



# **Microcontroller Based Assembly Check and Built-In Self Test**

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**ABSTRACT:** In present large scale industries where production per day is of the orders of few hundreds to few thousands, it is difficult to check whether each component assembled on PCB (Printed Circuit Board) is in the proper position or not and also to check whether all the designed components are present on the board. If the manual method is used to perform this process, production cost increases and decreases the rate of production. In manual method an electronic engineer or technician who has knowledge of all electronic components will check component by component and will send the tested board to next section if everything is correct else it will be rejected which is time consuming. A solution to solve this problem is to replace the current system with a cost of around 2 to 3crore which is used to design an electronic system which tests all the sections of the board and will give clear report of all assembled components at cost of 20 to 25 thousand rupees (low cost systems), which will be helpful for small scale industries. If one or more components are not present, it will automatically detect and discard it as defective PCB and if all the designed components are present it will display the details of component checked and their position.

**KEYWORDS:** Printed Circuit Board (PCB), Assembly Check, Electronic components, MPLAB IDE, Embedded system.

## **INTRODUCTION**

The novel idea of this project is to achieve higher production rate in a large scale industry by using this embedded system. This project is basically a microcontroller based design used to check the assembly of all the components in a PCB (Printed Circuit Board). When all the components are present then it continues to check the voltages in different sections of the board and gives decision about the working performance of each section of the circuit under test.

It consists of a platform on which the assembled board is placed in specific position. Once the system is switched on, it starts checking the components one by one and display the states of operation. When the specific component is not found in the specific position, it will display the name of components and their specifications on the display unit and rejects the board since it cannot be sent to next section for testing.

Three stepper motors are used in the project to check position of each component on the board. First motor move in X-direction and second will move in Y-direction and third motor in Z-direction is used to check the components. The speed, direction of movement and the displacement of all the motors depends on the values specified in the software. Since stepper motor requires high current for its operation Darlington amplifiers are used. The power supply unit consisting step down transformer, rectifier, filter and regulator IC (Integrated Circuit) is used to supply different DC voltages to different sections of the circuit.

The MPLAB IDE (Microprocessor Lab Integrated Development Environment) is used in this project, a window based platform for designing the software. The program is simulated in the system using simulator and then is tested with the hardware modules.

## **II. LITERATURE SURVEY**

Printed circuit boards (PCBs) testing is becoming more expensive and difficult due to the complexity of PCBs design. The common methods for diagnosing PCBs still suffering from many difficulties; it needs long time, a lot of manual

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kg) ... Kinetic Energy (KE) =  $\frac{1}{2}$  mass times velocity squared Potential and Kinetic Energy Worksheet. Kinetic Energy (KE) =  $\frac{1}{2}$  mass times velocity squared. KE =  $\frac{1}{2} mv^2$ . Potential Energy (PE) = mass times the acceleration ... Kinetic and potential energy worksheet answer key o myaiu kinetic and potential energy worksheet classify the following as type of potential energy or kinetic energy (use the letters or bicyclist pedaling up ... Kinetic and Potential Energy Worksheet Walkthrough - YouTube kinetic and potential energy worksheet Flashcards A. How much kinetic energy does the ball have? B. How much potential energy does the ball have when it reaches the top of the ascent? KINETIC AND POTENTIAL ENERGY WORKSHEET Answer the following: a. What is the kinetic energy of a 1-kilogram ball is thrown into the air with an initial velocity of 30 m/sec? Kinetic vs Potential Energy Practice KEY Page 1. Scanned by CamScanner. Page 2. Scanned by CamScanner.

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