



Making a **difference**

Contract Electronics Manufacturers (CEMs) can add substantial value to New Product Introductions (NPIs) but only if the outsourcing engagement model is collaborative rather than transactional. Nick Fairhead, Sales & Marketing Director of Speedboard Assembly Services, explains how 'virtual shop floor' arrangements produce a real win-win.

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The practice of outsourcing the manufacture of PCB assemblies (PCBAs) is commonplace within the electronics industry. However, in the current economic climate, CEMs that cannot find new and innovative ways to add value to the services they offer face a bleak future. To add true value – particularly where an NPI is concerned - it is necessary to move away from the traditional model of waiting until the design is considered final before engaging with a CEM, even if it is a manufacturer that has been used before.



Figure 1 - Vantage's Strobe Board is a metal-backed single layer substrate. For its assembly, the Vapour Phase technique was employed. It involves lowering the PCB into the vapour of boiling Galden

Consider how an OEM with its own shop floor would behave during an NPI project. The engineers responsible for manufacturing and test would be involved in early design meetings, feeding their expertise into the design process. Also, with early sight of the Bill of Materials (BOM), long lead-time items would be purchased, even if some are only 'contender parts'.

As the design nears completion, all other materials and stencils would be ordered. The programming of manufacturing and test equipment would also take place. The overall result: efficient and de-risked fast-track assembly, test, inspection and product launch.

In addition, the OEM would most likely have a post-launch review meeting, as there is always scope for improving processes and realising cost savings.

Subject to an early engagement and, importantly, open discussions, a CEM can be a 'virtual shop floor'. Whereas an OEM can only draw on the knowledge garnered from a selection of earlier in-house projects, probably in relation to serving a single industry sector, a good CEM can draw on the experiences of far more projects. Also, the CEM is likely to have good buying power and strong relationships with its suppliers. This is useful if some of the NPI's parts have long lead-times.

Picture this

In June 2015, Vicon Motion Systems, an Oxford-headquartered developer of motion capture products and services, launched Vantage, a high-resolution and high-sample-rate camera. It comprises three PCBAs, the manufacture of which is outsourced to Speedboard Assembly Services. Moreover, the on-time launch of Vantage was largely down to the level of collaboration between Vicon's design engineers and the CEM, working together to tackle a number of technical and logistical challenges.

The CEM, which was already, and remains, engaged for the manufacture of another of Vicon's products worked alongside Vicon's engineers and produced prototypes of Vantage's three PCBAs. Of these PCBAs one, the Strobe Board, has a metal substrate of significant thermal mass. This can present problems when manufacturing using a

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traditional convection reflow line, as getting some parts of the board up to temperature (for solder reflow) runs the risk of damaging sensitive electronic components. An early appreciation of the Strobe Board's design enabled the CEM to recommend the use of the Vapour Phase technique.

Also presenting a significant challenge was the assembly of the Sensor Board; a mixed technology double-sided, surface-mount PCBA dominated by a high-end, through-hole sensor device with several hundred pins and a tight pitch. It was agreed that the board could not be hand soldered reliably and consistently, in accordance with IPC Class 3, in production volumes and that another solution would be required. As part of the DFM process, both parties agreed Selective Soldering would be the most appropriate manufacturing technique and worked together to optimise the board's design accordingly.

However, there was a logistical problem to address. With the CEM already responsible for manufacturing one of Vicon's other camera ranges, would awarding the volume manufacture of Vantage range represent putting too many eggs in one basket? Due to the openness of the engagement, the airing of the business concerns of both parties and the fact that solutions had been found early on for all of the technical challenges, Vicon's management agreed that the benefits of engaging with a single CEM partner outweighed any downsides of single-sourcing.

How far?

Another example of the 'virtual shop floor' model in action is the relationship Speedboard has with its customer Vocality, a privately-owned company specialising in network routers for data and voice. All of Vocality's manufacturing, with the exception of some final customer configuration, is outsourced to the CEM.

The decision to engage with just one CEM was taken in 2010, when Vocality evaluated all of its working practices and recognised that any cost savings it might have been gaining through getting a number of CEMs to compete against each other were being offset by the amount of time and effort spent managing multiple manufactures.

The company was also unable to take advantage of economies of scale.

It was recognised that a much closer, mutually beneficial relationship with a single CEM would serve the company's long-term plans better.



Figure 2 - A Vocality product is packaged prior to shipment to the customer

Over a nine-month period, one of the CEM's owners/directors, spent a number of days on site with Vocality and recommended how the company's DFM practices should change. These changes included a completely new multi-level part numbering system (to cover all of Vocality's products and respective variants), a change note system and the rule of 'One BOM per product variant'.

The CEM also appraised the entire order-received-to-goods-shipped lifecycle, identifying how processes could be improved and waste eliminated, in order to provide Vocality's customers with reduced lead-times. A traditional Kanban system, for about 20 of Vocality's products that don't have variants, was introduced. For products with variants,

the CEM introduced a customise-to-order model and, rather than building and holding several of each product variant, the CEM manufactures and then holds common baseboards in Kanban, with final assembly components managed on line-side stock on a min-max ordering process.

The win-win

A CEM can add value to the manufacturing process – particularly when the customer can engage with the manufacturer as if it were their own shop floor. When that happens, the CEM is trusting the customer to identify good markets and designing products to serve them and the customer is trusting the CEM to build quality products, keep its processes efficient and identify cost savings.



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