



RIZAL TECHNOLOGICAL UNIVERSITY
College of Engineering and Industrial Technology



**MICROCONTROLLED PRINTED CIRCUIT BOARD (PCB)
DRILLING MACHINE**

A Student-Faculty Collaborative Project Study Presented to the
College of Engineering and Industrial Technology
Rizal Technological University
Mandaluyong City

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Engineering

By:

Engr. Emelita C. Presbitero
Michael Kelvin M. Alday
Jolina Danica J. Arcalas
Leah S. Cabillos
Estefany A. Dinglasan
Lito L. Iglesia
Brayen H. Jalandoni
Jaime P. Logronio
Kristine Mae Malinao
Louise Clyve Anderson F. Rodis
Eliza Mae C. Sanclaria
Mark Francis E. Trono

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ABSTRACT

Title: **MICROCONTROLLED PRINTED CIRCUIT BOARD
(PCB) DRILLING MACHINE**

Proponent: **Alday, Michael Kelvin M.
Arcalas, Jolina Danica J.
Cabillos, Leah S.
Dinglasan, Estefany A.
Iglesia, Lito L.
Jalandoni, Brayen H.
Logronio, Jaime P.
Malinao, Kristine Mae
Rodis, Louise Clyve Anderson F.
Sanclaria, Eliza Mae C.
Trono, Mark Francis E.**

Faculty Collaborator: **Engr. Emelita C. Presbitero**
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Subject: **Design Project**
School: **Rizal Technological University**
Adviser: **Prof. Jennis N. Articono**
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CHAPTER 1

THE PROBLEM AND ITS BACKGROUND

Introduction

A Printed Circuit Board (PCB) is a board made of glass reinforced plastic and conductive copper line printed onto board. The development of electronic circuit makes use of the PCB, and designing such is one of the most challenging practices in the field of electronics. In the designing process, the PCB is drilled in accordance with the designed holes.

PCB drilling is an important stage in electronic circuit production. It requires both precision and patience of the laborer. Small electronic circuits may be finished at earliest possible time, but large electronic circuits which come with large number of via and pad holes may require great effort and longer time. The number of holes in the PCB greatly affects the entire process.

Background of the Study

In creating an electronic circuit, an electronic layout is first designed using one of many designing softwares, such as Proteus and Eagle. This layout is then etched to a PCB. After successfully etching the layout, the next process is to drill via and pad holes onto the board, in which the electronic components will be soldered on. This process can be considered as one of



the most difficult phases, as drilling (especially using hand-held drilling machines) requires precision and patience. Any damage to the etched PCB may require repetition of the whole process.

Nowadays, Computer Numeric Control (CNC) machines are being utilized for drilling purposes in large scale electronic industries. These CNC machines are expensive and bulky, that small scale industries cannot afford.

In the traditional method of printed circuit board designing, the students find it difficult to use a hand-held drilling machine, and hence the proponents came up with the idea of creating a machine, that will completely handle the drilling activity. The project aims to reduce the valuable time and man-effort required in drilling printed circuit board.

This project may be used for commercial purposes but its main beneficiaries are the engineering students of Rizal Technological University that can potentially work in electronic field. As PCBs are extensively used in electronic field, this project also intends to create a user friendly and cost effective microcontrolled drilling machine.

Statement of the Problem

The purpose of this study was to develop a PCB Drilling Machine using a Microcontroller. Its goal was to solve the following problems:

1. The lack of precise, easy to use, and cost-effective automated PCB drilling machine that can be used by the students during laboratory activities to reduce inaccuracy in making via and pad holes;



2. Errors are encountered in the use of the present hand-held PCB drilling tool while the use of CNC machines are costly; and
3. The existing hand-held PCB drilling tool consumes a lot of time and great effort.

Objective of the Study

The study is designed to meet the following objectives:

1. To provide a reliable PCB drilling machine that requires minimal human intervention for ease of use.
2. To provide a cost-effective PCB drilling machine that minimizes the errors encountered when using hand-held machines, hence saving time, money, and effort of the user.
3. To develop an efficient PCB drilling machine that would return a clean and precisely drilled output.