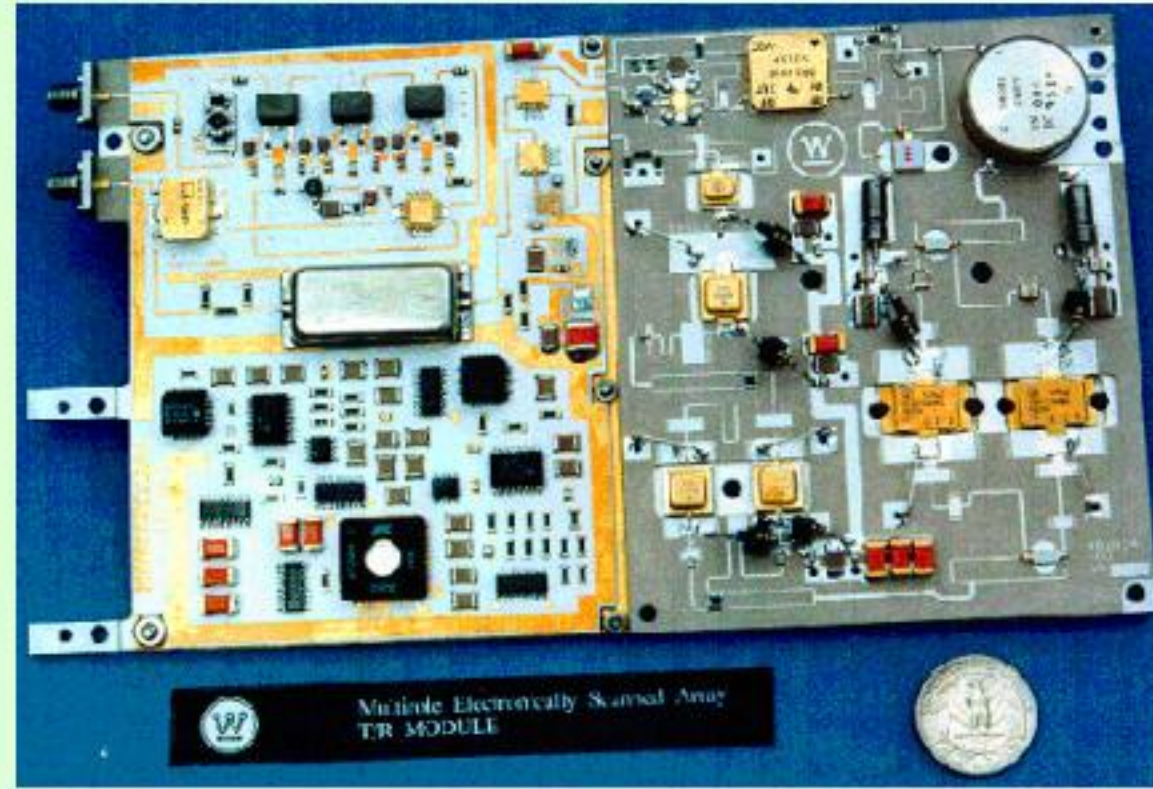


Design For Production: Using Manufacturing Cycle Time Information to Improve Product Development

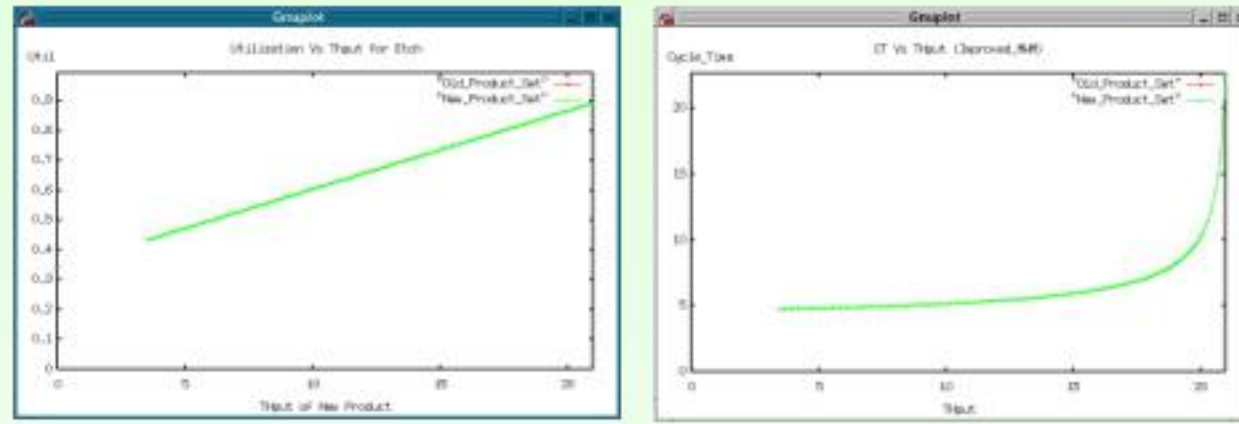
J.W.Herrmann, M.M.Chincholkar

Microwave Modules are electromechanical devices used in radar applications.

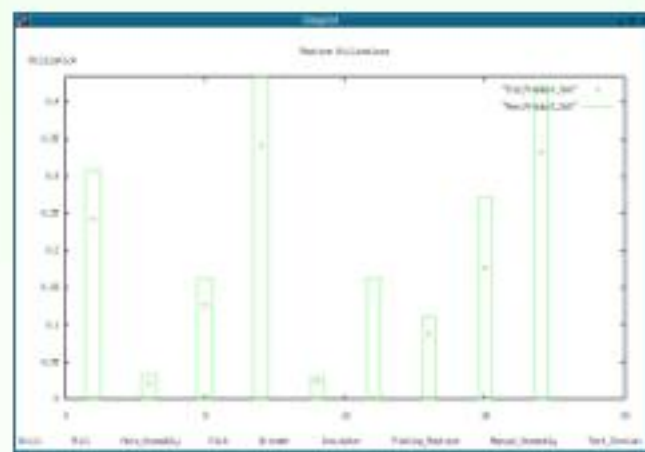


DFP-MWM

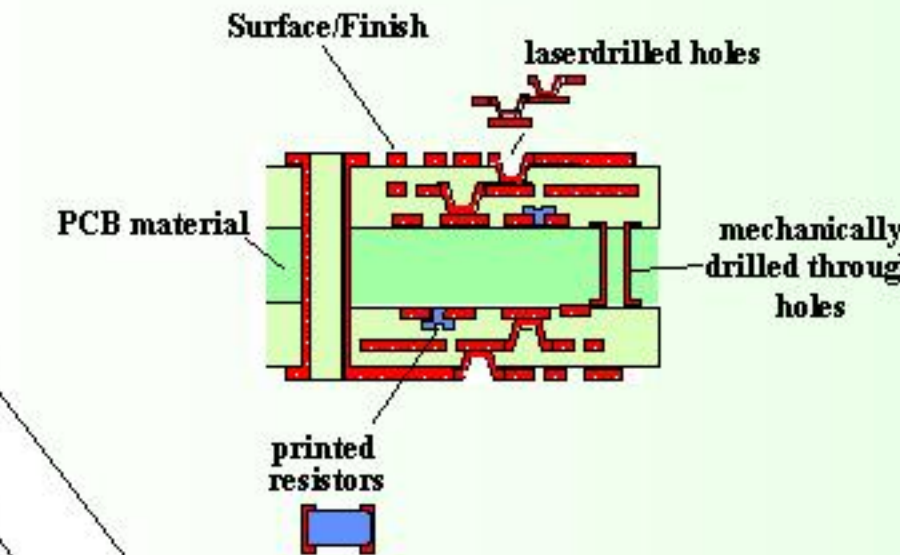
Estimates changes to resource utilization and manufacturing cycle time as the product mix and throughput change.



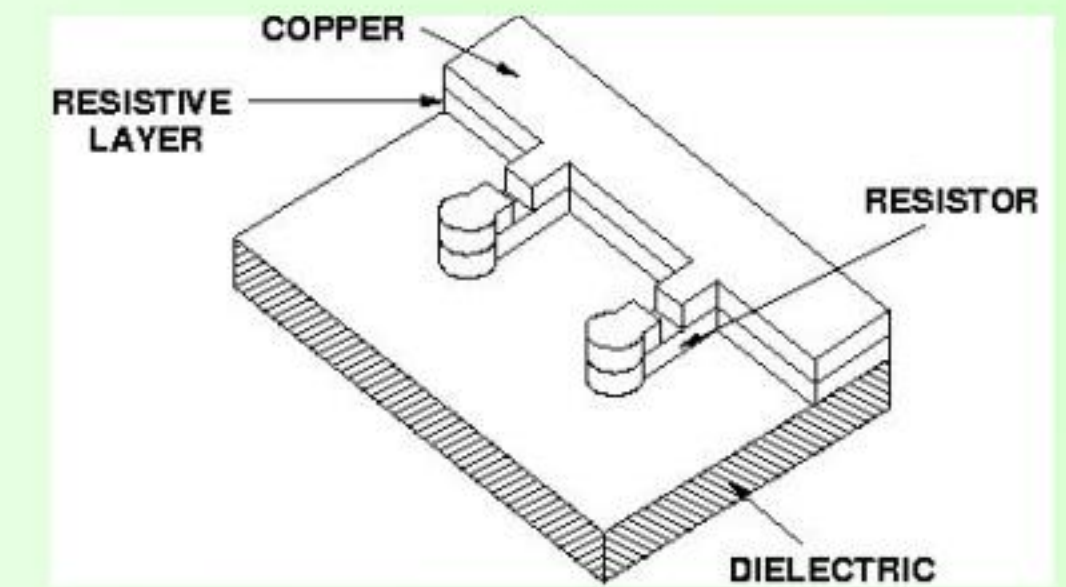
Introducing a new product increases resource utilization unequally.



Embedded Passives are buried or embedded into a PCB substrate, which reduces board size.



Cross-section of a PCB with embedded passives.



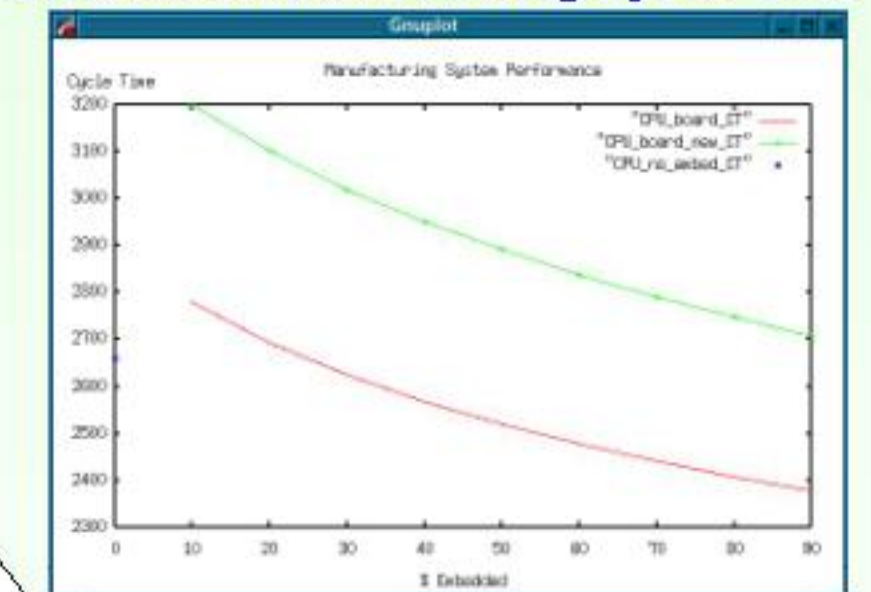
Etching an embedded resistor.

Tradeoffs in manufacturing PCBs with embedded passives:

- Additional processing steps
- Fewer holes to drill
- Additional layers
- More boards per panel

DFP-EP

Estimates the impact of embedding passives on manufacturing system performance, including resource utilization and manufacturing cycle time



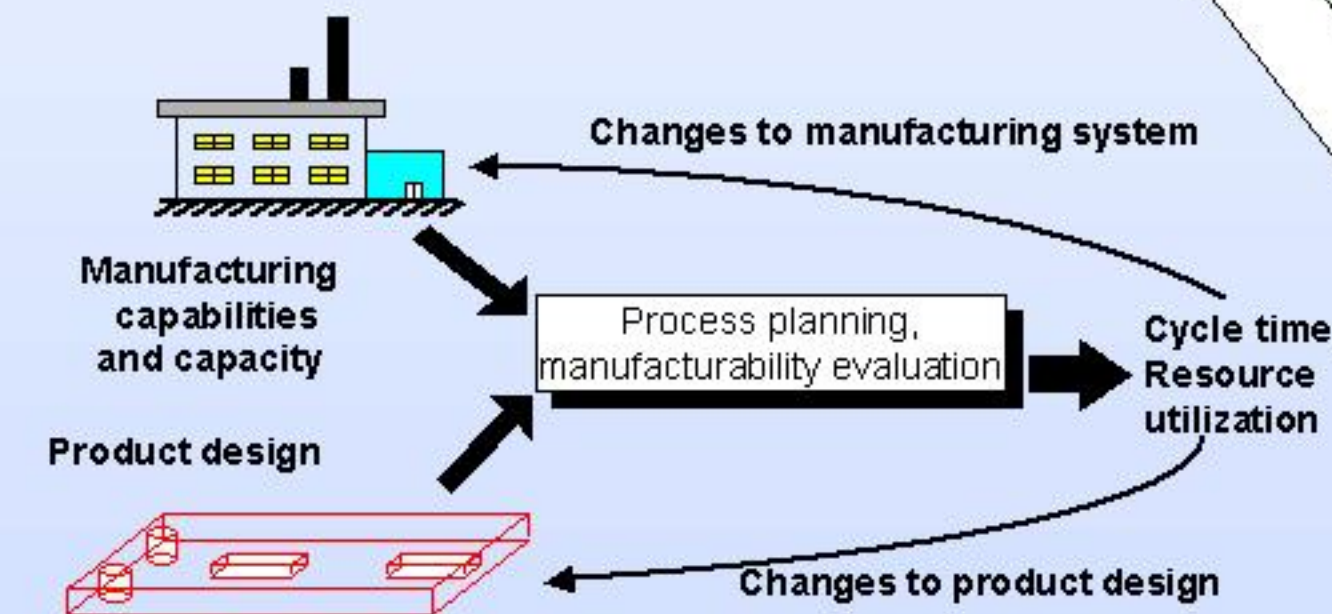
In this example, manufacturing cycle time decreases as more passives are embedded.

What is DFP?

Design for Production describes techniques for calculating capacity requirements and estimating the manufacturing cycle time of a new product in a new or existing manufacturing system. It identifies problems due to insufficient capacity or congestion in a factory or supply chain and makes redesign suggestions. Reducing manufacturing cycle time early in the product realization process avoids unnecessary costs and delays in time-to-market and production.

Concurrent Manufacturing System and Product Design

Manufacturing cycle time is an important performance measure. The product development team should aim to avoid manufacturing cycle time problems by predicting the impact that the product design has on the manufacturing cycle time and making needed changes to the product design and the manufacturing system.



Implementing DFP

The left-hand figure is a general DFP flow chart. The right-hand figure is a prototype DFP tool.

