KIT 149 (version D/E) USB PIC PROGRAMMER

This documentation written April 17, 2004.

Kit 149D has added the 10K resistor needed to program the 16F88 PIC chip supported with diypack22.zip (R25).

It also has the 3 protection resistors, uses a USB 'B' connector and adds a sixth pin to the header and harness for ICSP programming added earlier.

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 top of the PCB. This is a FT232BM chip and details about what it does can be found at

http://www.ftdichip.com/

Software
Download the User Interface for the firmware from

http://www.crowcroft.net/kitsrus/diypack22.zip

Run setup.exe. The program will unpack in **C:\diypgmrp**. Make a desktop icon for MicroPro.exe. This is the User Interface software to run with K149. (It is also used for our other PIC Programmers: Kits 128, 149A & B, and 150.) MicroPro.exe will auto detect the Kit

149C so long as the correct COM port is selected. Pre-programmed firmware is supplied with the kit in the

PIC16F628 IC. This firmware will **only run with MicroPro.exe from diypack22.zip**. If you are upgrading earlier diypackxx's reprogram the firmware with the supplied diyk149bc.hex file in diypack22.zip.

NOTE: if you log onto this site and find later versions of diypack.zip then make sure you still download **diypack22.zip** and not the latest version. After you have

the kit working then you can download the latest version, upgrade the firmware & run with the latest MicroPro.exe.
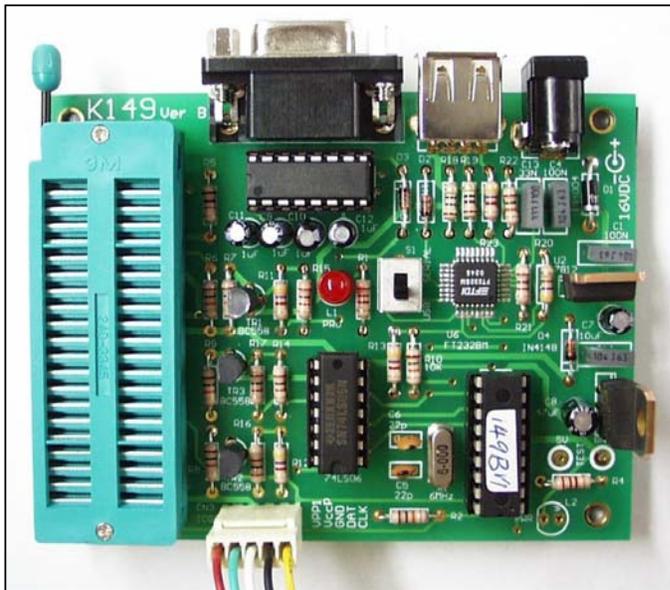
Assembly
Look for k149bc.pdf in C:\diypgmrp. Solder the lowest height components first: the resistors, diodes and IC sockets. Do not put in any of the ICs. (Note component designators C2 & C3 were omitted.)

Make sure you do the 5V check at the TEST points in the lower right-hand side of the board before putting in the ICs. Make sure the ICs are around the correct way. (The notch on the firmware and the 74LS06 ICs are in the 6 o'clock position.)

16V-18VDC is needed to power the programmer. Since the FT232 draws about 50mA this means that the 7805 will get a little warm. Note that the FT232BM will turn off when it is not in use to save power.

USB drivers. These can be **downloaded from my website.** The PIC programmers communicate with the FTDI device (FT232 IC) using a Virtual Com Port device driver (software). This driver **NEEDS** to be loaded onto your PC **before** you can use the programmers.

Currently, (April 17, 2005), the latest Windows XP USB driver (unMicrosoft Certified) is r9052154.zip (October 2004.) The latest Microsoft Certified driver (July, 2002) is p8002104.zip. Use either one.

In my PC I just extracted the driver (either one) to a folder C:\diyprgmp\USB then did **Start/Settings/Control Panel/Add Hardware**.

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 on p4 of the k149a.pdf docs. However, if you program a lot then please buy a wide-slot 3M ZIF socket as shown in the photo to the left. We sell them at $US10 plus $US3 postage. You can order it direct from me at

peterhk@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.

Power. When you connect power the Power LED will light up. Plug in a USB or serial cable. Select the DPDT switch accordingly. Then start the program. Make sure the correct COM port is selected. Note that if you switch between USB & serial modes you will have to reset the COM port. Exit the program to reselect the COM port. If you forget which USB com port is installed you can always look it up at **Start>Settings>Control Panel>System>Device Manager >Ports**

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Note the 'Fly Window' under Options which allow K149D to be used with MPLAB when a new hex file is compiled.

No-Keypress Programming. Flash chips are automatically erased in this mode if they are not blank.

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.

PIC Supported. For the list of PIC's supported (which is changing all the time) go to Options/Edit Chip List. Or just click on the Chip Selector drop-down box and run through the list.

ICSP. Click Options/ICSP Mode. Does **not** support low voltage programming. The LOW pin is an open collector output, which when active will pull the LOW pin to ground. It can be used in ICSP to hold the LVP pin low while programming, or the OSC1 pin, or any part on the target board which may need control (in this manner) during programming.

jpg's. The color version of the photo on the page above may be downloaded from

http://www.kitsrus.com/jpg/k149b_1.jpg

K149C dropped 1 10K resistor and adds 3 x 3K3 resistors. It uses a USB 'B' connector and uses a 6 pin header and harness. K149D adds a 10K resistor.

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 of the micropro.exe this file was called chipinfo.dat but this cause compilation problems in W2000 so the name was changed.) Because new PIC's are being released almost every month look regularly for new versions of the **diypackxx.zip** in

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

Upgrading. You can upgrade by buying and programming a second 628-20/P or 16F628A PIC, or if you have access to a second PIC programmer and reprogram the existing 628 in it.

16F628A. About 2/2004 Microchip stopped production of the 628-20/P chip. The hex files in diypack20/21 will load into either the 628-20/P or the new 628A-PI chip.

You can ask questions on our Kit Forum at
http://www.beam.to/diyforum

COMPONENTS

Resistors 5%, carbon		
27R red violet black	R18 R19	2
470R yellow violet brown	R20	1
1K brown black red	R14 15 16 17	4
1K5 brown green red	R21	1
2K2 red red red	R1 R4	2
3K3 orange orange red	R2 R3 R24	3
4K7 yellow violet red	R11 R12 R13 R23	4
10K brown black orange	R5 6 7 8 9 10 22 25	8
1N4148	D2 D3 D4	3
1N4004	D1	1
22p/33pF Ceramic	C5 C6	2
100N MKT Box Poly	C1 C4 C14	3
33N MKT Box Poly	C13	1
10uF Electro 16V	C7	1
47uF Electro 25V	C8	1
1uF Electro 50V	C9 C10 C11 C12	4
3mm Red LED	L1 L2	2
7805	U1	1
7812	U2	1
BC327	TR1 TR2 TR3	3
6.000 MHz Xtal 49US	X1	1
DPDT PCB switch	S1	1
3 pin power jack	JK1	1
20 pin IC socket		3
18 pin IC socket		1
16 pin IC socket		1
14 pin IC socket		1
ICL232 or equivalent	U3	1
16F628 preprogrammed	U5	1
SN74LS06 TI brand	U4	1
DB9 R Female PCB mounting	CN1	1
USB connector	CN2 B type	1
rubber feet		4
6 pin Header and harness		1 set
K149 PCB with FT232BM presoldered		1

See our other PIC Programmers

Kit 150. A smaller, mostly surface mount version of K149. It has only the USB port, no serial port. It has a 6-pin ICSP capability.

Kit 128. An all PIC Flash USB programmer has been developed. Power for the kit is taken from the USB port itself so no external power supply will be needed. It is mounted on a plastic box. ICSP supported. See
http://www.kitsrus.com/jpg/k128_sc.jpg

Kit182. This is K128 but without the ZIF socket.

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