

# Domestic Fabricators: Round 10 and Still Standing! *Keys to Growth in 2013*

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**SUMMARY:** *Reshoring may be real, but fabricators still need to understand that the conditions driving it have nothing to do with mandates or politics. This article defines five skill sets driving the targeted reshoring campaign. Does your company possess these capabilities?*

*When one door closes, another opens; but we often look so long and so regretfully upon the closed door that we do not see the one which has opened for us.*

- Alexander Graham Bell

I recently polled suppliers with global footprints<sup>1</sup> about their sales during the past year in North America vs. in China. It's not news that the industry slowed down in 2012. However, it



**As Rocky Balboa said, "Ain't so bad..."**

was definitely news to me that while the domestic market is estimated to be down by approximately 8%, sales in China are posting about a 30% YOY drop. This could have many far-reaching implications. Not only does this discrepancy expose the longstanding presumption that global impacts unilaterally span and affect the entire industry, but it also affirms that these two regions are succinct entities with diverging end-markets requiring different core competencies.

China's manufacturing model has appeal—assuming your volumes or labor content are high enough. Otherwise, the Chinese model may not be a good fit. There's a reason Apple is willing to put up with this (as well as the heat it takes for Foxconn's working conditions with human rights groups<sup>2</sup>). China is cheaper.

That being said, what type of work do we have in North America that has insulated us from this significant drop in industry sales? Hypothetically, could we have actually realized growth in other segment sales that offset a similar drop in 2010-2011 sales? My theory (and experience) is that there has been a targeted reshoring based on sound business principles.



## This Article is for Domestic PCB Fabricators

This article will identify the product categories that remain strongholds in our industry, and the reasons they remain as such. We'll then go a step further by opening our bag of tricks and attempt to educate fabricators on how to capture more business in these categories.

As I mentioned in [TCO: From Buzzword to Reality](#), these are bottom-line, concrete facts. The product categories identified in this piece reflect the business needs of the target customer.

### Defining the Domestic Fabricator of the New Millennium

PCB fabricators looking to sustain their revenue levels and, perhaps, even generate significant growth should be providing (and continuously developing) the following five *target categories*:

1. Prototypes
2. Low-med volume production
3. Service parts
4. Contingency production
5. Intellectual property that is sensitive to copyright violation



## PRODUCT CATEGORIES

Some are obvious, but worth detailing, while others may be mere blips on your marketing group's radar screen.

Incidentally, the archetypical domestic fabricator has *already been* handling this sort of work—now it's just time to give up on "waiting for all the work to come back" and make it an actual target market.

### 1: Prototypes

Quality shops in China do not like to deal with low quantities. They certainly won't do quick-turns. These are the primary definitions of prototype work. While customers can save on price by finding overseas sources that will support low-volume and relatively quick-turn work, they lose from a total cost of ownership (TCO) perspective.

The first and most obvious of the TCO loss is the lead time. Sacrificing the ability to have parts in hand in a matter of 1-3 days vs. 5-10 days from overseas may not seem like the end of the world on a single project. However, compound this over numerous successive revisions and programs and you can significantly extend the time it takes to get to market. Depending upon the product and/or application, this could be the difference between being a market pioneer and a "me-too" follower.

Another characteristic of the prototype process is that it instills a knack for quickly eliminating flaws in the product design with respect to the end application of the product. Often, we see ads in magazines and websites touting "3 pieces for \$99" or "\$50 protos from China," etc. These products are clearly run in a proto-only environment. These manufacturing setups are specific toward churning out "functional" product in that they pass an open and short test (if you choose to pay for that option). However, engineers don't just want to test to determine that a particular design functions; they are also seeking production validation. Production validation includes lifetime testing, environmental testing, and max performance testing. Production-capable board houses have a large production capacity, and they also control their processes to tight standards to ensure they meet IPC specifications on an ongoing basis. This translates to repeatability in the quality of the

product from one production run to another.

Let's take an example from the automotive industry. An engineer is designing an engine control module (ECM) and generates a new design for a board. As usual, she places an order for prototypes and has them assembled. The first step is to plug it into a test module to verify functionality of the design. Many engineers stop at this point. Some groups, though, continue the validation process to speed time to market. The next step in this engineer's validation process would be full, functional testing, which means that the ECM is mounted to an actual engine and tested in an environmental chamber to simulate the product in use in the field. This is followed by stress testing, meaning that the module will be powered up to full capacity for an extended amount of time to ensure that the design is robust enough to pass. This is where a pure proto shop can get them in trouble.

The test results can go one of three ways from here, depending upon the manufacturing methods used and the resulting output of the product. For ease of discussion, let's hold all things equal except for copper plating. Many small proto shops use a single rectifier to power an entire 4-rack copper plating bath. That means that a single current output is split between four plating racks that are unequal distances from the rectifier, and between both sides of a panel that may have different copper retention rates on each side. This type of setup can generate a range of copper plating thickness in the vias of +/- 50%. Assuming the nominal target value is 1.2 mils in the hole, we can see a range of 0.6 mils to 1.8 mils in the hole.

Conversely, a production-qualified shop would have a much more intricate setup that includes a rectifier for each side of each plating rack. This allows you to optimize the amps to the design on each side of the board, resulting

in a lower variation of less than 20% across a plating rack, and within 10-15% across a single production panel.

**A)** Parts with less than target copper plating thickness will most likely fail the thermal cycling test due to barrel cracking. They will fail the stress test due to reduced current carrying capacity of thinner traces. Now the engineer must deduce whether the failure was due to design or product.

**B)** Parts with higher copper plating may pass both tests. The quickest line of thought is that the design is good and the project can move on to either the next validation process or to production, depending upon that OEM's systems. What is overlooked, though, is that this design could have been lacking in current-carrying capacity through vias, traces, or both and the over-plating covered for this.

Once in production at a qualified shop, the boards will be built to IPC Class 2 or 3, with a target thickness of 0.8 to 1.0 mils in the hole. We could be looking at a mass failure now that design flaws are exposed.

**C)** The parts are made at a production-qualified shop and come in just as they would from a volume production shop. Parts can be tested for function, life in the field, and stress/performance to generate reliable data to validate the design in its entirety. Product goes to market on time ahead of the competitors. BAM!

Ask your customers which path they would prefer.

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## **2: Low/Med Production**

While customers have similar definitions of what constitutes a production part, the volumes associated with those parts numbers can be across the board. In my view, a production part is one that has regular recurring demand

and is in use in the field on current production products. Quality is of utmost importance since product failure can not only tarnish a brand, but also result in excess costs for the OEM in the form of product returns, repairs, and possibly recalls. As such, these boards must be built by a production-qualified supplier. If the demand is high in volume, finding a good overseas supplier is not difficult. However, when monthly demand is relatively low (<100 production panels), overseas suppliers may demand minimum order quantities (MOQ) that cover up to a year of demand at a time. This is where TCO principles should be applied to calculate the true savings in price versus total cost. Also to be considered is the impact on operations of having cash tied up in holding inventory for long periods of time.

A domestic supplier can remedy this by offering program or estimated annual usage (EAU) pricing for each part number and allow for monthly releases. This not only allows the customer to free up cash, but there are additional savings related to reduced handling of inventory. Further, a domestic supplier's lower lead time allows the customer to react quickly to changes in demand (both up and down) and designs without additional cost or effort.

### **3: Service Parts**

Historically, service parts are the red-headed stepchild of PCB production. Production suppliers are forced to agree to supply post-production service parts if they want to be awarded the volume production. By law, OEMs are required to make available a supply of service parts for a period of up to 10 years, depending upon the product. Taking an automotive example, due to the current economy, 82% of American drivers are holding on to their vehicles longer<sup>3</sup> than they had originally planned. As a result, quantities and required lead times for service parts

have become highly volatile. In many cases, the demand and quantity of part numbers is so high, purchasing departments cannot handle the workload. This is a prime opportunity for a

domestic supplier to add true value to the supply chain and absorb this workload from the customer by managing this portion of the supply chain for them.

In our experience, overseas production suppliers are now in a much stronger position with customers than in the past. Buyers find themselves renegotiating past terms and being forced to buy higher MOQs than initially agreed upon. The most obvious impacts are A) buyer's time is being spent negotiating terms on low value-added product; and B) more cash is being tied up into slow-moving inventory.

A third impact is often overlooked, and that is spoilage. If a production supplier's MOQ covers a year or more of service part demand (hard to know since it cannot be accurately forecast), the customer assumes the risk of holding on to PCBs for extended periods of time. If the boards have standard SnPb solder finish and are made from FR-4 (IPC 4101/21) material, the risk of time is minimized relative to other products. Now that RoHS has been around for almost a decade, it's reasonable to assume that current service parts families will include lead-free PCBs. This is a great time to remind buyers of the weaknesses in lead-free PCBs: First, solderability is reduced over time depending upon final finish; second, potential for delamination increases due to moisture absorption. Volumes have been written on these topics so I won't re-hash.

The main point is for domestic PCB fabricators to brush up on these topics so that they can speak intelligently to the customer. The goal would be to educate them that the additional risks they are assuming can more than wipe out piece price savings that are realized when pro-

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curing larger quantities at a time from overseas. Solutions are similar to those for low-to-medium volume programs in that domestic suppliers can work with customers' service programs in one of a few ways:

1. Offer EAU pricing with smaller release quantities
2. Provide Kan Ban inventory management programs
3. Offer blanket pricing schedules across a series of service parts programs

Regardless of the solution provided, it's bound to be more dynamic than what their overseas production suppliers can offer. Buyers just need to be made aware that these possibilities exist.

#### **4: Contingency Production**

Now that we've gotten the most obvious target product categories out of the way, let's get into new categories created by the exodus to China for bare PCBs. While high-volume production won't be reshoring on a regular basis any time soon, there are always earthquakes, tsunamis and other acts of God that will paralyze the overseas supply chain from time-to-time. On a brighter side, successful product launches can create a spike in demand that overseas suppliers may not be able to meet in time, resulting in potential lost sales. Finally, quality issues can render entire shipments to the quarantine cage, further posing risks to continued production.

Line-down charges can range from thousands of dollars an hour for a CM, to over a million dollars per hour for an OEM's auto assembly line. It is for these reasons that OEM quality systems often require that a contingency plan be part of a supplier's quality and supply chain assurance plan. And that means customers will need to turn to certified fabricators capable of quick-turn, volume production to pick up the slack.

As a result, contingency-providing fabricators serve as a critical resource to customers on the verge of experiencing line shutdowns due to supply chain gaps prior to product launch or offshore supply chain disruptions.

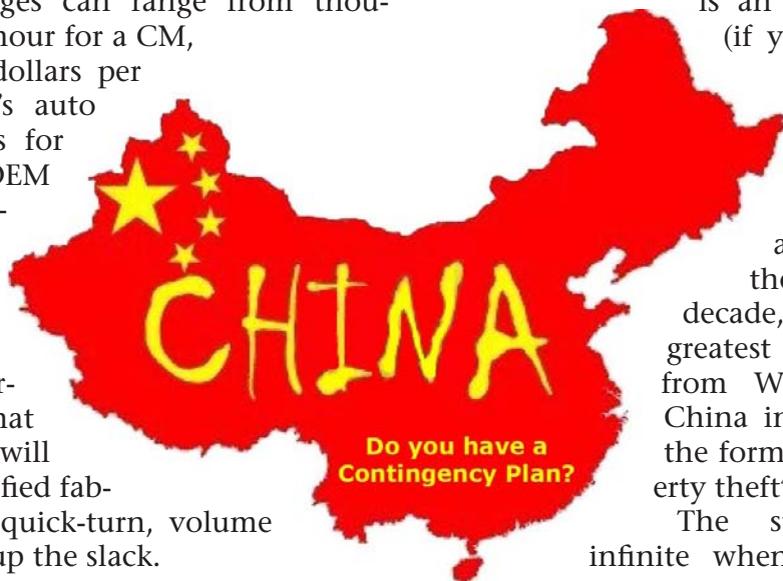
Unfortunately, most purchasing programs are so enveloped with capturing the best possible production pricing that they overlook this critical cog in the supply chain. This conversation is best to be had with vice-presidents or managers of purchasing, as it's their responsibility to oversee the entire supply chain and its stability. Examples of disruptions are easy to find, and most likely they've experienced similar issues but have since forgotten about them. Time for you to remind them of the resource they already have in their supply chain—YOU!

Even though our volumes are smaller compared to pre-2001 levels, there is no reason that we cannot continue to uphold production quality management systems and techniques that ensure consistent quality and performance of product, even if it is only being used to sporadically support volume production. This is where customer education is essential on the part of your sales and marketing teams.

#### **5: Proprietary Technology Sensitive to Counterfeiting**

It's no secret, and I don't feel I'm being politically incorrect in saying that counterfeiting is an integral component (if you will) of the Chinese entrepreneurial spirit. Hopefully this statement doesn't result in my mysterious disappearance, but it's the truth. Over the past decade, there has been the greatest transfer of wealth from Western countries to China in modern history in the form of intellectual property theft<sup>4</sup>.

The stories are almost infinite when polling customers



ranging from small technology transfers to outright copying of full hardware and software. In many cases, OEMs have ended up competing with their former CM suppliers. The reactions range from an “oh well” attitude, to 100% reshoring of the final assembly and all components that can possibly be sourced domestically to reduce the amount of information transferred out of the country.

The easiest way for a customer to control information flow is to select ITAR-registered suppliers. Unfortunately, in my opinion, this is a program that needs a great deal more oversight. We’ve seen ITAR registration awarded like candy on Halloween and found ourselves competing against brokers and even overseas manufacturers, which negates the implied benefits of keeping information stateside.

While counterfeiting in the electronics industry usually implies components, counterfeit PCBs are often overlooked. By counterfeit PCBs, I’m specifically referring to unscrupulous domestic fabricators that confirm domestic supply to their customers, but then turn around and have the boards built overseas. Overseas vendors are notorious for allowing domestic fabricators to insert their UL logo on to the production boards so that all traceability leads to a domestic source.

As a trusted source, you benefit by educating the customer on this practice, and you also help to identify overseas product disguised as a domestically fabricated PCB. Sometimes it’s as easy as pointing out that the PPAP report is written in Chinese, and other times you have to perform a minor autopsy on the product and point to certain characteristics such as solder-mask, material types, final finish thickness, etc., that can point to an overseas source vs. a domestic source.

### **The Final Tally—Target Markets**

The bottom line is that there are new markets that can be targeted across a wide swath of industries that virtually every domestic PCB fabricator currently services. The work is out there to be captured. The question will then become, how do we make this happen and bring the sales home?



### **Don't Forget: Educate Your Existing Customers**

It's too often when I talk to other board houses regarding conversations with their customers that I get similar responses. Most call their customers just to fish around to see if there is work they can get from them that day. Few have targeted conversations with customers to truly explore their relationship and open up opportunities to expand it. Often, we find ourselves actually educating our customers on their own supply chain, akin to seeing the forest through the trees. Buyers are so inundated with their daily work that they seldom have the chance to perform organizational planning. So help them out.

Start by asking pointed questions to help them understand the types of work that they have. Most just classify protos vs. production, but we now know there are more categories. Help them to develop boundaries to classify their work between these categories based on volume, spending, forecast-ability, etc. Then help them to build out a TCO model to figure out their true savings (or net costs) by defaulting to an overseas supplier vs. going a domestic route. Better yet, build the model yourself and run the numbers for them. This can dramatically speed the course you are trying to get them to take.

Another topic of education is contingency planning. Look at their certifications and end markets to see if there are industry requirements they might not know of, or just plain haven't even thought of. Many tout their Lean

manufacturing programs as a benefit. And it is—for you! The leaner a customer is, the more susceptible they are to supply chain disruptions that could cause line-down issues. Chances are, they probably haven't thought of it this way. Help them to do so.

The last step here would be to educate the customer on your company and its capabilities. You might be saying that they should know all of your capabilities since you've been working with them for years now. Are you willing to bet your future on it though? I see many competitors shy away from this conversation because they feel they are not far enough ahead on the technology curve to make an impact, some even fear that it could cost them work if the customer thinks they are too low tech.

The fact of the matter, though, is that not everything is HDI, sequential lamination, or made of exotic materials. There is still plenty of bread-and-butter, straight forward, low-to-medium technology work out there to be had. I've always been a big fan of selling what I actually know how to build—and the market is there to support that same strategy for everyone in the industry.

All this sounds like I'm telling you to do your customer's job for them—and it's partially true. Frankly, though, it should be done in the spirit of partnership. Our customers are much like us—too few people wearing too many hats in the name of efficiency. Get to be part of that team and help them out; you just might be rewarded for it by opening up a new market for yourself at an existing customer.

### **Finding New Customers**

Now that your tool kit is full and you've squeezed every bit of sales possible from your existing customers, does that mean your work is done? Only if you're looking to end up where you started at the beginning of this article. The dumbest move a board house can make is resting on their existing customer base. Even if you are just looking to stay the same size, you should always be trying to expand your customer base to counteract the effects of losing customers to bankruptcy, quality issues, and competition in general.

Using your current customers as a base is a great way to expand your target audience. You

are already familiar with several key aspects specific to their business lines such as industry jargon, design requirements, and applications. Who best to target next than their competitors? If you are selling to Ford, drive over to GM. Selling to Boeing? Fly to Lockheed's door. It makes sense and your customers are used to a shared supply base. You don't have to worry about losing what you have in the process of expanding your customer base.

So, how do you find your customers' competitors? It's easy. All your customers are assigned industry-specific codes classifying them into groups of similar companies. Identify their North American Industry Classification (NAICS) or Standard Industrial Classification (SIC) codes and search for other companies with the same industry classifications. For example, the NAICS code for Printed Circuit Assembly (Electronic Assembly) is 334418. Enter that code into a searchable database such as Hoovers ([www.hoovers.com](http://www.hoovers.com)) and you can generate a list of thousands of companies that are ripe for targeting.

### **Direct Sales Calls vs. Inbound Marketing**

Comparing modern marketing to old-school direct sales is like comparing targeted drone strikes to carpet bombing. Less effort *can* equate to better results.



While cold-calling sounds outdated, it is still rampant in the industry. Unfortunately the advent of caller ID has rendered this technique mostly ineffective. PCB buyers really don't want to hear from people they have no interest in buying from. *They* will do the reaching out when they are good and ready to pull the trigger. The question now becomes, how do you get them to reach out to you when they are ready?

Carpet bombing with phone calls with the hope that you will reach them at that exact moment is more likely to piss them off than it is to result in a new sale/customer. The right answer, in my opinion, is a targeted marketing campaign.

Marketing campaigns can be as simple as refreshing and sending out brochures, flyers, and/or mailers. You can bump up the effort by exhibiting at (not walking) industry-specific trade shows in different geographies for added exposure. Still, these are old-school methods that have reduced effectiveness compared to pre-bust years.

My suggestion is to beef up your e-marketing programs. And NO, this does not mean that all you need to do is find a fancier picture for your home page. On that note, most websites in our industry are fairly useless. They focus on just the skin layer of what customers are looking for by mainly displaying the fabricator's facility, equipment, and a broad stroke listing of capabilities. Poll your customers and you will likely find out that the last time they visited your site was the first time they visited your site. They saw no need for repeat visits that give you the opportunity to keep them updated on your company's capabilities. Put in a new focus to integrate engineering tools, IPC/industry specifications, design rules, cost calculators, etc. This kind of information will get different disciplines within your existing and target customers to perform repeat visits. Your goal should be a 50/50 split between new

and repeat visitors, if you're even tracking those metrics from your website analytics service. If you don't know what this is, then it's time to start getting educated.

Continue to *educate your customers* on yourself and industry topics. This type of e-marketing would include publishing bi-monthly newsletters and contributing to industry media such as technical forums or industry-specific newsletters. Of course, the first step in this would be to either hire someone that has technical knowledge, or have your staff educate themselves in order to put out effective and useful information. It's this type of knowledge base that will have customers calling you instead of the other way around.

Finally, there's *technical marketing*. This is the next logical step is to showcase your expertise in specific technologies or industry topics. There are numerous avenues that include hosting webinars and technical workshops at your facility. Think of how hard it is to get a customer to spend five minutes on the phone with you—and now you can have them actively listen to you for up to two to three hours at a time. A good ROI calculator on the time spent creating a webinar would be to compare it to the number of cold calls you would have to make to get that much collective face/phone time with the same number of new and existing customers.

After completing all of these different marketing tasks, the best way is to wrap them up on your site and inject a good dose of search engine optimization (SEO) to the mix. SEO makes it easier for new and existing customers to find your content when searching a topic on the web. This gives your new content legs so it can deliver for miles and miles to come. SEO is an entirely different article on its own, but you can read about the basics in a previous newsletter we've published<sup>5</sup>. The lesson

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here is that it doesn't matter how good the content is if no one is going to experience it—*You can't make a horse drink if it can't find the water.*

**Conclusion**

The net effect of putting together a targeted sales and marketing program geared towards North America's "new" PCB markets is contacting people—and getting them to contact you—to do work that is mutually beneficial. For too long, North American PCB fabricators have been hanging on waiting for the next big thing to happen. The next big thing to happen is going to be you actually growing your company based on a long-term plan. So let's try to take a lesson from 2012 and make 2013 a growth year, regardless of what the global industry is doing! **PCB**

**References**

<sup>i</sup> Suppliers include chemicals and laminate manufacturers

<sup>ii</sup>Cade Metz, "As Apple Toils in China, Others Make it in America," *Wired* 2-13-12

<sup>iii</sup> [www.driverside.com](http://www.driverside.com)

<sup>iv</sup>Michael Riley and Ashlee Vance, "Inside the Chinese Boom in Corporate Espionage," *Business Week* March 15, 2012

<sup>v</sup>[archive.constantcontact.com](http://archive.constantcontact.com)



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## Orbotech Launches Two New Machines at HKPCA

by *Real Time with...HKPCA & IPC 2012*



Orbotech has installed more than 730 LPI machines worldwide. And to celebrate, they have launched several new machines at the HKPCA & IPC Show 2012. Yair Alcobi, VP of Orbotech's PCB business, discusses the Discovery II AOI solution.



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