

# QUASAR PROJECT KIT 3160 - PIC16F62x Experimenter & Programmer

This is an introduction to one of the most recently released [Microchip](#) PIC micro-controllers (uC) the PIC 16F62x. When we write 62x we mean all the four chips 16F627, 16F627A, 16F628 and 16F628A. We will use the 16F628-04/P chip in this kit. (Do not let yourself get hung up on the number of chips in a sub-family and different chip speeds of the chips. For this introduction any of these chips at any of the chip speeds is OK.)

In this kit we provide:

- a Windows 9x/NT/2000 user interface
  - 5 detailed code examples to flash LED's
- a 40 page pdf which introduces the MPLAB program from [Microchip](#) to do program development and assembly.

The Kit connects to the serial port of a PC. You program the 16F628 using the user interface software provided then the software starts to run immediately and flash the LED's on the board.

Thus we guarantee that your first programming efforts are successful. We provide the fully commented source code for 5 programs which flash the LEDs in a variety of patterns: binary up.asm, binary dn.asm, binary lr.asm and flash.asm. The compiled object code is also provided: the hex files.

## How to Proceed.

1. Download the software from "[link provided in kit documentation](#)"

Unzip it to a temporary directory and run set up. This creates a directory c:\qel3160. Make an icon on the Windows desktop for **qel3160.exe**. Follow the instructions in the **drivers.txt** file. Then run the software and check that the program comes up on the screen.

2. Print out the **3160.pdf** Tutorial manual. The schematic and assembly instructions are in it as well as Introductory Programming Tutorial.

3. Assemble the Kit. Connect it to a com port on your PC. Add 9V-12VDC power to the board. Run **qel3160.exe**. Set the port value (2, 3 or 4) if it is different from the default value of Port 1.

4. If the Test is OK then press Program and with the 16F628 in the socket select **binarylr.hex** and hit Open. The programming sequence begins: erase, programming, programming fuses. After it is completed hit Run on the User Interface. Hit 'Yes' in response to the Question then the LED's should flash up and down continuously.

Print out the commented source code **binarylr.asm** from C:\qel3160 and study it.

5. Now it is up to you to use the Tutorial, the examples given and any other PIC books you have to learn to program

6. When you feel ready you will have to download MPLAB as outlined on page 27 of the Tutorial. Here are the current details of how to do it. Try not to let the complexity and size of the program intimidate you. The learning curve is steep but stay with the PIC 16F84A only and follow the Tutorial outline.

Log on to <http://www.microchip.com>

Click on Development Tools>Development Software>MPLAB®IDE

Now I suggest you click on the MPLAB®IDE v5.70.... the second in the list. This is the well tested version. Later V6 and higher still has minor bugs and that is the last thing you need.

Click D/L the full 13.73MB of MPLAB®5.7.

After you have it I suggest you also get the MPLAB®Manual & Tutorial from the Documentation lower down the page. Maybe print it out.

## Conclusions.

1. You now have the Introduction and Tools to learn quite a bit about programming the PIC 16F62x chips. It is now up to you to work at your own pace through the examples provided. Vary the examples to flash LED's differently. Program to flash the LEDs by different methods of code.

2. Google '16F628' to find many code sources and websites.

3. Some PIC programmers (the actual people, not the kits) actively promote the 16F62x IC's over the 16F84 although they neglect to mention the huge software archives and whole books available for the 16F84 compared to the F628. For example, see

<http://www.finitesite.com/d3jsys/16F628.html>

**NOTE: we made an error on the PCB. To flash the LED's properly cross over R5 and R6 as shown in the photo when you assemble the kit. (Shows the need to do netlist checking even on 'simple' boards!)**

