CHAPTER 1

INTRODUCTION

Design of a Real-Time system is a relatively recent development since the inception of the digital computer. The concept of 'Real Time' can be envisaged basically as operations being sequenced in time at specific intervals.

Mainframe computer systems are unique examples of Real-Time systems where each terminal is serviced at set intervals. Industrial controllers form an integral part of Real-Time Monitor systems where changes in control gains and variables are often required and hence these changes are made while the task is on line.

In particular, this project attempts to develop and implement a Real-Time Monitor which utilises the Motorola Monoboard Micromodule 19 (MM19) that is housed in the M6809 Exorcisor bus system. The system should incorporate the following :

(a)   A controller task in which one of the following five controller modes is used.

  (i)   P mode   : Proportional mode.

  (ii)   PD mode : Proportional-Integral mode.

  (iii) I mode :   Integral mode.

  (iv)   PI mode : Proportional-Integral mode

(v)   PID mode : Proportional-Integral-Derivative
mode.

When the system is on-line, changes should be made with relative ease.

(b)   A clock task in which hours, minutes, seconds and meridian is known.

(c)   A modification task in which any task/s can be brought on-line or aborted and changes in any task effected whilst on-line.

(d)   A display of the plant's output. and status which is of utmost importance since the user must know these quantities.

Because of the constraints of time, modification in the sample rate was not completed. At present, the sample time is 50 ms but the rate can be changed with future modifications to the software.

It should be apparent that since operations are sequenced at set times, that some form of clock system is utilised and when an operation must be executed, it must interrupt the task currently being executed and then returns. Hence the concept of interrupts and re-entrancy are one of the two most critical issues in the success of this project.