CHAPTER 1

INTRODUCTION

1.1 PROJECT MOTIVATION

The definition of manufacturing is the application of tools to the transformation of raw materials into finished products (Kalpakjian & Schmid, 2003). Another definition is to make or process (a product), especially with the use of industrial machines (Kalpakjian & Schmid, 2003).

Manufacturing exists to make use of the existing raw materials (Kalpakjian & Schmid, 2003). There are methods and machines used to manufacture. The methods and machines are to be the solution for effective manufacturing. Even though the solution has already been found, the manufacturing arena still faces problems.

The first main problem that occurs is the problem of manufacturing time. Companies look for methods and machines to decrease manufacturing time. The increase of manufacturing time increases the rate of profit loss. Manufacturing time too becomes a liability for satisfying customer needs. For production companies, the lesser the manufacturing time the better.
The second main problem is the number of products produced. Companies want big production amounts to be profitable. Producing small amounts at a time consumes time. Small production rate too increases profit loss. Machines or methods that produce small amounts increases labour cost and energy consumption.

The two main problems cannot be eliminated but it can be decreased. That is what engineers today are doing, searching for solutions to decrease or to eliminate problems that exist in the engineering world.

### 1.2 PROJECT BACKGROUND

Today CNC machines are essential for manufacturing companies. CNC machines increases production rate. CNC machines also decreases labour cost and energy consumption. However, CNC machines still have disadvantages.

CNC machines are only capable of being operated at its location (H. Chen et al. 2005). Operated at location means production can only be done during working hours. The disadvantage of that is time consuming. Time consumption results in increase of profit loss.

The other disadvantage of being operated at its location is that it could result in causing injuries to the operator. If there’s a sudden defect to the machine, the operator might end up injured. This causes losses in labour and machine loss.

Another disadvantage of CNC machines is that it requires an operator for each machine (H. Chen et al. 2005). That requirement requires the employment of several operators. Employing more operators result in increase of labour cost.
The current CNC machines are not able to be integrated with engineering programs. The disadvantage is that quality products with fewer defects could not be produced. Another disadvantage is that quality check for products needed to be done. This results in more time consumption.

1.3 PROJECT PROBLEM STATEMENT

The main disadvantage of the CNC machine is it can only be operated at its location (H.Chen et al. 2005). This disadvantage will increase the number of disadvantages for manufacturing companies.

The machine operator can only operate the machine at operation hours (H.Chen et al. 2005). This limits the production amount of products in a day. Another disadvantage is that if there is a need to operate outside operational hours, traveling claims by operators will arise. There are two disadvantages raised here, limited production and increase in labour cost.

Operating machines at its location too may cause injury to the operator which is a liability. This looses the operator and may lose the machine too. For example, the operator slips while the machine is operating. The injured operator accidentally presses a button. The machine malfunctions. This results in labour loss and equipment loss.

This project is to create a remote machine addition for the CNC machine. The remote machine will eliminate the disadvantages of the CNC machine.