

Fixture Tracking and Pogo pin Testing Using LabVIEW

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ABSTRACT:PCBA consists of various processes like fuse forming, Depaneling, In-circuit board testing, Hot Functional Testing etc. The main aim of this project is to develop application to track the details and data management of fixture and pogo pin stock using LabVIEW (Laboratory Virtual Instrumentation Engineering Workbench) software and identify the faulty pogo pins present in the fixture. Many different fixtures have been developed for the functional testing and ICT(In circuit Tester).Before fixture detail tracking there was no proper tracking of fixture and new operator takes more time to identify the appropriate fixture for different model of PCBA. It had no features to identify the fixture related breakdown and Part identification (pogo pins) and no data management of fixture provided. To overcome these limitations, graphical user interface application is used to identify fixture located in rack and provide details of fixture and pogo pin stock with image description for operator convenience after entering the fixture number and part number. It takes less change over time and contributes preventive measure

KEYWORDS: Fixture, ICT, HFT, PCBA, LabVIEW, pogo pins

I. INTRODUCTION

The PCB assembly process having various stages include adding solder paste to the board, pick and place of the components, soldering, inspection and test. All these process are performed for a complete PCBA which can be tested by the various process like fuse forming , depaneling, In-Circuit testing, hot functional testing etc. Fixture is an equipment used in test stations which test the PCBA using different methods as In Circuit Testing (ICT), Hot Functional Testing (HFT). In this testing process all the components of PCBA like active and passive components functionality are checked and measured so that the defected components can be detected and replaced.

A bed of nails type of test fixture is used which has a numerous pins inserted into holes in an epoxy phenolic glass cloth laminated sheet which are aligned using tooling pins to make contact with test points on a PCBA and also connected to a measuring unit by wires .There are two main types of test stations: In circuit Tester (ICT) and Hot Functional Tester (HFT).

- i. ICT –It is type of testing which finds defected active and passive components, short circuit, loose connection etc. It may performed with a bed of nails type test fixture and specialist test equipment.
- ii. HFT - A testing method which is used as a final manufacturing step .It provides a pass/fail determination on finished PCBA's before shipment. Its purpose is to verify the function of PCBA. While the primary purpose of HFT are to demonstrate operability of the plant system and satisfy regularity requirements .HFT is the first time plant equipment is exposed to high temperature water and chemistry maintained during HFT . By these methods of testing is performed to find the faults.

II. RELATED WORK

This paper describes about developing an application to track and identify the fixtures using Lab VIEW. Fixture is equipment that acting as interface between tester and PCBA, tests the PCBA for any faults. There are many fixtures differs in terms of size, cost and installation height etc. are used in both the machines– ICT and HFT. These fixtures are arranged in rack and used when testing different PCBA models. The operators find too much difficulties in identifying particular fixture and replacement of faulty pogo pins .In order to overcome more time consumption, an application is developed to overcome these problems by entering the part number and serial number .It fetches the details about the location and description of the fixture as well as it had no features to identify the defects in the pogo pins. In order to know the pogo pin stock details we are using serial number to find the fixture description and also it fetches the test cassette image .By clicking on that pogo pins we can able to identify the pogo pin description and stock details using Lab VIEW tool.

III. EXISTING METHOD

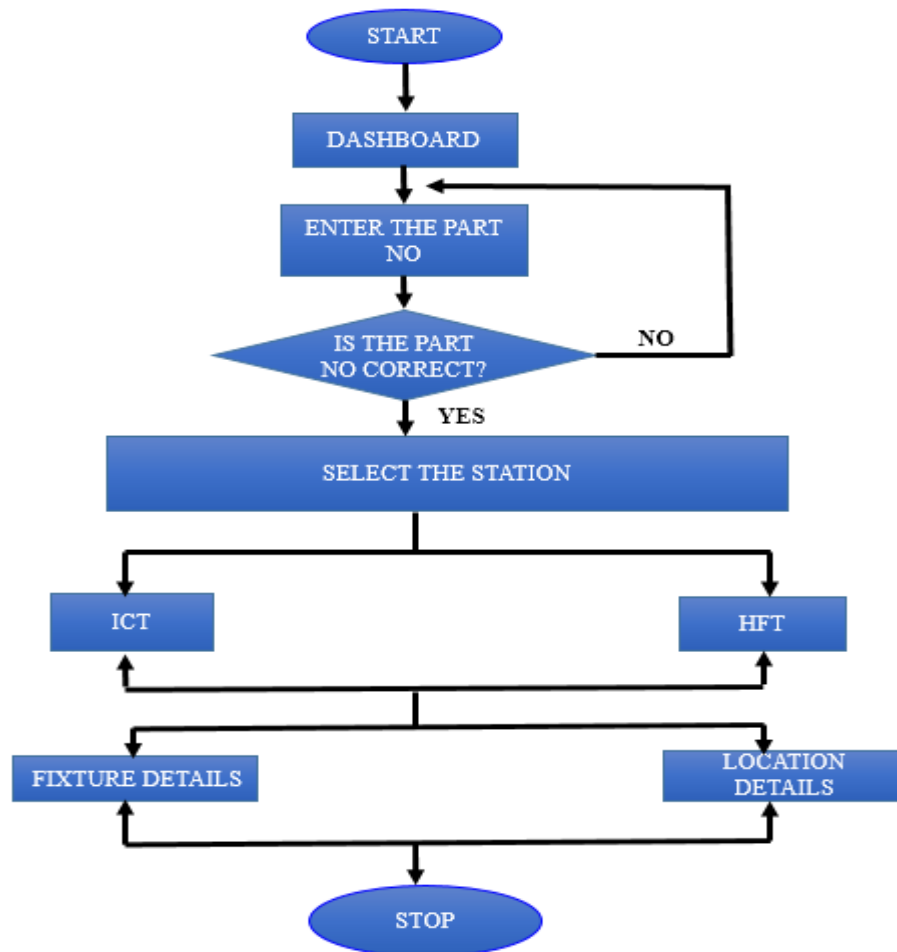
In the Existing system, Fixture tracking has been done manually in the rack. Since it takes time to track the fixture location. This method of tracking is not much preferred. It has some disadvantages where lots of time is taken to identify the fixture and its details. It needs an additional human intervention for placing and identifying the fixture to the new user. It has no proper data management of the fixture and pogo pins where it has a less accuracy and efficiency. When the new user is appeared they may not find the fixture and will feel difficult to know the details about it at this time they need an additional human to explain or to guide them, so by this it takes more time. By manual data collection users face difficulties to find a details of an particular fixture and also new user will be not knowing the details of the fixture easily where it will take more time to learn about a particular fixture.

IV. PROPOSED METHOD

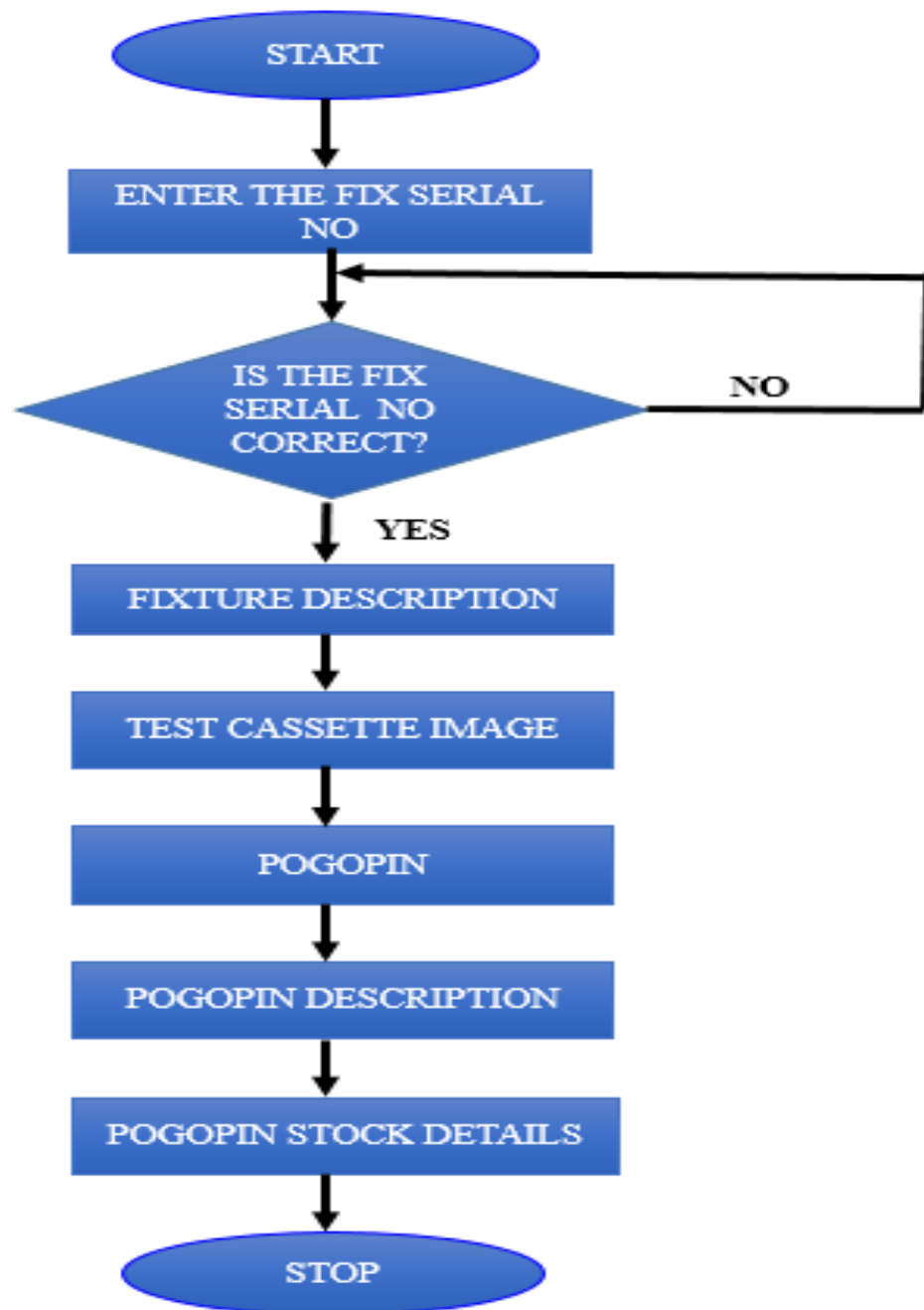
To overcome difficulties of manual tracking, a new User Interface Application is developed by using Lab VIEW software tool. This way of tracking helps to identify fixture by entering the part number and fixture number. It tracks the fixture location graphically and fetches the particular fixture image and fixture details from database. By this the new operator can know the details and location about the fixture visually. After error results displayed in manufacturing execution system, faults occurred in pogo pins present in fixture are detected and can be replaced with good pogo pins after fetching stock details. By this way of tracking the time consumption is reduced, production will be increased; errors or faults in the fixture can be identified easily and can be replaced with the spare parts.

V. BLOCK DIAGRAM

PRODUCTION WINDOW



TEST WINDOW



VI. SOFTWARE DESCRIPTION

Lab VIEW is the abbreviated form of Laboratory Virtual Instrument Engineering Workbench. It is a system design platform and development environment for virtual programming from National Instrument. It creates program using graphical notation. Each Lab VIEW program is called as VI (Virtual Instrument) because of their appearance and operation often imitate actual physical instruments. It is mainly used in automated manufacturing tests, Product design validation, Control or monitoring of machines and equipment. Lab VIEW allows to create programs in the form of block diagram in control panel and group of blocks are connected by wires. It is an interactive program development and execution system designed for the users, like scientists and engineers, who need to program as part of their jobs. The Lab VIEW software works on different platforms of the computer like Windows, Mac OS X, and Linux etc. Lab VIEW can create programs that run on those platforms, as well as a variety of embedded platforms, including Field Programmable Gate Arrays (FPGAs), Digital Signal Processors (DSPs), and microprocessors. Lab VIEW can increase the productivity by orders of magnitude. Conventional programming language developed programs takes more than one month to complete where as it can be completed in case of Lab VIEW because it allows to take measurements, analysing data, and present results to the user. It is such a reliable graphical user interface and easy to program with, it is also find its application in simulations, presentation ideas, and general programming, easy to teach basic programming concepts. It offers more flexibility than standard laboratory instruments since it is a software-based.

VII. APPLICATION DESCRIPTION

The New User Interface Application is split into two divisions one is Production window and another is Test window.

In production window, fixture location and details can be tracked. In test window pogo pins stock details can be fetched during replacement of defected pogo pins.

i. PRODUCTION WINDOW

Fixture tracking Dashboard is loaded at beginning of the application (fig 7.1) .It is accessed by entering login credentials with password (fig 7.2) .Two different modules are appeared as in (fig 7.3).Enter fixture number and Enter part number with search option .After entering Part number,. Select stations ICT/HFT according to need as in (fig 7.4) and after entering fixture number, location of fixtures graphically indicated as shown in (fig 7.5).

ii. TEST WINDOW

In test window, after entering fixture number it checks for correct fixture number .If the fixture number is wrong ,it displays fixture number does not exist or incorrect fixture number .If the number is correct ,It fetches fixture details with image, test cassette .The Test cassette contains numerous pogo pins and test points. After clicking on pogo pins, its description with stock details can be fetched.

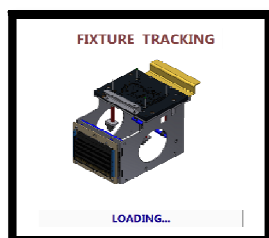


Fig 7.1 Dashboard

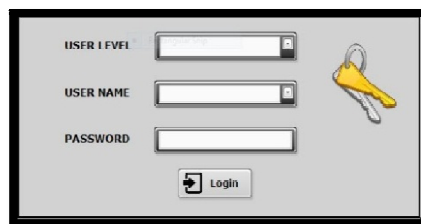


Fig 7.2 Login credentials

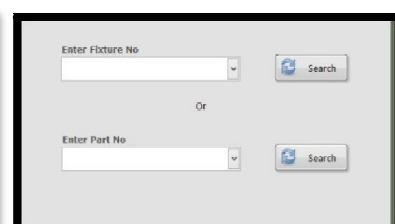


Fig 7.3 Entering fixture or part number

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Fig 7.4 Select the tester

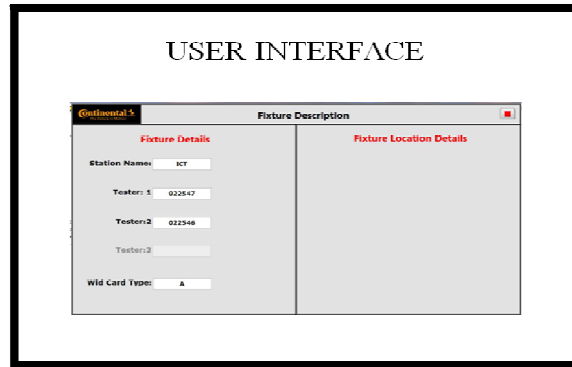


Fig 7.5 User interface

VIII. EXPERIMENTAL RESULTS

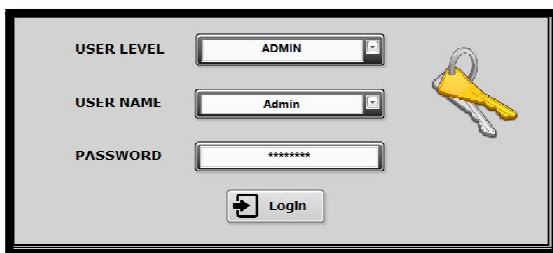


Fig 8.1 Login credentials with ID

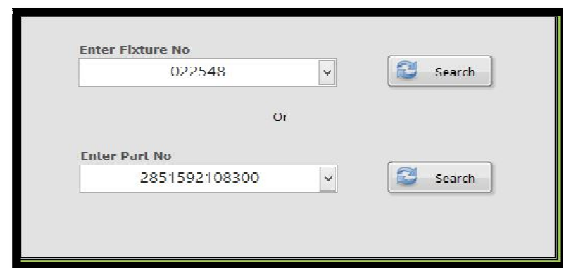


Fig 8.2 Fixture and part number

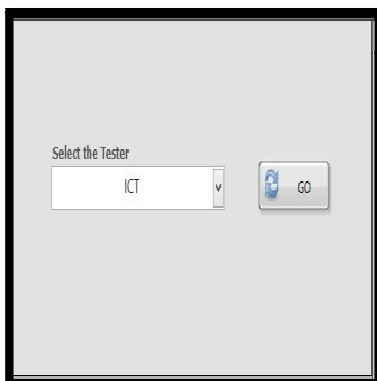


Fig 8.3 Selected tester



Fig 8.4 Fixture details and location

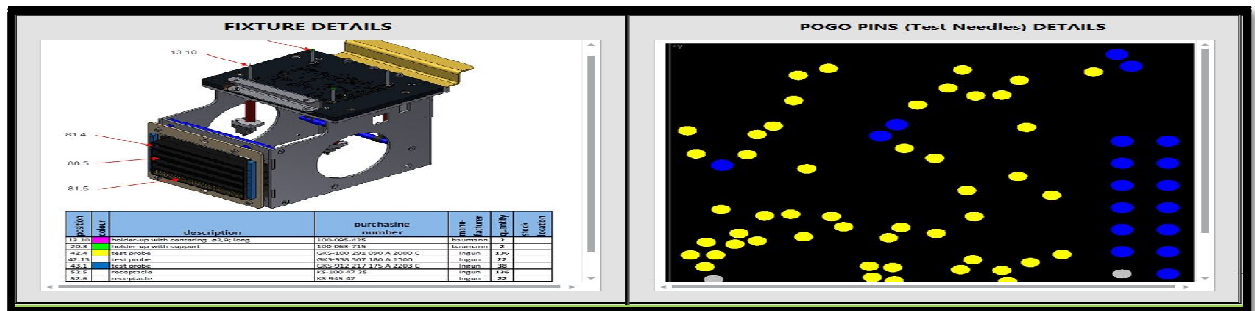


Fig 8.5 Fixture and pogo pin details

IX. CONCLUSION

Thus the Fixture tracking has been done manually in the rack should be overcome automatically and also new user interface application is developed using Lab VIEW software tool. The way of tracking helps to identify entering the part number and automatically tracks the fixture location and fetches the particular image and details from the database. Also this helps to the new operator can know the details and location about the fixtures and also it can identify the fault and based parts of the fixture .It maintains the proper data management which makes the new operator convenient and also identifies faults occurred in pogo pin present in the fixture using Lab VIEW software tool. The advantages of this tracking are throughput improvements, increased reliability, reduced maintenance cost, test consistency, reduced time consumption, error reduction and preventive measures.

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