

1 Background

1.1 What is a microcontroller

PIC™ is a trademark of the Microchip Corporation. It's not quite clear whether this is just a name or an abbreviation. On the Internet names like Peripheral Interface Controller or Programmable Integrated Controller are occasionally used, but on the website of the manufacturer PIC is used as if it is a normal name which just happens to be spelled in capitals.

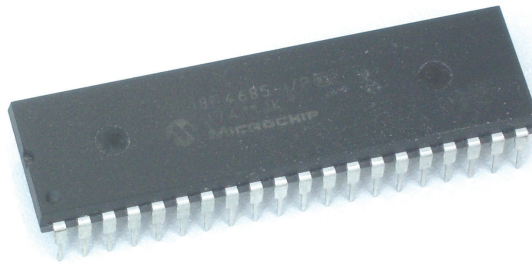


Figure 1. A 40 pin PIC microcontroller.

A PIC microcontroller is actually a complete mini computer on a chip. As opposed to a normal computer, such as a PC, which is an abbreviation and stands for Personal Computer, a PIC is not designed to work with people but with machines. This means there is no simple way to connect it to a keyboard or a terminal. There are however many ways to connect it to machines or parts of them, such as switches, LEDs, variable resistors, temperature sensors, infrared sensors, or even other PIC microcontrollers.

Because they can be programmed microcontrollers can be used in many different ways. You can find microcontrollers in VCRs, remote control units, vending machines...they control motors and heaters, decipher remote control signals, measure temperatures, and much more. Being found inside machines is the reason that microcontrollers are often called "embedded systems" or "embedded microcontrollers".

Throughout this course we will quite often refer to the datasheet of the 18F4455, the microcontroller used in this course. The datasheet is the "instruction manual" that comes with the microcontroller. Don't let the word "sheet" fool you, the datasheet contains hundreds of pages. You will find this an invaluable source of technical information regarding the microcontroller and its recommended application. You will find a copy of the datasheet in the download file that comes with this course. The most recent version can be downloaded for free from the website of the manufacturer, Microchip.

1.2 What is a program

A program is a set of instructions that tell your microcontroller what it needs to do. So why do you need a special language for that? In English we can give instructions too can't we. At the breakfast table for example you might say "Could you hand me the butter please?" and you will be handed the butter. Let's take a closer look at this question. You didn't really ask for the butter. All you asked was if the person you addressed would be able to hand you the butter. So the most logical result of the question would be "yes" or "no" depending on the actual location of the butter. The words "Could" and "please" are redundant. You don't need them to get what you want; you were just trying to be polite. Even if we ignore that, there is another problem with this question. You'd be very surprised if the person you asked this question to would take the butter container and dump the contents on your outstretched hand. Even though you just asked for