ENGR 1242

Engineering Fundamentals

# Guide to Programming the PIC

1. **The dsPIC30F3013 Digital Signal Controller**

Available Pins:

Many of the pins serve other functions so are unavailable for general purpose use for us. Others will be used by us so we need to reserve them for later. Here are all the pins:

|  |  |  |  |
| --- | --- | --- | --- |
| Pin Number | Pin Name/Function | Pin Name/Function | Pin Number |
| 1 | MCLR: for programming and reset | AVDD | 28 |
| 2 | B0 | AVSS | 27 |
| 3 | B1: Test Switch | B6 | 26 |
| 4 | B2: Test Switch | B7 | 25 |
| 5 | B3 | B8 | 24 |
| 6 | B4 | B9 | 23 |
| 7 | B5 | F4 | 22 |
| 8 | VSS | F5 | 21 |
| 9 | OSC: external oscillator | VDD | 20 |
| 10 | C15 | VSS | 19 |
| 11 | T2CK: Timer Clock | RX: UART | 18 |
| 12 | T1CK: Timer Clock | TX: UART | 17 |
| 13 | VDD | F6 | 16 |
| 14 | D9 | D8 | 15 |

|  |  |  |  |
| --- | --- | --- | --- |
| Color | Meaning | Meaning | Color |
|  | Power | Special Purpose/Unused |  |
|  | Programming and UART | Reserved for our Project |  |

The remaining pins are the I/O Pins you may use throughout the semester:

|  |  |  |
| --- | --- | --- |
| **Pin number** | **Pin Name** | **Pin Type** |
| 2 | B0 | DIGITAL or ANALOG |
| 3 | B1 (But reserved) | DIGITAL or ANALOG |
| 4 | B2 (But reserved) | DIGITAL or ANALOG |
| 5 | B3 | DIGITAL or ANALOG |
| 6 | B4 | DIGITAL or ANALOG |
| 7 | B5 | DIGITAL or ANALOG |
| 10 | C15 | (Already set as DIGITAL) |
| 14 | D9 | (Already set as DIGITAL) |
| 15 | D8 | (Already set as DIGITAL) |
| 16 | F6 | (Already set as DIGITAL) |
| 21 | F5 | (Already set as DIGITAL) |
| 22 | F4 | (Already set as DIGITAL) |
| 23 | B9 | DIGITAL or ANALOG |
| 24 | B8 | DIGITAL or ANALOG |
| 25 | B7 | DIGITAL or ANALOG |
| 26 | B6 | DIGITAL or ANALOG |

1. **Programming the Pins**

* **Defining the pin**

In the definition.h file, you can define each I/O pin you use with the signal name that uses that pin.

Examples:

**#define** rightLED digOutput2 //defines pin 2’s as rightLED

**#define** testPin3 digInput3 //defines pin 3’s as testPin3

* + **Setting the Pin Direction**

Each I/O pin you use needs to be defined as an INPUT or OUTPUT pin.

Examples:

pin2Direction = OUTPUT; //set pin2 as an OUTPUT pin

pin3Direction = INPUT; //set pin3 as an INPUT pin

Note that you use the word Input and Output in the pin definition, as well.

* + **Setting the Pin Type**

Some of the I/O pins can be set as either ANALOG or DIGITAL. In the course, we only need to use DIGITAL pins, but we still need to set the type. What is most confusing is that not all pins have this option, so ONLY THE I/O PINS THAT CAN BE DIGITAL OR ANALOG NEED TO BE SET! You can see which ones have this option in the table above.

Examples:

pin2Type = DIGITAL; //set pin2 as a DIGITAL pin

pin3Type = DIGITAL; //set pin3 as a DIGITAL pin

1. **Setting the Pins**

To set an output pin to 5 V,

rightLED = 1;

To set an output pin to 0 V,

rightLED = 0;

**Acknowledgements**

We’d like to give credit to CE students Nick Little and Steven Bell who wrote the utilities.c, utilities.h and aliases.h files to make life much simpler for us! If you get adventurous, you can see what they did in those files. For example, the aliases.h file has the actual bits you set for the different I/O pins, and the utilities files make it so we can use the timer functions and the UART function much easier.