

**RETROFITTING OF MILLING MACHINE
BY USING
STEPPER MOTOR**

**This is presented in partial fulfillment for the award of the
Advanced Diploma in Electrical Engineering of
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ABSTRACT

Retrofitting of Milling Machine by using Stepper Motor

by

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The operation of machining of conventional milling machine is proposed to be retrofitted by constructing the controller of X-Y table milling machine based on a new concept of computer control system. There are three slide motions of conventional milling machine which are operated manually by action of operators. Each of the slide motion has their handwheels rotation to move the slide movements. Such milling machine's operations are slow and production rates are not productive. Hence, the replacement of handwheel by the drive motor such as a stepper motor will improve the speed, accuracy and efficiency of production. The concepts of computer numerical controlled system is applied in the process of retrofitting the conventional milling machine. The hardware of stepper motor's controller and serial/parallel interface are implemented as controller unit to control the stepper motor and software programming is used to monitor the operation of the X-Y table milling machine.

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CHAPTER 1

1.0 INTRODUCTION

1.1 Retrofitting

Machine as like lathe, vertical and horizontal milling machine and others have been used for decades to machine mechanical parts. These machines are manually operated. For some precision parts and parts that need to be produced in large quantity, highly skilful machinists are required and the rate of production are also slow. To overcome these problems, machines that can be operated and controlled by computers will be useful. Initially, numerical controlled (NC) machines and later, computer numerical controlled (CNC) machines have been manufactured for these purposes. CNC machines are very expensive to buy, especially for small and medium-scaled industries (SMI). Since manually operate machines are not expensive and many of these SMI's already have a few of these machines, the automation of these machines for relatively inexpensive cost will be helpful to these SMI's. Retrofitting is the process of turning a manually-operated machine into a CNC machine for a fraction of the cost of a new CNC machine.

1.2 Milling Machine

A milling machine is a device that machines metal by bringing the metal into contact with a rotating cutting tool or vice versa, where the cutting tool has a number of cutting edges (Feirei, 1961). There are three common types of milling machine. These are universal, vertical and plain horizontal milling machines. Figure 1.1 shows an example of a conventional vertical milling machine.

The size of milling machine is categorised by the amount of the table travel, the amount of horse power and type.