

Project Management for Hardware Design

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An engineer, by nature, loves solving problems. Provided the right guidance, this predisposition is a valuable asset for companies driven by innovation.

But what problems are worth solving? And further, how does one define solutions to such problems and then assess their opportunity? These are the core questions which project managers must answer. Failure to ground a project by rigorously addressing these questions can be the undoing of even the most talented engineers. Once these questions are answered, project managers are also responsible for translating their solutions into a featureset. This all must be done within the constraints of a fixed schedule and a defined budget.

While there are common driving principles, any detailed discussion of project management is highly dependent on the industry under consideration. This is certainly true of hardware design.

Hardware product development presents a unique set of challenges for bringing a solution to the market. Unlike other areas of product development which can allow for some fluidity in final deliverables, a hardware project's featureset must remain largely fixed throughout development. Factors such as component procurement, PCB fabrication lead times, manufacturing delays, and "change impacts" to validation and verification (V&V) impose challenges to hardware development. If "feature creep" is permitted during a hardware design cycle, then target schedules and development expenses are almost certainly invalidated.

In my talk, I will describe a framework for hardware project management which allows for clear feature definition, opportunity assessment, risk qualification, trade and regulatory considerations, as well as product quality assurance. In addition, I wish to provide insight into why large corporations have a distinct advantage when it comes to hardware development.

To convey this material in an accessible format, I will describe this framework using a hypothetical new project development of a high density power inverter. I will briefly describe the inverter technology, and will then walk through how a company would conceive the technology, define a solution, plan for V&V, and see the project through manufacturing verification and release. I will place considerable emphasis on the concept and definition of this hypothetical project and will clearly define its Estimated Return on Investment (EROI).