
# Predict wear out before it happens

## Locate high risk failure zones in fielded PCBAs with Sherlock Automated Design™ Analysis

Sherlock Automated Design Analysis™ Software, is a Physics of Failure based reliability tool that will help you better forecast electronics maintenance and reduce operating and support costs. Sherlock is the first-of-its-kind Automated Design Analysis software for analyzing, grading, and certifying the expected reliability of products at the circuit card assembly level.

### Automatically Extend Time Between Maintenance Cycles

Sherlock automatically identifies components with solder joints near end of life and alerts repair personnel so that they can be 'refreshed' wile the PCBA is already in depot for repairs. This unique tool allows suppliers to effectively anticipate and remediate the next points of failure, extending time between maintenance. In addition, because the enhanced process identifies the most likely future failure zones caused by solder joint fatigue, intermittent failures that cause no-fault founds or cannot duplicates will also be reduced.

### Easily Manage Complex Materials and Systems

An avionics electronic assembly is a complex interaction of materials that depends on the harmonious interface of their various mechanical, thermal, and electrical properties. The DfR Solutions, Sherlock software tool effectively balances traditional maintenance procedures with condition based maintenance processes enabling suppliers to predict and proactively repair the most salient failure sites that have not yet degraded to the point of detectability. In this way, a PCBA can be returned to ready for issue status with a much extended time to next maintenance.

sherlock
AUTOMATED DESIGN ANALYSIS™

- ✓ Predict useful life or remaining RUL of electronic circuit boards
- ✓ Identify age related wear out items
- ✓ Detect most likely future failure zones caused by solder joint fatigue
- ✓ Reduce return rate and extend time between maintenance cycles

**Call for more information**
**Phone:(301) 474-0607**

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Beltsville, MD 20705


dfrsolutions.com

DfR Solutions
reliability designed, reliability delivered


## Reduce Your Risk

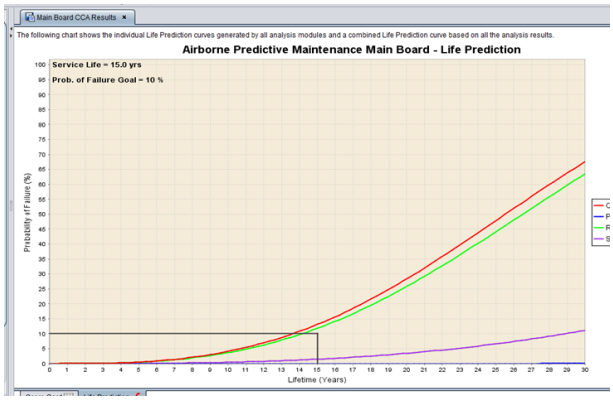
Determining a maintenance approach for complex avionics electronics systems is an exercise in tradeoff analysis. Four main risks need to be considered when choosing a maintenance approach:

- **Handling Risk:** electrostatic discharge (ESD), dropping, board bending, etc.
- **Thermal Risk:** Potential that heat generated during repair can cause unintended damage
- **Obsolescence Risk:** What parts are obsolete
- **The Risk of Return:** How soon after re-fielding an LRU is it likely to need additional repairs

Sherlock Automated Design™ Analysis predicts the useful life or if already in operation the remaining useful life (RUL) of electronic circuit boards. It identifies age related wear out items, and identifies the most likely future failure zones caused by solder joint fatigue. By planning ahead for wear out items or making repairs of future solder joint failures, the return rate of these same boards will be reduced.

## Sherlock is Fast, Easy, and Accurate

Using a number of validated techniques including failure based predictions, Sherlock accounts for the use environment and required lifetime of the PCBA. Sherlock provides aggregate lifetime predictions at the PCBA and box and quickly and easily identifies which components are the most at risk of solder joint failure and what the gain in time to next failure is likely to be.




**PCBA probability of failure prediction by failure mechanism**

dfr-vibration-coupon4 Solder Fatigue

| RefDes | Package | Part Type | Side | Solder | Max dT (C | Cycles to Fail | TTF (yrs) | Score |
|---|---|---|---|---|---|---|---|---|
| U11 | LCCC-44 | IC | TOP | 63SN37PB | 57.5 | 5,050 | 13.84 | 0.0 |
| U12 | LCCC-44 | IC | TOP | 63SN37PB | 57.5 | 5,050 | 13.84 | 0.0 |
| U9 | BGA676 | IC | TOP | 63SN37PB | 57.5 | 13,052 | 35.76 | 5.1 |
| U10 | BGA676 | IC | TOP | 63SN37PB | 57.5 | 13,052 | 35.76 | 5.1 |
| U13 | TSOP-32 (... | IC | TOP | 63SN37PB | 57.5 | 14,083 | 38.58 | 6.1 |
| U14 | TSOP-32 (... | IC | TOP | 63SN37PB | 57.5 | 14,083 | 38.58 | 6.1 |
| U15 | TSOP-32 (... | IC | TOP | 63SN37PB | 57.5 | 14,083 | 38.58 | 6.1 |
| U16 | TSOP-32 (... | IC | TOP | 63SN37PB | 57.5 | 14,083 | 38.58 | 6.1 |
| U5 | QFN-80 (M... | IC | TOP | 63SN37PB | 57.5 | 32,308 | 88.52 | 10.0 |
| U6 | QFN-80 (M... | IC | TOP | 63SN37PB | 57.5 | 32,308 | 88.52 | 10.0 |
| R1 | 2512 | RESISTOR | TOP | 63SN37PB | 57.5 | 34,105 | 93.44 | 10.0 |
| R2 | 2512 | RESISTOR | TOP | 63SN37PB | 57.5 | 34,105 | 93.44 | 10.0 |
| R3 | 2512 | RESISTOR | TOP | 63SN37PB | 57.5 | 34,105 | 93.44 | 10.0 |
| R4 | 2512 | RESISTOR | TOP | 63SN37PB | 57.5 | 34,105 | 93.44 | 10.0 |
| R5 | 2512 | RESISTOR | TOP | 63SN37PB | 57.5 | 34,105 | 93.44 | 10.0 |

**Time to Failure by Component**

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