

What's Your PCB Assembly IQ?

Quiz #1 – Outsourcing Board Assembly

QUESTIONS

Part 1 – Business Decisions

True or False:

1. Outsourcing PCB assembly usually costs more than keeping it in-house
2. Despite the high, but legitimate cost of overheads, contract assemblers still make big, fat profits
3. Outsourced PCB assembly operations produce better quality than captive ones
4. It's okay to contract out production boards, but prototypes should always be built in-house
5. All CEMs are the same. Same equipment, same experience, same old story. In the end, choosing a contractor all boils down to price...

Part 2 – Component Decisions

True or False:

6. Kitting components for contractors will keep their markup down
7. OEMs should specify the PCB fabricator when outsourcing assembly
8. CEMs will use substitute components to get the price down to win the business
9. CEMs get better component pricing
10. If we let our contract manufacturer buy components for us, then we will lose service from our component reps and miss out on new product introductions

ANSWERS:

1. **False.** Basic cost comparisons often fail to consider many of the hidden expenses such as employee training, health insurance, overhead burdens, material handling, ancillary functions such as QA and shipping/receiving, and - of course - the cost of capital equipment, which is very expensive and often goes underutilized for small, in-house operations.
2. **False.** CEMs typically mark up about 30%, but after expenses realize about a 10% profit margin. And that's with better asset utilization than most in-house operations.
3. **True.** Contract manufacturers that focus on electronic assembly have a stronger skills base, more specialized expertise, and more sophisticated equipment and methods than OEMs that manufacture a wide variety of products.

4. **False.** Prototypes demand more expertise than production boards. They require flexible manufacturing systems and people with great attention to detail to handle last-minute BOM changes, circuit modifications or part shortages. Also, prototypes must be built with the utmost care, because there is no room for yield fallout and no time for rework, and they rarely incorporate DFM principles. Some contract shops specialize in prototypes; others have groups within their organization dedicated to it.
5. **False.** What makes the difference between all contract manufactures are the people – from the ones that run the business to the ones that build the boards. Different contractors may have similar equipment, quality certifications or marketing claims, but they do not all have the same discipline, work ethic or reliable supplier base.
6. **True.** But most companies appreciate the value in having their contractor buy components. Contractors are extremely meticulous in making sure incoming inventory is on-time and correct.

On the topic of kitting components, contract assemblers HATE getting strips of parts – we can't feed strips on our placement machines and have to hand place the components. We need reels to be able to machine place the parts, so please, please, if kitting parts, don't cut strips from reels!

7. **False. Well, mostly false.** Usually, OEMs should let their contractor select from their own preferred fabricators. This way, if there is ever a quality issue related to the PCBs, the contractor takes full ownership of it.
HOWEVER, if the boards are IPC Class III, that's a different story. Based on her extensive PCB experience, Marissa suggests having the fabricator build a proto PCB and sending to a 3rd party for verification before releasing a production order to them or to the assembler. Because the reliability of Class III boards is so important, it's wise to verify the fabricator's capability before moving forward with the fabrication and assembly processes. The verification process only takes a few extra days, and is worth it, given the performance requirements of the end products. The assembly contractor should be able to arrange the PCB validation process for the OEM, especially if the PCB is procured through one of the CEMs' preferred fabricators.
8. **False. Again, mostly false.** Most American contractors do not want the liability of line item substitutions for key components, because minor differences in electrical, mechanical or thermal properties could affect overall product performance.
HOWEVER, on commodity items like capacitors or resistors with standard impedance and tolerance values, most CEMs will use their best value supplier. Not necessarily the cheapest, but the one that consistently delivers the best quality products and service at the best prices. So in this case, letting the CEM select the component vendor is in the OEMs best interest.
9. **True.** CEMs can often get better component pricing due to their purchasing volumes, particularly when it comes to commodity components or bare boards. Sometimes, however, when purchasing on behalf of the OEM, assemblers can get better pricing from the big component distributors like DigiKey or Mouser because they will discount their pricing based on the OEM's total expenditure. Either way, the CEM is going to get the best available price for the components.

10. **False.** Component distributors understand the nature of the supply chain and are well accustomed to PCB assembly getting contracted out. Just because an OEM is not building the PC board doesn't mean the component distributors will forget about them – they still want to get their components spec'd into the OEM's products. It makes no difference to the distributor if the OEM or the CEM buys the parts; the OEM will still receive the service and support they are accustomed to, and get credited with the sales for overall pricing and discounting purposes.

SCORING

What is your PCB Assembly Outsourcing IQ? Give yourself one point for every correct answer, deduct one point for every incorrect answer, and do whatever you want with trick questions #7 and 8.

This is February, the month of Valentine's Day and the month of Love, so we are equating you're the quiz scores to our special Love Scale.

If you scored 8-10, you are Cupid! With the highest possible score, you have demonstrated your worldly knowledge about electronic manufacturing and strategic sourcing. So how does this make you Cupid? Simple – love is a chemical reaction, just like many of the processes that make printed circuit boards. Its ion exchange creates small electric charges that release brain chemicals like serotonin and dopamine to make you feel good. We figure that since you are a master at PCB processes, you must also be a master at love; hence the designation of Cupid. While you might outsource your electronics manufacturing, you never have to outsource your love (wink!).

If you scored 0-6, you are Arm Candy. You came in second to Cupid. That's not bad; it's just not the entire package. You seem to have decent enough knowledge about electronic manufacturing, and that is half the battle. Your love skills are anybody's guess; you might want to stay focused on your career for now. Keep taking the bi-monthly IQ Quizzes to improve your knowledge of PCB assembly, and maybe next year you'll reach Cupid status!

If you scored less than ZERO, you are Stupid, not Cupid. You got a negative score – how pathetic! Mathematically speaking, the only way to get a negative score is by getting more answers wrong than right, and two of them were gimmes anyway. You loser; your only hope for Valentine's Day is spending it with your Ex – your Xbox360 (ouch!). Such a sad irony: your only love is electronics, and you don't even know much about them. Shallow fool...

If we seem a little harsh on quizees who ended up in the hole, well, slackers need a little tough love once in a while. But for everyone who took this quiz, regardless of your score, we love you all!