

# Plan Your Way Around Supply Chain Issues

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## IN SUMMARY

The more complex the product being assembled, the more diverse the bills of materials and components required are likely to be. With this comes the increasing possibility of a global supply chain along with all the challenges that come with such a wide-reaching beast. Global supply chains need to be meticulously managed to ensure that the right components are in the right place at the right time.

A key objective for EMS companies is achieving the “on-time, in full” performance demanded by their customers. To secure this productivity, a production plan detailing the exact routes and timings of all processes in the assembly procedure needs to be accurately defined. And it’s no light-weight document; an outline is rarely sufficient. The plan must include PCB assembly and test, integration of sub-modules, box-build, final configuration

and system test. This has to be compiled for each assembly or product being built during the period.

This alone can be extremely complex, but the resources required within the plan are predominantly within the control of the organisation. The one element that is likely to be more of an external control issue is very often the one that can derail the entire process: The supply chain. The availability, or—perhaps more to the point—the non-availability, of components is often the single biggest contributing factor in EMS companies failing to achieve the “on-time, in full” performance demanded by their customers.

That’s where Supply Chain Management comes in. But what do we really mean by Supply Chain Management? There are countless definitions, but one that works for me is that a supply chain “spans all movement and storage of raw materials, work-in-process inventory and finished goods from point of origin to point of consumption.” I think it’s easy to visualise this definition applying to every stage of an electronics manufacturing procedure.



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### Time: A Whole New Dimension

Now let's add another dimension to the challenge, one of timeliness. The move towards just-in-time (JIT) methods to reduce in-process inventory is well documented. In an OEM environment, with other key supporting elements of a Lean strategy firmly in place, this can work extremely well. But in an EMS environment, things are necessarily different. By definition, EMS companies will be dealing with a variety of ever-changing products in production. As it is, they must maintain a high degree of agility to cope with changes from external influences (engineering change orders, customer-driven changes, environmental legislation changes, etc.). Without a major focus on supply chain management and an accompanying investment in inventory, JIT can easily become JTL!

At the risk of stating the obvious, it is worth pointing out that EMS is not just about detailed PCB assembly. As OEMs outsource more and more of their manufacturing processes and rely on their EMS partners for total system build encompassing electronics and electromechanical assembly, final configuration, test and logistics plus returns management and repairs, the complexity of the supply chains EMS companies are required to manage becomes far greater. As a result, they now manage global supply chains on behalf of their customers and their role and responsibility has escalated dramatically from where it was even five years ago. Today it really is a total supply chain management capability.

EMS companies are now routinely sourcing, procuring and managing supply chains for all components and materials to build their customers' products. The



resource pool for such chains stretch in all directions and typically include bare PCBs, a myriad of electronic and electromechanical components, cables and cabinets, custom plastics, packaging, machined and fabricated metal work and so on.

The supply chains of OEMs in the electronics/electronics assembly industry are such that they are now typically scattered across the globe to ensure that they are procuring the right materials for each job. As well as keeping track of this sophisticated global network and the geographic and cultural factors that can add complexity to that task, there are other issues to contend with like managing inventory, coping with fluctuating lead times, obsolescence and the very real threat of counterfeit components. It all demands significant ongoing investment in resources, systems, equipment and procedures.

Accordingly, given these supply chain challenges, what can companies do to address these and make their supply chains more efficient?

One strategy is to partner with an EMS specialist. It is not uncommon for this approach to be justified on the strength of the supply chain alone, without even needing to consider the benefits to be gained from outsourcing the cost and timescale risks associated with the assembly and test elements of a manufacturing project.

### What is the True Cost of Acquisition?

It is generally accepted that there are "grey area" costs that distort a company's true cost

management expertise of their sister company. Interestingly, the original group remains independent and also services other EMS providers in European territories.

When looking to outsource your supply chain, you need to know what you're getting and the level of expertise of your chosen supplier. Confidence and peace of mind only come from working with an organisation that takes total responsibility—one that will take your supply chain fully on board. Franchised distributors won't do this, nor will brokers. This partial responsibility can be frustrating and costly as these companies will happily ship 60 to 80% of the required items on your BOM and clearly expect payment, to terms, for doing so without taking responsibility for everything you need for your batch build. The cost of delays, disgruntled customers and working capital tied up in WIP can be significant.

A lot of EMS companies don't take full responsibility for materials supply chain either; they so often pass supply chain issues back to the customer. In fact, a lot of companies will do bits of it, but not all of it. We found (and still find) that you could almost get a whole solution, but not quite. That was the gap that we decided to fill by becoming a dedicated supply chain management specialist: It's all we do—and we've been able to refine our business model over the years.

### **Pigs and Chickens**

This reminds me of the tale of the pig and the chicken. Consider, for a minute, their role in producing bacon and eggs for a breakfast. Clearly the chicken had a role and was certainly "involved." The pig, however, had a somewhat different role and could genuinely be described as being "committed." Clearly this is an extreme example, but OEMs need to fully understand which suppliers are involved and those who are somewhat more committed!

So what should a dependable supply chain management service ideally comprise? In my view, it starts by taking a BOM and looking after it as if you're the OEM. Full responsibility, in short. The end game should be the delivery of everything required for the current batch, assembly-ready, to the point of production. In between, however, is the detail of supply and validation to ensure the integrity of the components.

Of interest to most EMS companies looking to outsource their supply chain management are solutions for high-complexity, low-volume products—still the predominant assembly sector in Europe and the UK. This can be fraught with problems, and that's where expertise comes in, along with experience and the optimum infrastructure. A good example of the challenge faced by the kitting process within a supply chain management solution is moisture sensitive devices (MSDs). Imagine that an EMS customer requires a quantity of 15 ultra-fine-pitch, QFP devices for its batch build. Chances are they'll have to be taken from a waffle tray of 96 parts, for example, and this will have been hermetically sealed after meticulous drying at the point of manufacture. So, once removed, they need to be carefully dried again and resealed. That demands specialist equipment. It's the same with unreeling 250 chip resistors from an original reel of 5,000.

This detailed preparation to create assembly-ready components is all part of the supply chain management commitment. It's not about simply locating and buying the bits; it's about the efficiency and effectiveness of the process of "decanting" those bits into proper quantities that make everything assembly ready.

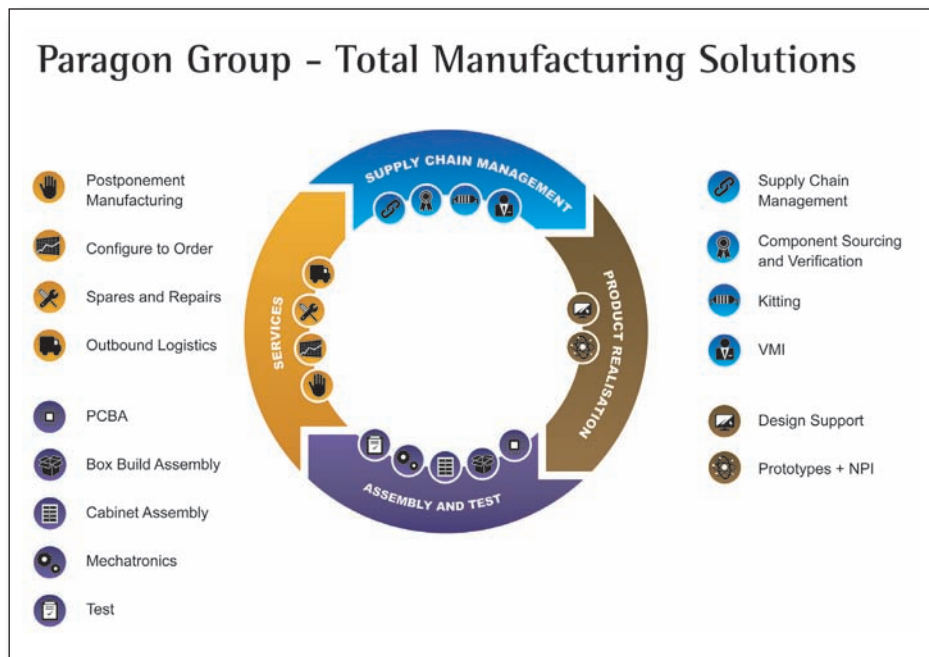


of materials acquisition. These crop up between purchasing and production and include a wide variety of “profit thieves” that occur within the processes involved in delivering assembly-ready materials through to production.

What sort of things? Well, they can include the costs of purchasing, expediting, carriage, inspection, inventory control, wastage/losses/damage, minimum pack sizes and storage, through to supplier management and purchase ledger.

In isolation, even the minimum order quantity (MOQs) and minimum pack size issues can be significant. We have seen cases where more than 5% of the value of a company’s inventory consisted of excess components remaining from the “residue” of MOQs. Even if things always went according to plan, and suppliers never let customers down, the areas listed here add a significant overhead to the visible invoice price. But when problems occur and items need to be re-sourced, the time and cost of this and the resulting delays can be significant. It is generally felt that these aspects can easily add up to 20% of the total cost of acquisition; it is debateable whether many OEMs really know the true cost of their components/raw materials. For most, particularly those striving to maintain a competitive advantage in today’s rebounding marketplace, this is clearly not acceptable.

The electronic component marketplace is characterised by lead-time fluctuations and cyclical shortages of components. Traditionally, OEMs tend to protect themselves against these issues by holding inventory. But there’s a real cost to this that can easily offset the value advantage offered by choosing the right global suppliers. Instead, by deploying dedicated, robust systems and procedures and by closely managing the components and materials required for each project, the impact



of lead-time fluctuations, changes in demand and even obsolescence can be minimised or even eliminated.

### It’s All About the Bits

Control of the supply chain is critical for an EMS company; ultimately it’s all about “the bits.” All the production equipment and manufacturing processes put in place are pointless without the components needed for assembly. Add to this the fact that customers are getting more sophisticated in the way they track and measure their EMS partners’ performance and you begin to see the imperative in securing an efficient supply chain.

One effective model is to outsource the supply chain management to a specialist. It’s an obvious and natural extension of the intrinsic philosophy behind EMS companies, given that their customers outsource manufacturing to them. This critical element of the manufacturing procedure is something we wrestled with 20 years ago and came up with our own solution by establishing a stand-alone specialist organisation to focus solely on supply chain management. Since then, the group acquired its own EMS business with facilities in the UK and Central Europe who both naturally benefit from the supply chain

### **Looking Inside**

Kitting up for batch-related quantities is just one part of the service in a total supply chain management solution. There are other procedures that must be addressed to make the components fit for purpose: Cropping and pre-forming of axial parts, programming of programmable devices into batch-appropriate quantities, rereeling and moisture sensitive handling to name a few. And then there's the real game breaker, the productivity thief and scourge of EMS companies the world over—counterfeit components.

To deliver absolute confidence and maintain integrity in any supply chain management solution, counterfeiting must be countered! Test and inspection validation should always be part of the standard routine when either receiving parts or during kitting. But checking for counterfeits demands a whole new level of resources. This is now such a critical element in the supply chain that it drove us to invest heavily over the past two years in new procedures, new equipment and training. The result is that we now act as a critical, robust barrier between our customers and the very real threat of counterfeit components.

Any company taking total responsibility for the supply chain must have a documented procedure to validate the integrity of the components supplied. As we know, it's all about the bits, but those bits need to be real! A quality commitment should begin with procurement. Ideally, a strict vendor approval process should also feature rigorous ongoing monitoring. It's wise to only partner with reputable suppliers who have a track record in the industry, and these organisations should be carefully screened prior to approval and undergo continuing performance analysis in order to determine a supplier rating. It goes without saying that suppliers must then maintain an acceptable rating in order to remain on the approved vendor list.

Then the focus switches to the incoming goods receiving and inspection processes. Upon receipt of material, this should commence with an inspection of the packing material and a comparison of parts against

the manufacturer's data sheet specifications. In my company, visual inspection is supported by a range of additional processes and equipment including high-powered microscopes, chemical tests, solderability tests and electrical testing against a known good digital signature stored in our IMS system. These procedures enable us to validate the devices and check for any signs of the parts being improperly stored or handled, or indeed anything that leads our inspectors to suspect they could be counterfeit.

Arriving shortly to bolster our armoury in the war against counterfeiting is X-ray. The system we selected looks right inside the device and provides digital image evidence of authenticity—something that OEMs find reassuring and EMS companies value because they can show it as evidence of diligence to their customers.

### **Where Does It End?**

So where exactly does the supply chain end? Obviously, it's different for each manufacturing company. For many, in practical terms, and the notional end of any obligation on the part of the supply chain management provider, it is the final delivery to the point at which assembly starts with all the components in place—it will have been counterfeit checked, inspected, kitted, programmed—all ready to go. However, the supply chain management role for EMS businesses extends into PCB assembly, box build, electromechanical assembly and test. For a select few, the remit continues with outbound logistics and repairs.

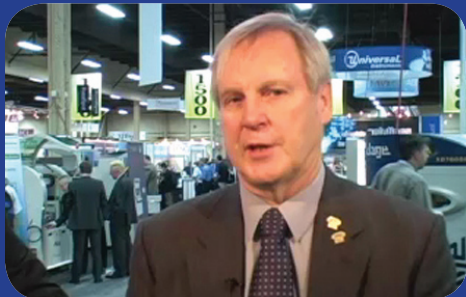
Going even further, the supply chain management role should extend beyond the immediate project or the next batch to address component obsolescence, long lead-times and all the other issues that need to be pipelined against the future. Unless managed, these will create shortages and delays downstream.

This ongoing support commitment demands strategic procurement solutions for each individual supply chain. Again, expertise prevails through global networks of suppliers and years of industry experience.

## Video Interview

# Hammering Out Improvements for Acceptability

by *Real Time with...IPC APEX EXPO 2011*



Mel Parrish, training director at STI Electronics, is actively leading change regarding the important acceptability specs—IPC-A-600, 610, 620 and 720. He gives Guest Editor Kelly Dack an overview of how these specs are changing and who is involved.



[www.realtimewith.com](http://www.realtimewith.com)

When specific electronic components become obsolete, companies need an organisation that can find these parts, utilising resources like OEM excess inventory and allocated franchised inventories. Inevitably, some components will cease to be available, so the next consideration is to partner with a knowledgeable business that can consult on alternative solutions, research cross-references and then work with the best suppliers to source the replacements without delay.

For OEMs, partnering with a specialist company to act as a centralised hub for their supply chain is a well-proven approach and one upon which we have built a successful business over the past 20 years. For most EMS companies, adopting a supply chain management outsource model should be second-nature; it's the way they work with their customers, after all. The tangible value of having total confidence in the parts delivered to the beginning of the assembly line just before production commences should not be underestimated. Sourcing complete kits of electronic component in this way eliminates

the risk of having the wrong parts, some of the parts or none of the parts at the point of production in time. It's one less (big) thing for them to worry about. **SMT**



Graham Smith is an established authority in the electronic components business, having worked in the industry for 25 years. Starting out in field sales, he quickly progressed onto running the pricing desk for the largest franchised distributor in the UK. In 1992, he joined the Paragon Electronics Group to oversee business development at the fast-growing supply chain management specialist. His success in this role saw him rise steadily up the ranks at Paragon, becoming a Director in 1994 before being appointed as Managing Director in 1999. In this role, Smith has responsibility for the commercial and operational sides of the business and has contributed to its current status as a world leader in the field of electronic component supply.