

A large, stylized white graphic element in the top left corner, resembling a downward-pointing arrow or a bracket, with a central vertical line and two side lines that curve inward at the top and bottom.

#32015

IN FOCUS:



Transition to outsource

– a recipe for higher quality at a lower cost



Pre-production at the Suntak factory. The artwork is being prepared for production.

Prejudice says that the acquisition of printed circuit boards in Asia involves risks in terms of quality and delivery reliability. We tell the story of a company that has found that the outsource production of printed circuit boards, correctly managed, actually offers a way to improve quality and the reliability of their deliveries. At the same time, it has enabled them to be more flexible towards customers and reduced their costs.

B+B SmartWorx is a US based manufacturer of intelligent products for machine-to-machine communication in wireless and wireline networks. It's about switches, hubs, nodes and the like for challenging environments, such as outdoors or in factories. The company's strength lies in providing the industry with solutions tailored for the so-called Internet of Things, or IoT - that is, more and more types of devices and machines connected directly to the Internet.

and cooling in the data center in a smarter way. The temperature can be automatically raised or lowered in that particular part of the hall where it is needed at any given time. It lowers energy costs and is a truly green solution," explains Ed Duquette.

B+B SmartWorx is headquartered in the small city of Ottawa in the state of Illinois, not far from Chicago, with another manufacturing facility in the Czech Republic. The company's high-mix/low-volume output comprises by definition a wide range of products manufactured in moderate volumes. Although it is a sizeable operation with total [annual] production of 65 million USD, with fast turnover and lean storage. The product range has recently been extended through a number of acquisitions.

"As our turnover rate is high, we have to put high demands on our suppliers," says Ed Duquette.



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ED DUQUETTE, GLOBAL VICE PRESIDENT OF OPERATIONS, B+B SMARTWORX

"Today everyone says they are into IoT but we actually have products that make sense," says Ed Duquette, Global Vice President of Operations at B+B SmartWorx.

He describes the company's wireless mesh network nodes that can be fitted with sensors and monitor temperature. For example, this enables equipment failures to be predicted ahead of time. B+B SmartWorx also make the router that collects the data. If the need arises, an administrator can take action directly via a dashboard on their smartphone.

"For one application, our nodes can be used to manage heating



B+B SmartWorx manufactures intelligent products for machine-to-machine communication in wireless and wireline networks.

PREVIOUSLY PURCHASED FROM DOMESTIC SUPPLIERS

B+B has historically always used domestic suppliers, out of concern for quality and delivery issues, as well as reliability if changes need to be made to any item.

“I wanted someone who could bring solutions but also protect us from the risks”

ED DUQUETTE, GLOBAL VICE PRESIDENT OF OPERATIONS, B+B SMARTWORX

“You do hear a lot of stories about uncertainty with regard to sourcing in Asia. The team at B+B did not possess the skills or experience necessary for that.”

When Ed Duquette joined B+B SmartWorx, he had previous experience of sourcing in China – both negative and positive.

“As I see it, the benefits outweigh the disadvantages. The outsource model enables us to reach a price range that means that we can move to ENIG PCB’s using gold, instead of silver or tin. We simply get a better product and at the same time lowering costs.”

To place orders directly from factories in China can be very resource intensive, since a lot of time and effort has to be put into finding the right manufacturer with the right technology, price, quality and delivery. This is particularly important for a high-mix/low-volume manufacturer like B+B SmartWorx.

“We are using more than 285 different PCB’s in our products. The majority of them are in the 2 - 4 layer range. We have some very sophisticated 8-layer cards, but nothing beyond 10-layers. To obtain the right quality we can’t turn to factories that specialize in highly complex 10 plus layer PCB’s to make very simple 2-layer boards.” Ed Duquette also underlines that the big risk with outsource production is shipping. “We must have guaranteed security of supply and need an inventory program that is flexible because changes can happen quickly with newer products.”

FACTS ABOUT B+B SMARTWORX

- Turnover: 100 million USD a year.
- Purchase volume: over \$700K USD
- Type of company: OEM.
- Products: Intelligent products (switches, hubs, nodes, converters) for machine-to-machine—communication in wireless and wired networks.
- NCAB customer: For almost 2 years.
- Established: 1981
- Head Office: In Ottawa, Illinois, USA
- Website: bb-smartworx.com

SUPPLIERS THAT ADD VALUE

B+B SmartWorx saw the need for a value-added partner who would help them successfully transition PCB’s to Asia and realize the potential benefits of this.

“I wanted someone who could bring solutions but also protect us from the risks; a partner who does all the things that I know that I need them to do to ensure well-functioning outsourced deliveries,” says Ed Duquette.

B+B SmartWorx set strict demands on their PCB supplier. They expect perfect quality, perfect delivery on time, together with cost efficiency.

“Quality is the most important demand that we place on them,” emphasises Ed Duquette. This is also even more important when it comes to outsource delivery. Any defects are time-consuming when the product comes from another continent, so the delivery must be perfect from the start. I have to be confident that the suppliers build what I need and deliver when I need it, while not



During 2014 NCAB delivered 75 million PCBs to customers around the world and Ed Duquette describes NCABs quality and service as flawless. “I can rely on their deliveries, and can be confident that if I need the boards tomorrow, they will be here tomorrow.”



Since partnering with NCAB, NCAB's technical staff are being brought in earlier in the design process as well as being involved in producing prototypes. The team makes design recommendations, that allow for better panel utilization.

having to worry about the cost of shipping. It is very important to have a partner that can adjust quickly to our requirements."

About two years ago, Ed Duquette found the supplier who could meet his expectations, M-Wave, whose PCB division was to be acquired by NCAB Group shortly after that.

"We started doing business with M-Wave and then about 3-4 months later NCAB acquired the company. We were in the middle of a transition and I didn't know NCAB or what the acquisition would lead to. The decision we were facing was to either stay with NCAB, go direct to China or find another partner," Ed Duquette explains. "But I met with the NCAB management team and their value proposition gave me confidence. I could also see synergies and increased quality through staying with NCAB. The tipping point," he adds, "was that they kept M-Wave intact. They kept the leadership, engineering team, sales people and so on. And we have seen since that we made the right decision to stick with NCAB."

NCAB BUILDS CONFIDENCE

The switch from over three decades of relying entirely on domestically based PCB suppliers to outsource is not something you can do in the blink of an eye. Ed Duquette was aware that there could be some misgivings about such a transition within his team. His strategy was therefore to involve the team in the process.

"NCAB was brought in to present their value proposition directly to them. NCAB's professional technical staff were able to create a confidence within my team and in the end everybody bought in. NCAB continues to organize 'Lunch & Learn' sessions with our engineers. It's both educational and helps to build camaraderie, it also serves as a forum if anyone has any issues they need to take up," he says.

At the end of the day what's decisive to consolidate confidence in a supplier is quality and delivery reliability. B+B SmartWorx took it slowly, creating for instance, our own design rules for PCB's.

"B+B has acquired 3 companies and had all kinds of specs for PCB's. We took them all and gave them to NCAB, and asked them to identify the difference between the boards and specs. We got the design, CAD and PCB specialists to talk through all the issues. Now

we have a single specification for 200 plus different boards with zero quality stops in our production line." says Ed Duquette.

Since partnering with NCAB, B+B Smartworx started involving NCAB's technical staff earlier in the design process as well as having them produce our prototypes.

"Historically we didn't involve our PCB suppliers until later in the process," says Ed Duquette.

"We are now including their engineering team and they come with design recommendations, that allows for better panel utilization, v-scoring vs. break-away tabs and so on. They help us avoid an additional board spin after the initial prototype. Doing it right the first time saves us money. We get very good support from NCAB's engineering team. We learn from them and resolve many issues. Doing it this way also prevents manufacturers from taking liberties, for example with panelization, at our expense."

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FLAWLESS QUALITY

For it's US operations, B+B SmartWorx buys all PCBs for mass production from NCAB. Ed Duquette describes:

"NCAB brings products into the USA fully inspected and can be relied upon to deliver on time. I can be confident that if I need the board tomorrow, it will be here tomorrow. They have also allowed me to supply my customer with shorter lead-times. That's great for us as our PCB needs fluctuate a great deal and are hard to foresee. There is unknown fluctuation. I want to be able to say yes to our customers and that demands a channel partner and suppliers that allow us to do just that." says Ed Duquette.

As regards to shipping, B+B SmartWorx has opted for a hybrid supply chain with NCAB, combining air and ocean. Legacy products are shipped by boat and newer products by air.

"Of course shipping by air means higher costs, but compared to scrapping 10 weeks of products it is still worth it," Ed Duquette points out.

One big advantage that NCAB offers according to B+B SmartWorx is its network and presence on the ground in China. Given the mixed product range, there's added value in being able to choose the right plant for the different types of circuit boards one needs.

"The manufacturers specialize in different areas and thanks to NCAB we are able to get the best from their respective areas of expertise. I don't have time to screen the factories in China myself, but I'm familiar with the qualification process they apply before approving a factory as a NCAB supplier. Based on first-hand observation in China, I fully trust, that NCAB will protect my interests every day."

SAVING THROUGH QUALITY GAINS

Looking at the total cost, including inventory, quality and so on, the transition to outsource purchasing of PCB's has led to significant savings for B+B SmartWorx. Ed Duquette mentions in particular the quality gains they've achieved.

"Before the transition to NCAB we had quality problems with some of the boards. But we have not had one shut down due to

B+B SMARTWORX'S DEMANDS ON THEIR PCB SUPPLIER:

- > Perfect quality
- > Perfect delivery on time
- > Cost efficiency

“I don’t have time to screen the factories in China myself, but I’m familiar with the qualification process they apply before approving a factory as an NCAB supplier, so I fully trust, that NCAB will protect my interests every day”

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quality issues on my line since I switched to NCAB. Either the manufacture is perfect or NCAB solves all the issues before they reach us. If we look at the Key Performance Indicator for quality, we have gone from 2 % to 0 % KPI. These are interesting numbers for any manufacturing company.”

B+B SmartWorx is looking to the future with confidence. The company is private equity owned and aiming for further growth, organically or through acquisition, with a focus on solutions for wireless sensing and the Internet of Things for the industrial sector. Ed Duquette is pretty sure he will continue to purchase PCB’s manufactured by outsourcing.

“Absolutely, it enables us to be responsive to our customers with good quality at good prices. It also allows us to be a part of a changing electronics industry. Although a trend I’m seeing is insourcing – coming back to the US. Lower gas and oil prices combined with cost rises in China are drivers that are tending to bring some products back to being made in the US. That said, I do not see PCB manufacturing doing that. It is simply not cost effective here,” he concludes.

THREE PIECES OF ADVICE WHEN CONSIDERING A TRANSITION TO OUTSOURCING-PCBS

- Make sure you have access to the necessary competence for sourcing to Asia, either in-house or through a professional partner.
- Give yourself the time you need to properly implement the transition and bring in your own engineers, so that everyone is on board.
- Think through your transport needs and build a transport solution that offers flexibility when needed and lower costs when possible.

Questions around the world: What do you see as your customers’ most important challenges when they make the transition from buying PCBs from domestic suppliers to purchasing from Asia? And in what ways does NCAB support them?



GERMANY

CHRISTIN THAU

Customer Support,
NCAB Group Germany

“There are many obstacles in such a transition. Language problems and misunderstandings due to cultural differences can for example affect quality, delivery times and overall costs. Adequate purchasing power is a prime factor to ensure that manufacturers meet the customer’s specific needs, specifications and priorities. NCAB customers can benefit from our combined purchasing power, our long experience and good relations with factories, which lowers the total cost. In addition, the NCAB team takes full responsibility for all aspects of the manufacture and delivery of their projects.”



FRANCE

VÉRONIQUE SIMONET

Key Account Manager,
NCAB Group France

“The main reason why customers opt for such a change is better prices. To make the transition on their own, however involves a number of major challenges such as language, time differences, poor management of low volume orders, quality issues and audits. With the help of NCAB, customers get what they are looking for - lower costs – as well as good service and quality. Regardless of batch size, we can find the right factory for the batch in question. We handle communications with Asia. We help with design and have full control of the quality we supply to our customers.”



USA

BOB DUKE

General Manager, Central Division
NCAB Group USA

“The key challenge for our customers when making a transition to production in Asia is to ensure they get many part numbers delivered quickly and efficiently, without their purchasing and engineering departments being swamped with work. That’s when they can quickly generate the savings they wanted to achieve through the transition. In order to facilitate and make the process as smooth as possible, we go through the customers’ specifications and drawings in good time, so that everything is ready for production once the orders start coming through. This enables the engineers to focus on developing new products, instead of wasting time on the actual transition.”

Should one be wary of buying PCBs from China?

HANS STÄHL
CEO NCAB GROUP



My answer is yes, absolutely! Buying PCBs from China is not so easy. The key question here is what makes it so complicated and risky? A great deal has happened since the days when China essentially only manufactured PCBs for toys or the domestic market. We've since been witnessing improvements in quality and growing exports to the United States and Europe. I would, however, still say that buying PCBs directly from manufacturers in China can involve unnecessary risks for many companies.

Why? Well the biggest problem is the consolidation that the PCB industry is currently undergoing. With regard to quality and personnel, consolidation is admittedly crucial. Size enables manufacturers to buy the best machines, employ the best staff and build optimum premises. This is particularly applicable within PCB manufacturing, where machines and tooling make up an extremely large proportion of the costs.

The snag is that small or medium series are also very much in demand, due to product life cycles getting shorter. At the same time, our customers have not been consolidating to the same extent, since

size is not as important in assembled circuit board manufacturing. So what we are seeing is PCB factories, growing in size and scale, also having to handle small series and meet the needs of smaller clients. That equation does not quite add up. When these groups are not prioritized in factories that have to meet strict profitability requirements, the inevitable result is substantially inferior service.

In our niche, which we call high mix/low volume (HMLV) manufacturing, communicating with the factories is an added challenge. You do not have several weeks to discuss a piece of artwork as you would when working with higher volumes. Instead, we're talking hours, which requires the parties concerned to communicate at a much higher level than they might normally do.

There are of course more aspects to take into account, but these two factors alone - the mismatch in volume and communication issues - are reasons in themselves to be wary of buying printed circuit boards directly from China!



NCAB Group in Social Media

For a few months now, customers and other interested parties have been able to follow us on Twitter and LinkedIn. We have also started a blog where we immerse ourselves in the versatile world of circuit-boards! » [Twitter](#) » [LinkedIn](#) » [Blog](#) » [YouTube](#)

Read more at the website about our quality assurance work:

» [Quality Assurance](#)

Subjects we have covered earlier

Do read our earlier newsletters. You will find them all on our website, www.ncabgroup.com/newsroom/

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Are we taking up the wrong subjects?

We are always looking for interesting subjects that we could take a more in depth look at. If there is something you would like to learn more about, or perhaps you would like to comment on anything we have written, do get in touch with us and tell us more.

Mail: sanna.rundqvist@ncabgroup.com