Lab4: Programmable Timer

1. Introduction

The purpose of this lab is to design a programmable timer. In the process you will be learning:

- To use the LCD of the EasyPIC 7 demo board as a display device.
- To save data in the data EEPROM to save the time setting of the timer.
- To use push buttons as input devices.
- To enter an external parameter (time setting) via the A/D converter.
- To employ the piezo buzzer as an audible indicator.

2. Lab Requirements

a. Write a program to implement a programmable timer with only 3 push buttons: **Up/RB2** and **Down/RB1** to set the time and **Start/RB0** to initiate the countdown process. The initial time is read from EEPROM address Seconds (0x00) into RAM address Seconds (0x000). After setting the time, the **Start** command:

   - Memorizes the set time in EEPROM.
   - Turns on the device (**RB7**'s LED).
   - Displays a down counter running at a rate of 1 Hz.

   Upon termination, the device is turned off and the program starts all over again. To promote modular programming, the program is subdivided into three routines:

   - **`Setup()`**: initializes the system ports and LCD.
   - **IncDec()**: sets the time with the **Up**/**Down** push buttons and waits for the **`Start`** command.
   - **`TurnOn()`**: turns on the device and displays a down counter until the time elapses. Upon termination, the device is turned off and the system is reset.

b. Use the voltage divider circuit tied to analog channel (say channel **AN0**) to specify the time duration. The **Start** push button turns on the device and initiates countdown.

Note: Take advantage of the beeper to create audible effects. Your instructor will be giving you a demo of the actual requirements.