

**FINAL RESEARCH REPORT  
ON**

**RETROFITTING CNC  
MILLING MACHINE  
( PILOT STUDY )**

**Presented to,**

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## **Abstract**

The successes of machining operation in machine tool depend on the experience and skill of the machine operator. A significant amount of work has been done on the machine to be controlled by computer. The on-line control serves as the key to this problem.

This pilot study also emphasizes the important of interface design between machine operator, computer and the machine tool. The designed controller will ease the integration work of the three elements mentioned above.

Another significant study carried out is the software element. The software has the features to understand the G-code and the M-code of the Computerised Numerical Controlled machine.

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## 1.0 INTRODUCTION

Retrofitting of machines is the technique of stripping off old and worn parts and replacing them with state of art technology. Conventional mechanical and electrical drive systems can be replaced with ones that are computers controlled and hence provide more accurate motion to cutting tools and workpieces<sup>1</sup>.

The rapid rates of advancement in the fields of electronics and computing have revolutionised the control and operation of modern day machine tools. At one end of the spectrum, special purpose systems have been designed and built to cover a wide range of machining and non-machining operations. These systems tend to be very expensive, with prices often in excess of RM 300,000<sup>2</sup>.

At the other end of the spectrum, standard machines have been converted to take advantage of up-to-date technology at a cost RM 2,000.00 upwards and often with similar capabilities of the purpose built machines.

To date, much work has been reported to enhance this technology. One of them is at Loughborough University of Technology. It's Centre for Industrial Studies has been involved with this development since the early 1980's. The technique was initially conducted as a staff exercise and latter become a topics for assignment work and project carried out by students undergoing training in the Centre<sup>3</sup>.