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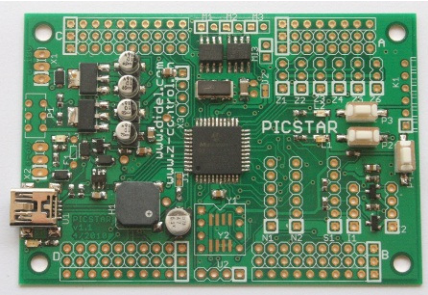
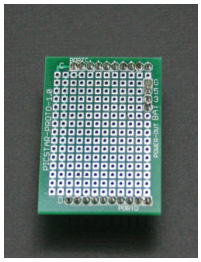
Building the PICSTAR

The PICSTAR consists of 2 boards, one is the processor boards and the second is an optional prototype board that plugs-into the main board on top of the power supply and into Port C + D. The main board includes all SMD components that where soldered in factory, one of them the 18f4550 microcontroller. All connectors have to be soldered by the customer.
Figure 1 shows the 2 available boards. For the 2nd board, a Veroboard may also be suitable.





1. Components included in the Kit

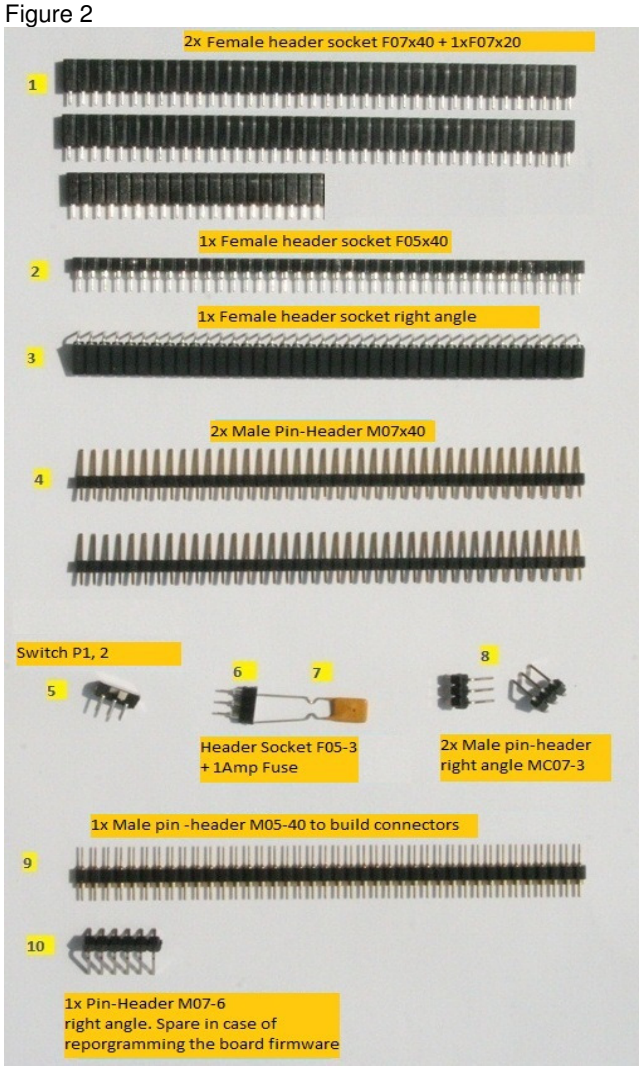
The set is delivered with all pinhead and plug-in connectors, a 1 Amp Fuse and a 2 position switch that allows battery to be switched-off. The next page shows how to prepare and solder components.

1. 2x female connectors F07-40
   1x female connectors F07-20
2. 1x female connector F05-40
3. 2x female connectors 90deg FC07-40
4. 1x male pinheads M07-40 1x M07x20
5. 1x 2 position switch (maybe soldered already)
6. 1x connector F05-3 for the fuse
7. 1x thermal fuse 1A
8. 2x male pinheads male 90 deg MC07-3

Not to be soldered on the board :

9. 1x male pinhead M05-40 to build cables.
10. 1x male 6 pin 90 degrees pinhead can be used in case of reprogramming the board over ICSP

Figure 2



2. To read before starting mounting the parts!!!!!!
All components are easy to solder but the work needs care and attention. For those who never soldered components, some tips are available under: www.didel.com/Soudures.pdf
The connectors and pinheads have to be cut the right length. You will find some indications about cutting them and some other tips about how to build nice boards under www.didel.com/SavoirFaire.pdf.

3. Mounting the parts
Picture 3 shows how to proceed for soldering the parts. We advise you to start with the lower components located in the center of the board. If you follow the letters (A, B....I) you will easily manage to build the board the right way. You can also refer to the checklist on page 3.

The connectors in step (D) are oriented 90 degrees and increase the size of the board overall. They are very useful for connecting test boards or Microdule modules from Didel. You can decide not to solder them in case you want to build the board into a case or robot with limited size. The connectors mounted in step (B) provide the same electric connections.

PICSTAR can be powered over 3 different ways:

-Power over USB (U1) port, useful when programming the board over the building HID bootloader.
-Power over 5V unregulated input (X2) i2 for powering the board with 3-4 AA 1.2V batteries.
-Power over regulated 6-18V input (X1). This allows connecting 2-3 cells lipo

REM: On the two power connectors the positive voltage + is in the center. Negative (-) on the outside plug.

We recommend you to solder only one of the 2 power connectors (step H) in case you use the 6-16V input, this to avoid plugging this source into the unprotected X2 connector. Powering more than 6V to X2 will damage the PICSTAR board.

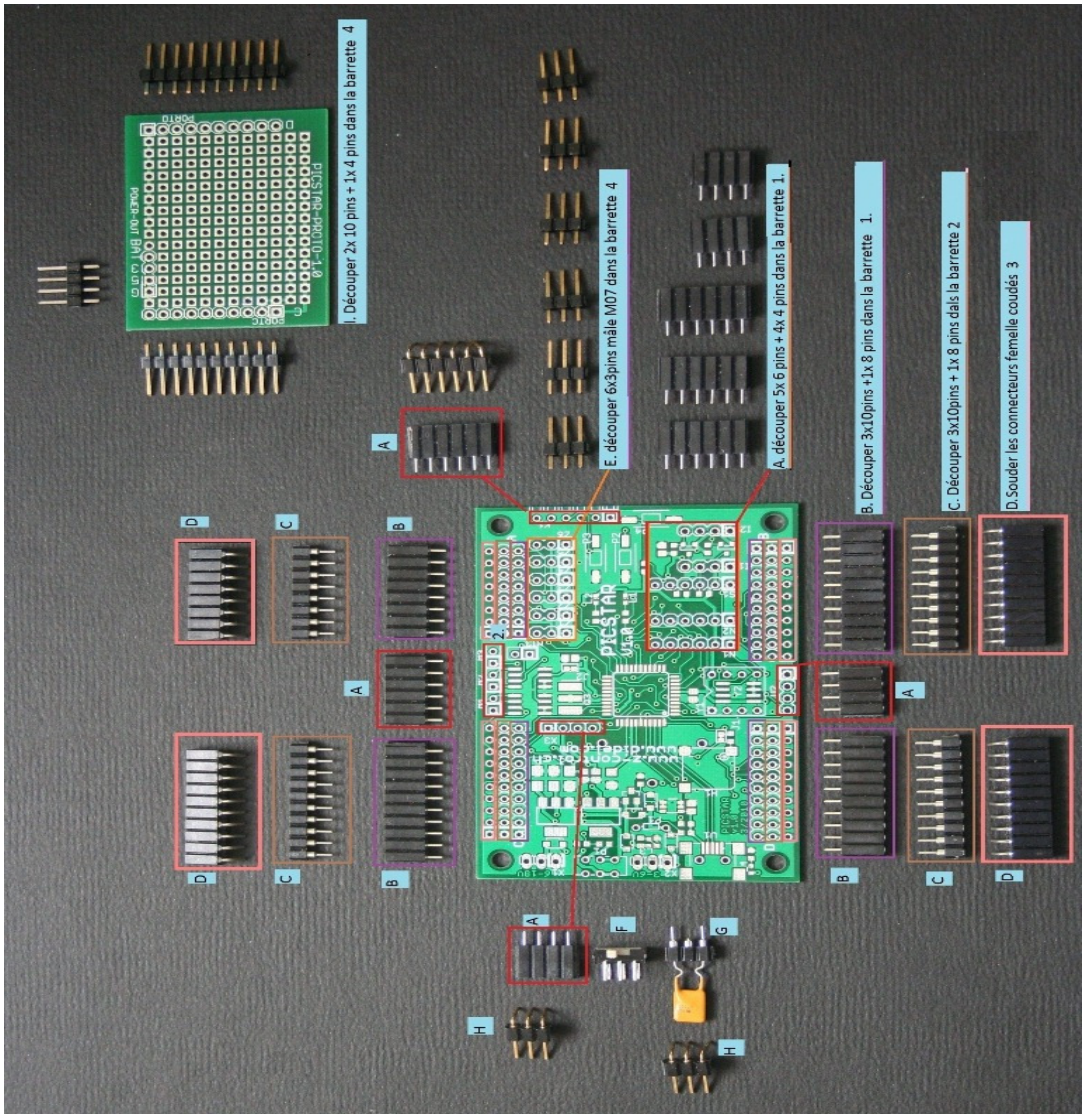


Figure 3

3a. Checklist montage:

A. Cut from the contact row (1): 5x [6 pins] + 4x [4 pins] et les souder.

B. Cut from the contact row (1): 3x [10 pins] + 1x [8 pins] et les souder

C. Cut from the contact row (2): 3x [10 pins] + 1x [8 pins] et les souder

If you decide to solder the external connectors !!

D. Cut from the contact row (3) : 3x [10 pins] + 1x [8 pins] et les souder

E. Cut from the contact row (4): 6x [3 pins]. Solder only 1 pin first and check that the row is in vertical position. Solder the other pins once you checked it is ok.

F. Solder the switch if not already in place.

G. Use connector 6, and remove the central pin on the PCB side.
Solder this connector into Fuse position F1. Insert the fuse 7.
! Without this fuse, the board will not work !

H. Solder the power connector as of your choice, please see remark about powering the board earlier in this paragraph.

I . Cut out of connector row (4) : 2x [10 pins] + 1x [4 pins] and solder them into the prototype board. If used, this board can be plugged into Port C+D of the main board.

Once all connectors are soldered, check carefully that you did not create any short circuits between pins. Use magnifying glasses if you are not 100% sure.
If all worked well, you are ready to power the board.

4. Starting using the board, first programming

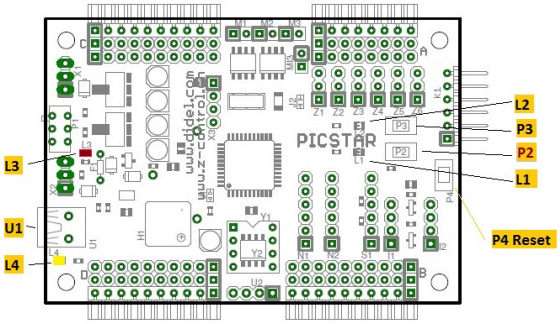
The main board has already been programmed with the Microchip HID bootloader in factory. This means that a PICKIT2 programmer is not required if you are satisfied using the bootloader. To test your board, we advise you to user the following procedure:

- Download the windows program « HID-BOOTLOADER 2.6a.exe »
- Download the test program « Test_Led_Picstar.hex »

From : https://sourceforge.net/projects/picstar-starlet/files/... PICSTAR/BOOTLOADER

- Connect your board to your PC using a USB cable with mini-connector to U1(not included). The Yellow/Orange LED L4 will light on showing the power from USB is in use. The red LED L3 (5V) will light on showing the board is powered.

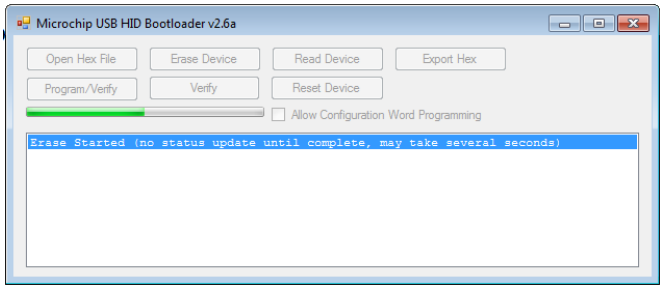
- Start the « HID-BOOTLOADER2.6a.exe ». To enter bootloader mode:
- Press button P3 (RB7) and without releasing it, press the reset button P4.



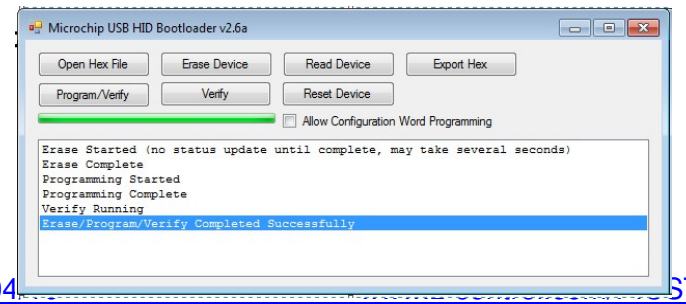
The 2 LED's L1 and L2 should now blink alternatively, showing the board is ready.

On the PC, the HID-Bootloader program shows « device attached ».

- Press the button « Open Hex File » and select the file "test_led_picstar.hex" you downloaded from sourceforge.
- Press « Program/Verify » the test program will now be loaded onto PICSTAR.

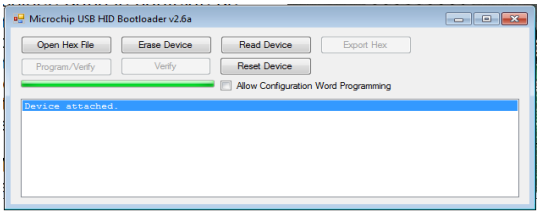


- The green horizontal bar will indicate once the download is done.



- The HID-Bootloader now indicates: « Erase/Program/Verify Completed Successfully »

- One press on « Reset Device » on the PC HID bootloader or Reset button on your PICSTAR board will start the program on the PICSTAR. The two LED's L1+L2 will now blink together. If you have a LED microdule from Didel, you can check on Connectors A+B+C+D that the signal on all IO's are blinking in alternative way.



5. References and program examples :

Will be available soon on www.z-control.ch or on Sourceforge under the PICSTAR-STARLET project.

R.Ziegler Avril 2010