PIL-Box kit notes
Update for firmware 2.x
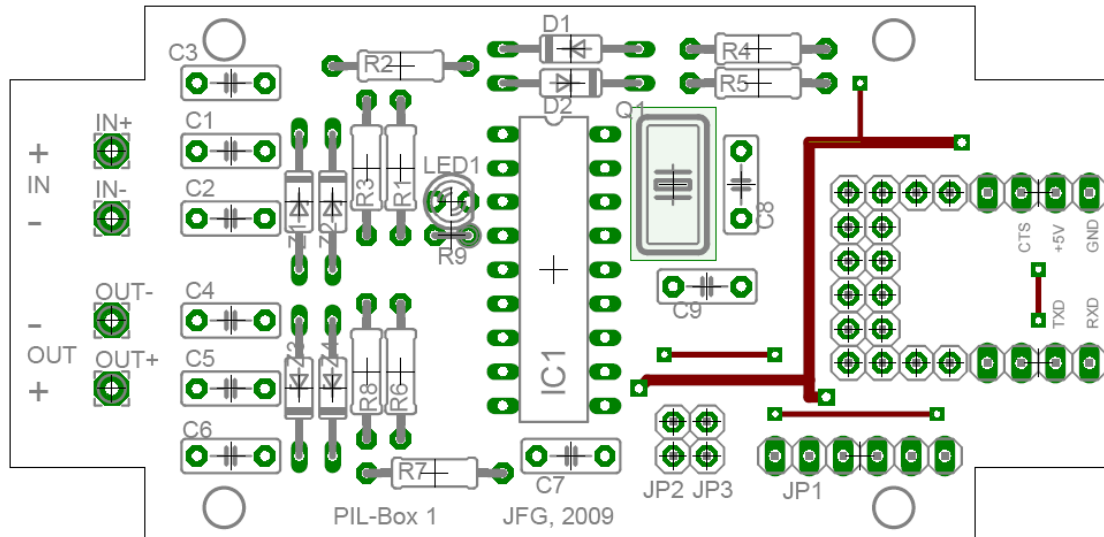
J-F Garnier, Jan 2016

Kit content:
- 1 programmed PIC16F1826 MCU
- 1 18-pin DIL socket
- 1 FTDI UB232R USB module
- 1 PCB "PIL-Box 1"
- 1 housing G403
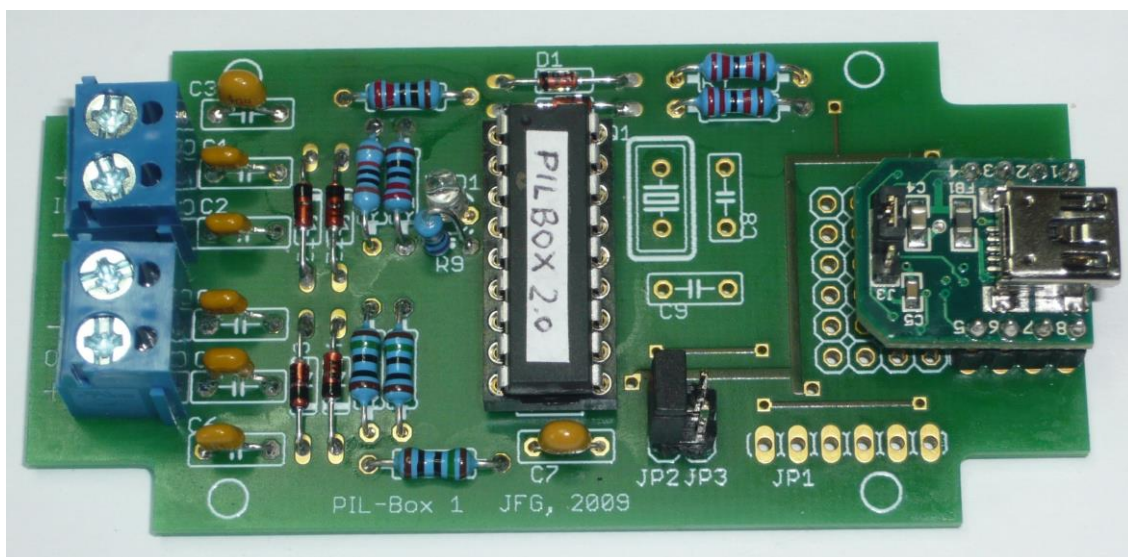- 1 passive part set (resistors, capacitors, diodes, LED)

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
C3, C7:   100 nF
C6:   100 pF
D1, D2:   1N4148
Z1, Z2, Z3, Z4: BZX55-5.1V
LED1:   3mm LED (optional) – cathode (shortest lead) towards IC1
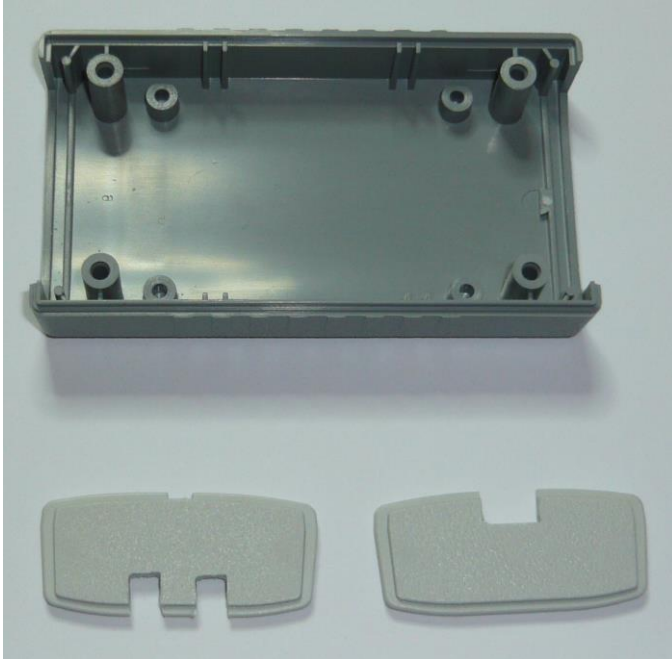IC1:   Microchip 16F1826 (on socket)
USB module: FTDI UB232R

Note that the capacitors C8, C9 and the crystal Q1 are not used.

Notes:
A jumper must be installed on JP2 position for operation at 115 kbps speed.
The HP-IL cables can be soldered directly to the PCB.

Housing making:

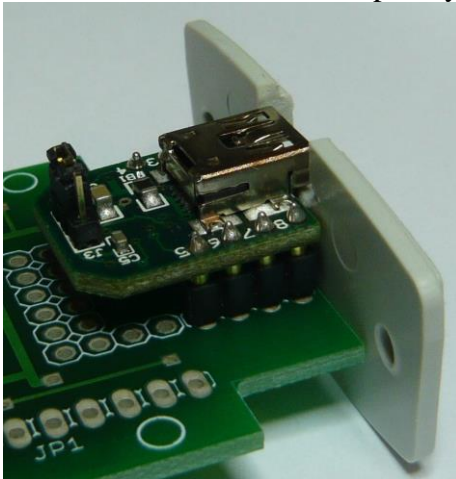

Left: HP-IL cable back panel. Right: USB port front panel.
Note that the font and back panels have a top and bottom side. The top side is indicated by the small mark on the middle of the top (visible here on the HPIL cable panel).

For the USB panel, the two slides have to be reduced to let the USB module fit in nicely.
Don't remove the slides completely 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:

Make sure that the jumper JP2 is installed on the PIL-Box board and that the ILPer software is set to 115 kbps speed.
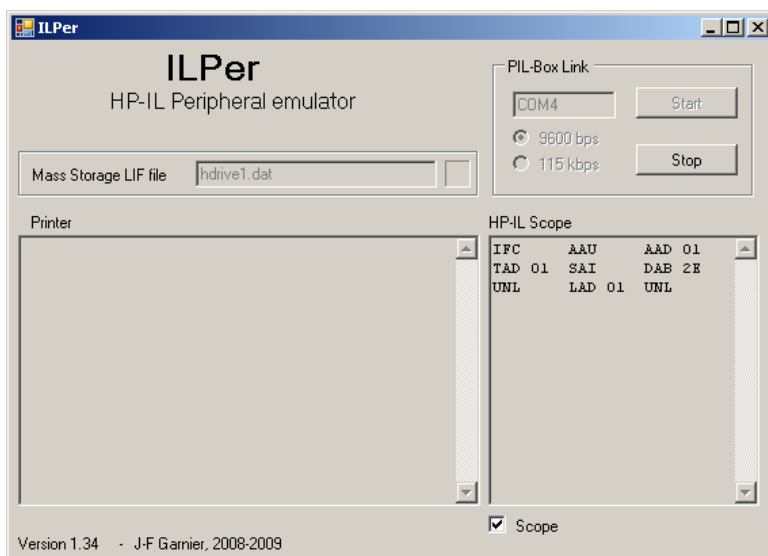The 9600 bps speed is no more supported with the PIL-Box firmware 2.x.

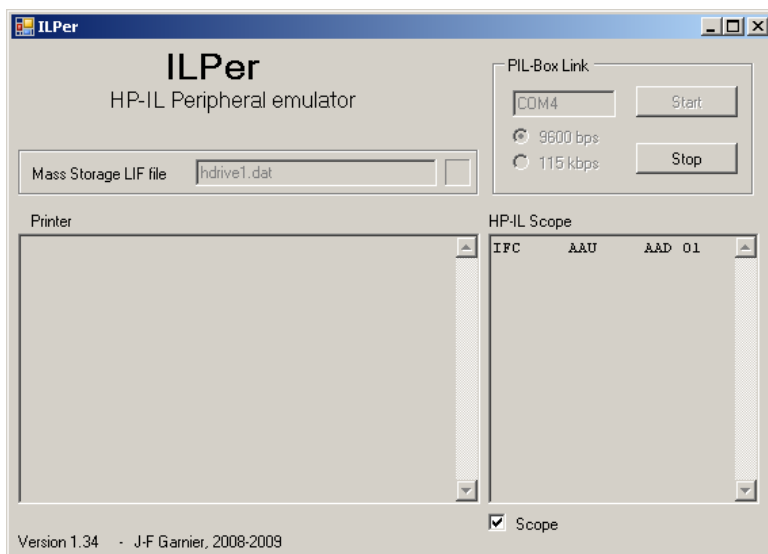Plug a USB cable to the PIL-Box. The LED should blink 3 times. If yes, the MCU is working correctly.
Start ILPer. If the PIL-Box is found, the USB module and connection to the MCU are correct.
Connect a HP-41C or HP-71B to the PIL-Box:
- HP-41C: Enable the scope mode of ILPer. Power-up the HP-41C. The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