

## 3 Digital ports

Lets get started with the course. Most of the chapters follow the same structure. Each chapter covers a specific topic. This chapter for example is on digital ports. A digital port is a port that can only be on and off, and can only recognize signals that are on and off. In this context on means +5 volt, and off means 0 volt. Other signals, like 2.5 volts, are not understood.

The chapters start with background information on that particular topic, and we will usually go into a lot of detail. The better you understand how a microcontroller works the more you can do with it. Sometimes the explanations are a bit long, and you may get tempted to rush ahead and get programming. That is most definitely not recommended, these explanations are necessary to understand why a program has to be written in a specific way.

Important remarks, formula's and explanations are clearly marked in grayish boxes, like this:

**This is important to remember. And if you make a summary of this course for your reference, then this should probably be in it.**

Once the theory is covered we will start programming. First in Assembly, because that is the programming language that is closest to the hardware of the microcontroller. Then we will expand our programs and continue with the C language. C is a very popular language that is used on may different platforms. Platform is another word for computer type. So a PC is a platform, and so is a microcontroller. C is a powerful language that allows you to do more things with fewer commands. Once we have done that we will continue in Flowcode. This is a high level visual language which allows you to do even more with even less instructions.

Near the end of the course the topics we discuss get a bit too complicated for Assembly so we drop that. And at the very end we drop C as well when we reach USB. This is so complicated that covering it in those languages would be a course in itself and have no educational value for this course. Since you own Flowcode it is highly unlikely that you will ever want to program USB application in either Assembly or C.

In this section we will discuss the digital ports of the 18F4455. Digital means that these ports can only be on or off, and only recognize between signals that are on and off. Off in this context means no voltage, and on means the full supply voltage. On the EB006 programmer the microcontroller runs on 5 volts, so when a pin is on it carries 5 volts.

The microcontroller has 5 ports marked A to E. Ports A to D have 8 pins, port E has 3 pins. The next Figure is a bit unclear with respect to port D, but the first line says D0:D4, which means D0 to D4. In this course we will use upper and lower case mixed. Sometimes we will write port c, at other times we will write port C. In "real life" you will be confronted with both upper and lower cast as well. The ports are connected to a gray line called databus <8>. The databus is a physical connection that transports data through the microcontroller. In consists of 8 lines, or wires, hence the <8> marking.