HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

PIC DEVELOPMENT PACKAGE

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Introduction

The purpose of this project is to study the needs of the development process of a PIC microcontroller based project and provide the necessary tools for the whole development process.

PIC microcontrollers, manufactured by Microchip, offer many advantages like their very low cost, the minimum number of components required to operate, their speed and many other on-chip features which makes them superior to other microcontrollers in their category. These microcontrollers exist in such a great variety that there is a microcontroller for every need in the development of a application.

For this project the use of the mid-range family (16XXX) was selected because of it's low price compared to the features offered. General features of this family of microcontrollers are the 14-bit wide instructions. The instruction set it's self is highly integrated and only 35 instructions must be learned, they can achieve high speeds of up to 5 MIPS at 20MHz. Also RAM memory is available, programmable interrupts, low power consumption and wide operating voltage. Several other features specific to each device allow these microcontrollers to be used for communication satelite applications, military applications and even for internet connectivity.

The programmer constructed is able to program all the Flash microcontrollers available in the 16XXX family produced up to date by Microchip. A Windows 95/98 interfaced program for the programmer was created which allows to read/write all memory locations of the microcontrollers and assemble/disassemble MPASM. Also the programmer is able to program the PICs while in circuit (In circuit Serial Programming ™) and/or using low voltage (Low Voltage Programming ™).

A development board is also constructed that can be used to teach how to use the PICs and furthermore projects can be developed and tested before the actual construction begins.

Finaly for aplication purposes a digital oscilloscope was constructed, utilising the development presented here, as featured in the October 2000 issue of Everyday Practical Electronics magazine. This is a dual channel oscilloscope and it can handle frequencies extending well above 10kHz and of up to 50V peak to peak of input.

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