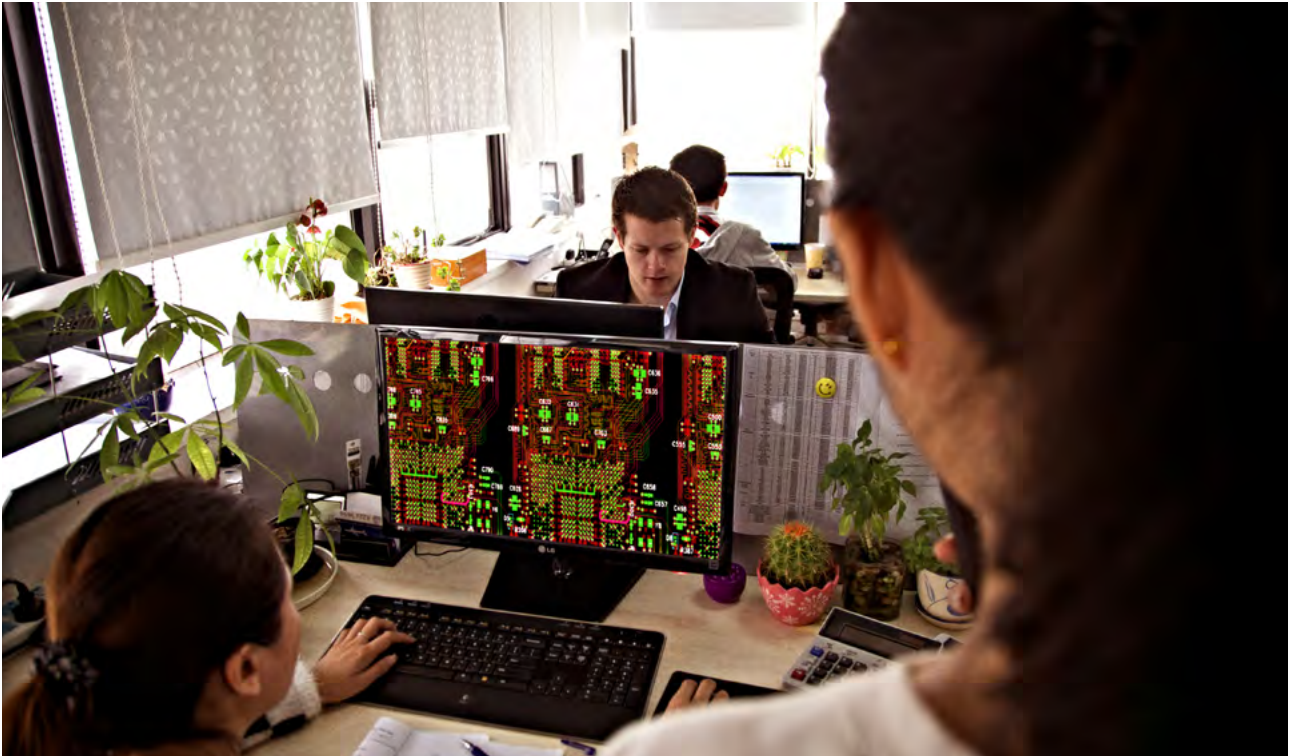


#2015 IN FOCUS:



Purchasing PCBs – How to do it successfully



As a buyer, it's vital you make sure your engineers provide the artwork that meets the specifications you have set. Pictured here are Linda Rong and Ellen Sun, NCAB Group China, going through a gerber file on behalf of a client.

How do you go about purchasing reliable and durable PCBs at the lowest possible cost? A key success factor is to provide the prospective suppliers with accurate and clear specifications, and to keep a close eye on the quality of the boards once they are in production. This in turn requires the parties involved to establish and maintain a close and efficient dialogue to ensure that the process builds on correct and relevant information.

PCBs are not standard components and thus not an easy product to purchase. The cost is determined to a large extent, by the complexity of the design.

"This means that factors determining the costs of a new PCB are established at a very early stage, long before the buyer has started asking for quotations from prospective suppliers. The major proportion of the cost is determined already at the engineering and design phase," says Bo Andersson, Technical Manager at the NCAB Group.

"The major proportion of the cost is determined already at the engineering and design phase."

BO ANDERSSON, TECHNICAL MANAGER, NCAB GROUP

The best way of reducing costs is to think in terms of volume right from the start. You should start gathering appropriate data from the EMS and PCB suppliers at the design stage; this to enable the boards to be optimized for series production, taking into account what they are they going to be used for.

"There is a great deal to be gained by looking twice at such factors as the material and technical specifications, for example track and gap, tolerances and aspect ratios. It can, in some cases be extremely difficult and costly to put right design solutions that haven't been optimised before they go into production. For example, an unnecessarily high aspect ratio affects so many parameters that it can be extremely

time consuming to correct. I know of a case where it took a year to put right design shortcomings, since almost all the PCBs needed to be redesigned," says Bo Andersson.

"Issues that may lead to unnecessary costs can often be corrected. It is important to familiarize yourself with and get a firm grasp of the specific requirements, and then work to achieve those requirements," he observes.

PUT STRINGENT DEMANDS ON THE ARTWORK

Before inviting quotations for a new PCB, the procurement team would be well advised to thoroughly scrutinise the artwork. This can save a great deal of time, trouble and not least, expense further down the production chain.



Bo Andersson, Technical Manager, NCAB Group.

"My advice to buyers is be uncompromising when it comes to the artwork they are presented with. A buyer doesn't have to be a technical genius, but it's vital they make sure they provide the suppliers with artwork that clearly specifies the technical standards that the PCB in question has to meet." says Michael Larsson, Key Account Manager at NCAB in Sweden, with Bo Andersson agreeing fully: "That's right, making sure the purchase and technology sides interact properly will save you money further down the road."

"My advice to buyers is to be uncompromising when it comes to the artwork they are presented with. The artwork should specify clearly and fully the technical requirements of the PCB item that is to be manufactured."

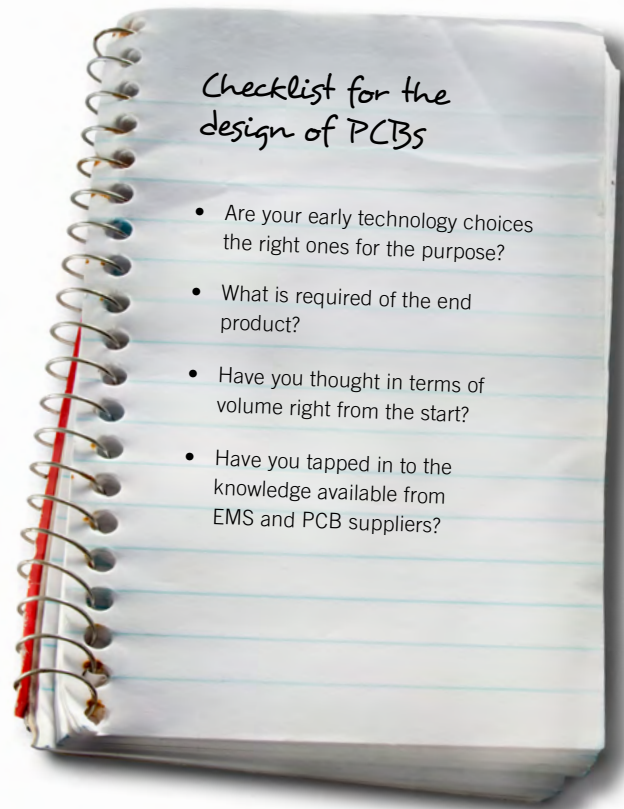
MICHAEL LARSSON, KEY ACCOUNT MANAGER, NCAB GROUP SWEDEN

If the documentation is incomplete, you risk receiving offers that vary to the extent that they'll be impossible to compare. Like comparing apples and pears, it can lead to some suppliers providing incorrect pricing. An inexperienced supplier may quote a price that seems favourable, but will not provide you with a satisfactory product. If the technical performance of a PCB is not up to standard, it can lead to more work or quality issues later on in the production flow.

"A PCB that does not meet the set requirements may necessitate time-consuming, and thus costly, manual measures to remedy its shortcomings in the client's production line. It can also lead to material having to be scrapped unnecessarily, which is both costly and harmful to the environment," says Michael Larsson.

"And we have another scenario, where defects appear much later and lead to end products that basically cease to work – which of course leads to compensation claims," Bo Andersson adds.

Faced with incomplete specifications, reputable suppliers will invariably turn to the customer for supplementary details. That then takes up time that the buyer could have made better use of, if their specifications had been properly prepared from the start.



PANELIZING – A CRUCIAL FACTOR

To ensure you receive uniform and fully comparable offers from different PCB suppliers, it's vital that the tender documents include the required specifications, including things such as board thickness, surface finish, base material requirements/specification, quality requirements and the number of assembly (reflow) processes the boards must be able to withstand. A decisive factor is also panelization, ie how many circuits per panel, and what handling rails, tooling holes are required to ensure optimum utilization for manufacture and also assembly.

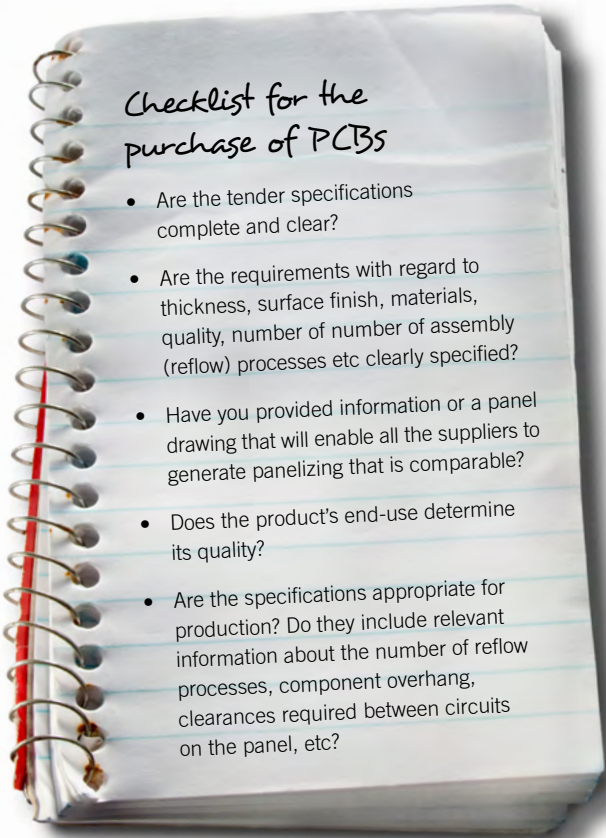


Panelizing is an important factor and should be included in the specifications you send to prospective suppliers. Pictured here, Dana Chen, NCAB Group China.

"Panelizing is a major price driver in so far as every sqmm of the PCB and panel delivered entails a cost. Leaving too much space between the different boards is like throwing money down the drain," says Bo Andersson and continues: "But it can be equally wrong to leave too narrow a space between each board, especially since we are seeing more and more boards with overhanging components, which requires greater clearances.



Michael Larsson, Key Account Manager, NCAB Group Sweden.



Checklist for the purchase of PCBs

- Are the tender specifications complete and clear?
- Are the requirements with regard to thickness, surface finish, materials, quality, number of number of assembly (reflow) processes etc clearly specified?
- Have you provided information or a panel drawing that will enable all the suppliers to generate panelizing that is comparable?
- Does the product's end-use determine its quality?
- Are the specifications appropriate for production? Do they include relevant information about the number of reflow processes, component overhang, clearances required between circuits on the panel, etc?

can eventually lead to costly problems. The solution here is, as with other factors, that buyers know exactly what they need and provide prospective suppliers with the appropriate and accurate specifications.

"Panelizing is key to ensuring you obtain appropriate and comparable offers. If you are a buyer, ask your production people to help you obtain a panel proposal or panelization rules/guidelines if it is missing from the specifications. In this way, you will get a comparable response between the incoming quotes and you won't have to spend time answering questions from suppliers," says Michael Larsson.

"Panelizing is key to ensuring you obtain appropriate and comparable offers."

MICHAEL LARSSON, KEY ACCOUNT MANAGER, NCAB GROUP SWEDEN

REVIEW YOUR PURCHASING PATTERN

Additional costs can be avoided by reviewing your purchasing routines. An important aspect here is how often you order boards and in what quantities.

"You may well be incurring unnecessary costs through ordering a product too frequently. For example, if you purchase 50 boards 20 times a year, you could save 30 to 50 percent by altering this pattern and instead consolidate your purchases to four times per year," Michael Larsson explains.

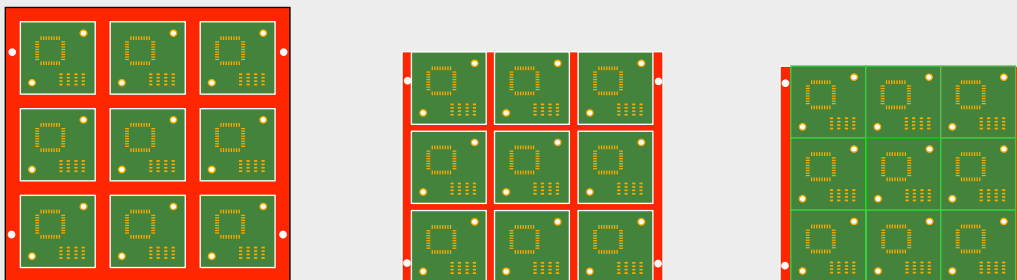
This is not solely related to the savings that a larger batch entails. You may find yourself with the option to transfer production of your items to an alternative NCAB factory that's better geared and more competitive in producing larger volumes, which in turn leads to an even more favourable price difference.

"You might on the other hand find that you are holding excessive

Also, panelizing with insufficient clearances may require hand-soldering, which would substantially increase costs."

Asking PCB suppliers themselves to propose panelizing can lead to widely different proposals and consequently, varying prices quoted which in turn, can make comparisons more difficult. This increases the risk of buyers choosing a less suitable solution for assembly, which

PANELIZATION



This picture shows the same PCB, but with different panelization. The surface area is 40% larger which affects the price significantly. Contrary to what one might think, the smallest panel does not constitute the best and cheapest choice, since in this case there are overhanging components on two sides of the board and the spacing between the boards is necessary for efficient assembly. If the boards had been delivered in the smaller panel, selective soldering of those overhanging components would not have been possible, and the additional production costs would have been much higher than those if manufactured on the larger panel.

“It’s crucial to maintain an unbroken chain of communication from engineering and design to procurement, right through to production. That’s how you’ll achieve the lowest total cost.”

BO ANDERSSON, TECHNICAL MANAGER, NCAB GROUP

stock of a PCB, quite often, the result of a fall in forecasted demand. This exposes you to a greater risk of obsolescence, since a PCB is a perishable commodity that cannot be stored indefinitely because solderability deteriorates with time,” says Michael Larsson, while Bo Andersson adds: “You need to think this through and keep an eye on the risks and opportunities in both directions.”

OPEN DIALOGUE ABOUT PROBLEM BOARDS

Another aspect to consider with regard to running part numbers is what Michael Larsson describes as quality costs. For a variety of reasons, some running part numbers may contain inherent shortcomings that may not be immediately obvious.

“These sorts of problems generate costs of the type we have discussed. I am convinced that buyers have much to gain by establishing an open dialogue with the product owners and together, get to grips with these issues. I would suggest they establish which items

do not perform adequately but are still being sourced time and time again, and then see what can be done about it,” he says.

Another aspect is that some older products are over specified, since the parties involved have not kept up with technical developments.

“Following the RoHS & Lead-free solder directives a decade ago, a high number of PCBs were immediately changed to utilize higher Tg laminates. Nowadays, you can apply lead-free soldering to standard Tg material (130-140 Tg) without affecting the functionality of the board; despite this, high Tg boards still have to comply with the old specifications,” says Michael Larsson.

“That is an example telling that it might be wise to think conservatively in terms of technology, but at the same time not to be afraid to adapt when we have to,” says Bo Andersson.

“To sum up: If you want to be sure of getting the correct total cost, you need to continuously seek out what works well and not so well in your production process. And then, on that basis, assess whether you could save substantial costs in downstream production by introducing changes,” concludes Michael Larsson.

“Whether we’re talking about purchasing new PCBs or managing part numbers currently in use, minimizing costs is basically about gathering the appropriate information and then, consulting with others who may have more knowledge. It’s crucial to maintain an unbroken chain of communication from engineering and design to procurement, right through to production. That’s how you’ll achieve the lowest total cost,” says Bo Andersson.

Questions around the world: What should customers consider in order to lower their total costs when buying PCBs?



USA
CARL MOHRING
Western Regional Sales Manager,
NCAB Group USA

“The two suggestions I have that would best benefit the customer are firstly, to build a good relationship with your suppliers, rather than managing the supply chain via spreadsheets. Use suppliers who truly value your business, deliver value and offer personalized and savvy solutions. You need to assume control of the supply chain by defining the characteristics of the supplier that are of value to your operations and then make your choices accordingly. Price is not everything.”



NORWAY
EGIL SKIAKER
Technical Manager,
NCAB Group Norway

“We advise our customers to make sure their specifications match the real needs of the PCB in question. To enable us to provide the customer with the best price and quality, we want to be involved early in the design phase. For example, it is important that the design doesn’t comprise more layers than needed. Panelizing is a very important factor to minimize cost, but it has to be robust enough for the assembly process later. Another important factor is to consider how many boards you will need over a period of time and what size batches are cost effective to order.”



GERMANY
UWE ZIMMERMANN
Key Account Manager,
NCAB Group Germany

“As regards the purchase of PCBs, the future lies in using suppliers who do not manufacture in-house. The greater purchasing power of those players will give you better manufacturing prices, which will cut your purchasing costs. You’ll also have access to a wide spectrum of PCB solutions and types of factories to choose from, without having to deal directly with several different contacts, or need your own in-house specialists.”

Can you reduce your PCB prices by 10 percent?

HANS STÄHL
CEO NCAB GROUP



The answer is definitely yes! Providing however, that you do things right from the start.

In this edition of our newsletter, Michael and Bo describe relatively simple measures that cut the cost of the boards themselves. Moreover, total costs are also lowered through reducing waste and improving the delivery precision of your PCB production process. The above examples alone probably save between 10 to 15 percent in costs, without sacrificing quality, which is never an option!

So why don't all buyers save 10 percent on their prices? It would

be reasonable to expect that everyone would be doing that? The fact is, I do not know. Perhaps it might have to do with the measures one needs to initially implement short term, both on the development and maintenance of the product. However, I can assure you - the work involved to implement the measures we recommend will pay you back hundredfold. I should add that many customers are in full control of this process. Their bottom line is thus a far superior product, at a lower total cost. However, I am convinced that these products can be even further improved!



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 our website:

» [NCAB Group Design Input](#)

Subjects we have covered earlier

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

» **Sustainable business**

2014 12 22 | NEWSLETTER 4 2014

» **High-tech PCBs**

2014 10 07 | NEWSLETTER 3 2014

» **Looking ahead with NCAB's Market Watch**

2014 05 30 | NEWSLETTER 2 2014

» **NCAB Group Production Insight Trips**

2014 02 14 | NEWSLETTER 1 2014

» **The Components Industry**

2013 11 18 | NEWSLETTER 4 2013

» **High product mix**

2013 09 24 | NEWSLETTER 3 2013

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