Middle East Technical University
Department of Computer Engineering

CENG 336

Spring 2006

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PIC Development Tool Programming Manual

1 Introduction

This document is intended to give you the necessary information about how to program the Microcontrollers (MCUs) on the PIC Development Tool (PICDEV) and execute your program on PICDEV.

PICDEV has jumpers which should be set properly according to its operation mode. Operation modes and settings for the jumpers are explained in Section 2. You will use the WinPic800[1] software for programming. Installation and settings of WinPic800 software are explained in Section 3. Since the type of the programmer used on PICDEV is ProPic2, you will need a parallel port. You are supplied with a parallel port connection cable for this purpose. Programming procedure is explained in Section 4 step by step.

2 Jumper Settings

PICDEV has basically two operation modes:

1. Programming Mode
2. Executing Mode

In the `Programming Mode`, you select one of the 18, 28, 40-pin microcontrollers on PICDEV and program it with your compiled program file. In the `Executing Mode`, you test your program by executing it on PICDEV.

PICDEV has five jumpers three of which (JP1, JP2 and JP3) are used in the `Programming Mode` and two of which (JP4 and SPK) are used in the `Executing Mode`. These jumpers are shown in Figure 1.

[1] In 1.0 version of this document IC-Prog software is explained. In the current version of the document, the software is changed to WinPic800 due to some errors faced with IC-Prog software.

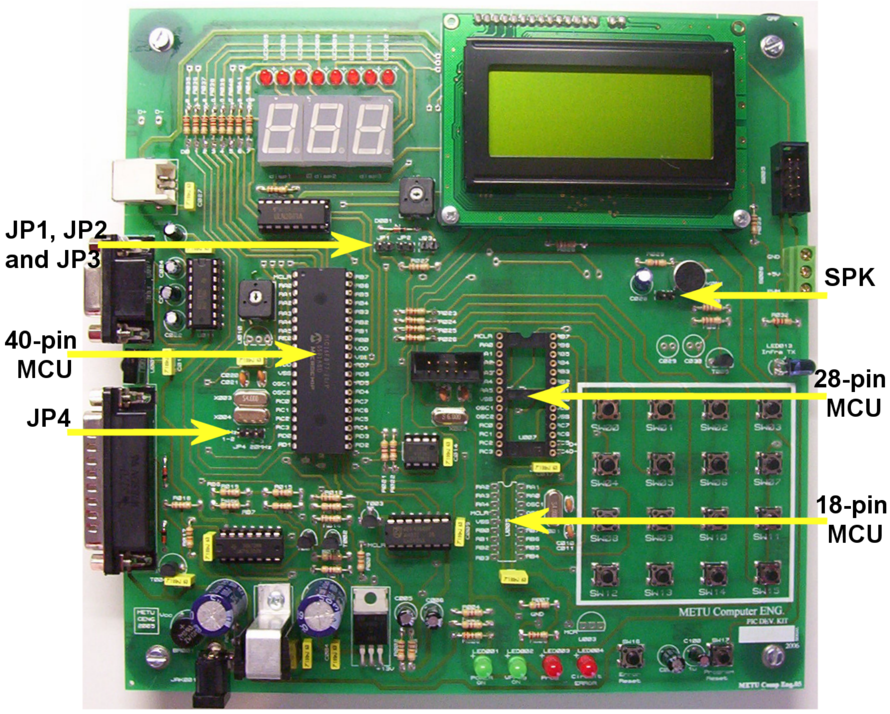


Figure 1: PIC Development Tool

In the `Programming Mode`, one of JP1, JP2 and JP3 is set to indicate the selection of which microcontroller is to be programmed. The valid configurations for JP1, JP2 and JP3 are illustrated in Figure 2. If none of these jumpers is set, then PICDEV can operate in the `Executing Mode`.

In the `Executing Mode`, you have to select 4 MHz or 20 MHz oscillator for 40-pin microcontroller using JP4. Also, you can enable or disable the speaker using SPK. The valid configurations for JP4 and SPK are illustrated in Figure 3.

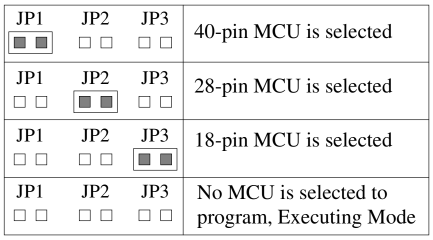


Figure 2: Configurations of the jumpers used in the `Programming Mode`

JP4	4 MHz OSC is selected
JP4	20 MHz OSC is selected
SPK	Speaker is enabled

Figure 3: Configurations of the jumpers used in the Executing Mode

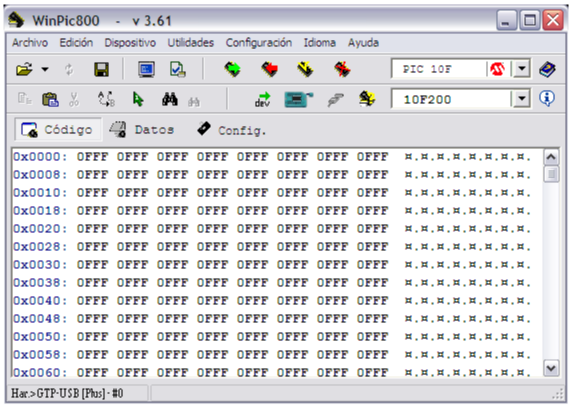


Figure 4: First run of Winpic800 after its installation.

3 Installation and Settings of WinPic800 Software

3.1 Installation

You can get the current latest version of WinPic800 software from http://www.winpic800.com/descargas/WinPic800.zip .

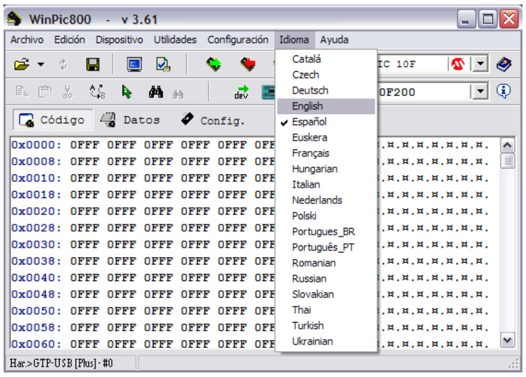
After downloading `WinPic800.zip` file, extract it into a folder and install the program. You can start the program by executing `WinPic800.exe` which is found in `C:\Program Files\WinPic800` after default installation.

3.2 Language Settings

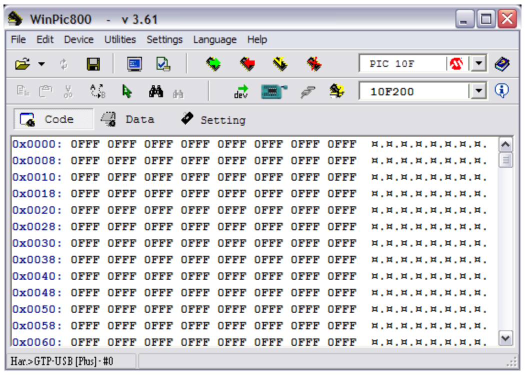
At the very first execution, the program runs in Spanish, as in Figure 4. You can change the language to English from *Idioma→English*(Figure 5).

3.3 Hardware Settings

In order to be able to program the PIC's on PICDEV, you should adjust the hardware settings for the first time only. Click on *Settings→Hardware* button in

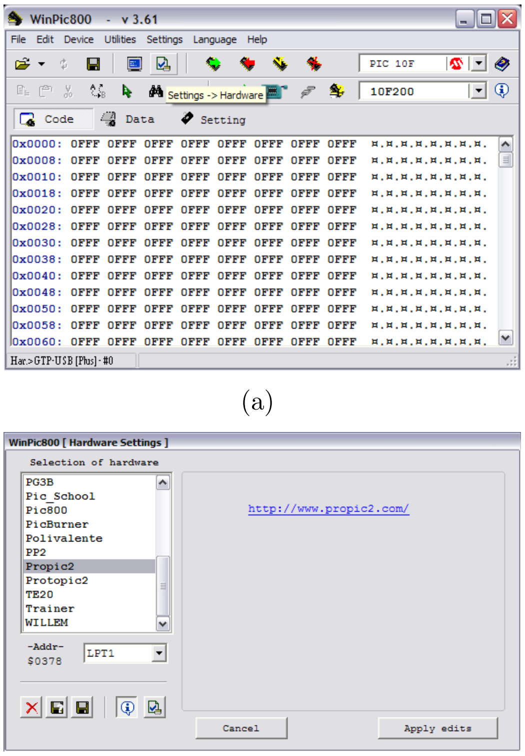


(a)



(b)

Figure 5: Language can be changed to English from *Idioma*→*English*.



(a)

(b)

Figure 6: Hardware settings

the tool bar (Figure 6(a)) and select *Propic2* from the list. To save the changes click on *Apply edits* button (Figure 6(b)).

Now you are ready for connecting PICDEV to your computer and test the settings. Connect PICDEV to the PC using parallel port cable (the cable with 25-pin connectors) without giving the power to the card. After that you can connect the power adapter. **The order is important for safety requirements**. Then, adjust the jumper settings for *Programming Mode* of the 40-pin microcontroller as explained in Section 2.

Now click on the *Hardware Test* button in the tool bar shown in Figure 7. If you get the message shown in Figure 8, then you have successfully adjusted the settings and you can program the PICs on the board.

4 Programming the Microcontrollers

In order to program the microcontroller(s) follow these steps:

1. [1]Configure the jumpers for the `Programming Mode` and select the appropri-

[1]The explanations are made assuming that you have just begin your work and you are programming the microcontroller(s) for the first time at the beginning of your work. After

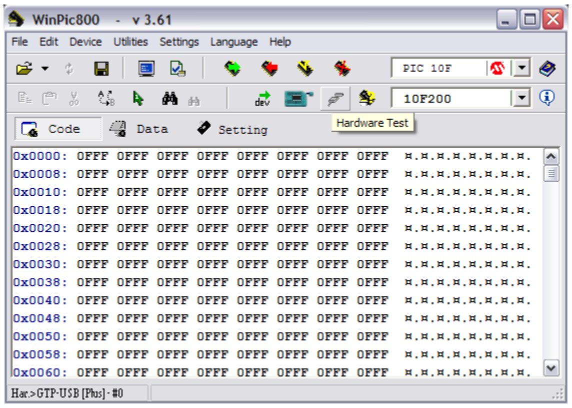


Figure 7: Hardware test button

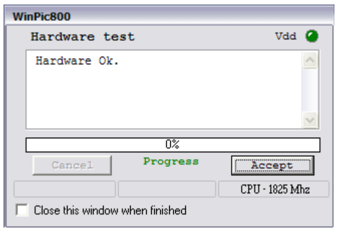


Figure 8: Hardware test is successful!

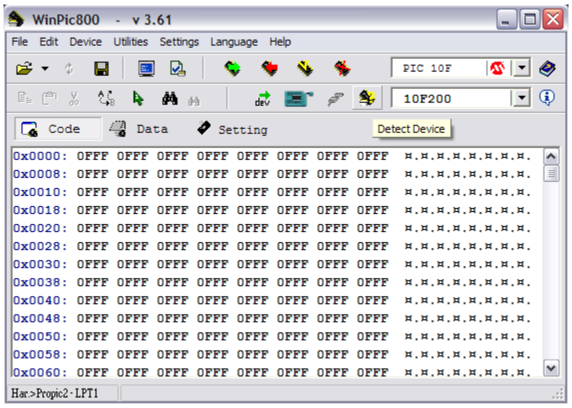


Figure 9: Detect device button

ate microcontroller to program as explained in Section 2.

2. [1]Connect PICDEV to the PC via parallel connection cable.

3. [1]Connect the power jack of PICDEV.
ATTENTION! DO NOT apply the power before connecting PICDEV to the PC. You can damage your parallel port or PICDEV.

4. [1]Open WinPic800 software if it is not open. *You can also connect PICDEV to the PC while WinPic800 software is open.*

5. [1]Select the appropriate microcontroller from device menu if it is not selected or just click the *Detect Device* button in the tool bar (Figure 9) to automatically detect the device on the board. After clicking the button, you will get the message shown in Figure 10 if everything is fine.

6. Open your `.hex` file (Figure 11).

7. [2]Adjust the oscillator settings. `XT` for $0.1 - 4$MHz and `HS` for $4 - 20$MHz (Figure 12).

8. [2]Adjust the code protection settings. *If a code protected microcontroller is read, the data is shown as all zeros and if the configuration is reset to be without code protection, the whole program memory is erased.* (Figure 12).

9. [2]Adjust other configuration settings. (Figure 12).

10. Click on `Program All` button in the tool bar (Figure 13) and wait until the operation is finished (Figure 14).

11. If you get the message shown in Figure 15 without taking any error message, then the microcontroller is programmed.

After programming the microcontroller, you can directly change the jumper settings for the `Executing Mode` as explained in Section 2 and test your program.

Using the other buttons in the tool bar (Figure 16) you can also

- read the program in a previously programmed microcontroller,
- erase the program in a microcontroller,
- compare a `.hex` file with the program inside a microcontroller and verify if they are the same.

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you adjust your working environment, probably Steps 2, 3, 4 and 5 are already done in the next programmings. At these times, you can just change the jumper settings for the `Programming mode` and go on with Step 6.

[2]You can directly adjust these three settings using `__CONFIG` directive.

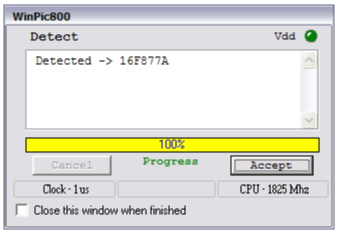

Figure 10: Message for successful detection of PIC16F877A.

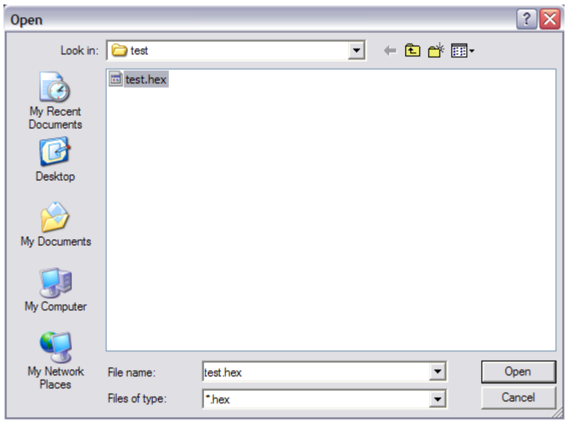

Figure 11: Open .hex file dialog

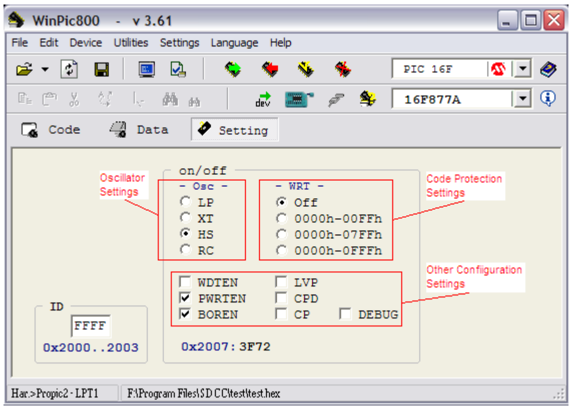

Figure 12: Configuration settings

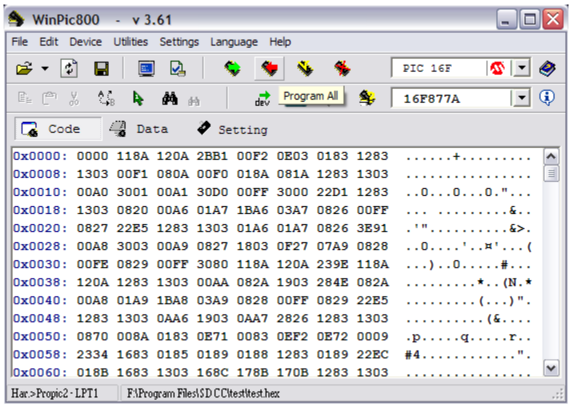

Figure 13: Program all button

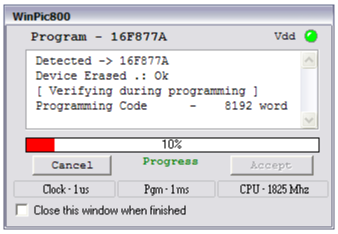

Figure 14: Wait until the programming is finished.

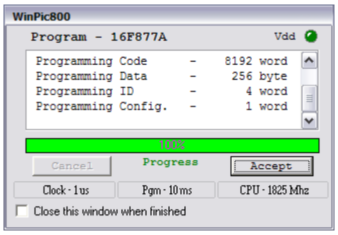

Figure 15: Programming is done succesfully!

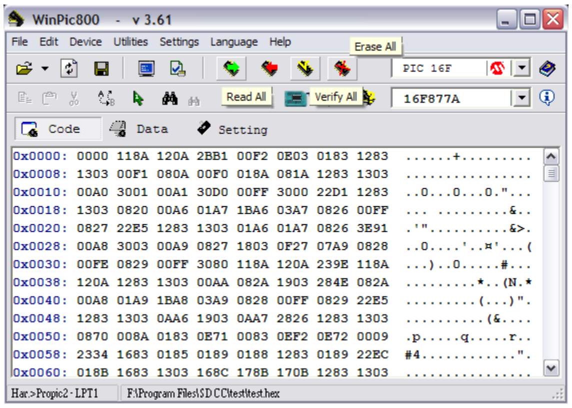

Figure 16: Other useful buttons in the tool bar.

5 Safety Precautions

To safely remove PICDEV from PC, you should first power off PICDEV by removing the power jack. Then you can disconnect the parallel port cable or any other cables if connected.

You should also power off PICDEV before connecting or removing any other cables–USB cable, serial port cable, etc., in any time.

ATTENTION! If you DO NOT follow the safety precautions, you can damage your ports or PICDEV