Need to develop an idea, provide relief to your engineering staff, or just an experienced opinion? Put my experience to work for you. Affordable Engineering Services for those times you need an engineer but don't want one on your permanent payroll. A broad range of engineering services are available from David@MyDesignEngineer.com. Services are available by the hour or project to help you control the cost.

Problem Definition

A key task in any development project or problem-solving process is the correctly define what needs to be accomplished. Is the right issue being addressed. Are all the necessary factors being considered. Properly defining the task and the goals will minimize the cost of solving the issue or developing the product.

Concept Development

When the end goal or product has been defined in general terms with as many specifics as possible, then concepts can be developed to help steer the develop effort and determine feasibility. The concepts will usually be illustrated with block diagrams and simple 3D models.

Develop Specification

When the concept development has matured to the point where features can be defined, a specification will be developed to define the parameters of those features so the actual hardware development can begin. The specification will often be guided by established industry standards required for the product or industry.

Electrical Design

The electrical design can begin as the specification is nearing completion. The design must meet the specification and the cost goals required to make the product successful.

3D Mechanical Design

The mechanical design will be guided by the concept development. This is where the manufacturability (DFM) of the effort will be considered. The design must meet the requirements and needs of the customer as well as the cost goals for the product.

PC Board Creation

The PC board will be designed in conjunction with the mechanical design to meet the electrical design requirements and cost goals. Special care must be given to component selection, manufacturability and testability to minimize production costs.

Software Development

The software development must begin with the mechanical and electrical design efforts. A plan must be created to define what types of software or firmware will be required and what languages and tools will be needed for development. If there will be a need to update the product software or firmware after the customer has taken receipt of the product, then that capability must be designed into the product from the beginning. Software code should be well developed and meticulously documented in case someone other than the original developer must update the code in the future.

Develop Prototypes

When the mechanical design is completed to an initial stage, a 3D printer may be used to create prototype enclosures that can then be used for evaluation against the concept and to aid in the development of the PC Board. Final production parts may be machined from metal, formed with sheet metal, printed in plastic or metal, or injection molded for high-volume applications.

Source Components

It doesn't matter how good the mechanical and electrical designs are if components used in the design are hard to obtain. Component sources and life expectancy must be considered early in the design phases. The quantity and life of the end product to be produced may influence what life expectancy is required. Will the components be sourced through distributors or directly from the

manufacturer? These decisions will impact the cost and cash flow required to build the product.

Manufacturability

Manufacturability (DFM = Design For Manufacturing) is critical to the success of the project. The mechanical and electrical design efforts must give key consideration to how the product will be manufactured for the lowest cost and highest reliability required for the intended market. The design must incorporate components that are readily available. The time to assemble and test the product must be considered from the beginning of the design effort to minimize the cost to produce the product.

Full Documentation

After all of the development work has been completed and prototypes have been built and tested, then all of the documentation to completely project must be made ready for production.

Manufacturing

After the product is developed the next step is to get it produced. This may be done in-house, or through a contract manufacturer. Component lead time and any required tooling should be considered as early in the project as possible. Engineering support may be required to interface with the manufacturing personnel to develop a plan for producing the product.

Production Support

After the product is in production, ongoing engineering support may be required to solve production issues as they arise. The manufacturer may need assistance developing a test plan for the product.