Closing the Gap Between Design and Production

DFM Strategies for Robust Electronic Products

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Overview

For every commercial Electronic Design there comes the time when the prototype stage is over and the production stage begins.

Let's talk about some strategies involving

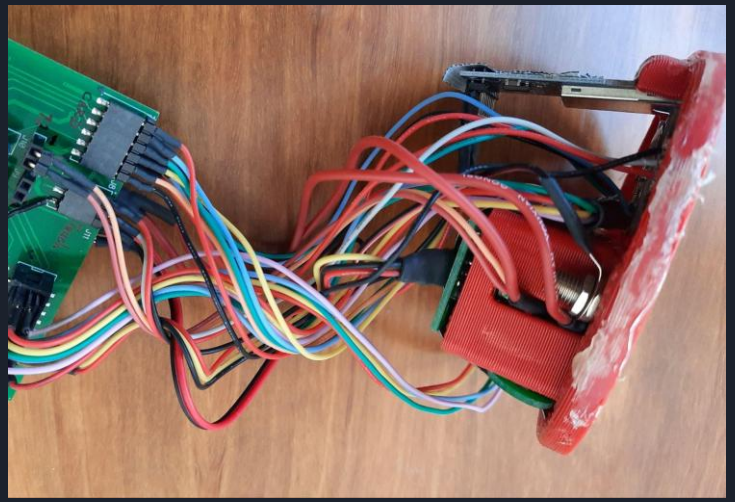
DFM - Design for Manufacturing

DFT - Design for Testing

DFS - Design for Serviceability

… and the one simple design feature that makes all three areas better.

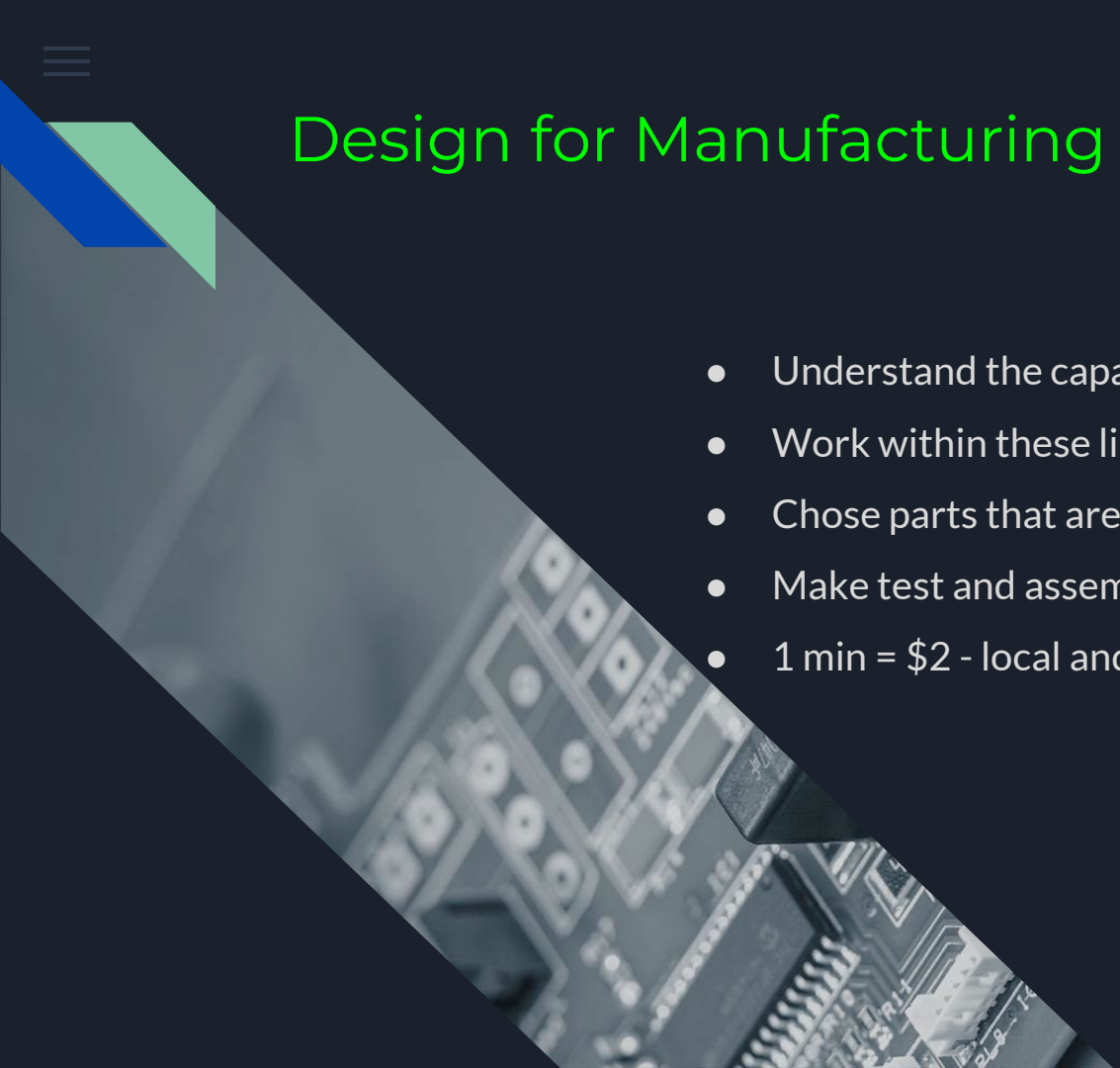
The Challenge



Turn This

into That

Design for Manufacturing - DFM



- Understand the capabilities of your fabricator and assembler
- Work within these limits, e.g. PCB rules
- Chose parts that are easy to source
- Make test and assembly easy and fast
- 1 min = $2 - local and overseas!

Design for Testing - DFT

- Production Test is not a Design Verification
- Test automation varies with quantities
- Ideal production test: Start button -> green / red LED
- Even better: Start button -> green / red LED + failed test info
- Reduce time/cost and test fatigue

Design for Serviceability - DFS

- Modular design
- Easy Access
- Standardisation of components and tools
- Error proof design (unique connectors)
- Diagnostic

In short

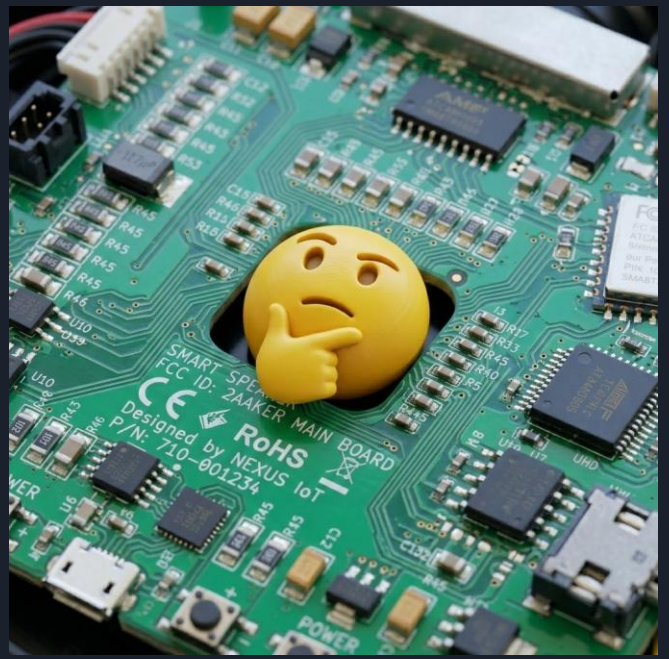
DFM - understand your manufacturer

DFT - simple and structured testing

DFS - easy to maintain and repair

There are a lot of details in these concepts

What is one thing that we can use in most designs to make all 3 areas better…



Would you rather be a

GP

or a Vet ?

Get an insight into the health of your system

In most microcontroller systems today you will have a spare serial port

Use this port to create a

diagnostic interface

that can support every stage of the product cycle from design via production to service

Serial diagnostic interface

Design - troubleshoot HW and FW

Field Test - log data, diagnostic

Production - automate testing

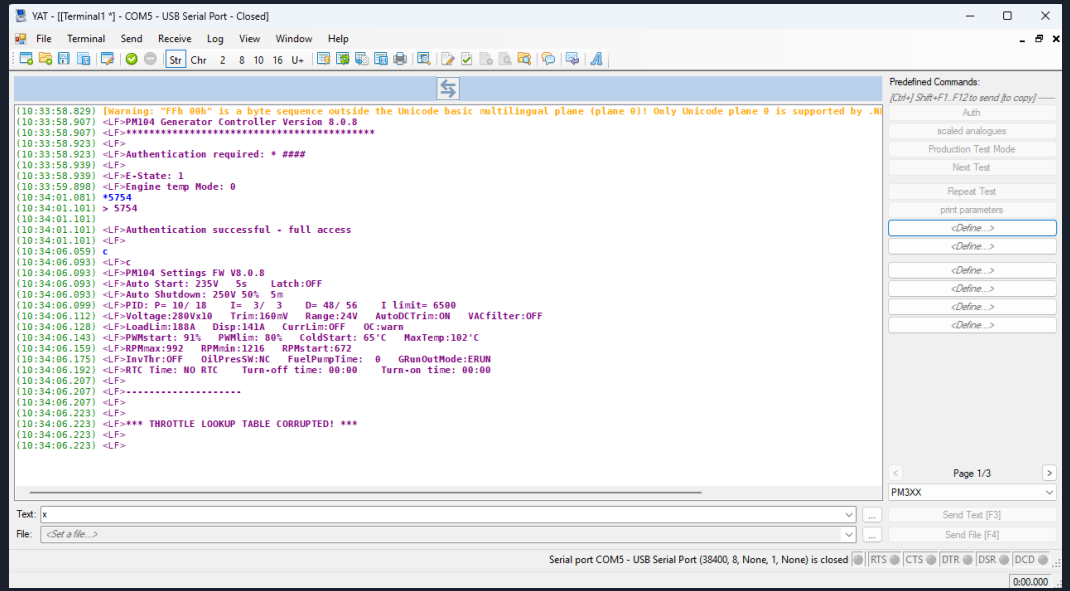
Installation - configuration

Operation - log data, self test

Maintenance - read logs

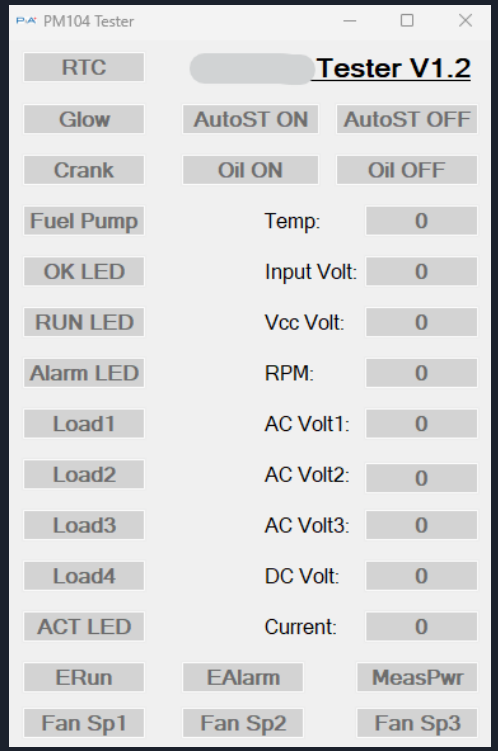
Service - diagnostic

User interface examples: Design



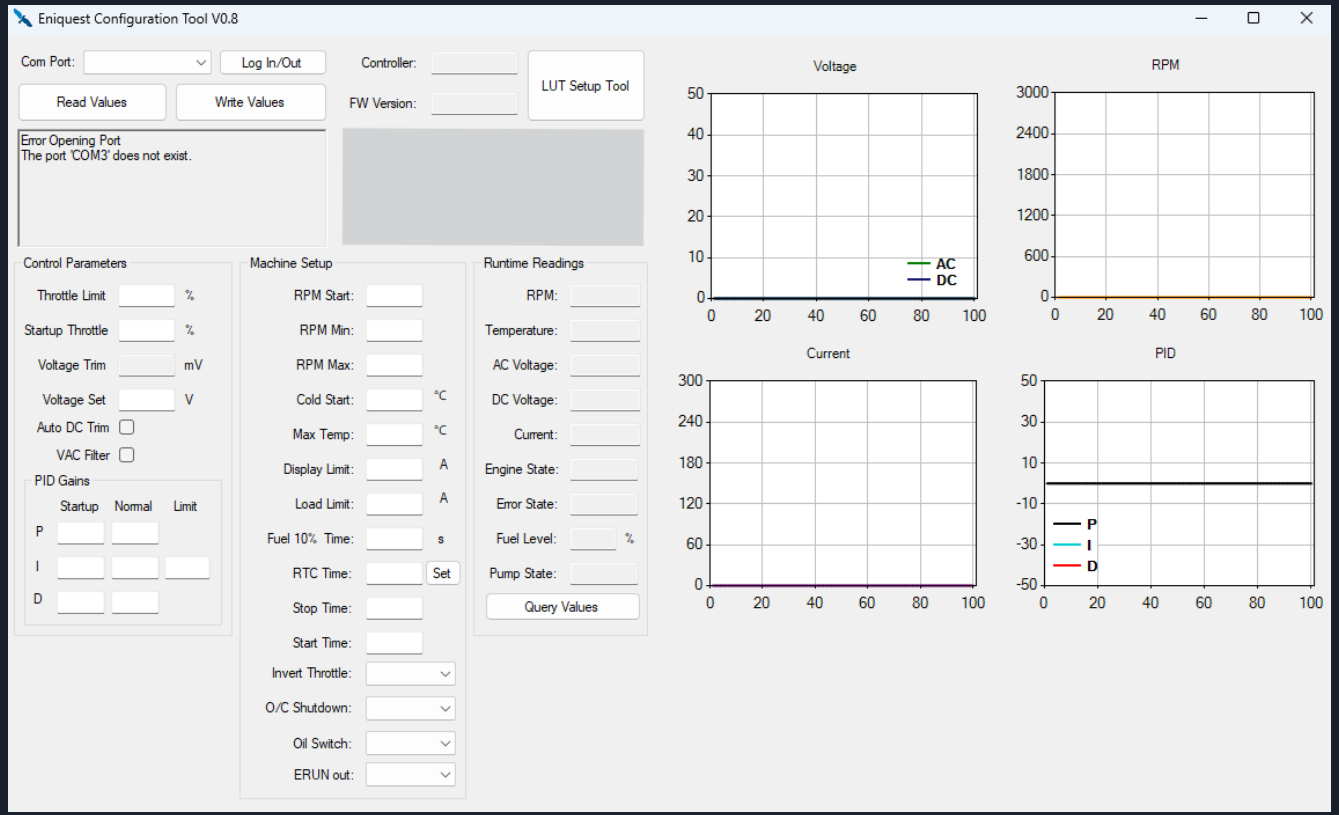
- Simple Terminal program
- Runtime diagnostic
- Parameter setting
- Issue control commands
- Debug information

User interface examples: Production Test

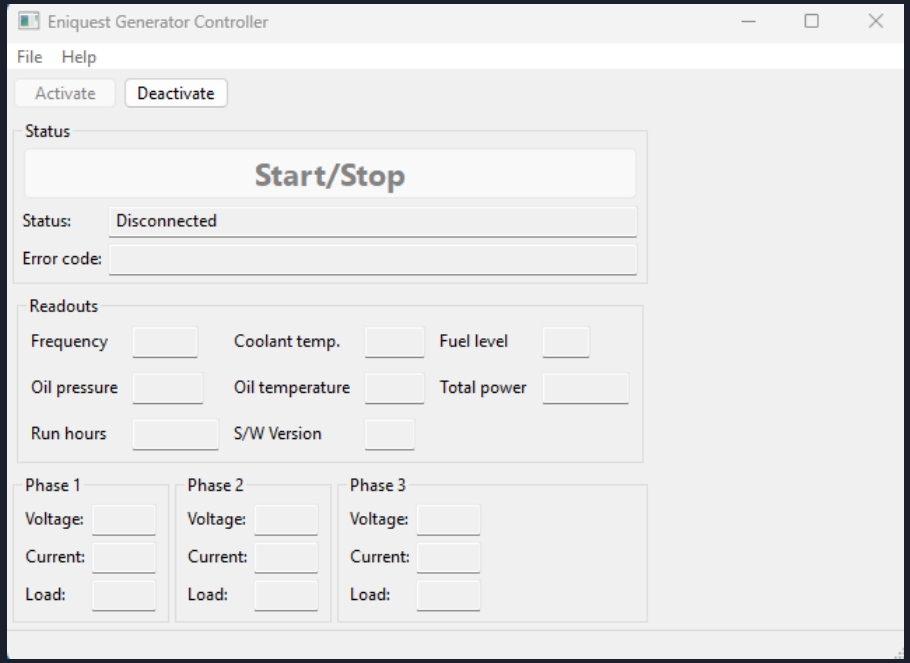


- DUT is placed on test jig
- PC controls target via serial connection.
- On completion, each test box goes green for pass or red for fail.
- Test steps proceed mostly automatically
- Prompts guide user through the sequence if interaction is required
- Test records are generated from PC software

User interface examples: Configuration tool



User interface examples: Remote operation



- Remote operation
- Remote diagnostic

Remember

01 Talk to your manufacturer
-> understand their requirements, play to their strength

02 Talk to your product (easier to be a GP than a Vet)
-> implement a diagnostic port

03 Make DFM, DFT and DFS part of your design process,
not an afterthought

Thank you!

We only scratched the surface today

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