News, plans to spend over $200 million over the next three years to increase its research and development in China.

Nortel is one of many. Note that we are talking about manufacturing and engineering. Why China? Look at the opportunities outside low manufacturing costs-the Chinese marketplace, for example. The thought of penetrating the potential of the Chinese market is mind-boggling to Western companies. A fast evolving country of 1 billion consumers makes the US market pale in comparison. According to semiconductor industry projections, China is predicted to buy $25 Billion in semiconductors in 2005. This is up from $16 Billion in 2001.

Not everything is rosy. Weijian Shan, a foreign correspondent for the Wall Street Journal said in his article recently, *Living on Borrowed Growth*, "China is a paradox. It is the fastest growing economy in the world, but by some measures it is also among the most inefficient. Its GDP has expanded at an average annual rate of 8.6% since 1980, outperforming any other country during the same period of time. Meanwhile Hong Kong's Hang Seng China Enterprises Index, which tracks the stocks of some of China's most prominent companies, has fallen by one-third since its inception in 1993.

"The banking system is the main symptom of China's hidden weakness. Foreign analysts estimate that the bad loan ratio of Chinese banks is about 50%, or twice the official estimate. That is arguably the highest of all

major economies in the world. Even if you believe the official numbers, China's banks make their largely insolvent Japanese counterparts look well capitalized by comparison. This is particularly worrying because bank loans currently make up almost 98% of the total financing for Chinese companies.

"So does this mean that the Chinese economy will eventually collapse, when the payback time inevitably comes for the 'borrowed growth?' Yes, if China's economic policies continue to favor, protect and subsidize inefficient firms through its already weak banking system. It will just be a matter of time."

Despite having a communist government, China has a capitalist-feeling economy. Leadership transitions in government are in progress, but the direction taken by

Canon's manufacturing plant in Shenzhen, China

any new leadership is yet unclear. Taiwan may be part of the underlying strategy. China considers it a rogue province rather than an independent nation. A worst-case scenario would include future military action between Taiwan and China with all of our very best technology residing there.

On the upside, customer service is incredible in China. On a recent 15-hour flight in Economy class, I asked the flight attendant for an aspirin. She asked me to wait a moment. Fully expecting to hear a disclosure statement about liability of dispensing medication– she promptly returned with five brands of headache remedies.

The responses I kept receiving while doing business there were loosely translated to– "no problem" and, "how can I help you?" When is the last time you heard this in a customer service transaction in North America? Many companies in the US have outsourced customer services to save money, with predictable results.

When it comes to products, however, the playing field shifts. One subject that is shaking the electronics market right now is how quickly products produced elsewhere are converted to a commodity item in China. Power supplies are one example. And what about intellectual property rights? That's the other subject shaking the electronics market.

China has thousands of regulations and laws being reworked to comply with World Trade Organization guidelines. At this point, they are not a member due to nonconformity to world standards of intellectual property rights and patent protection. Copying products with a flagrant disregard of international copyright laws is part of the Chinese culture.

We visited the electronics marketplacein Shenzhen, which is an astounding place with no US equivalent. This is an eight story building, which offers everything imaginable in electronic components and equipment, plus computer accessories. You can purchase all the parts (off the shelf) necessary to start making cell phones if you so desire. Negotiations for any and all electronic components were possible in virtually any quantity needed.

Photos of the Electronics Mart in Shanghai

And to complete your design, you can buy counterfeit sticker logos (with copyright symbols) of AMD, Dell, Motorola, Intel or anything else you might want. If you don't see what you need, it can be custom made for you with a quick-turn order.

Pictures are strongly discouraged in the electronics marketplace. Chinese military uniformed guards are available to remind you of this rule, and we soon discovered why. DVD's are available everywhere at the electronics mart as well as on the street corners, sold by vendors with portable kiosks. These include first run movies and even those not yet released in their country of origin. Some packaging is in Mandarin, and other packages cannot be distinguished from the real product.

Switching Power Magazine

While this may sound like something you can see on the streets of New York, here's something you won't find in the US: engineering software such as PADS,

Five American movie DVDs and software CDs (Pads and Protel) available at the Shenzhen Electronics Mart for $1 US each.

Protel, Electronics Workbench, Ansoft, Cadence and Orcad tools plus others for $1 per CD. (These are serious design products, some of which retail for over $5000 here.) Any and all Microsoft products were slightly higher at $3 for Microsoft Office 2000. The vendors guarantee that the serial numbers on all software are zeros.

This flagrant disregard for Intellectual Property is occurring right under the eyes of Chinese government officials, with their apparent full approval. Why this is allowed to continue as Western companies pour money into R&D facilities there is a mystery - or perhaps not. It can certainly save a lot of money for the new design facilities. If this is the case, what is the value of a non-disclosure agreement covering your technology?
A note to managers in the West who often scrimp on the necessary tools for their engineers: Next time your power electronics engineers say they need software or education to accurately complete a job, consider what their counterparts in China are using for practically nothing. So what's our competitive edge in the Western world as designers and managers? Freedom to think, design and produce amazing new technologies and products. I believe we can maintain leadership on that front if our engineers have the tools they need.

Unfortunately, many managers these days view technology as just an expense, not as a valuable asset to their company. This is especially true of power electronics design. When design engineering is displaced to China, consider the results. Schematics, build instructions and

code are displaced (just to get rid of the design 'problem') to a land where copyrights are not respected. Beware the company that doesn't know how to deal with these situations.

As a manufacturer, a few new rules and questions come into play when you disband your local power groups and move design engineering to China. Here's an example: You have a product that was designed in Europe and given to a contract manufacturer in the US, who decides to use one of its facilities in China for assembly. This requires, first of all, that you have a global reach plan. Conference calls, flights and support will be required. Wireless communications are very advanced in China. There are over 68 million cell phones in use in the country, with cell phone repeaters on the elevators so no one needs to be out of contact.

Then comes the barrage of questions. Do they know how to test the product before shipping it? Do they have the right test equipment and procedures? What kind of component pricing is available? Who will be procuring the parts and handling shipping logistics? Who pays for all this?

Don't let product size fool you. China has consumer electronics and appliance manufacturers waiting to take on the Western marketplace. It is mind boggling to think that a refrigerator or piano can be made in China and shipped to the other side of the world and sold for less than what a US company can produce locally.

In addition, consider that it is inherent in the Chinese culture that all information is shared. You cannot offer "special" pricing for one customer. Almost overnight, the word spreads and it is expected that your prices will reduce when asked. On the other hand, once a good reputation is established with just one customer, the word spreads with equal speed.

Engineering based in China comes in many forms. Some engineers work strictly by trial and error, force-fitting parts into a power supply to see what works. But don't underestimate their potential, because they are learning quickly. Part of the cost of doing business in China is training the Chinese engineers. A design engineer in China may cost $10,000 including overhead. Plus he comes with all the design software he desires. The saying comes to mind- I have 10 unskilled warriors and you have one skilled warrior, let's fight and see who wins?

Chinese engineers typically work six days a week and ten hours per day. Many companies have a noon rest period where the lights dim and employees lie on sleeping cots for a 30 to 60 minute break.

So, we have a large, hard-to-saturate market for low cost labor and consumers of goods. China is a rapidly expanding economy, which offers irresistible attraction to companies and a willing workforce with a great customer service attitude. Sounds like the US 30 years ago.

Today, you'd be hard pressed to identify consumer electronics that are NOT made in China. In the electronics industry, PC boards can be fabricated in China very inexpensively. Before the lure of low cost takes hold, however, consider what the new business model entails. Add to your "hands-off" method the cost of training and applications support of the Chinese engineers and an indirect support of the Chinese infrastructure to manufacture your product.

Are all of our engineering jobs migrating to China? Well, yes and no. How many of the 560,000 high-tech jobs lost over the past 18 months were due to offshore dislocation? We simply don't know. What can Western design engineer do? This is a wake up call.

● Learn all you can about your trade. To acquire knowledge in your field is essential and takes a lifetime of effort. This is particularly true today when new technologies, packages, parts and techniques are released at a dizzying pace. Be on top of these subjects.

● Identify your niche expertise and advance it to the next level. Be an expert in a subject. Study every nuance in your spare time. In time, the value you add will become obvious to you and others around you.

● The ultimate level of sophistication as a designer is where your power supply is fully integrated with a system, like a car or computer. It has embedded microprocessors and communications and cannot be separated from the system it powers. If this is your category, chances are that your design job will stay in this country, but by no means should you sit comfortably and wait for this trend to pass.

● Don't be a victim. Be a trouble-shooter. Keep in mind that over half of the fortune 500 companies in the 1980 list have disappeared. In many instances these declines were due to rapid and frequently unpredictable technological progress and the failure of company leaders to keep pace with changes. It is the engineer's responsibility to proactively offer new solutions.

● Join a group to keep in touch with other aspects of design engineering. A continual acquiring of professional expertise gathered in trade associations and conferences can be invaluable. Maintaining a high exposure in the design community by stepping outside your social box can keep you employed or employable.

● Commit your products to excellence in design. If manufacturing of your design moves to China, keep in mind a few important points: Component substitutions will be made to convert to lower cost local providers. The inductor or capacitor from your favorite supplier may be substituted with one that is made locally in China. So, be very specific as to which components should not be changed. One Chinese engineer told us that the rule of thumb was, "if it does not catch on fire it will be shipped."

● Look at the upside potential. A lot of power supply design is a subset of what a company does. Telecom is an example. Power is part of the telecom board. In many cases, when the board itself is outsourced, the power goes with it. We see a lot of really good designers unemployed when this happens. It's not just a disbanding of the power group, but of that entire section of the company. Where are the opportunities in this? There are many startup companies looking for you, creating new technology domestically.

Take advantage of this opportunity to learn and grow. And be prepared for the future. Currently, many products are designed in Taiwan and manufactured in China. The future trend is leaning toward creating design centers and manufacturing exclusively in China. As the Chinese proverb says - "may you live and prosper in interesting times." Be prepared for change.

Backroom inventory at the Electronics Mart.