The DIY Pic Programmer

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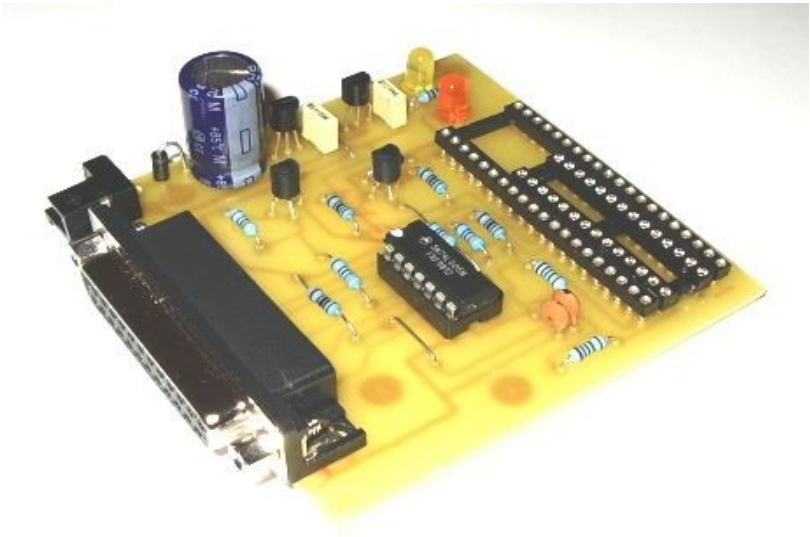


The 28pin/40pin Parallel Port PIC Programmer for the the project chips.

This document has been produced to compliment the Temperature Multi Controller Project.
It will enable you to quickly produce a simple, cheap, programmer for the PIC chips used.

Construction should be easy, but please read all these notes before ordering the parts.
Problems in the actual programming can be given if you do not observe these points.

It should cost very little, many parts probably in your 'junk' box, so it is ideal for the odd programming needed for the project.

It has been tested on the following chips only:-

16F873, 873A, 876, 876A 18F2520, 4520

If you have only USB or need to program a wider selection, then see the PicKit2 programmer available from Microchip Direct and other outlets for as little as US$35 plus delivery etc.
Its an excellent unit with great potential for the PIC enthusiast.

The Hardware.

A pcb layout is provided and all parts are standard.

Construction should pose no problems, but please check with your supplier the correct pin out for their transistors and regulators incase they differ.

Note that ic1 and ic2 are mounted in opposite ways.

Please see the hardware notes in the rest of this document before ordering your parts.

Parts List.

IC1	74LS05	1	
D1	1N4004/5/6	1	
C1	1000 or 2200uf 63v	1	radial
C2/3	100nf	2	5mm lead spacing
C4/5	33pf	2	ceramic
REG1	78L05 +5v 100ma	1	t092 type
REG2	78L08 +8v 100ma	1	t092 type
T1/2	BC557 A/B/C	2	any version
LED1	RED	1	3 or 5 mm
LED2	GREEN	1	3 or 5 mm
R1,3,4,5,7	4K7	5	all resistors 1/2w approx
R2,6,11,12	10K	4	
R8	1K	1	
R9,10	100 OHM	2	
ICSKT1	14PIN DIL .3”	1	NEW
ICSKT2	28 / 40 PIN DIL .3/.6"	1	NEW
SK3 *	2.5mm power skt	1	+ to inner or 2x5mm connector block
SK4 *	d25 pcb connector	1	male or female to suit your cable
CAB	d25 cable	1	parallel port to pcb cable – see text
PSU	as spec	1	mains plugin type psu 16-25v DC min 300ma

* extra, larger pcb pads provided to allow cables to be hard-wired, instead of sockets

Board Testing -
Visually inspect the completed pcb and clean between the joints to ensure any small solder bridges and heavy flux residues are removed.

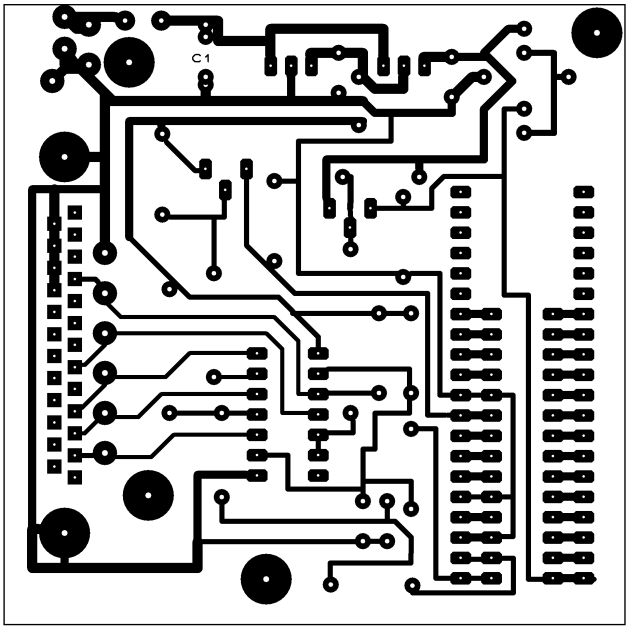
Check +5v and +13v are nominal.

DC ma measured at power socket - all values approx

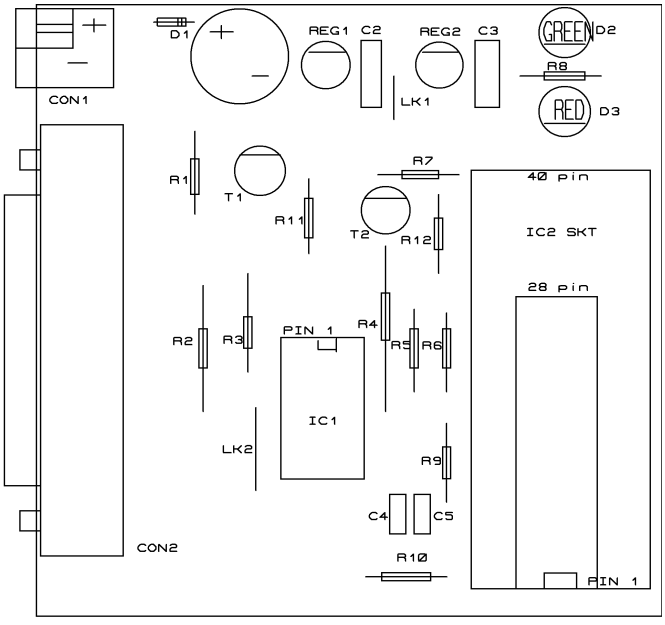
no chips in - one led should light 9ma
with 74ls05 in 13ma
actually programming 28ma

Individual lines can be tested by the software; see software section.

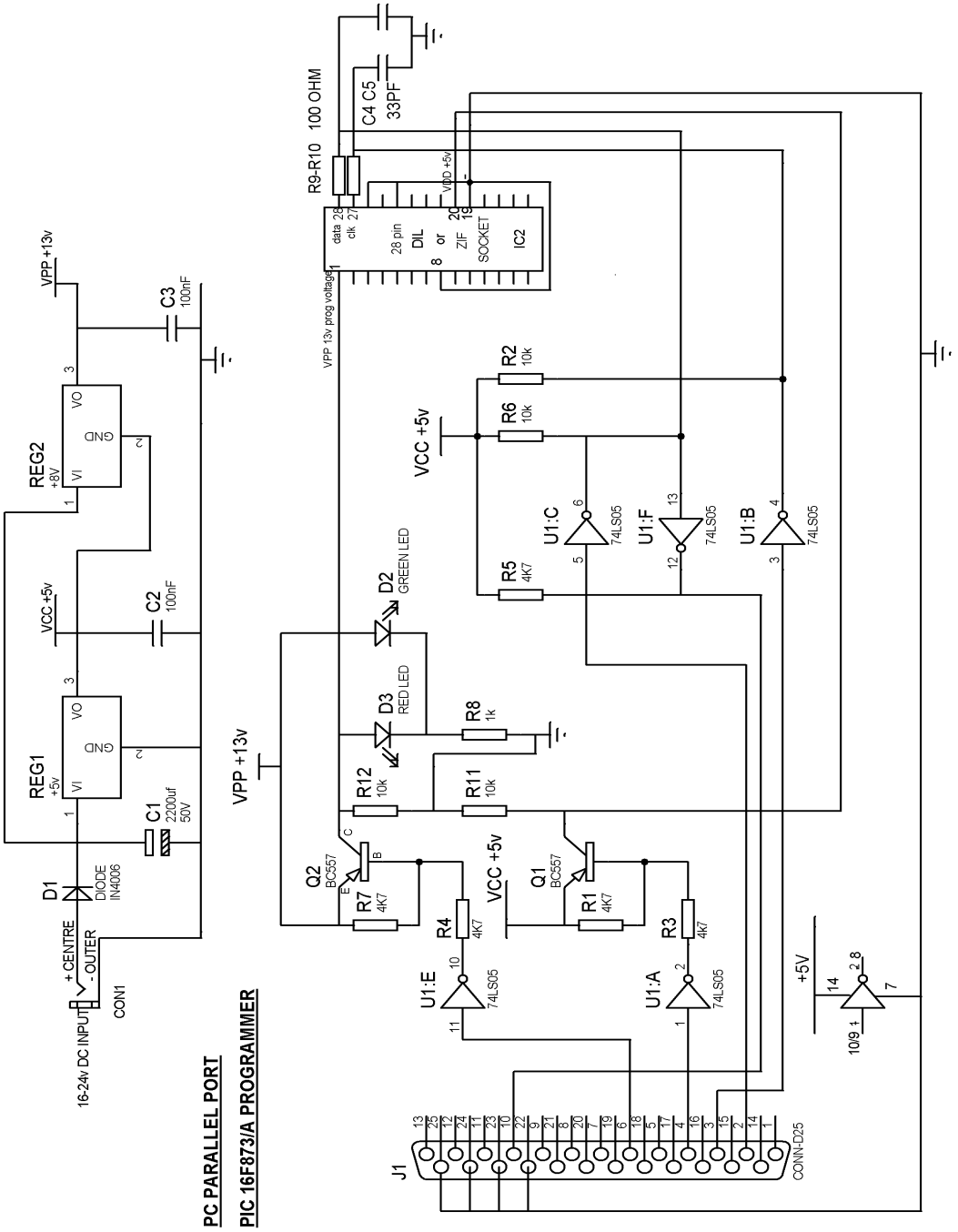
The PCB Layout - please check your *printed* sizes as 77mm square



Pcb view – looking down from topside through board



Component silk


PC PARALLEL PORT
PIC 16F873/A PROGRAMMER
16-24v DC INPUT
+ CENTRE
- OUTER
CON1
D1
DIODE
IN4006
REG1
+5v
REG2
+8V
VI
VO
GND
C1
2200uf
50V
C2
100nF
C3
100nF
VPP +13v
VCC +5v
VPP 13v prog voltage
R9-R10 100 OHM
C4 C5
33PF
28 pin
DIL
or
ZIF
SOCKET
IC2
data
clk
VDD +5v
R2
10k
R6
10k
R5
4K7
U1:C
U1:F
U1:B
74LS05
D2
GREEN LED
D3
RED LED
R8
1k
R12
10k
R11
10k
Q2
BC557
Q1
BC557
R7
4K7
R4
4K7
R1
4K7
R3
4K7
U1:E
U1:A
+5V
J1
CONN-D25

Hardware Information.

Please observe the following if you wish to avoid all sorts of weird problems when trying to burn.

Use only brand new ic sockets, preferably with a new pic ic. (contact resistance)

The D25 cable should be a good quality round screened type, and no more than 2m long!
It must be the Straight, Fully Populated type of D25 cable.
Do no use the crossover rs232 type.

Connect directly into the PCs parallel port, do not go via a switch box.

Do not add any extra capacitors to the circuit. These can affect the circuit timings

IMPORTANT NOTE

THIS CIRCUIT HAS BEEN BUILT SEVERAL TIMES AND ALSO IS USED VERY REGULARLY AS THE PROGRAMMER INCORPERATED INTO MY DELVELOPMENT BOARD.

OTHER USERS HAVE ALSO CONFIRMED THEY HAVE IT WORKING OK.

BUILT AS SPECIFIED IT DOES WORK.

Software WinPic

Download the software directly from www.qsl.net/dl4yhf/winpic/winpicpr.zip
or www.qsl.net/dl4yhf/winpic if you want to look at their site more.
(it looks rather complicated if you are not into micros, but it is good information should you have more interest in them)

Just let it self unzip, then install and startup.
To run, you need to first configure the program.
First goto 'tools' and ensure the 'show toolbar' is checked on.

From the interface folder , interface type; select 'custom on LTP1 from file'
Then port LPT1 address 378 – assuming you are using a standard port pc.
From the Custom Interfaces select 'Bojan Dobaj PR16PRO40
Notice that this folder also allows you to test the lines out to the programmer board.

In the options folder; select your language, and select the I/O DRIVER; SMPORT driver.
Two small files are downloaded with this document - 16f876a.dev and 18f2520.dev.
Put them in a folder on say c: These files tell the programmer about the types of chips used. In the 'MPLAB DEV file dir ' box, browse and select this folder.
(or point the program to the respective mplab ide dev file folder if your have mplab on your pc)

From the 'device,config' folder select the required chip, this may bring up a mismatch message, from the option folder, reply yes, to correct.

Now from the File, Load or Open folder, load in the latest HEX file.
You are ready to program, but if you select the messages folder you can watch the messages as it programs. Press the Program Icon to run.
Once it says done Ok then try it in the working circuit – should be fine.

If it does not program successfully then :-

Check your hardware, and run the line tests from the program and check with a voltmeter.

October 06 Outstanding Winpic/XP Bug

As the program file has increased in size I noticed that , when first starting to program a chip, verify errors were given, when the same thing worked just hours earlier.

However if I simply pressed program again, if would fail again, but doing it again, after about the sixth attempt it programs up - ? Thereafter it continues to works fine - but power off or leave it unused for a couple of hours and the problem returns - Windows XP fooling around ?

However, if you program just a very small file this will works fine

Other users have since reported the same problem, so it seems likely to be the WinPic program and/or windows xp.

It means that I have to spend 2 minutes every time I start a new programming session, but knowing how to handle the problem is the main thing - its not worth spending hours trying to find the cause of 2 min delay once in a while.