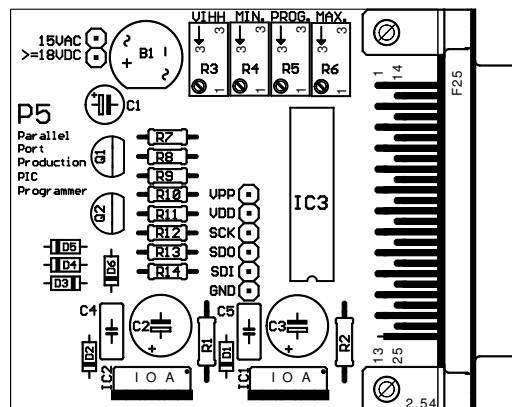
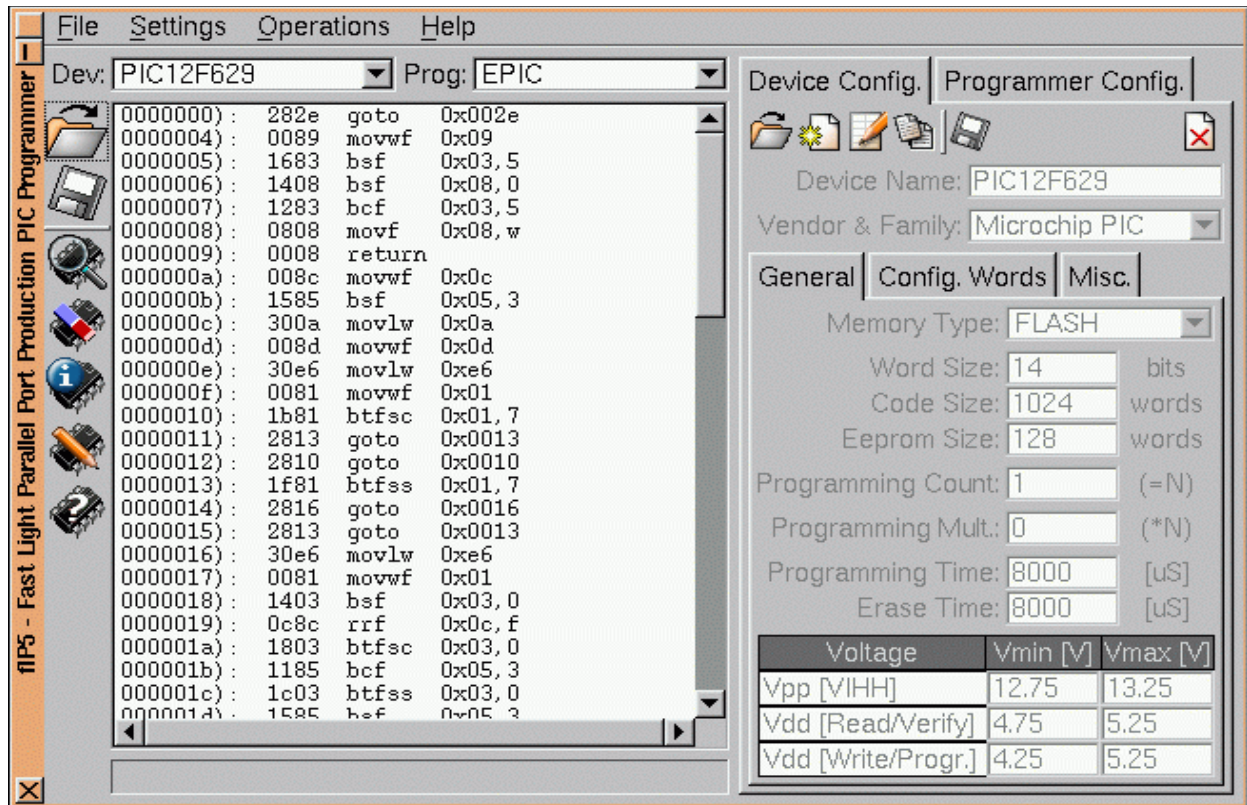


fIP5 & P5

The fast light Parallel Port Production PIC Programmer



by Francesco Bradascio <fbradasc@katamail.com>

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flP5 - The Software

I've made this program because I needed an easy to use, easy to configure and easy to extend full featured PIC (and most of the serially programmed device) programming software.

Easy to extend because it's based on:

- the Mark Aiken's Odyssey - PIC Programming software, a well written, documented and structured C++ program/library, used as programming engine.

Really flP5 uses an enhanced version of Odyssey, I've added the support for the 3 voltages 'production' programmers and made some little changes to the library to best fit with the GUI toolkit.

This library implements the parallel port access and the devices programming algorithms. It's almost the 90% of the whole flP5 program.

- the FLTK 1.1.3 or later - The Fast Light Tool Kit, it's a multiplatform (*nix, MacOS, OS/2, Windows) C++ GUI toolkit, it comes with its own interface designer, a lot of examples, a very good documentation and it's very very easy to use.

Easy to configure because all the settings are easily accessible and full documented by the extensive use of tooltips.

Easy to use thanks to the user friendly interface, the use of few self explaining icons and the extensive use of tooltips.

Features

- can support all the parallel port programmers supported by **Odyssey**, plus the 3 voltages *production* PIC programmers (on parallel port), as specified by Microchips.

New programmers can be easily configured on the fly.

- can support all the PIC devices supported by **Odyssey**, here's a summery:

Tested (with the **P5** programmer):

PIC16F84

Untested but should work:

PIC16C84, PIC16C76, PIC16F74, PIC16C765, PIC16F877, PIC18F252,
PIC16C61, PIC16C62, PIC16C62A, PIC16C62B, PIC16C63, PIC16C63A,
PIC16C64, PIC16C64A, PIC16C65, PIC16C65A, PIC16C65B, PIC16C66,
PIC16C67, PIC16C71, PIC16C72, PIC16C72A, PIC16C73, PIC16C73A,
PIC16C73B, PIC16C74, PIC16C74A, PIC16C74B, PIC16C77, PIC16C620,
PIC16C620A, PIC16C621, PIC16C621A, PIC16C622, PIC16C622A, PIC16C710,
PIC16C711, PIC16C712, PIC16C716, PIC16C745, PIC16C773, PIC16C774,
PIC16C923, PIC16C924, PIC16F83, PIC16F84A, PIC16F870, PIC16F871,
PIC16F872, PIC16F873, PIC16F874, PIC16F876, PIC16F73, PIC16F76,
PIC16F77, PIC18F248, PIC18F252, PIC18F258, PIC18F442, PIC18F448,
PIC18F452, PIC18F458, PIC16F627, PIC16LF627, PIC16F628, PIC16LF628

New PIC devices can be easily added on the fly, but, in the current verion of the software, they must folow the Microchip's specifications listed below:

DS30034D - PIC16F62X
DS30228J - PIC16C6XX/7XX/9XX
DS30262C - PIC16F8X
DS30324B - PIC16F7X
DS39025F - PIC16F87X
DS39576A - PIC18FXX2/XX8
DS41173B - PIC12F6XX

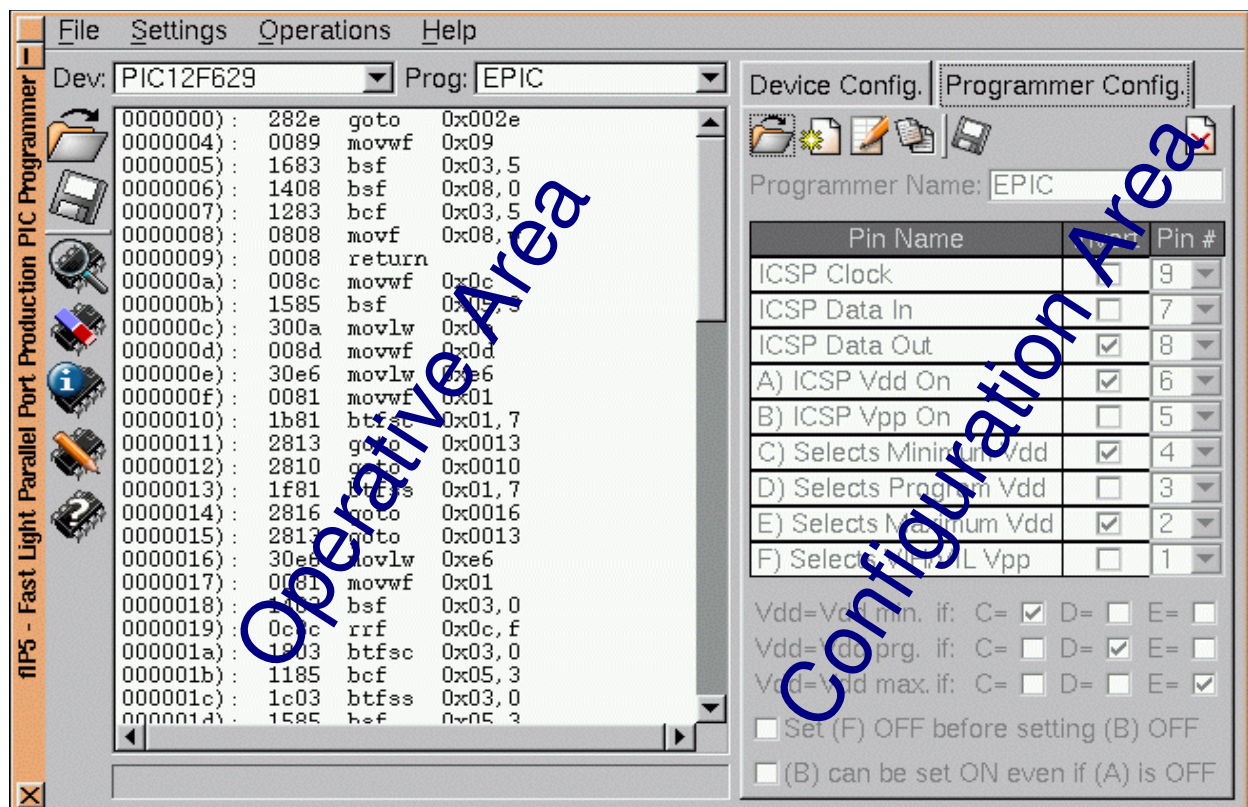
- As Mark Aikens says, thank to his **Odyssey - PIC programming software**:

"This program has the potential to program any serially programmed device and I would like to be able to program any PIC in existence (under Linux of course)." ...

... and even under Windows.

Usage


The interface is subdivided into two areas: the *Operative area* on the left and the *Configuration area*, on the right.





From the **Operative area** you can:


Dev: **PIC18F458** chose the device to work on.


Prog: **EPIC** chose the programmer to use.


 load an hex file into the memory buffer to write into or compare to the device memory.


 write the content of the memory buffer into an hex file.

 load the content of the device memory into the memory buffer.

 erase the content of the device memory.

 perform a blank check of the device memory.

 load the content of the memory buffer into the device memory.

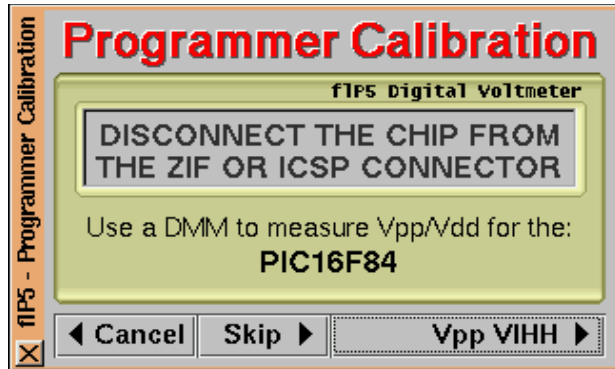
 verify the content of the device memory compared to the memory buffer.

Device
oriented
buttons

view the content of the memory buffer either in hexadecimal format or in disassembled format, depending on the chosen device.

When you choose one of the **device oriented buttons** for the first time or after changed the device or the programmer, the **programmer calibration procedure** will be automatically executed.

The **Programmer Calibration Procedure** consists on a wizard showing the optimal values for the Vpp and Vdd voltages, if your programmer allows you to trim the Vpp and Vdd values then you need a DMM to attach to the ICSP Vpp and ICSP Vdd connections.



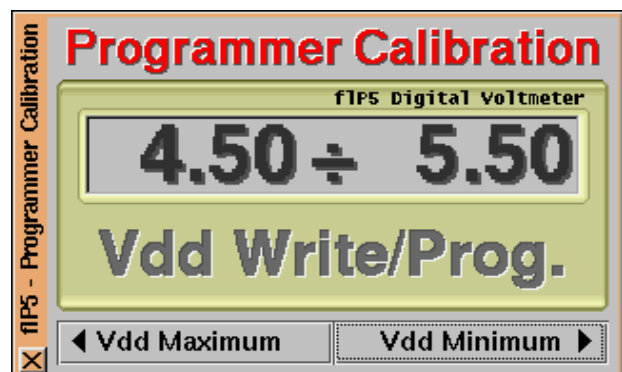
Start of the calibration procedure, clicking on **Cancel** will terminate the selected operation, while **Skip**, when active, allow you to skip the calibration procedure ...



... measure the **Vpp VIHh** value, it must be in the range shown. If you aren't using a production programmer the next step will be **Vdd programming** ...



... measure the **Vdd maximum** value, it must match the value shown ...



... measure the **Vdd programming** value, it must be in the shown range. If you aren't using a production programmer this is the last measure you have to do ...




... measure the **Vdd minimum** value, it must match the shown value ...








... you are done, now can start the selected operation.

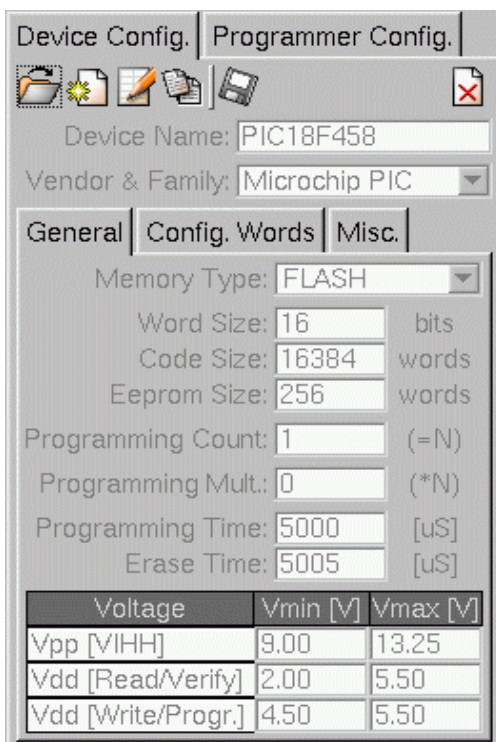
From the **Configuration area** you can:

-  load the devices/programmers configuration from a file. The changes between the current and the new configuration, for each device or programmer loaded, will be shown by the following panel:



-  create a new device/programmer configuration entry.
-  edit the configuration for the chosen device/programmer.
-  duplicate the configuration of the chosen device/programmer.
-  store the configuration changes into the program memory.
-  revert the configuration changes or delete the device/programmer configuration from the program memory.






The **Configuration area** is furthermore subdivided into **Device Config.** and **Programmer Config.** tabs.



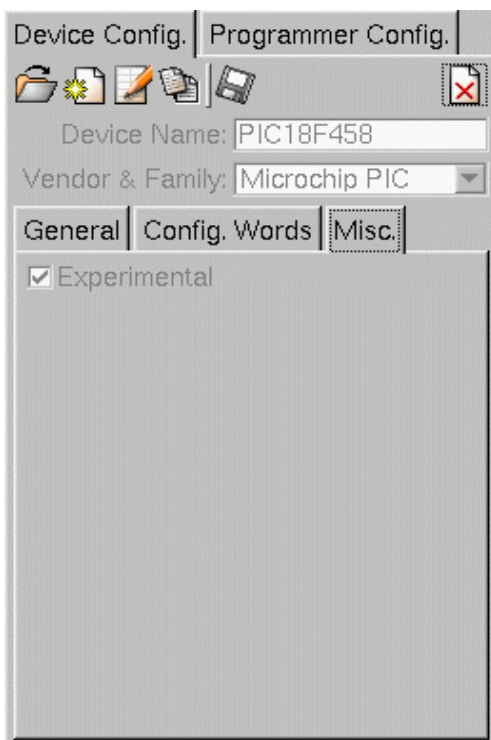
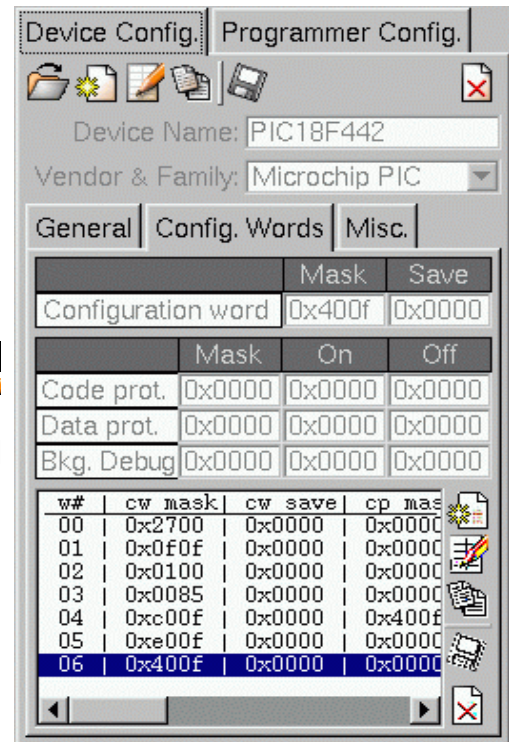
Device Config. tab - General settings

Device Config. tab - *Config. Words* settings

Here you can:

add 
 modify 
 duplicate 
 store 
 and remove 

the device configuration words which are listed in the list placed on the left of the *Config. Words* toolbar, here you can select the word to edit and change the bitmask of the various fields from the above texts.



Device Config. tab - *Misc.* settings

Devices marked as *Experimental* have never been programmed with this software by anyone. When you successfully program a device with this software you can toggle off the *Experimental* mark.

In the list of devices the *experimental* ones are written in **blue**, otherwise are written in **black**.

Device Config. | **Programmer Config.**

Programmer Name: EPIC

Pin Name	Invert	Pin #
ICSP Clock	<input type="checkbox"/>	9
ICSP Data In	<input type="checkbox"/>	7
ICSP Data Out	<input checked="" type="checkbox"/>	8
A) ICSP Vdd On	<input checked="" type="checkbox"/>	6
B) ICSP Vpp On	<input type="checkbox"/>	5
C) Selects Minimum Vdd	<input checked="" type="checkbox"/>	4
D) Selects Program Vdd	<input type="checkbox"/>	3
E) Selects Maximum Vdd	<input checked="" type="checkbox"/>	2
F) Selects VIH/VIL Vpp	<input type="checkbox"/>	1

Vdd=Vdd min. if: C= ☒ D= ☐ E= ☐
Vdd=Vdd prg. if: C= ☐ D= ☒ E= ☐
Vdd=Vdd max. if: C= ☐ D= ☐ E= ☒
☐ Set (F) OFF before setting (B) OFF
☐ (B) can be set ON even if (A) is OFF

Programmer Config. tab

Here you can:

- edit the programmer name.
- configure the pin for the connection of the programmer to the parallel port. If more than one connections have the same **Pin #**, those connections are marked with a **yellow background**.
- specify the signals configuration to obtain the Vdd min/max/programming values for the 3 voltages *production* programming.
- specify the signals configuration to put Vpp to GND.
- specify whether Vdd can be switched OFF before switching OFF Vpp.

From the main menu you can also set the parallel port the programmer is connected to and, under Linux, if possible, the access method to the parallel port, either direct or via a user mode device.

P5 - The hardware

I spent a lot of time in the search of a valid, full featured (3 voltages or *production*), low cost PIC programmer but all the programmers I found, which follow my prerequisites, use a PIC to control all the functions. Why to home build a PIC programmer I need a PIC programmer !?

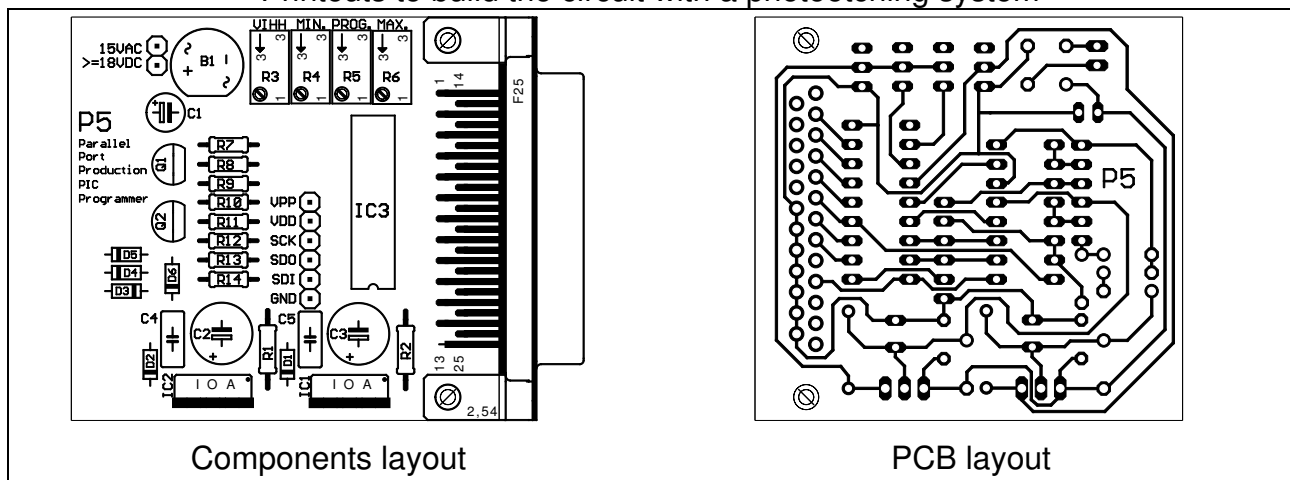
So I decided to design one on my own and the **P5** is the result, it uses few and easy to find components, its brain is the PC to which is connected via the parallel port and I think it has a simple design, also I worked a lot to design a single sided printed circuit board.

Schematic circuit

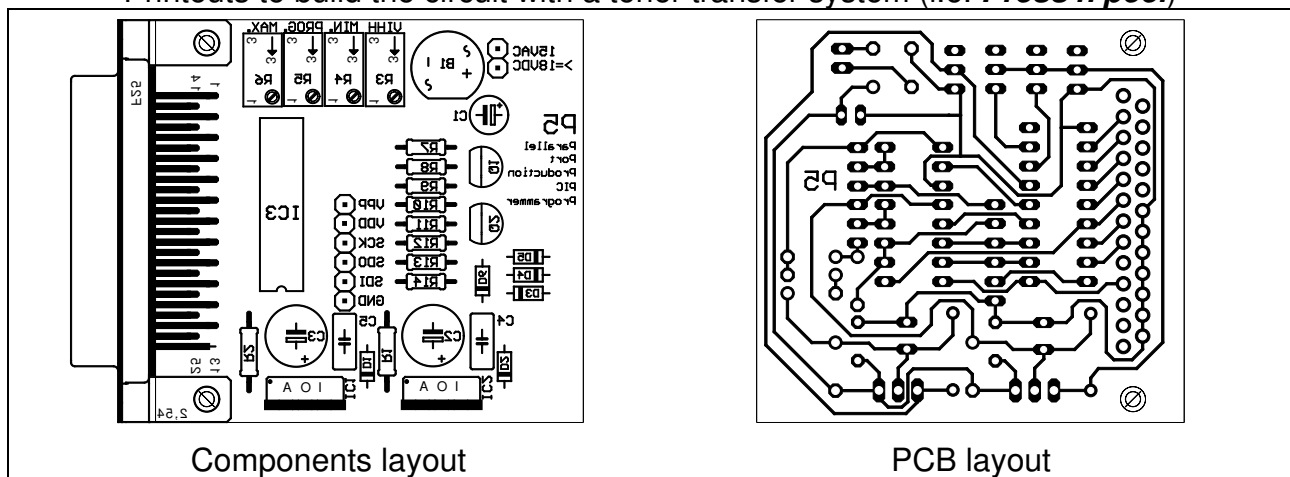
See the next page for the schematic circuit.

Components layout and PCB design

Printouts to build the circuit with a photoetching system

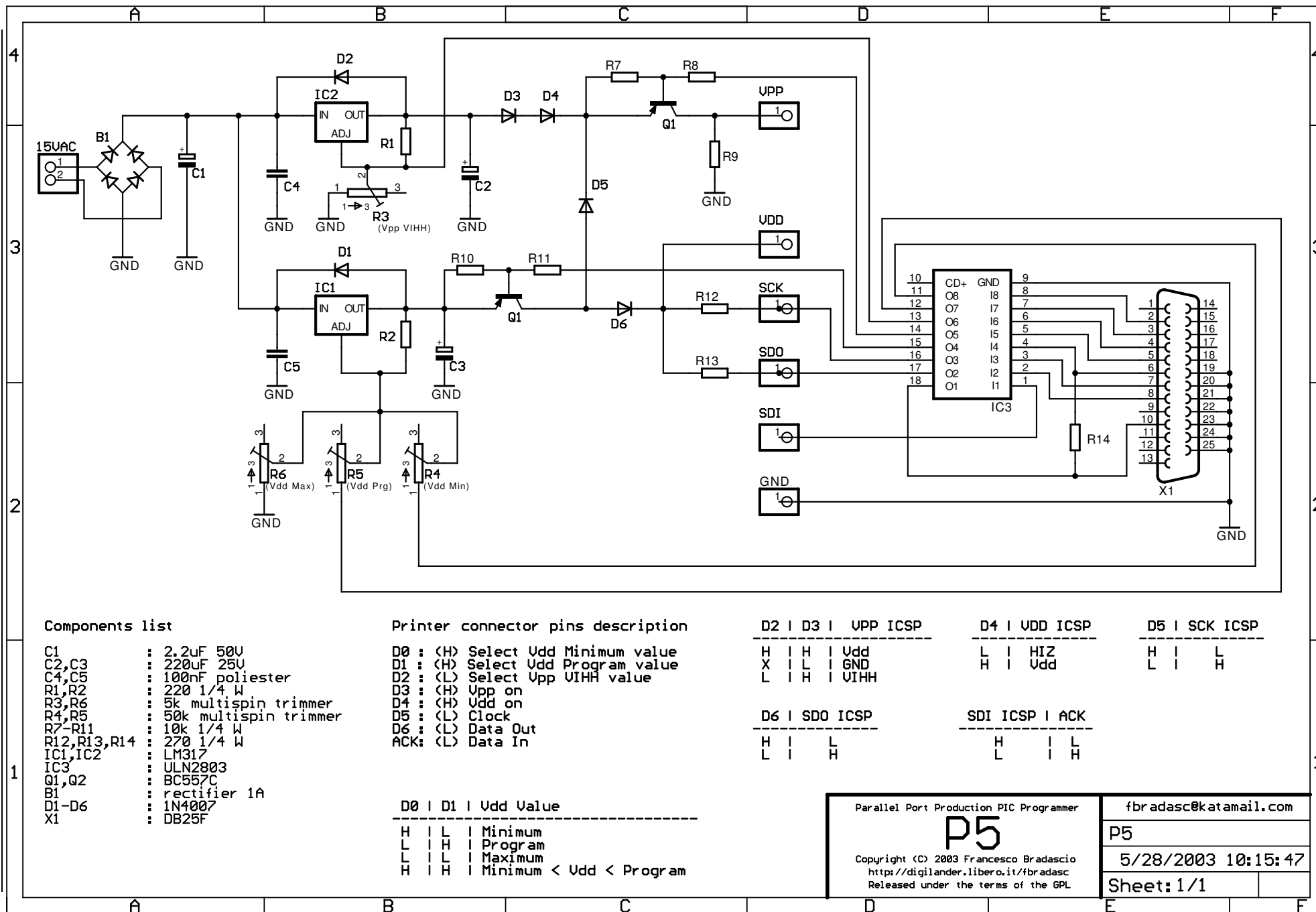


Printouts to build the circuit with a toner transfer system (i.e. *Press'n'peel*)



IMPORTANT ANNOTATION:

When printing this page make sure the PCB is 54 ± 0.5 mm wider and 56 ± 0.5 mm taller



Components list

C1 : 2.2uF 50V
 C2,C3 : 220uF 25V
 C4,C5 : 100nF poliester
 R1,R2 : 220 1/4 W
 R3,R6 : 5k multispin trimmer
 R4,R5 : 50k multispin trimmer
 R7-R11 : 10k 1/4 W
 R12,R13,R14 : 270 1/4 W
 IC1,IC2 : LM317
 IC3 : ULN2803
 Q1,Q2 : BC557C
 B1 : rectifier 1A
 D1-D6 : 1N4007
 X1 : DB25F

Printer connector pins description

D0 : (H) Select Vdd Minimum value
 D1 : (H) Select Vdd Program value
 D2 : (L) Select Vpp VIH value
 D3 : (H) Vpp on
 D4 : (H) Vdd on
 D5 : (L) Clock
 D6 : (L) Data Out
 ACK: (L) Data In

D0 | D1 | Vdd Value

H	L	Minimum
L	H	Program
L	L	Maximum
H	H	Minimum < Vdd < Program

D2 | D3 | VPP ICSP

H	H	Vdd
X	L	GND
L	H	VIHH

D6 | SDO ICSP

H	L
L	H

D4 | VDD ICSP

L	HIZ
H	Vdd

SDI ICSP | ACK

H	L
L	H

Parallel Port Production PIC Programmer

P5

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P5

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Sheet: 1/1

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