

Designing & Building Marketable Electronics Products

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Dr. Michel Jullian, President, OCM Manufacturing



Skill-Testing Questions

- The majority of the cost of an electronics product is:
 - Material cost
 - Labour cost

- Product design can cut the costs of an electronic product by:
 - 2%-5%
 - 5%-10%
 - 10%-30%
 - 30% or more

- The best time to assess a product's manufacturability is:
 - When the product is in early design
 - Once a design schematic is available
 - After parts have been sourced
 - Once a prototype is available



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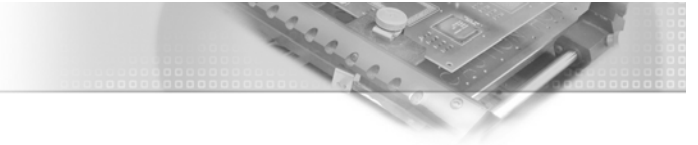
Most Product Costs are Invisible

- 90% of the cost of an electronic product is determined by design
- Most design-for-manufacturing defects are “invisible” until a manufacturer looks at the design
- By the time a product gets to manufacturing stage, no one can afford to make changes



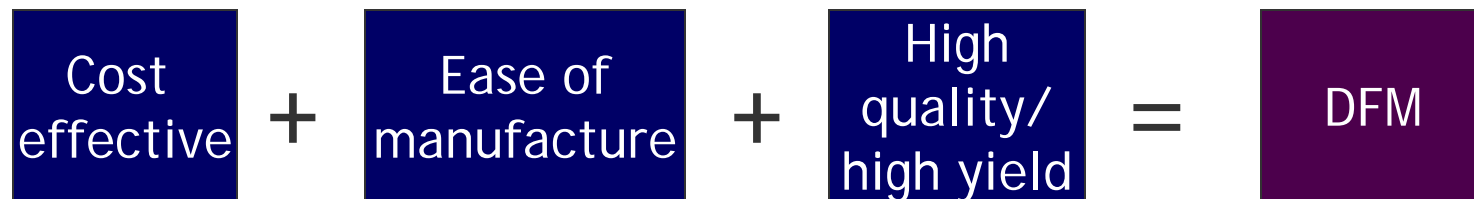
Unforeseen Costs Affect Marketability

- Costly delays when products must be re-designed
- Parts selection can increase product cost substantially
- Unforeseen labour costs can price a product right out of the market



Design for Manufacturing

- DFM balances design and manufacturing considerations
- DFM focuses on achieving the most cost-effective and easily manufactured product while maintaining high quality





Myth 1: 90% of Cost is Material

- In LVHM manufacturing, labour contributes 20%-40% of the product's cost
- Product design can cut those costs by 10% - 30%

- It is possible to design products for near-zero labour cost!
- Must engage contract manufacturer (CM) early in the design process to make it happen



Myth 2: Performance Trumps Manufacturability

- Performance can differentiate an electronics product ...
- But the product won't sell if the market won't bear its cost


- It is possible to over-design a product into market oblivion
- Must engage contract manufacturer (CM) early in the design process to prevent this



Myth 3: Prototypes Prove Manufacturability

- Prototypes prove what a product can do
- Most prototypes do not address volume manufacturability issues

- Only a manufacturer can gauge a proposed product's actual cost by assessing its manufacturability
- A CM incorporates design-for-manufacture into its prototypes
- "Doing it on the next round" means it's not done or not done in time



Myth 4: Component Choice is an Engineering issue

- Savvy component selection can also reduce product costs dramatically
- Single-source components cause manufacturability issues:
 - No opportunity to seek competitive bids
 - High risk of obsolescence
- 20% of the parts that make up 80% of a product's material cost should always be reviewed by the CM



Myth 5: Consignment Saves Money

- Consignment shuts you out of a CM's volume purchasing power
- Consignment costs money to purchase and kit
- Consigned kits add labour cost to the CM's process

- Contract manufacturers have mature purchasing processes and relationships that you can piggy-back on



Myth 6: Smaller Products Cost Less

- Higher-density parts are more costly to manufacture
 - More difficult to inspect
 - Lower yield
- If the board has room for it, use less-dense parts

- A contract manufacturer can identify unnecessarily dense components and recommend alternatives



Best Practices

- Form a relationship with an appropriate CM early on
- Choose components with more than one source
- Design to reduce manufacturing steps
- Design for automation
- Design for test
- Plan panelization or leave it to the CM

About OCM Manufacturing

- OCM Manufacturing: electronics manufacturing services for small- and mid-size companies – **partnership model**
- Low-volume, high-mix (LVHM) specialization
- 20%- 40% of the cost of LVHM products is labour
- Operations in China allow us to build low-cost Chinese labour into our business model





Thank You!

michel.jullian@ocmmanufacturing.com