TopoQC

Increasing PCB Production Line Yield

Reach effective defect prevention through better utilization and analysis of existing defect data from all stages of production.

Increasingly complex PCBs drive production costs up while manufacturers are facing constant price pressures. In this environment it is critical to increase yields and reduce costs. Identification and elimination of defect route-causes early in the production process cycle can have tremendous impact on costs and productivity.

TopoQC enables effective defect prevention in PCB production lines. It illuminates route-causes of defects by providing a powerful graphical analysis tool.

QA Today

The electronic industry is known for its constant struggle to achieve higher levels of quality. Every PCB assembly line has some mechanism of QA. Most manufacturers invested heavily in QA technologies such as ICT, AOI, JTAG etc. Combined with visual manual inspections QA is performed at various stages of production:

- Paste
- Solder /Reflow
- Touch-up
- Functional Test (FT)
- Final Quality Control

QA Inefficiencies

In most operations today, the collected defect information is used solely for repair purposes i.e.: manually fixing specific defects on specific PCBs or rejecting the PCB's altogether depending on the defect.

Obviously, locating malfunctions retrospectively is inefficient and costly both in labor and material.

Defect Prevention

Many of the defects are caused by fixable failures in planning (i.e. wrong shape) and technology (i.e. bad mask or SMT). Early identification is necessary so that problems can be eliminated and defects can be prevented. Preventing defects before the PCBs are actually assembled saves material and labor costs.

Effective prevention is hardly achieved today because analysis of the defects is difficult. Most companies use reports and charts to analyze the data but these methods are too simplistic and limited to unravel many of the causes.

Effective Defect Data Analysis

TopoQC maps defect data to the PCBs components creating a color-coded, thermal-like, map of defects on the PCBs geography.

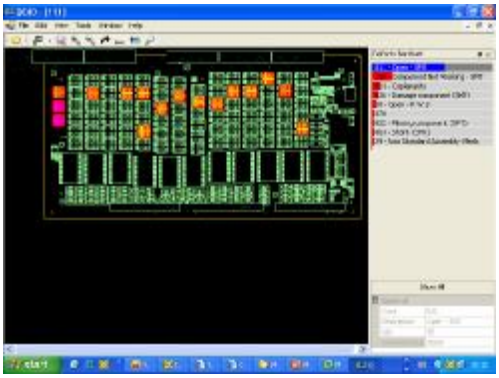

Figure 1: Color coded defect map

This form of presentation unravels patterns in the defect spread that are otherwise invisible. For example, defects can be concentrated in certain geographic areas due to a damaged mask, inaccurate SMT arm or temperature spread problems.

The color scheme highlights concentrations of defects. Thicker concentrations appear as darker orange/red. Extreme defect concentrations passing a definable threshold (e.g. 15%) appear in a different color (Pink in the picture above).

Its easy to see how this patent pending presentation surfaces problems immediately starting from the most trivial (defected component) to the more complex ones.

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TopoQC analyses the complete defect picture (as opposed to identifying specific defects on specific boards), leading to a better understanding of the failures causing these defects and enables effective defect prevention

Immediate and Accessible

TopoQC uses two kinds of data as its input; defect data (AOI, ICT, VMI, JTAG etc) and PCB design (CAD, FATF, Mentor, Cadence, PCAD, Verybest etc). Since both types of data are highly available at any manufacturing operation, the analysis can be done whenever it is required and at very short intervals. After loading the data to the TopoQC application, the map appears immediately, no work or processing is required. The analysis is therefore immediate and accessible.

Simple To Use

As can be seen from the screenshot above, using TopoQC does not require any special skills or training and can be used by production floor or QA workers as well as managers.

Easy to deploy

Apart from the fact that it relies on highly available data inputs, TopoQC requires no special infrastructure. No databases, software or hardware. A simple standalone off-the-shelf PC station is all that is required.

Immediate Results

Since TopoQc utilizes highly available data, requires very little skills or training and almost no infrastructure, it can be up and running in no time. This means that existing defect data from all sources can be analyzed and the effect on production is instantaneous.

Applicability

The following types of organizations can benefit from using TopoQC:

- OEMs with in-house production
- Electronic contract manufacturers (sub contractors)
- OEMs who outsource production (monitor & control).

TopoQC can be used by small as well as large operations. It is applicable and effective for small batches starting with prototypes as well as for mass production. The effort to increase yield is ongoing. It starts with proper planning and prototyping but even deep into production, lessons can be made and process and design can be improved to eliminate problems that appear along the way. TopoQC can assist in any of these stages by illuminating problems earlier.

Summary

- Identification of problems that are otherwise hidden
- Effective defect prevention
- Immediate and Accessible
- Can be performed at factory floor level or by management
- Easy to deploy
- Applicable to any operation size
- Immediate results

Business benefits

- Increased Yield
- Lower production costs
- Higher productivity
- Shorter production cycles

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