

AssistWare

T E C H N O L O G Y

Low-Cost Electronic Manufacturing

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AssistWare Technology

And the survey says...

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What We Do

- Annual Cost of Fatigued Driving
 - 71,000 injuries
 - 1,500 fatalities
 - \$12.5 Billion
 - Considerably more due to inattention & distraction



Product

- SafeTRAC Lane Departure Warning System
 - Monitors road and warns against:
 - Unintended lane drift & fatigue
 - Reduces accidents caused by:
 - Fatigue, Distraction, Inattention



Under the Hood

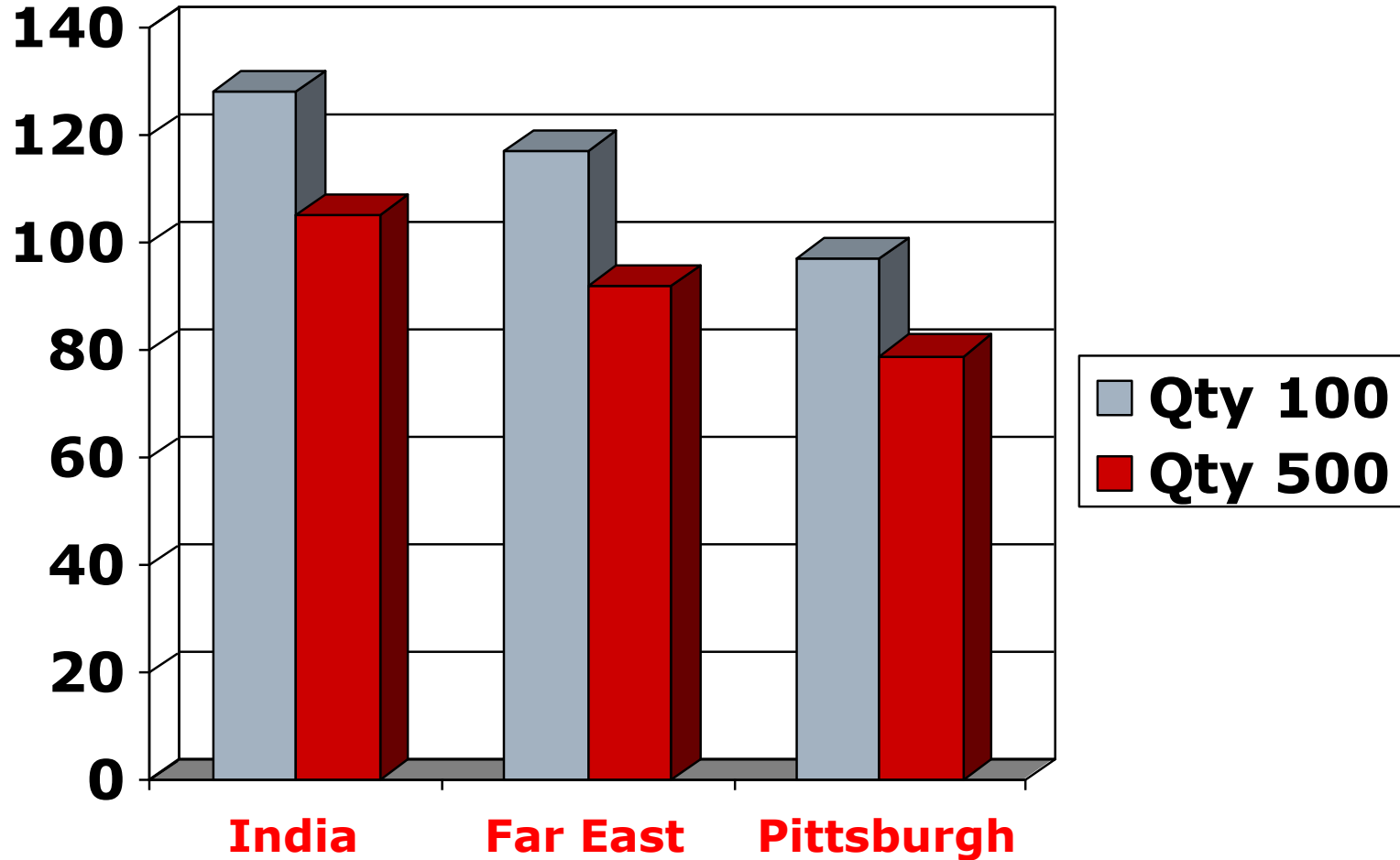


Case Study

- Main Processor Board
 - 4 layers, double-sided
 - Approx. 30 components
 - Fine pitch, surface mount



Quotes



Why?

□ Automation

- Labor is insignificant relative to:
 - Material cost
 - Machine cost
-

Perception



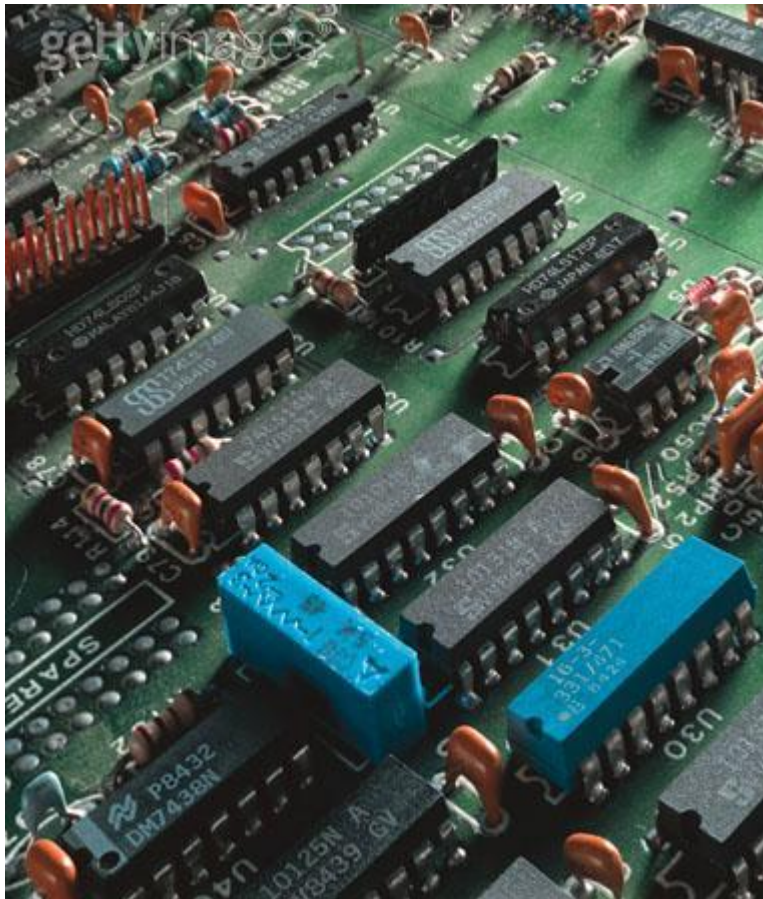
Reality

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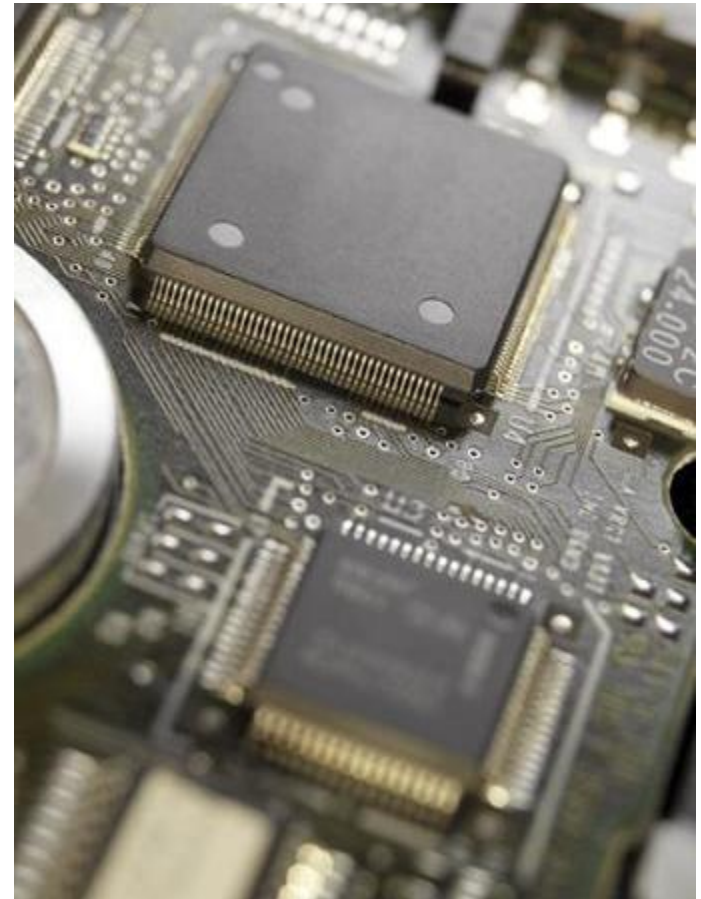


What changed

Thru-hole



Surface Mount



Analysis

- Cost of components
 - \$93.5 fixed component cost
 - Variable OH associated with supply chain procurement
-

Analysis

□ Machine setup

- Time = 1.5 hours
 - US labor rate \$65 / hr => \$100 / run
 - Run size = 100 boards
 - **\$1 / board for setup**
 - Varies based on efficiency, skill and planning of vendor
-

Analysis

□ Line 'lease'

- Line Cost = \$300,000
 - Board throughput = 1 board / minute
 - Line throughput = 120,000 boards / year
 - 50% utilization, 2 shifts
 - **\$2.5 / board for run time**
 - 1 year payback on line capeq
 - Varies based on depreciation schedule of equipment and utilization rates
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Analysis

- ❑ \$93.50 materials
 - ❑ \$1.00 setup cost
 - ❑ \$2.50 machine cost
 - ❑ \$97.00 total cost
 - ❑ Labor represented 1.02% of total cost
 - ❑ Material and machine cost independent of location
 - ❑ Setup labor diluted with higher volumes
-

Intangibles

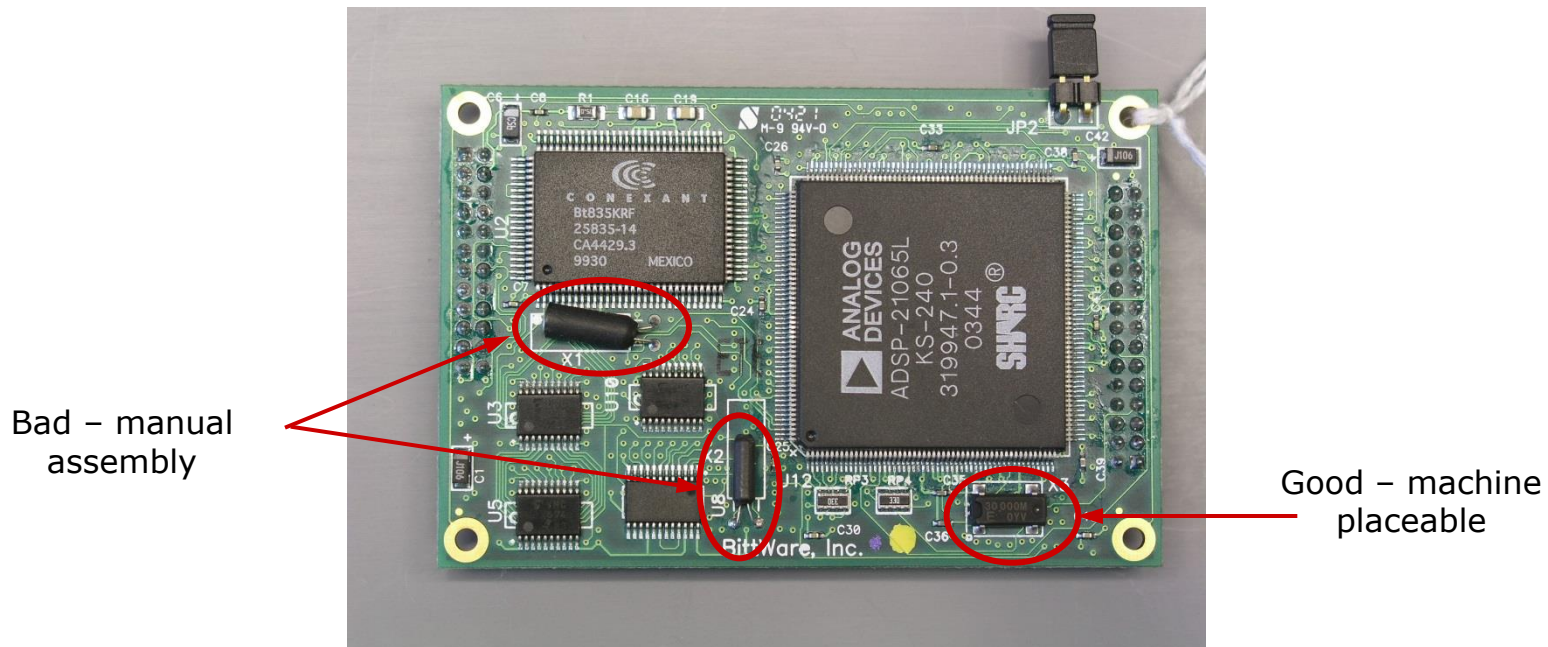
- Quality control
 - Supply chain leverage
 - inability to source certain parts
 - Documentation
 - FDA, MILSPEC
 - Freight, customs, taxes
 - IP Control
 - Responsiveness to engineering changes
 - Initial NRE
 - Testing
 - Less dramatic for low cost, very high volume devices >100,000
-

Keys to low-cost

- DFM – Design for Manufacturability
 - DFA – Design for Automation
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Keys to low-cost

□ A Tale of Three Crystals



Conclusion

Overseas manufacturing has its role, but...

Don't automatically assume that it has to be cheaper

