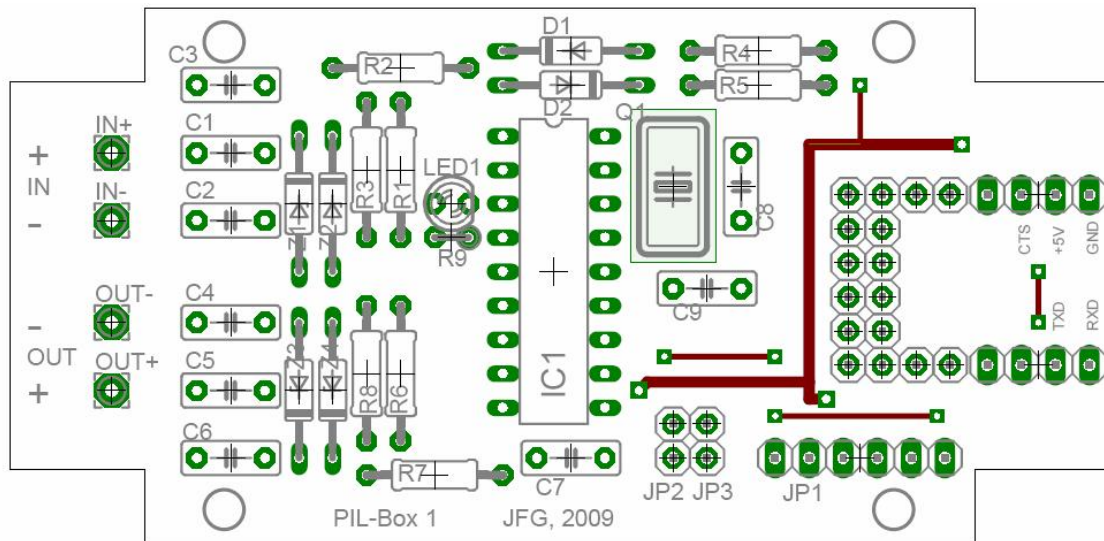# PIL-Box kit notes

J-F Garnier, Feb 2010

Kit content:
- 1 programmed PIC16F628A uC
- 1 20 MHz crystal
- 1 18-pin DIL socket
- 1 FTDI UB232R USB module
- 1 PCB "PIL-Box 1"
- 1 housing G403
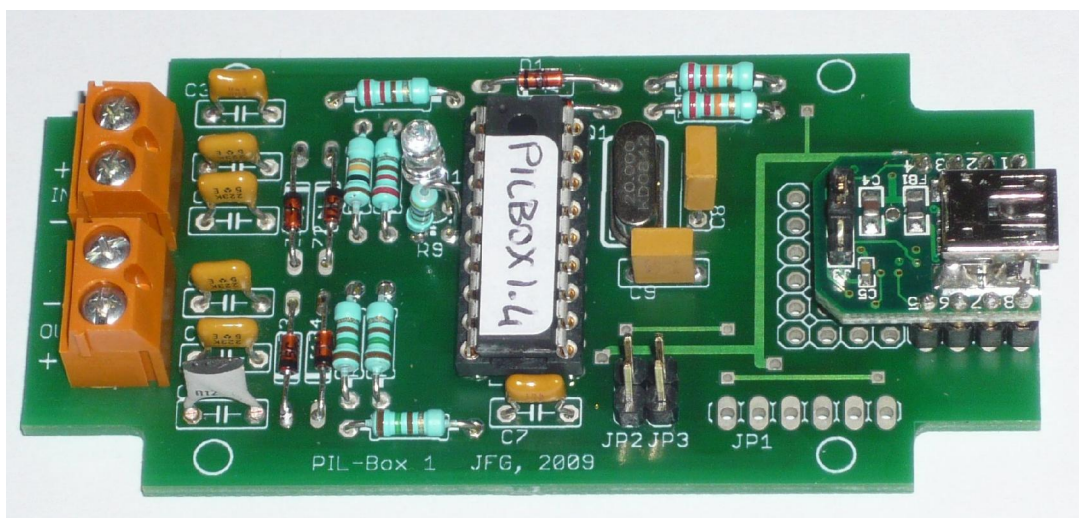- 1 passive part set (resistors, capacitors, diodes, LED)

PCB layout:

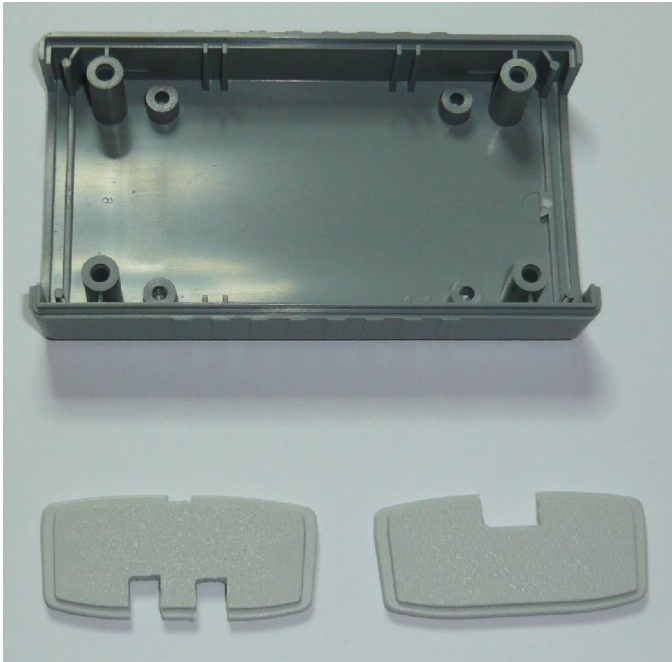

Bill of Material:

R1, R2:   220 Ohms
R3:   10 kOhms
R4, R5:   22 kOhms
R6, R7, R8:   150 Ohms
R9:   470 Ohms – vertical mounting, used only if LED1 is mounted
C1, C2, C4, C5: 22 nF – 100V rating
C3, C7:   100 nF
C6:   120 pF
C8, C9:   22 pF
D1, D2:   1N4148
Z1, Z2, Z3, Z4: BZX55-5.1V
LED1:   3mm LED, red (optional) – cathode (shortest lead) towards IC1
Q1:   20 MHz crystal
IC1:   Microchip 16F628A (on socket)
USB module: FTDI MM232R or UB232R

Note: the screw connectors are not provided with the kit, the HP-IL cables are soldered directly to the PCB.
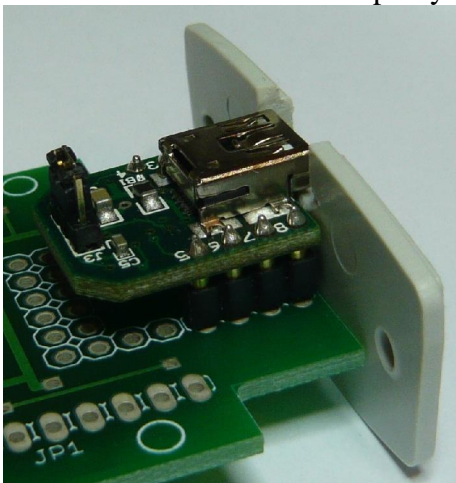
Housing making:

Left: HP-IL cable back panel. Right: USB port front panel.
Note that the font and back panels have a top and botton side. The top side is indicated by the small mark on the middle of the top (visible here on the HPIL cable panel).

For the USB panel, the two slides have to be reduced to let the USB module fit in nicely. Don't remove the slides completly otherwise the board will no more stay in place:

For installation of the PCB into the housing, and wiring of the HP-IL cables, please refer to the "PIL-Box set-up" document.
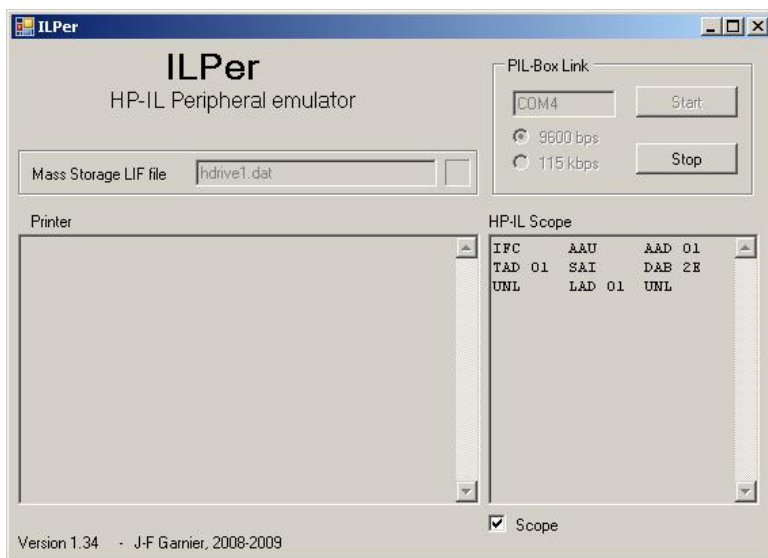
PIL-Box Board Test:

Plug a USB cable to the PIL-Box. The LED should blink 3 times. If yes, the uC is working correctly.
Start ILPer. If the PIL-Box is found, the USB module and connection to the uC are correct.
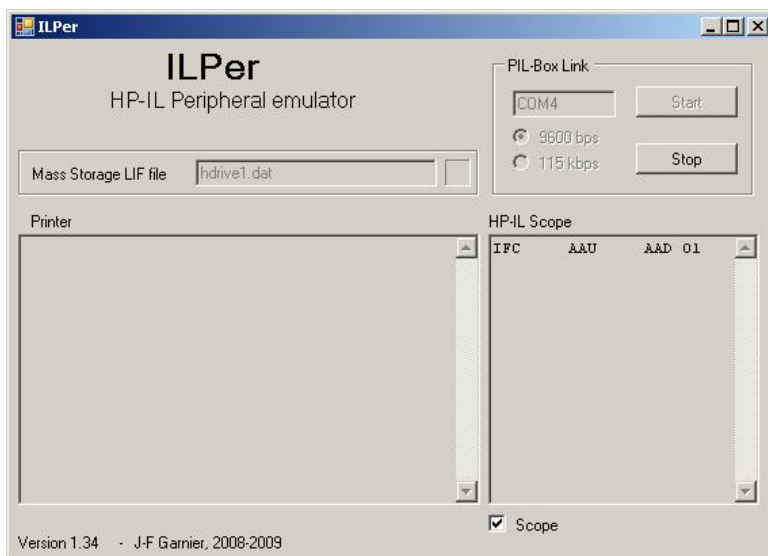Connect a HP-41C or HP-71B to the PIL-Box:
- H-P41C: Enable the scope mode of ILPer. Power-up the HP-41C. The LED should stay on (actually blinking at high rate).
- HP-71B: Power up the HP-71B. Enable the scope mode of ILPer. Do "RESTORE IO" on the HP-71B. The LED should blink briefly.

The first HP-IL frames in the scope window should be: "IFC   AAU   AAD 01 "

ILPer test screen with the HP-41C

ILPer test screen with the HP-71B