KIT 149 (version A) USB PIC PROGRAMMER

This documentation written march 28, 2003.

Parallel ports are slowly disappearing from PC's and laptops which means that our current PIC programmers are all facing extinction. So this is our first PIC programmer using the USB port. It can also accept input from a serial port at the flick of a switch.

Note the PCB has a presoldered surface-mount IC on the solder-side of the PCB. (This is version A of this kit. Version B to be released later will have the FT chip on top of the PCB.) See the photo below. Four rubber feet are already attached to protect it. This is a FT232BM chip and details about what it does can be found at

http://www.ftdichip.com/

NOTE: two adjacent pins (13 & 14, on the right of the picture, 3rd & 4th pins down) of the FT232BM are connected together. If you see a solder bridge between these pins is OK and not a mistake. The kit schematic indicates that pins 3, 13, 14, & 26 are connected to Vcc.

Software Problems
Since this kit was released rapid development of the User Interface for it, plus trying to use the same interface for two other PIC programmers under development meant that we issued an incomplete software package early march. This was V030303. If you have this please delete it and if you made the link to enable no-keypress programming please remove it.

If you already have a Kit 149 then you have a choice. You can go back to the previous version (V110103) of the user interface which can be downloaded from

http://www.crowcroft.net/kitsrus/k149_v4.zip

or you can go straight to the k149_v61 software as outlined below. Unzip the files using winzip a temporary subdirectory and run setup. It dumps into C://diyk149. Print out k149.pdf and follow the instructions. **Note** you will have to get the k149_v4.hex file and program your own new firmware IC using **another** programmer. (This is a straight hex file which can be directly programmed. It does not need to use the Options/Upgrade button.)

Your second choice is given in the next paragraph but note you must have a 6.000MHz crystal available & you will have to program a new firmware using the new hex file.

If this is your first Kit 149 then the firmware is already programmed with the v61 firmware, 2 x 6.000MHz crystals are supplied. Put one of them in the socket marked 4.0MHz. You have to download the following software

http://www.crowcroft.net/kitsrus/k149disk.zip

As well as fixing the software bugs in the V030303 version there are two significant upgrades here. Later upgrades are also contained here.

- we have moved to a 6.000MHz crystal for the firmware IC from a 4.000MHz crystal. So put the supplied 6MHz crystals in the place marked 4MHz, and

- it has a no-keypress programming mode. This means you have to add a link on the back of the board from pin 1 of the firmware IC to one end of R6. See the photo below.

The reason we have moved to a 6.000MHz crystal is that we are developing this kit with two other PIC programmers: kit 128 and Kit 150. In order to use the same software interface for all 3 kits we have had operate the firmware at the same frequency of 6.000MHz.

Note that the k149av61.hex file for the firmware is in the software package and if you are upgrading from a previous version then you will have to program your own firmware IC using **another** programmer.

We have now moved away from trying to protect the firmware code. It caused to many problems!

ALSO if you are upgrading from a previous package you **MUST** have a 6.000MHz crystal available to **replace** the 4.000MHz crystal. The v6x firmware requires a 6.000MHz crystal to operate with the new User Interface.

We will provide a 6.000MHz crystal free to all those who want it. Just ask and we will send to you. We believe the 6MHz crystal will work OK with the –04/P firmware IC.

Assembly. Follow the instructions in the k149a.pdf file in the c:\diyk149a sub-directory.

PLEASE make sure you do the 5V check before putting in the ICs. Do **NOT** put in the LK1 link until you have done this. Make sure the ICs are around the correct way. Follow the overlay on the PCB. Note that the diode D3 has a via under it. Do not feed one leg of the diode into the via by accident. (Some people have. We will move that via next production.)

There is on-board firmware in the PIC16F628-04/P IC.

Details about how to install the USB drivers are in the documentation. Download the required files as directed. Currently the software runs under W9x/NT/2000/XP.

Note that if you switch between USB & serial modes you will have to reset the COM port. If you forget which USB com port is installed you can always look it up at

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Start>Settings>Control Panel>System>Device Manager >Ports You will need a Type A – Type A USB extension cable to connect the PC to the Kit.

18VDC is needed to power the programmer. Since the FT232 draws about 50mA this means that the 7805 will get a little warm. We have provided a small heatsink for this. Note that the FT232BM will turn off when it is not in use to save power.

Note the 'Fly Window' under Options which allow K149 to be used with MPLAB when a new hex file is compiled.

Programming Socket. If you do not do a lot of programming then use the 3 x 20 pin IC sockets provided. Break one of the sockets to make pins 21-40 of the 0.6" wide socket as shown in the photo in k149.pdf docs. However, if you program a lot then please buy a wide-slot 3M ZIF socket. We sell them at $US12 plus $US3 postage. You can order it direct from me at

peter@kitsrus.com

Or buy the socket from one of my distributors. If you use an Aries ZIF socket with smaller pins then do not feed to much solder into the pin/pads when soldering. You will just short-circuit to an adjacent pad with excess solder.

No-Keypress Programming. As mentioned there is a link to add to the back of the PCB to allow no-keypress programming. See the photo below. This is a new feature introduced with the V030303 of the User Interface. This link must be removed if you go back to an earlier interface version than that. Flash chips are automatically erased in this mode if they are not blank.

Firmware V6x. The firmware supplied with this kit is the latest firmware and designed to go with the V270303 or V280303 User Interface software.

Known Bug. Switching between USB & Serial modes may indicate an error when the COM port is reset. However, the port, if correct, will in fact be properly Reset. We are trying to fix this bug.

PIC Supported. For the list of PIC's supported (which is changing all the time) go to Options/Edit Chip List.

ICSP. This option is in the menu but not available in this version A of the PCB. It will be available in version B and in Kit 150 both due out soon.

chipinfo.cid This is just a text file and you can add your own PIC chips to it if you understand and conform to the format. Note only one (not two or more) blank line between different PIC definitions. (In early versions this file was called chipinfo.dat but this cause compilation problems in W2000.)

Because new PIC's are being released almost every month look regularly for new versions of the **chipinfo.cid** in

http://www.kitsrus.com/upuc.html

24LC256/515 programming. If you want to program these EEPROM's you need to add a 10K resistor to the underside of the PCB (version A only.) See the file **k149mod.pdf** in the downloaded **k149_v4/disk.zip** for position details.

Kit 150. A smaller, mostly surface mount version of K149 is currently being prototyped. It will only have the USB port, no serial port. It will be have ICSP. A 40 pin wide-slot ZIF socket will be supplied as standard.

Kit 128. An all PIC Flash USB programmer is also being developed. Power for the kit will be taken from the USB port itself so no external power supply will be needed. It will be mounted in a plastic box. 40 pin wide-slot ZIF socket will be standard.

Both these Kits will use the FT232BM surface mount IC. All surface mount components will be presoldered. Users will not have to solder any surface mount components for themselves.

Kit 149(version B.) The next version of this kit is under development. It will ICSP and fewer components. It will still be USB and serial. It will be out in mid-april, 2003.

One User Interface. The latest MicroPro.exe (V240303 or later, date code in 'ddmmyy' format – Tony Nixon is Australian!) you will see under File/Programmer Style a choice of five Programmers. Thus the one User Interface is used for all of Kits 149A (the current one), K149B (coming mid-april), K128 (out early april) and K150 (out in may.) The only difference is the firmware with each kit. (The Vx option is a programmer of Tony's.)

You may email me at **peter@kitsrus.com** with any questions. See my website at

http://www.kitsrus.com/

For design questions email Tony Nixon direct at

Tony.Nixon@eng.monash.edu.au

(Documentation, march 28, 2003.)

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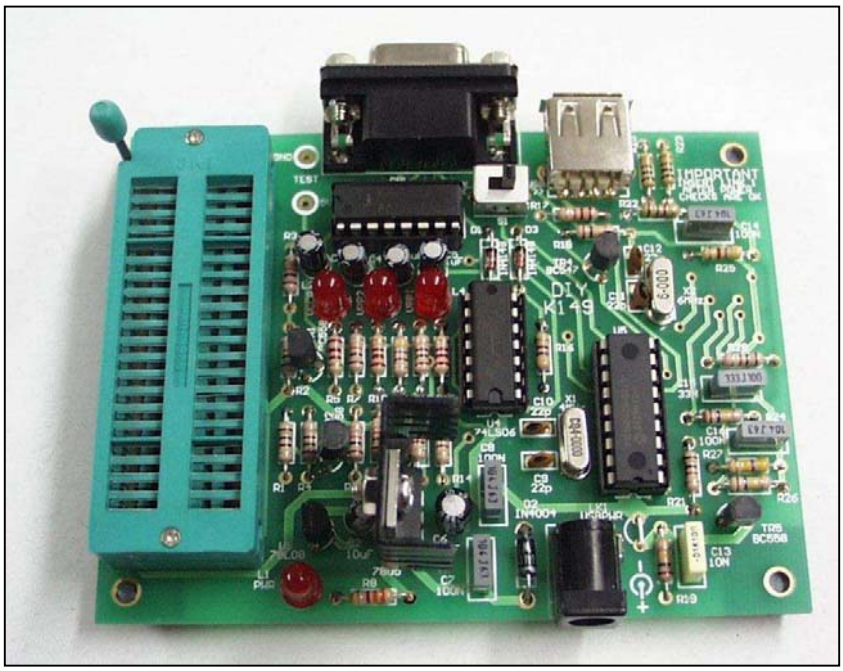

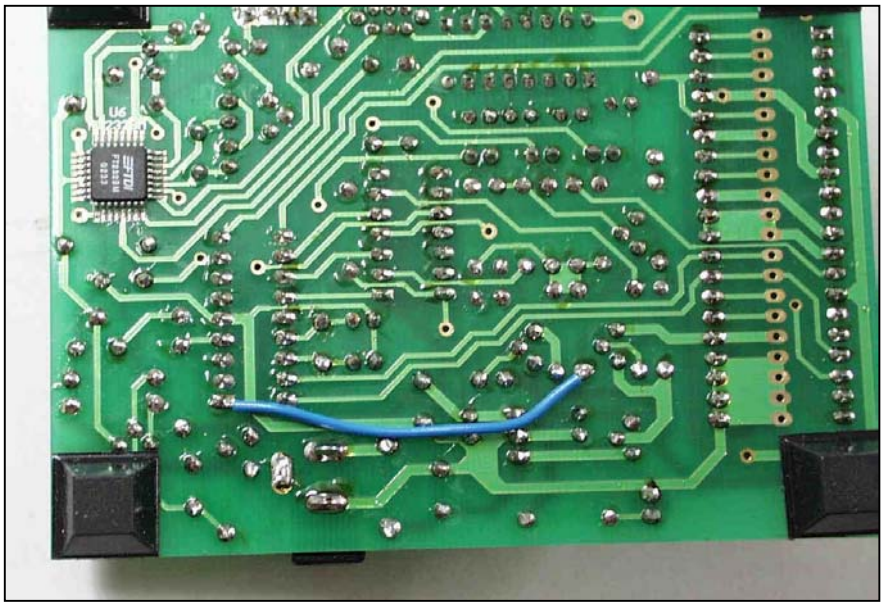

For more detail the 3 color photos shown here may be downloaded from

http://www.kitsrus.com/jpg/k149_1.jpg

http://www.kitsrus.com/jpg/k149_2.jpg

http://www.kitsrus.com/jpg/k149link.jpg