

## **Quickstart Profidoit. (version 0.75 or higher)**

**For Profiler with 3D or 2D card and with or without controller.**

**The program comes in two versions one for LINUX and one for Windows.**

Update : 150601

The windows version is tested with: Windows XP and 7.

The linux version is tested with: Debian 6 and Ubuntu 12.04.

There are two controllers with 4 digital in/outputs available.

The USB- controller uses one single usb-port for the Profiler and controller.

The Piccolino-controller uses a separate usb/serial port.

A controller may be used to automate a number of functions while milling.

Before starting the program read section 10 License.

1. Start program.
2. Processing object file.
3. Preview.
4. Toolchange.
5. Levelcan ( only available with controller).
6. Basic settings for 3D and 2D and controller type.
7. 3D-card and usb-controller settings.
8. Tools screen.
9. Materials screen.
10. License.
11. Directories.
12. Accountability.
13. Profiler commands used
14. Conversion object files.
15. Tool types.
16. Materials.
17. References

## 1. Start of program.

Create a directory for the program and install the program in this directory by unzipping the zip-file. The program creates a number of subdirectories and a configuration file when run for the first time.

Start the program by double clicking on it or create a short cut.

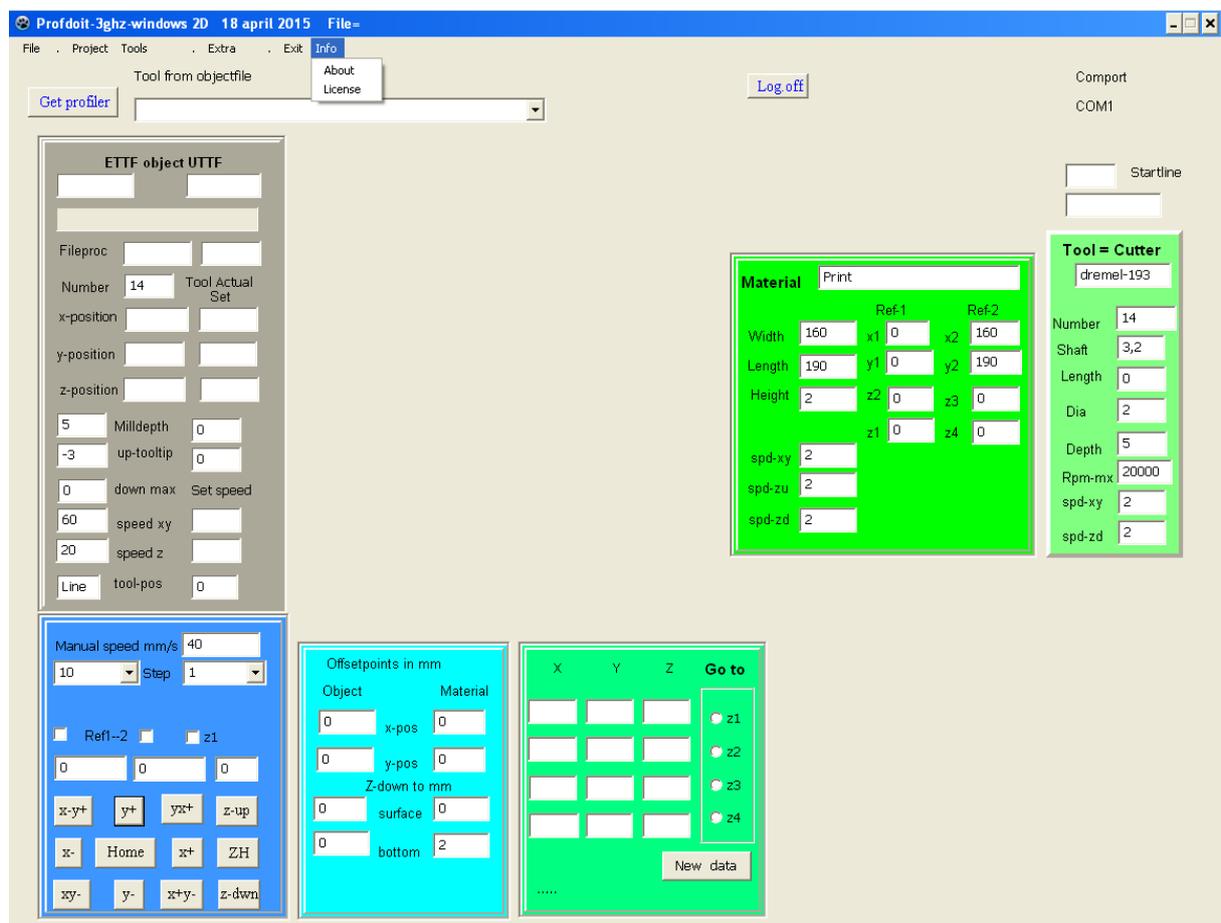


Fig. 1.1 Opening screen. (01-00-150418)

First goto "Tools" -> "Options" to set the comport for the Profiler (see chapter 6).

At startup some error messages may be displayed.(see chapter 1.1)

In this screen use "GET Profiler" button to let the program find the Profiler and establish communication via the serial- or usb-port if present.(see "Settings" chap.6 fig. 6.2).

If the Profiler is found at one of the serial or usb ports the Profiler control block becomes visible Fig.1.3, Fig 1.4.

If the profiler is not found the following message is displayed and the program may be terminated or you can test many of the functions of the program without using the Profiler being activated.

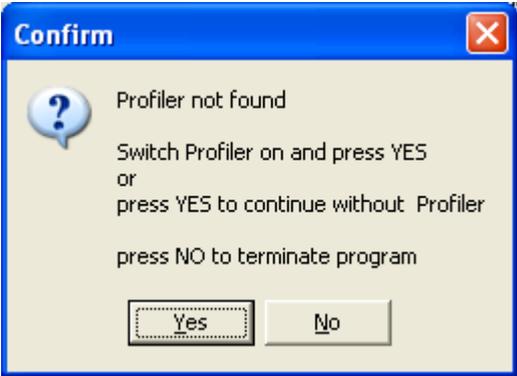


Fig.1.2 No Profiler found (01-08-140126)

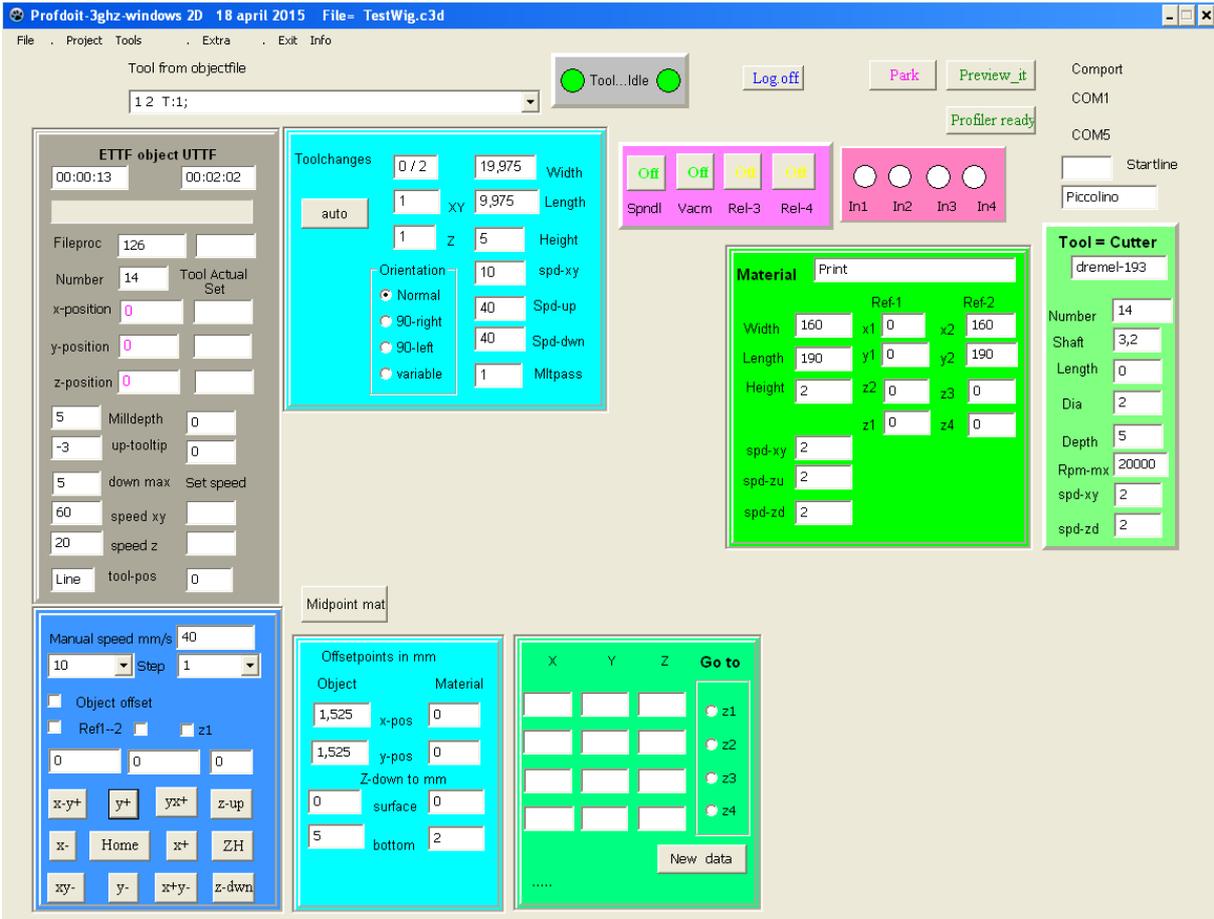


Fig.1.3 Profiler and Piccolino-controller is found and activated. (01-01-150418)

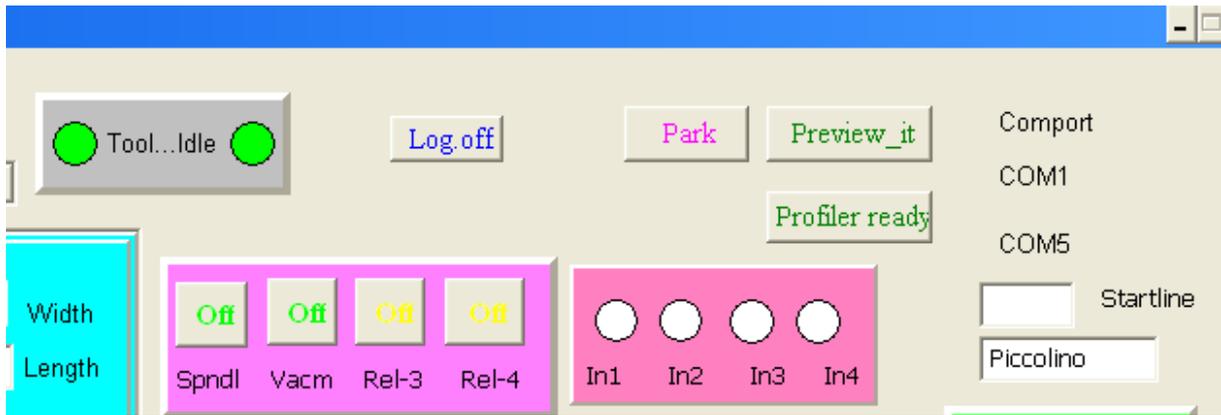


fig 1.4. Profiler block, comports and output relais-block (Piccolino controller present). (01-02-150418)

- “Tool...Idle” shows sending data to profiler and tool up/down, Idle (red) is profiler busy.
- “Profiler ready” start processing of the object file, changes to “milling”.
- “Park” move spindle to park position
- “Preview\_it” shows object file in preview screen (chap.4)
- “Comport” shows the comports in use by profiler (COM1) and Piccolino controller (COM5).  
In case of the usb-controller only one port is displayed.
- “Log.off” switches debugging and logging on/off

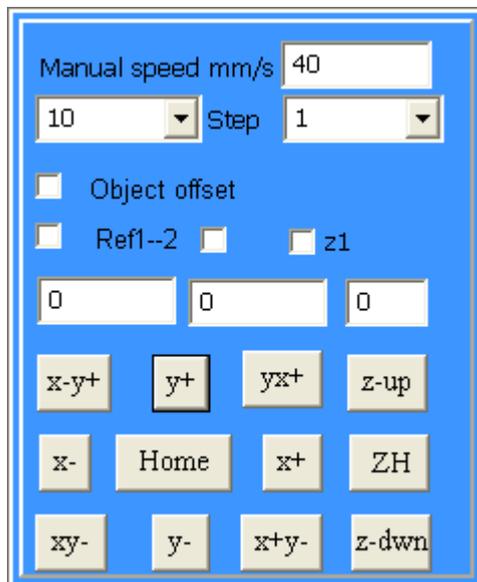


fig 1.5 Profiler move buttons (01-09-150418)

- “Home” moves engine to position 0,0,0.  
The x, y, z buttons move the spindle with the steps set above and displays the set-position.
- “Ref1—2” sets the material x-y-position and dimensions in absolute position (fig 1.6)
- “z1” sets and saves xy- and the spindle z-position above the material.

“Set obj xy” sets the object offsets in absolute position .

Set the material dimensions by using the direction arrows (Fig.1.5 ) and set the lower left reference point of the material Ref-1 (Fig.1.6).

		Ref-1		Ref-2	
Width	160	x1	0	x2	160
Length	190	y1	0	y2	190
Height	2	z2	0	z3	0
		z1	0	z4	0
spd-xy	2				
spd-zu	2				
spd-zd	2				

Fig.1.6 Setting reference points (01-10-150418)

Now set the upper right corner of the material Ref-2. The material position and dimensions are calculated and displayed.

“Ref1” lower left corner, offset of material.

“Ref2” upper right corner of material.

“z1...z4” z-value for the corners of the material (used in slope calculations. autolevelling)

“spd-xy” xy-speed from object file when milling, may be changed manually

“spd-zu.. spd-zd” up and down speed settings of the spindle for 2d-card

Now go back to the lower left corner of the object and use the z-arrow to set the height offset at that point by clicking the checkbox “z1” see fig.1.5

### 1.1 Start-up error messages.

If the comport cannot be found on a Windows system.



Fig.1.1.1 Communication Port not found (01-06-140126)

Press “OK” and check if “Comport” is set to the comport used by the Profiler.  
See “Tools” → “Options”. ( chapter 6 )  
Return to main screen by “exit” to save the data into the configuration file.

The configuration file is not found or differs form this version of Profidoit.

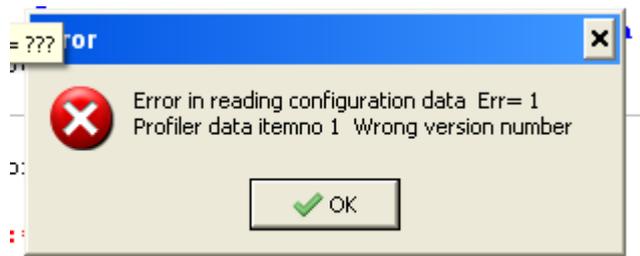


Fig 1.1.2 Configuration file error (01-07-140126)

A wrong version number is displayed but no real error is present in this case  
If there is an error in the configuration file this error is displayed giving the position of the error in the file. .  
Press “OK”, in this case the configuration file will updated automatically when you exit the program.

## 2. Processing of object file.

An object file can be loaded using “File” and “Open”. The file is read and dimensions, number of lines to process of the object are displayed.

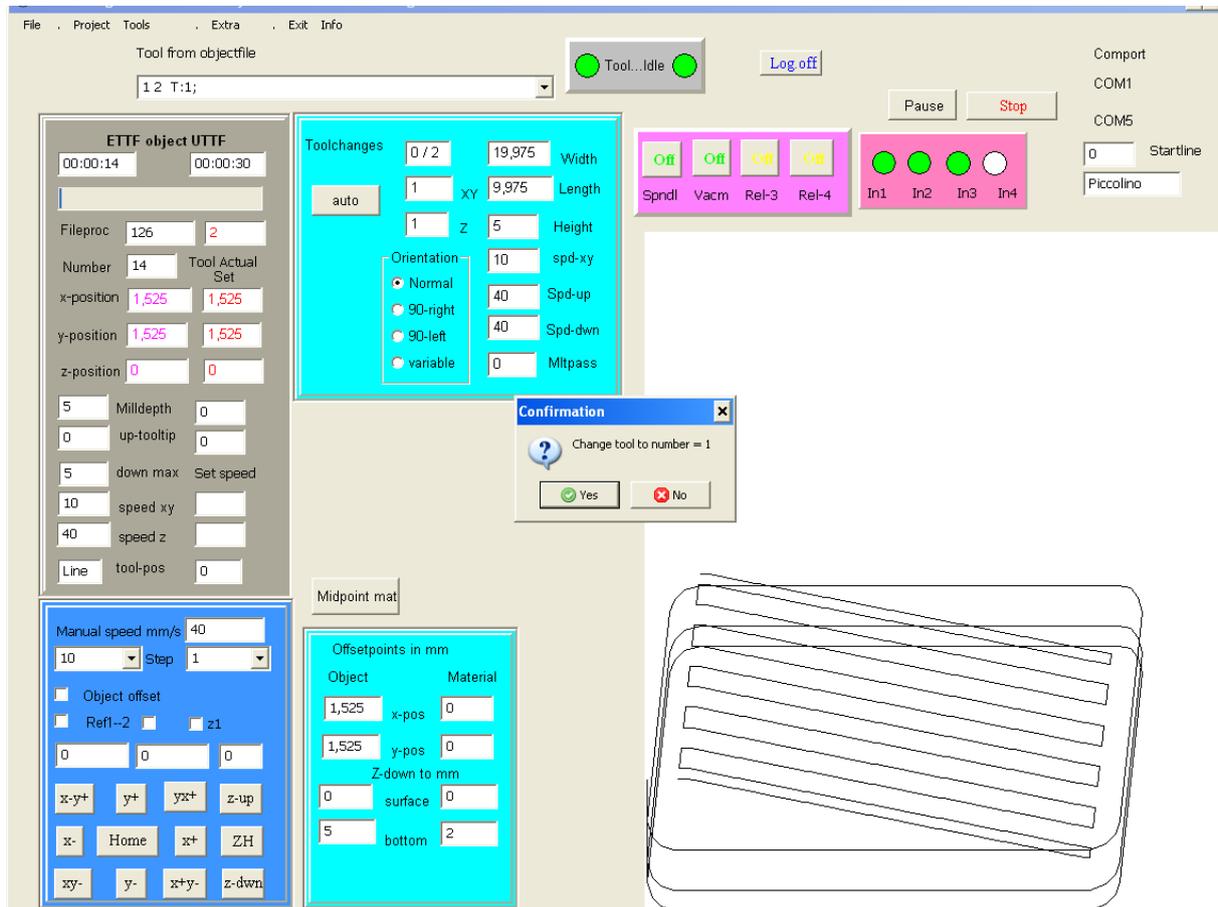


Fig 2.1. Object file loaded. Dimensions and number of lines to process are displayed. (01-03-150418)

The offset of the object and dimensions as read from the object-file. To change dimensions or position of the object the following questions are forwarded:

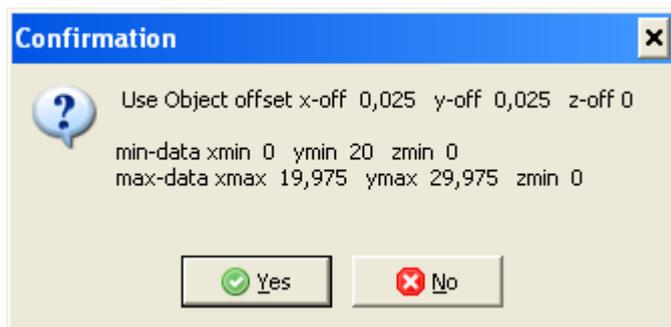


Fig 2.2 “Use object offsets”  
 if “yes” the display offsets are added to the object offset. (01-11-140126)

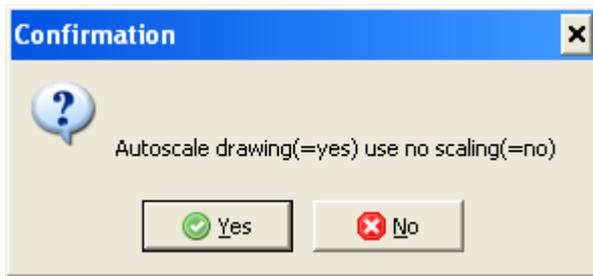


Fig 2.3 “Scale object”  
 if “yes” the object is scale within the material dimensions. (01-12-140126)

Pressing “Profiler ready” button ( fig 1.4) starts the real processing,  
 The button changes to “Milling”

The line number processed is displayed and the values for x, y and z are displayed at the  
 “actual tool”.

To interrupt the processing click “Pause”. The profiler does not get any new data and is  
 paused. (see Fig 2.5).

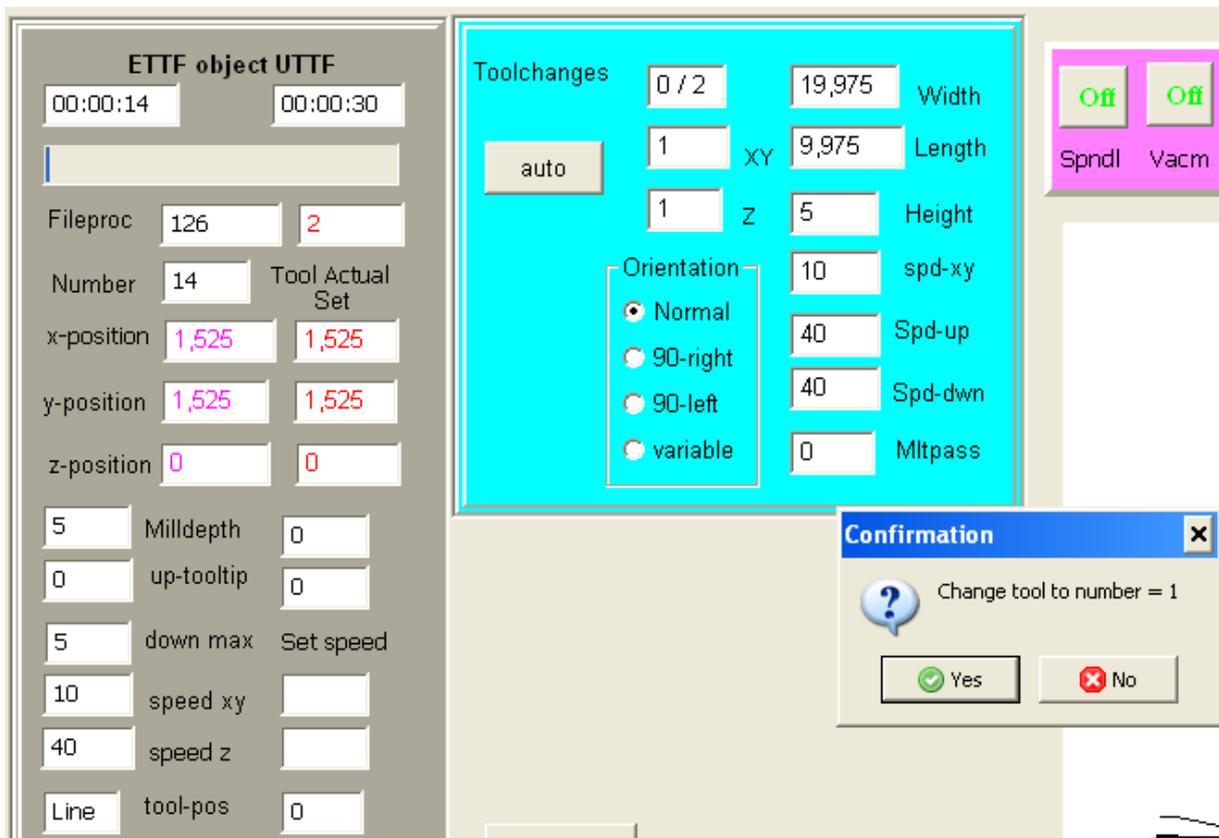


Fig.2.4 Processing the milling, lines, times, positions (01-13-150418)

“Fileproc”	number of lines in object file and number of lines processed.
“Number”	tool number from object file
“x, y,z “	positions actual and set by object (see exceptions for 3d-card)
“Milldepth”	required by object
“up and down”	max up/ down data of spindle.
“xy and z”	actual speed set by processing
“ETTF”	expected time to finish
“UTTF”	used time by process
”Stop”	aborts processing.

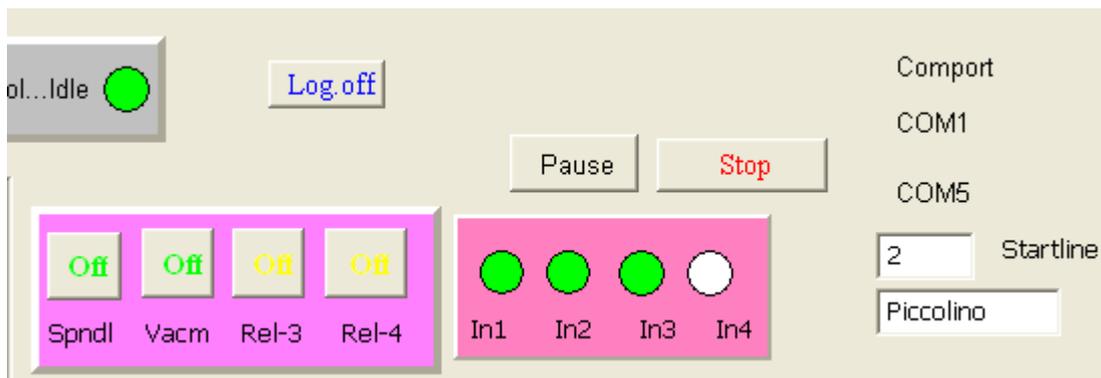


Fig. 2.5 Processing aborted, when using “Stop” (01-02-150418)

When aborted the program communication to the profiler is halted. The program should be “exit” now as the status of internal buffers may be undefined and communication to the profiler has to be restarted and restart object file processing .

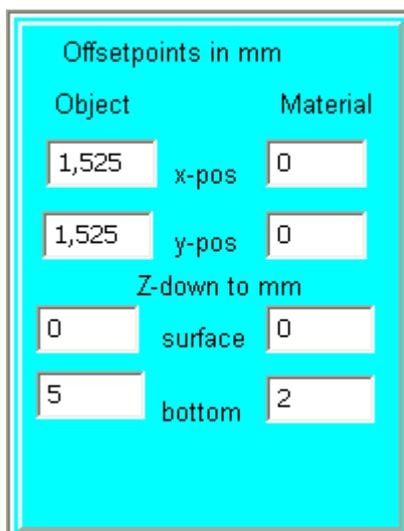


Fig. 2.6 Offset points (01-14-150418)

The offset points are set :

for material using “Ref1” see fig.1. 6  
for object using “Set object xy” see fig.1.6



Fig. 2.7 Relays outputs using a controller (Usb or Piccolino) (01-15-150418)

When there is an usb or Piccolino is controller available the output may be used for switching on or off:

1. “Spdl” milling spindle on/off
2. “Vacm” vacuumcleaner on/off
3. “Rel-3” external relais
4. “Rel-4” external relais

At the end of processing an object file the spindle and vacuumcleaner are switched off automatically.

The spindle is switched off and on when there is a tool change.

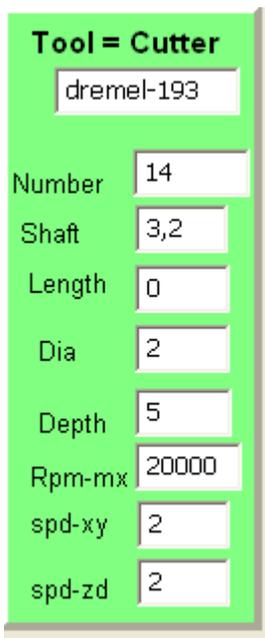


Fig. 2.8 Display of tool data from tool database (01-16-150418)

Toolchanges	<input type="text" value="0 / 2"/>	<input type="text" value="19,975"/>	Width
<input type="button" value="auto"/>	<input type="text" value="1"/>	XY	<input type="text" value="9,975"/> Length
	<input type="text" value="1"/>	Z	<input type="text" value="5"/> Height
Orientation	<input type="text" value="10"/>		<input type="text" value="10"/> spd-xy
<input checked="" type="radio"/> Normal	<input type="text" value="40"/>		<input type="text" value="40"/> Spd-up
<input type="radio"/> 90-right	<input type="text" value="40"/>		<input type="text" value="40"/> Spd-dwn
<input type="radio"/> 90-left	<input type="text" value="1"/>		<input type="text" value="1"/> Mltpass
<input type="radio"/> variable			

Fig. 2.9 Object file loaded (prf-23-150418)

When object file is loaded the dimensions are calculated and the milling speed data from the object file are displayed. If there is an offset in the object file the question is asked to use this offset. If the dimensions of

the object fall outside the material dimensions the question to scale the object within the material dimensions is asked.(Fig. 2.3)

### 3. Preview.

Displays the object on the Profiler working area.

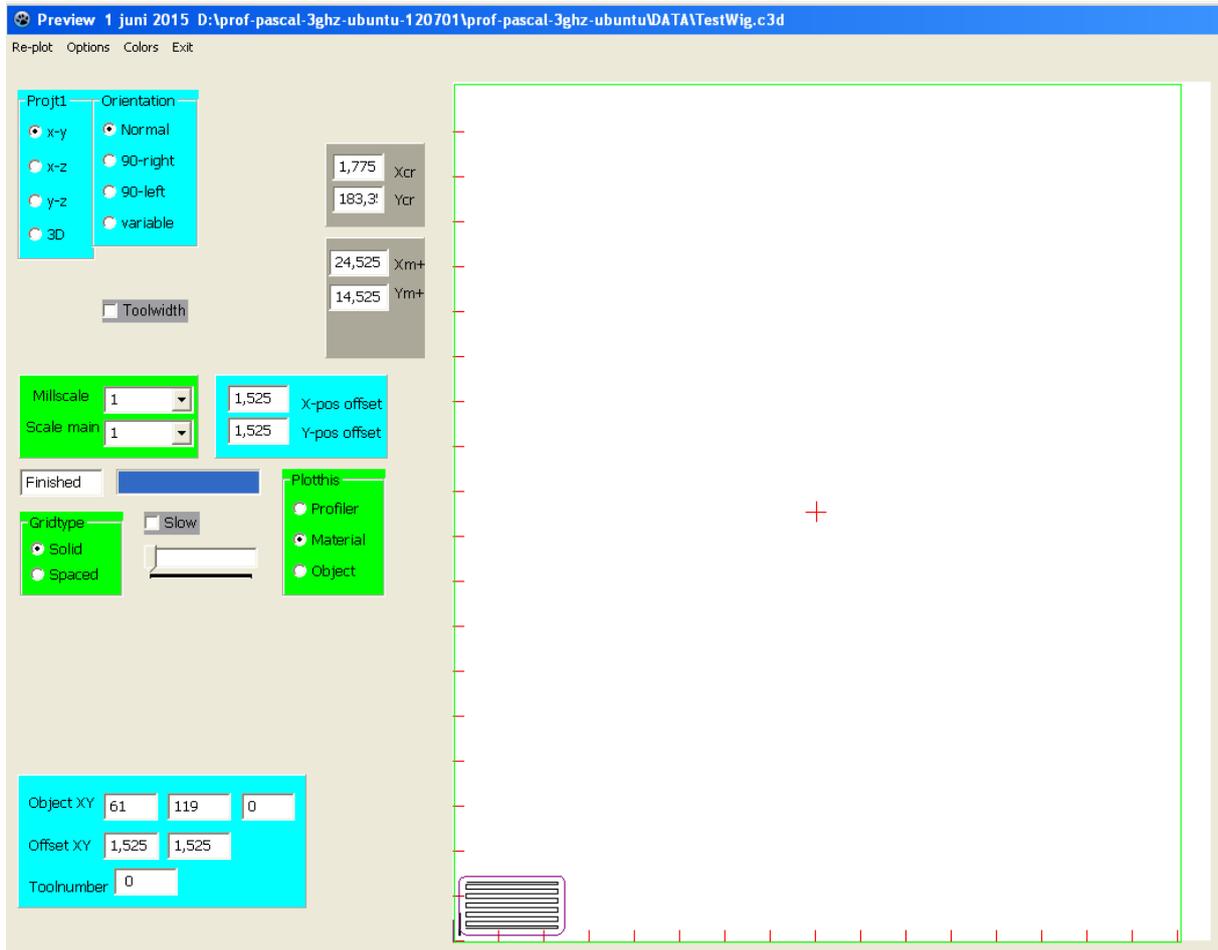


Fig. 3.1 Preview screen (03-01-150418)

Displays the object file:

Menu item : "Project"

x-y as x-y projection

x-z as x-z projection

y-z as y-z projection

3D as 3d-projection ( shown in fig.3.7)

Menu item : "Orientation"

"Normal" as shown in fig.3.1.

"90-right"

"90-left"

"variable" any angle up to 360 degrees

Menu item : "Plotthis"

"Scale" any scaling

"Profiler" profiler area as base

“Material “ material area set in mainscreen as base  
 “Object “ object dimensions as base



Fig. 3.2 Preview menu Options (03-02-140126)

Under “Options” in the Preview menu a number of additional items may be set.

- “Grid” switched the grid on/off
- “XY-autoscale” draws the object file as large as possible in the choose area (see “plotthis”)
- “Up/Down” displays all the up and down moves of the spindle in the object file
- “Moves” displays also then the moves above the material
- “Modelarea” displays the contour of the object, this may be moved within the material and set new offsets for the object
- “Set scale” enter a scale factor, may display object outside material area

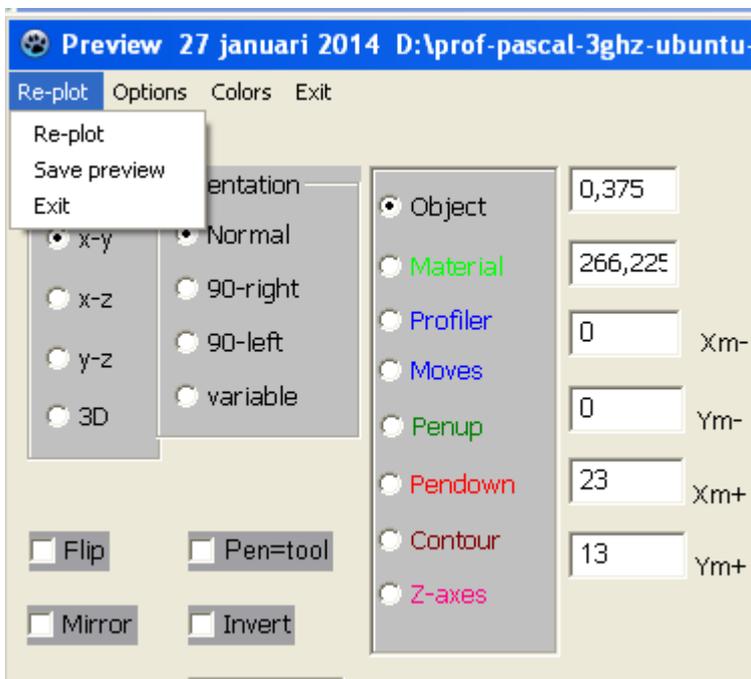


Fig. 3.3 Re-plot and color bar (03-03-140126)

Some options do not automatically re-display the object. In these case use “Replot” to get the new positions displayed.

The color bar is used to set the different colors for the options displayed.

The data Xm-, Ym-, Xm+, Ym+ are the minimum and maximum dimension of the object displayed.

The data above these are the moving mouse position in the Profiler area field.

“Save preview” dumps the preview data in a file, this file stays open till the programme exits. This file may be used to collect preview data of several objects. Later the collected is used as one new object.

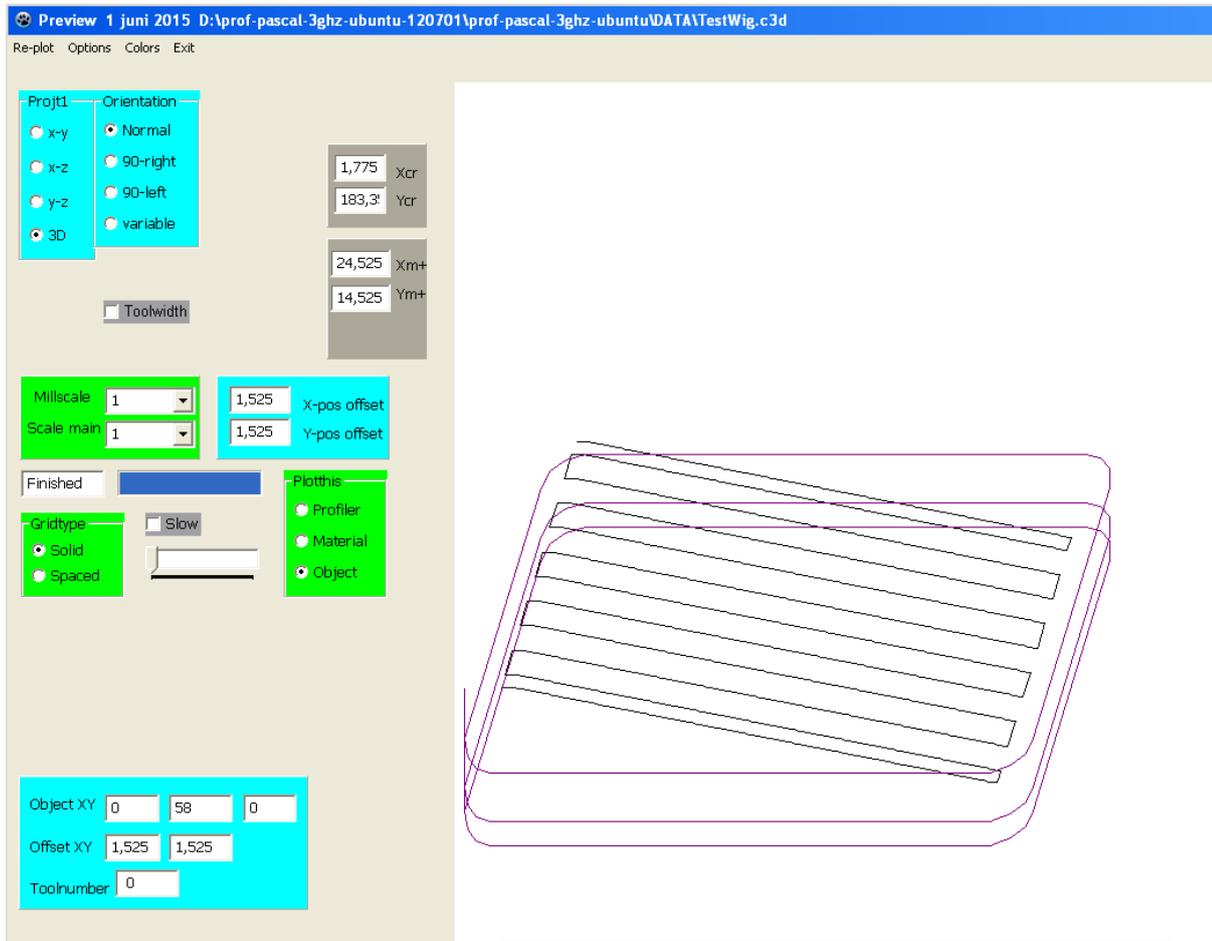


Fig.3.4 Object displayed in full and 3d (03-04-150418)

Use “Plotthis” to display the object on the "Profiler surface" , within the "material dimensions" or as "full object".

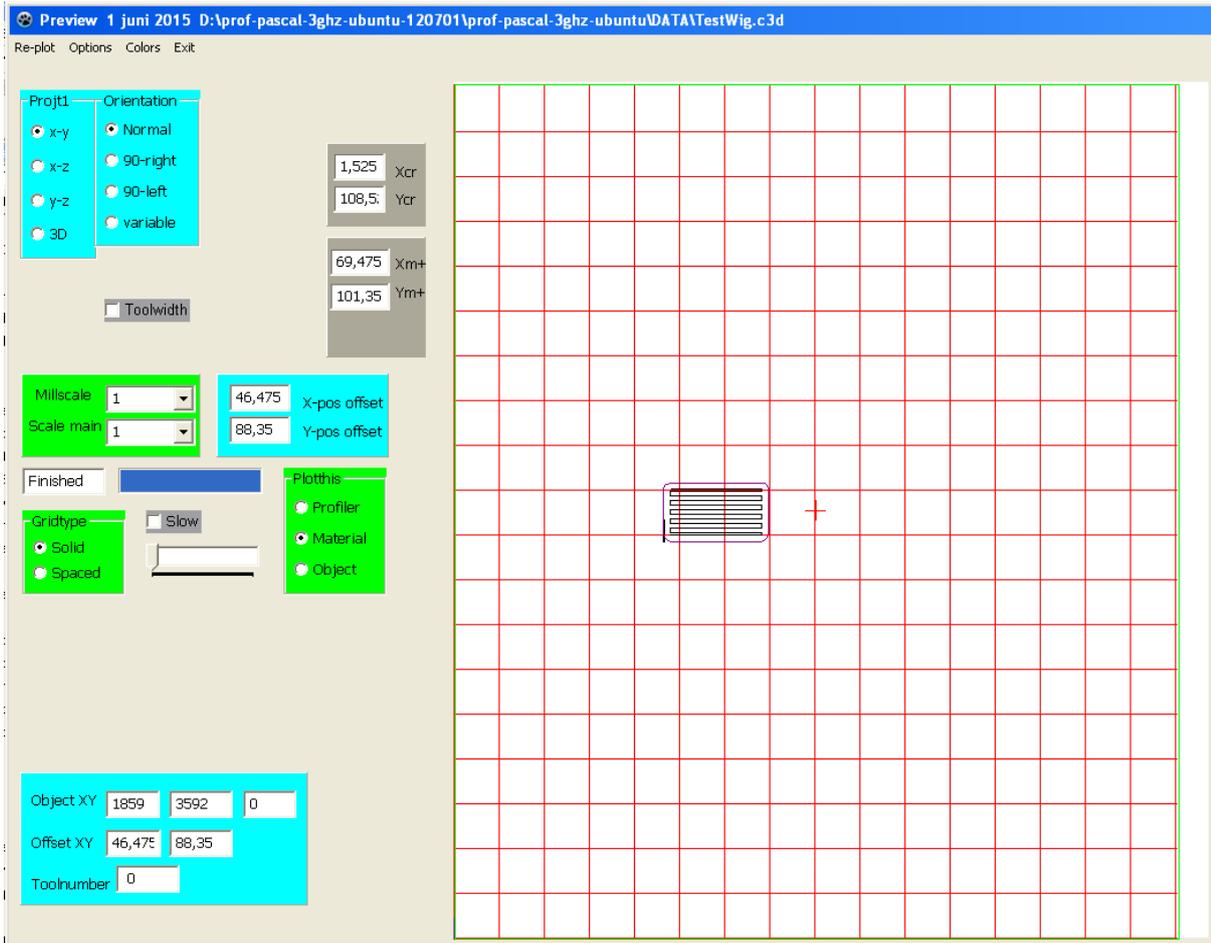


Fig. 3.5 Preview solid grid and object moved (03-05-150418)

Grid displayed by switching the "Options -> Grid" on or off. The Gridtype is set "Solid" or "Spaced".

Grid spacing is set in "Settings" -> "Miscellaneous" Standard is 10 mm.

Pointing with the mouse at the lower left corner of the object and pressing the left button the object may be moved around the Profiler area. To speed the moving a contour of the object is displayed during moving. The new position is translated to new XY-offsets.

Use "Options" to display Profiler up/down and movements above the material.

#### 4. Toolchange.



Fig 4.1 Tool list from object file. (01-c01-140126)

The program collects the tool descriptions used in the object file into a list. The actual tool is displayed in the "Tool from objectfile" window. With the arrow at the right side to whole list will be displayed.

Toolnumber, line number in the objectfile and description are displayed.

Selecting a tool before milling, starts processing of the objectfile at the tools linenumber.

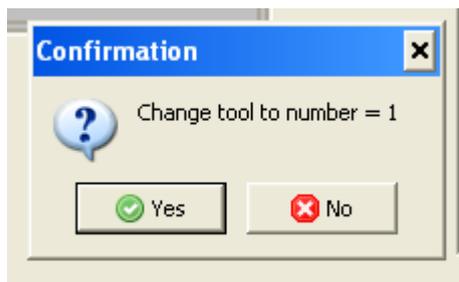


Fig 4.2 Toolchange tool number 1 (01-c02-140126)

If a new tool is placed in the milling spindle a new z-value has to be set as the tool length may differ from the previous tool. The tool length is measured "manual" or "automatic".

If an usb- or Piccolino controller is present this tool length measurement may be automatic if there is a reference switch mounted at the profiler and is activated. (see 3d or 2d settings screen)

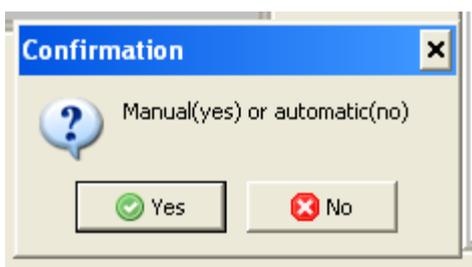


Fig 4.3 Toolchange: manual or automatic tool length measurement (01-c03-140126)



Fig 4.4 Before processing a tool change the spindle has to be switched off (01-c04-140126)

If processing a toolchange the program needs confirmation that the spindle is switched off before going to the “Change tool position”.

In an automated tool change using a controller, the spindle is switched off by the programme

#### 4.1 No toolchange.

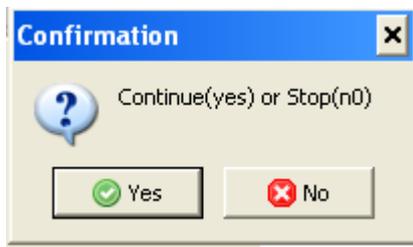


Fig 4.5 No toolchange (01-c06-140126)

If no toolchange the programme may be continued with the same tool or may be stopped at this point in the object –file.

#### 4.2 Manual tool change.

If the spindle has been stopped and is at the tool change position, the tool may be changed. The tool length has to be corrected by using the z-parameter.

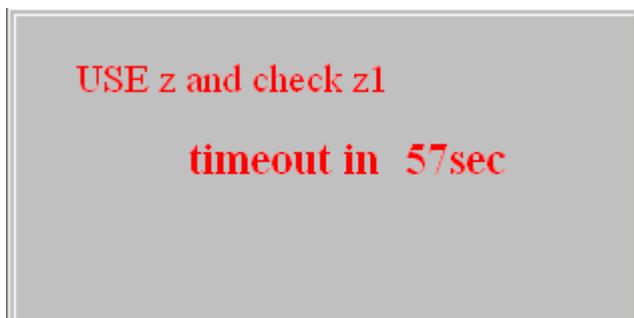


Fig. 4.6 Set new toollength use z and check z1 (01-c07-140126)

When z1 is set, the programme need confirmation to use the new toollength.



Fig. 4.7 Use new toollength (01-c08-140126)

Start spindle



Fig. 4.8 Now the spindle is started again and milling is continued. (01-c09-140126)



Fig.4.9 Confirm that spindle is on. (01-c10-140126)

After confirmation the programme continues milling.

### 4.3 Automatic tool change.

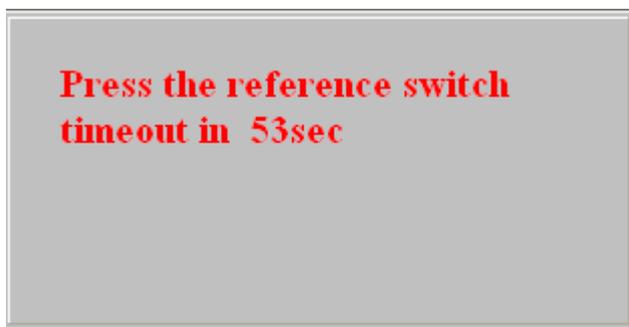


Fig. 4.9 Check reference switch. (01-c11-140126)

In automatic mode the first tool must be set manually ( see level chapter 5). All following tools may be calculated using the length of tool-1 and the values measured using the reference switch.

After measuring and calculation the programme ask to use the new values, see fig. 4.7 onwards

If the reference switch is not found or not activated within a certain time frame the programme will use the previous set data and continued from fig.4.7 onwards.



Fig 4.10 If set to automatic but no reference switch is activated.(01-c05-140126

**5. Areascan. (only available with controller, Piccolino, USB)**

Level scanning is available in several different modes ( see chapter Settings -> Miscellaneous -> Levelconfiguration)

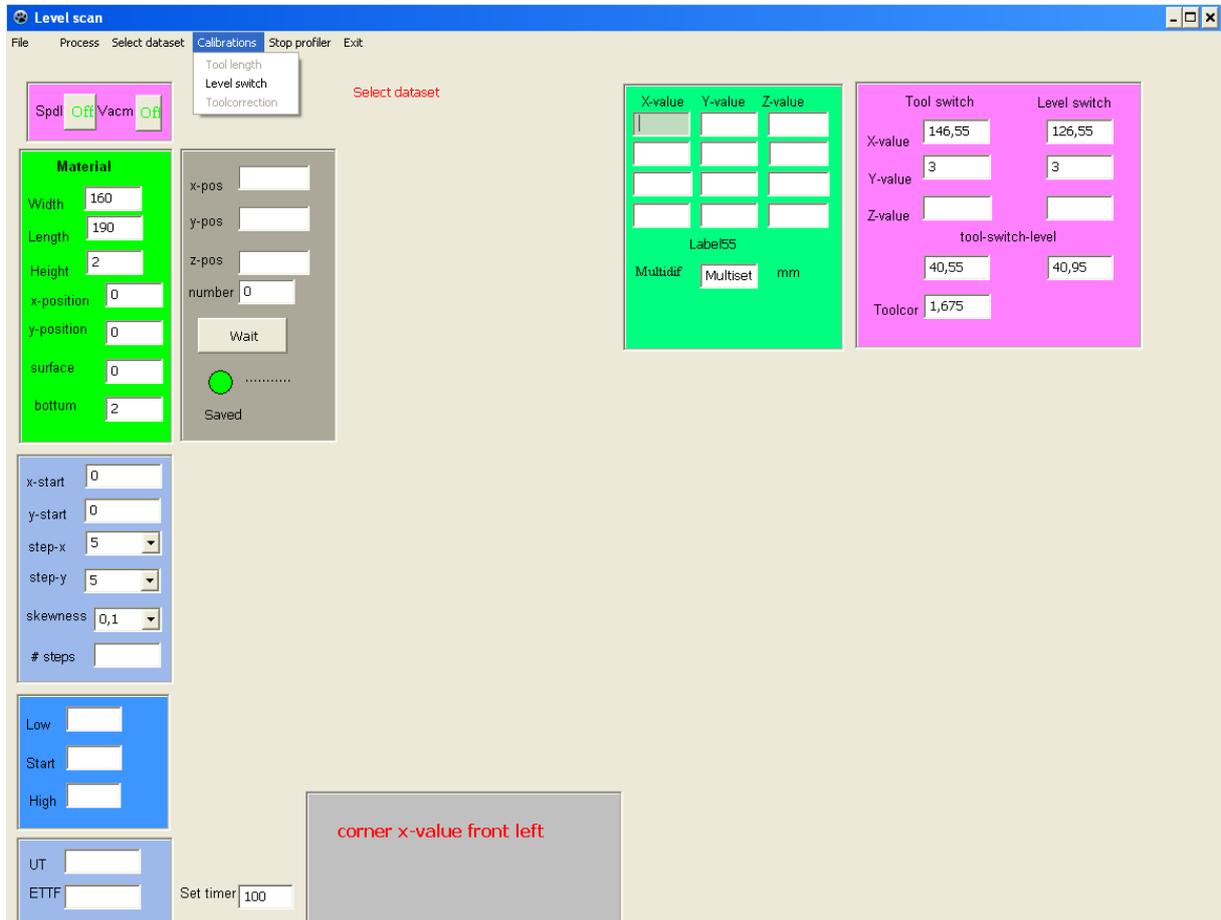


Fig. 5.1 Level-scan screen (17-01-150418)

Depending on the interface controller and “settings” in the mainscreen several options under “Process” are available depending also on the selected dataset used for level scanning.

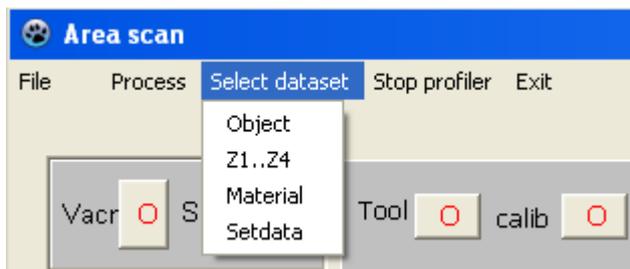


Fig. 5.2 Select dataset menu (17-02-140126)

Select the dataset to use for level scanning. Object dataset scan only the area of the where the object is situated.

Z1..z4 is the area set in the mainscreen.

Material area as given in the mainscreen.

Set data is used to enter a new area to scan.

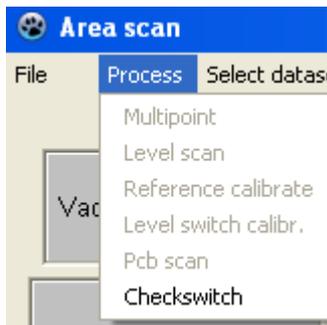


Fig. 5.3 Select process menu (17-03-140126)

Before the grey-ed out options become available the “Checkswitch” must be run.

Each switch activated will be noticed and processes being enabled by the program.

“Tool “ uses reference switch

“Calib” uses level scan switch mounted under the spindle.

“DSR” interface pcb switch.(in development)

Depending on the available switches “Reference, Level, Pcb, Inbit4” the appropriate process options become available. (see usb or Piccolino controller manual for details)



Fig. 5.4 Check switches is run (17-04-140126)

Check switches is run and the reference and level switch are pressed. To get out of this routine press the “check switches” under “Process” again.

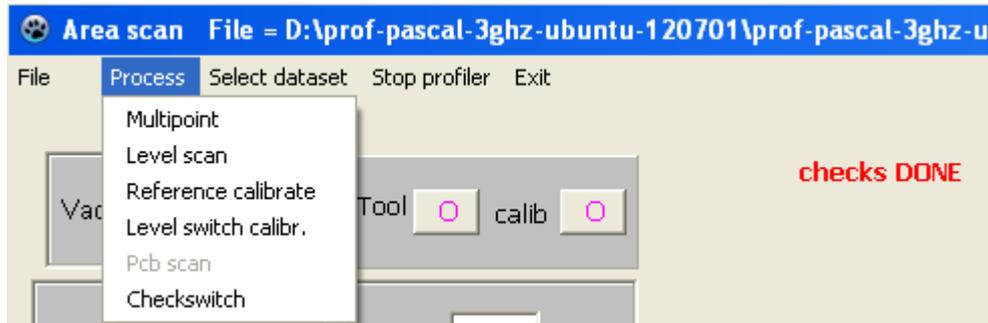


Fig 5.5 Switches are found and tested (17-05-140126)

Level scanning is selected with the z1..z4 dataset. The area to scan is displayed and after confirmation of the level switch the scanning starts at the given positions. The z-values found are displayed.

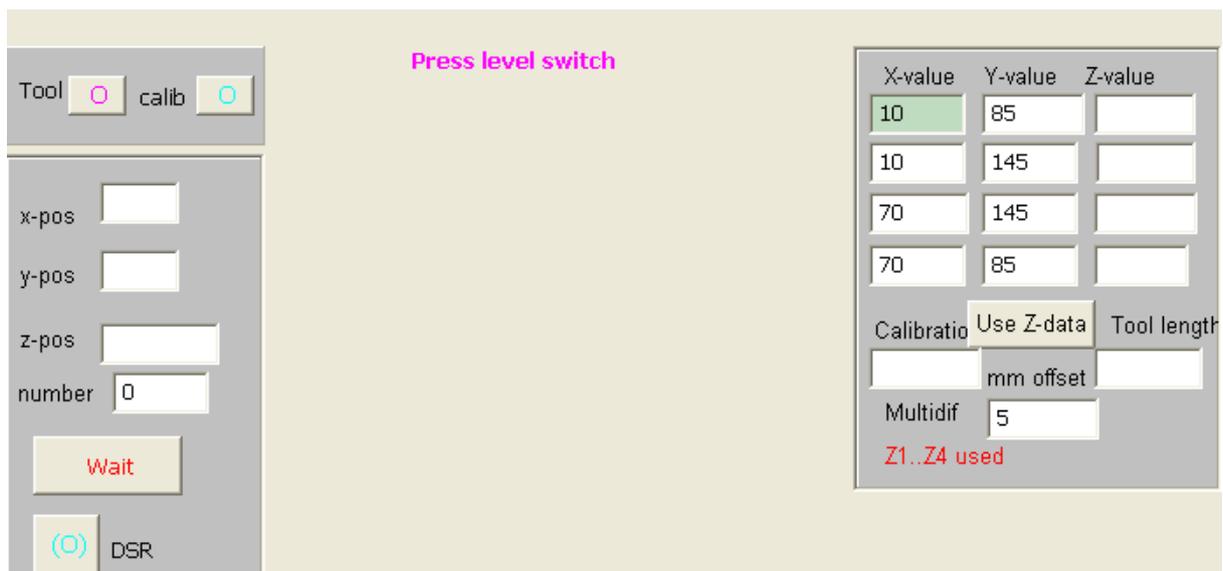


Fig. 5.6 Level scanning is selected , switch has to be confirmed (17-06-140126)

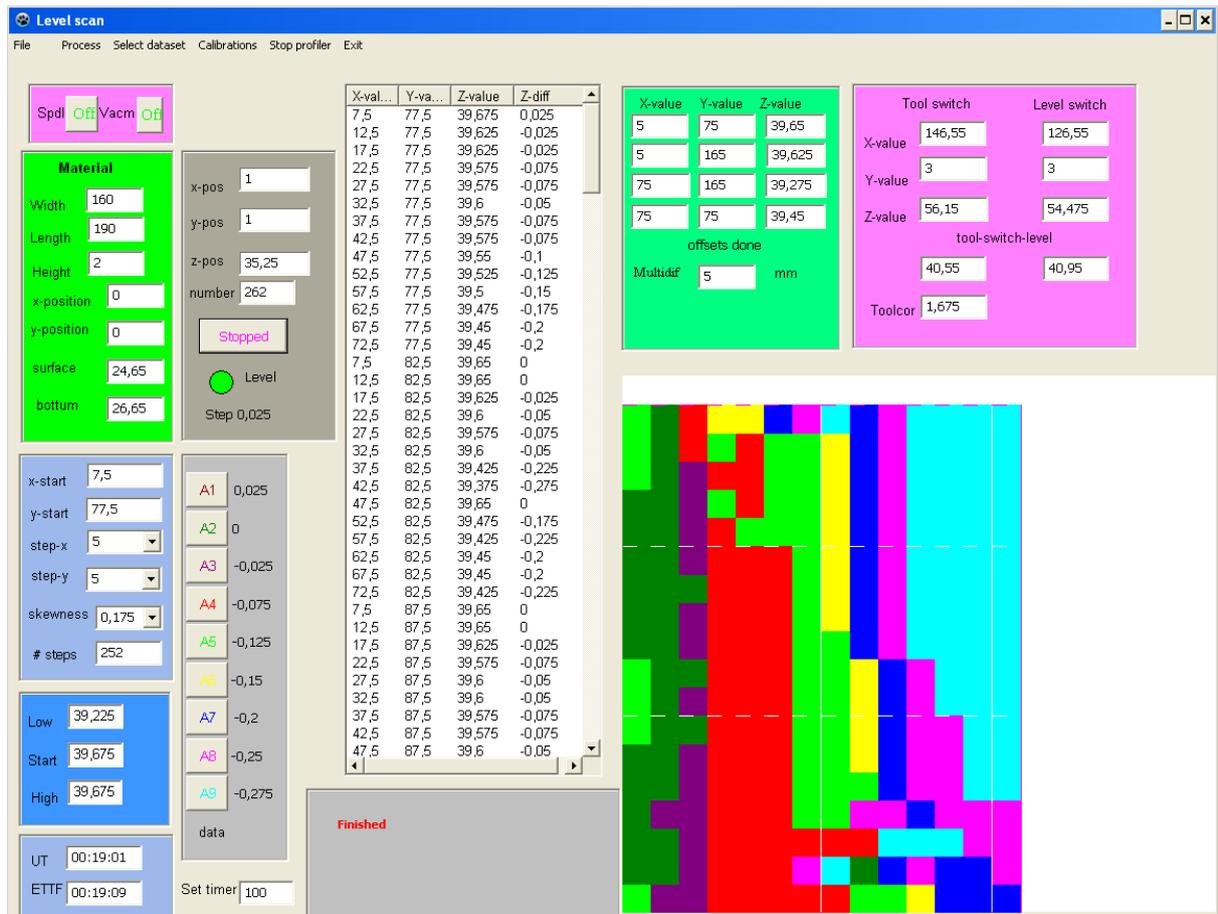


Fig 5.7 Compleet areascan picture (17-07-150418)

First the level switch z-values are determined, then the corner points as given by the z1..z4 xy-positions are measured.

From the z-difference values the z-color values are calculated and displayed.

Next the are is scanned using the start and step values given (standard step value 5 mm).

Height differences of the material level are measured and displayed as coloured areas.

The height differences and their position are also stored in a file for correction of the z-value during real milling.

Fig. 5.7 the height varies from 0.05 to  $-0.125$  of this small board.

## 6. Basic settings for 3D and 2D card and controller type

In the mainscreen menu under “Settings” there is the “Miscellaneous” for setting basic processing parameters and displaying the processing settings



Fig . 6.1. Tools menu (01-04-150418)

“Options” setting processing parameters

“3D- options”

“Level scan” see chapter 5.

“Pcbauto” in development

“Toollength check” measure toollength

"Check switches" check tool/level/pcb switch

“Milling tools “ Tool data base

“Materials” Material database.

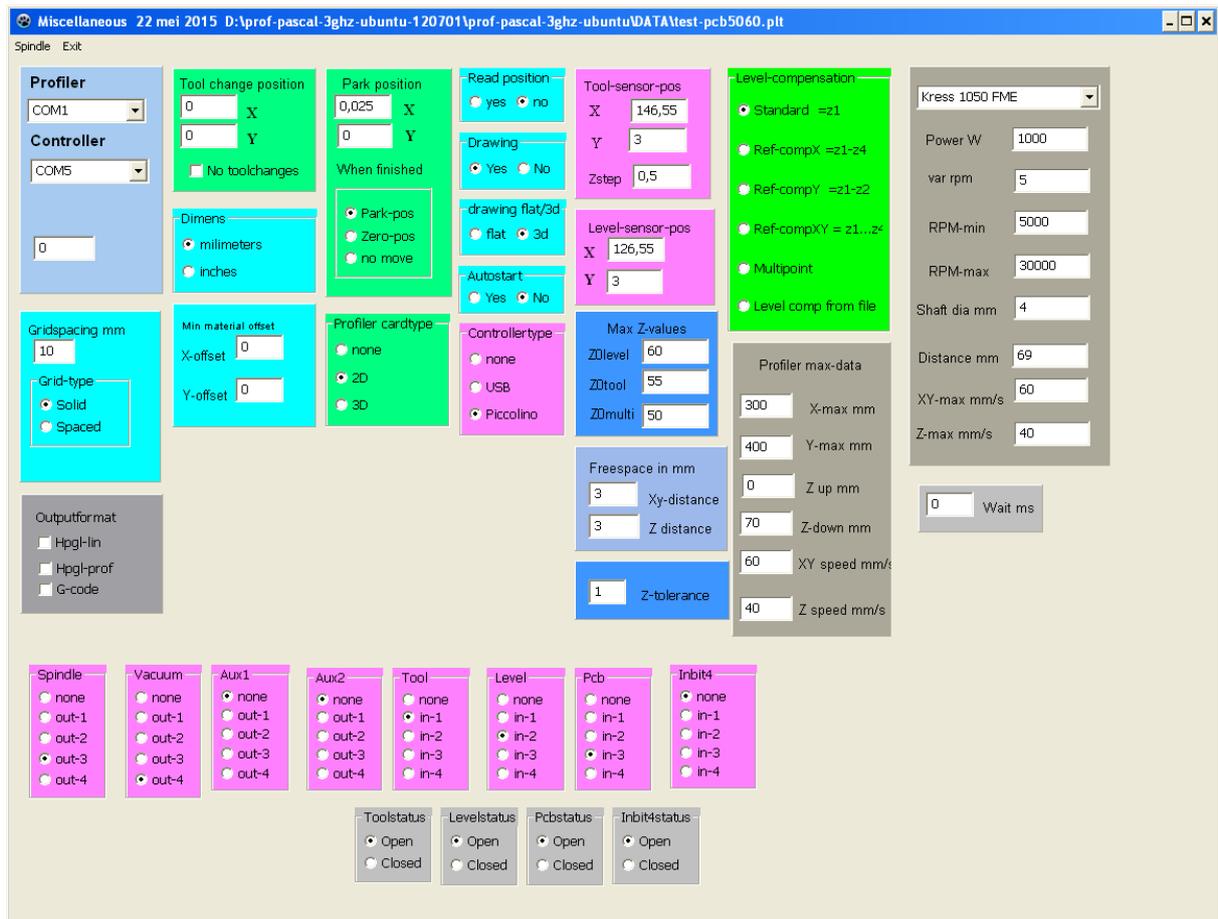


Fig. 6.2 Options screen (15-01-150418)

Displays :

“Spindle” data of used spindle (data is used to set operating boundaries).

“Profiler” is used to set the serial port used by the profiler and the serial port if a Piccolino controller is used.

“Tool change Position” set to the position where you will change the tools

“Park Position” at the end of the milling the engine is moved to this position.

“Profiler max data” maximum dimensions the engine can move, these data can't be changed for security reasons.

“Material offset” preset offset for materials, the object and engine can't go below these values.

“Max Z-values” to prevent the z-axis to move outside reach

“Dimensions” use mm or inches

“Cardtype” the profiler card type used 2D (old) or 3D

“Controllertype” the type of controller used (see USB or Piccolino and see 3d-card settings fig.6.3)

“Spindle, Vacuum, Aux1, Aux2” settings for the controller outputs

“Tool, Level, PCB, Ibit4” settings for the controller inputs

“Wait” used to slow down processing

“Position” yes reads position after every profiler move and slow the programme down a little bit

“Flat3d” object drawing pin the main screen as flatbed or 3d

“Autostart” if yes then profiler is started up at start of program, if no program waits till

“Get profiler” is pressed.  
“Drawing” object drawing in main screen  
“Gridspacing” set the grid spacing in preview (chapter 3)  
“Ref sensor pos” position where reference sensor is located at profiler  
“Level sensor pos” used in conjunction with reference sensor.

## 7. 3d-settings for 3D card and controller

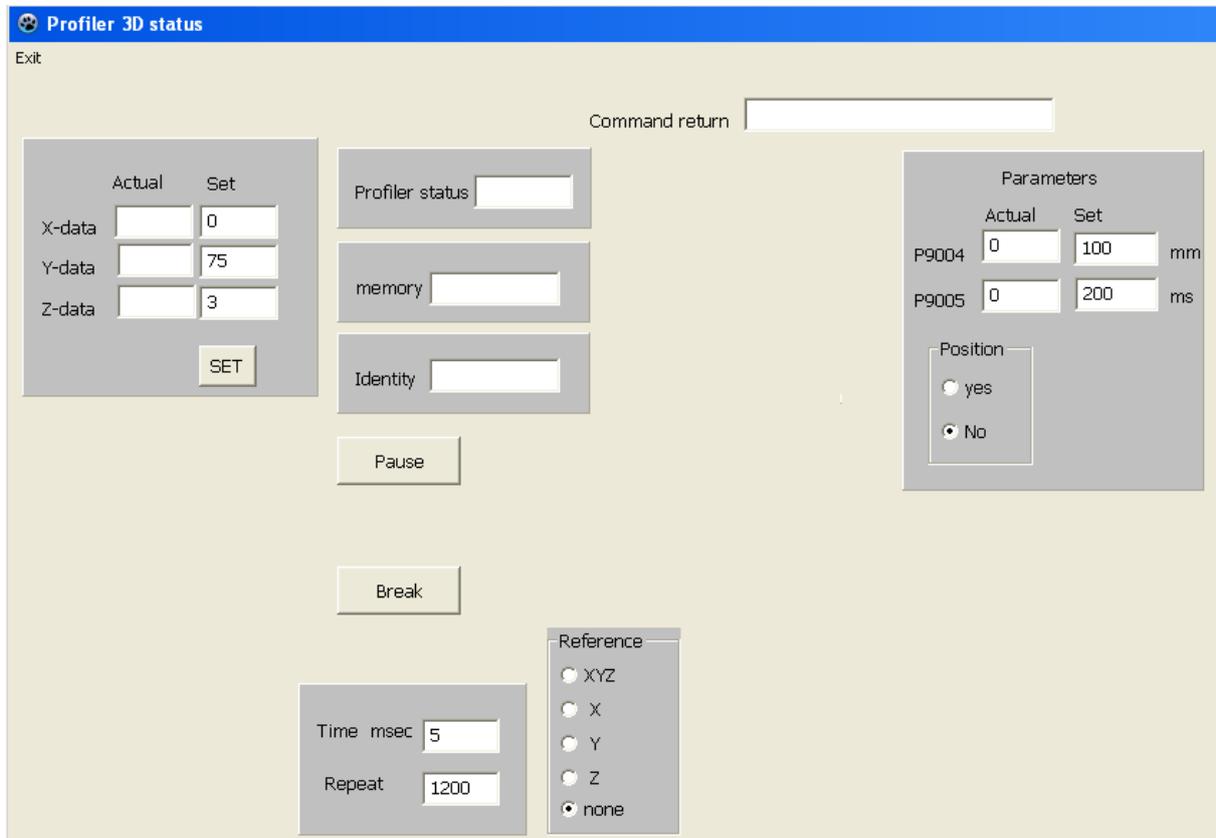


Fig. 7.1 3d-settings screen (26-01-140126)

Displays "Actual and set positions", status, amount of memory, identity.  
Reference recalibrates the position of the chosen axis.

"Pause, Break, Continue, P9004, P9005" See also the 3D-card manual for these items.  
The parameters P9004 and P9005 may be set to other value to speedup file processing.

Position when no: the program does not wait for a command to finish, but sends till profiler buffer is full or a tool change is encountered.

When yes: the program waits and reads the actual profiler position before sending the next command. This slows down processing but keeps a tight control over what happens.

## 8. Tools.

Settings 4 november 2012 D:\prof-pascal-3ghz-ubuntu-120701\prof-pascal-3ghz-ubuntu\DATA\TestWig.c3d

Tools . Toolchange Mainscreen

### Tools

Number: 14  
Name: dremel-193  
Remarks: high speed cutter  
Type\*: HSS mill

37 mm Toollength\*  
0 mm length/drillhead  
3,2 mm Shaft\*  
2 mm Diameter\*  
5 mm Depth\*  
0 degr Angle  
20000 RPM  
2 mm/s Speed xy  
2 mm/s Speed Z  
0 Flutes  
0 Center  
d-193.bmp toolpicture



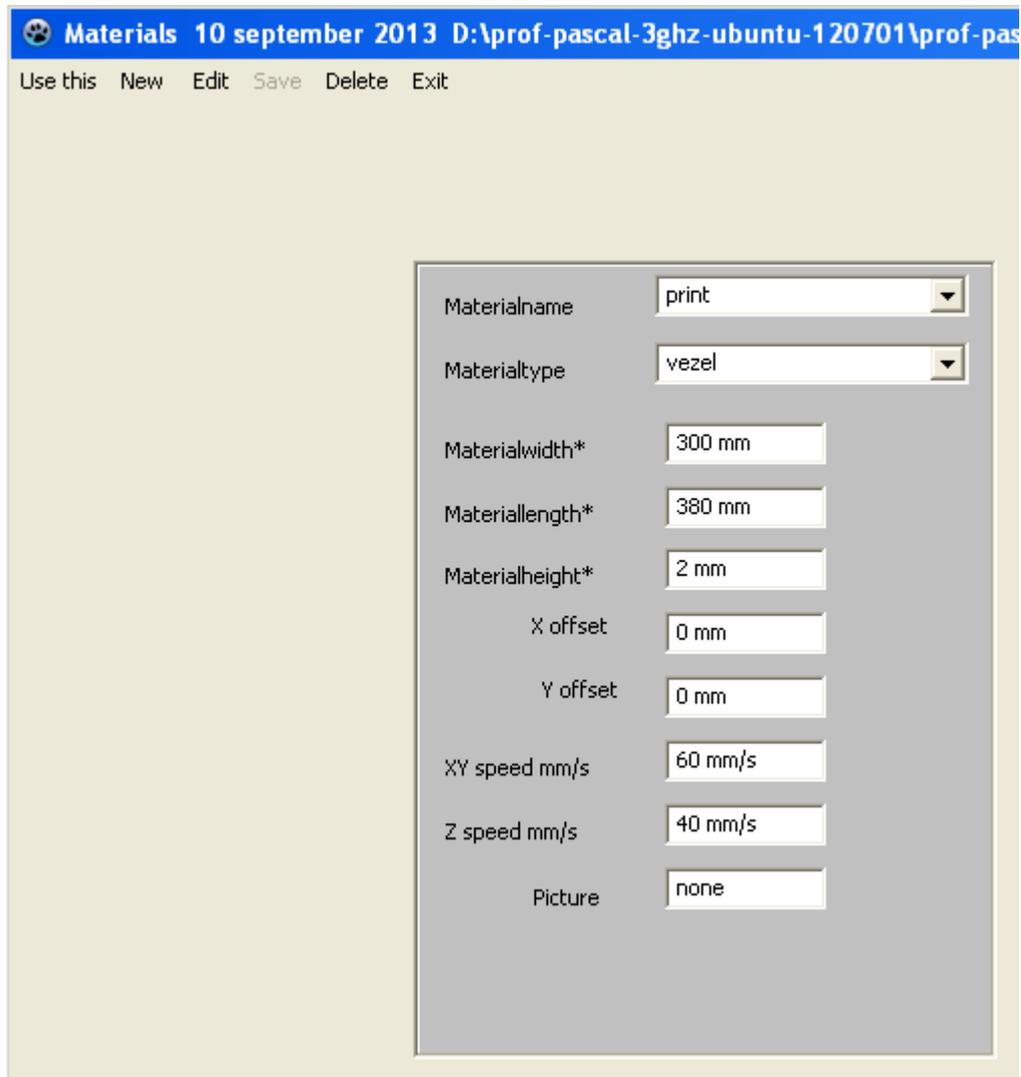
### Cutter data

Depth total: 5  
Depth step: 2  
Number/steps: 3  
 Do Multipass

Changes #	Left	Line	Right	Color
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ptcol1
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ptcol2
0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ptcol3
0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ptcol4
0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ptcol5
0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ptcol6

Fig. 8.1 Tools screen (12-01-140126)

## 9 Materials.



Materialname	print
Materialtype	vezel
Materialwidth*	300 mm
Materiallength*	380 mm
Materialheight*	2 mm
X offset	0 mm
Y offset	0 mm
XY speed mm/s	60 mm/s
Z speed mm/s	40 mm/s
Picture	none

Fig 9.1 Materials list entry. (18-01-140126)

## 10. License.



Fig. 10.1. Main screen info menu (01-17-140126)

To read the license goto the mainscreen menu "Info" as shown in fig. 10.1.

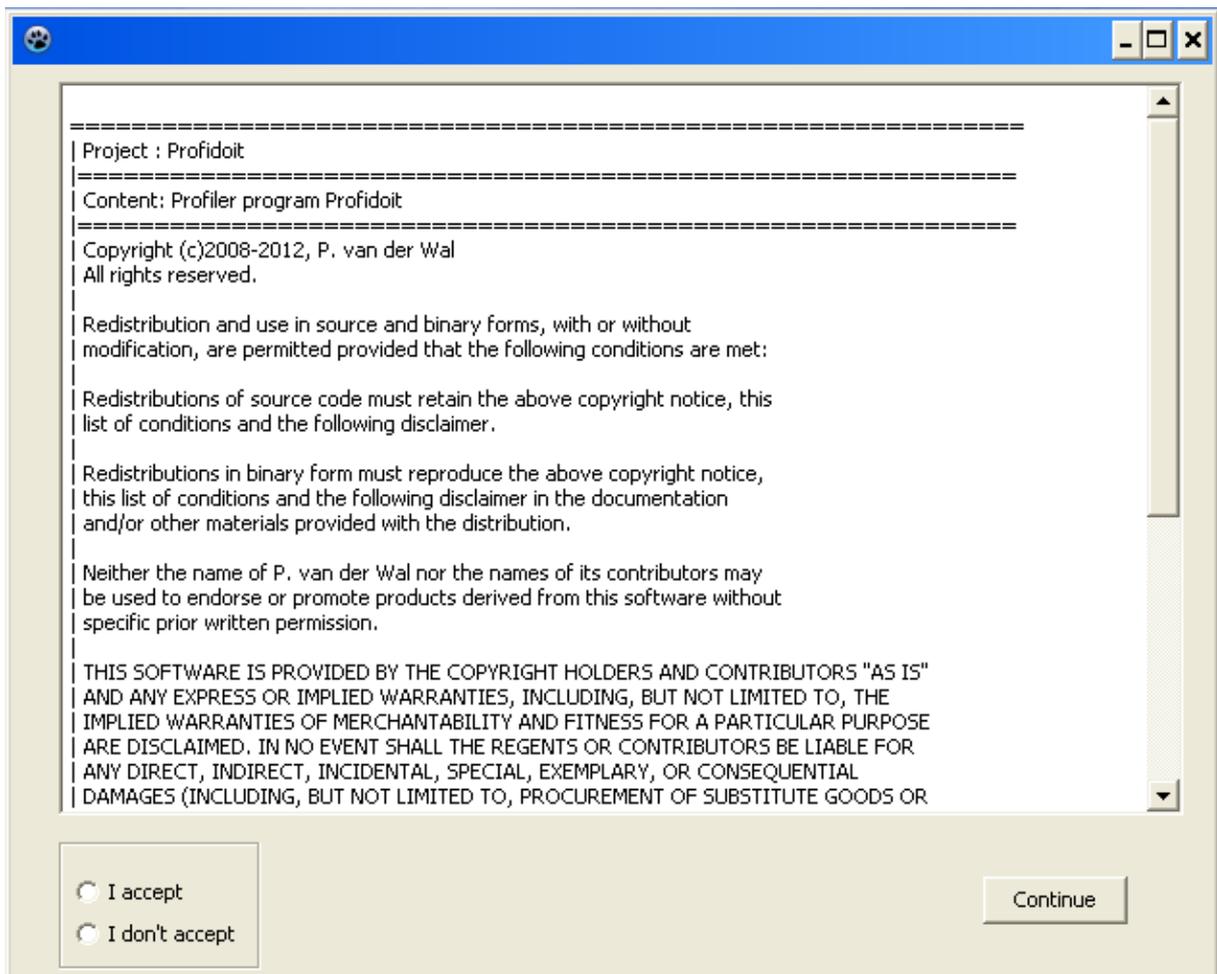


Fig. 10.2 License (28-01-140126)

Without accepting the license the program is restricted in some area's.  
(Levelscan, automated movements, toollength measurement)

Read and accept the license and the full program is available.

If an interface controller is present also automated features are available.

## 11. Directories

Extract the program from the .zip file and store in your own directory.

The program may be stored in any directory together with the “Prof”-directory. All other data directories, when not present will be created by the program.

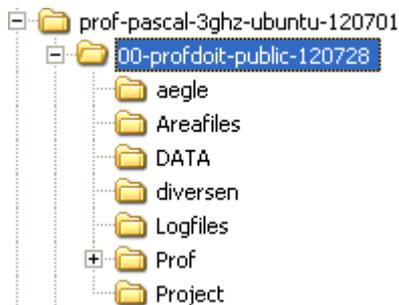


Fig. 11.1 Directories (50-01-131120)

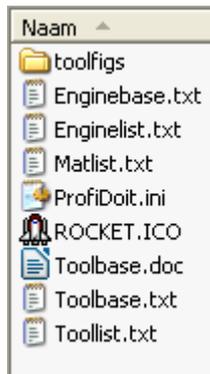


Fig. 11.2 Prof-directory (50-02-131120)

Contains the profdoit startup-data-file (Profdoit.ini) and the data files for tools (Toollist.txt), materials (Matlist.txt), spindle (Enginebase.txt).

All files are in readable text format.

WARNING don't change the contents of these files as the program can't read them anymore and crash.

Use the program option for changing these items from within the program.

Use “Settings” -> “Tools” or “Materials” in the main screen.

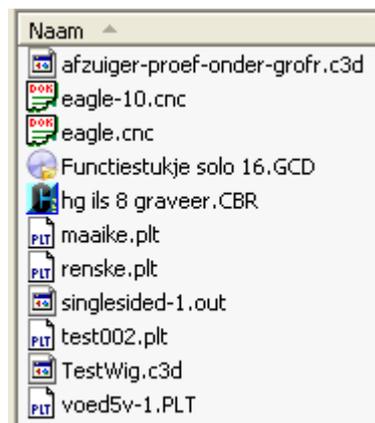


Fig. 11.3 Data directory (50-03-131120)

Contains the data files to be processed from simple plot-files to 3D-cnc-files  
Files extensions: plt, cnc, c3d, gcd are recognised by the program.  
But only a subset of the commands is used in the program.(see chap. ...).

## **12. Accountability.**

The author would like to thank Mr. Richard van den Hof and Hessel Oosten for their considerable experience and value comments. Especially for the considerable time and patience they used in testing the program and aid to write this manual.  
And Mathieu Velghe for the development of the USB-controller. Richard for the Piccolino controller.

This software and documentation are copyrighted by PE0PWA.  
The software and documentation may be used or copied only in accordance with the License Agreement accompanying the software and/or reprinted in this document.

All trademarks referenced in this document are the property of their respective owners.

Specifications subject to change without notice

© Copyright 2008/2014 PE0PWA. All rights reserved worldwide. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, scanning, digitizing or otherwise, without the prior consent of PE0PWA.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

This program is provided "as is" without warranties of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the program is with you. Should the program prove defective, you assume the cost of all necessary servicing, repair or correction. In no event will any copyright holder be liable to you for damages, including any general, special, incidental or consequential damages arising out of the use or inability to use the program (including but not limited to loss of data or data being

rendered inaccurate or losses sustained by you or third parties or a failure of the program to operate with any other programs).

### **13. Subset of Profiler commands used in program.**

#### **Commands for the 2d-card.**

See manual 100524-0003 rev.1 dd 23/06/2004 Franklin industries NV

<esc>BT: Output total dram in bytes.  
<esc>LI: Start DCC mode =1.  
<esc>LM : Start HPGL-line mode =2.  
<esc>LO : Return to local mode = 0.  
<esc>MD : Output current system mode.

DF Default restore.  
OA Output actual position.  
OC Output commanded position.  
OF Output scale factors.  
OI Output identification.  
PA Plot absolute.  
PD Pen down.  
PR Plot relative.  
PU Pen up.  
SP Pen select.  
VS Velocity select.

@HM Home all axis.  
@HZ Home z-axis.  
@WT Wait msec.  
@XX Reset system.  
@ZA z-move absolute.  
@ZD z-down velocity.  
@ZR z-move relative.  
@ZU z-up velocity.

<esc>.) Plotter off command returns to DCC mode.

#### **Commands for the 3d-card.**

See Colinbus controller manual REV.2 Franklin industries NV

G0 X,Y,Z goto position x,y,z  
G1 X,Y,Z idem  
G0 F set speed f  
G1 F idem

?AREUTHERE  
 PAUSE  
 CONTINUE  
 BREAK  
 ?PA            get position x,y,z  
 ?S            get status  
 ?P            get parameters  
 P             set parameters  
 OS            set digital output data  
 RF            do reference

The following command is added when using the USB-controller unit

&IN            get digital input data

### **14.1. Example AutoCAD conversion.**

Start the program AutoCAD in this example AutoCAD 2000 was used

With: File → Open Select a data file, the file type needs to be DWG or DXF .

After the file has been opened and displayed at the screen

File → Plot Select the correct plot-device e.g 7475A.

The plotter papersheet has to be set to A4 for correct measurement conversion.

Check if measurement output is set to 1 mm = 1.0 plotter units.

Tick the box "Plot to file" , the file is put in the selected directory and has the extension .plt.

### **14.2. Example BOCnc conversion (ref. 2E).**

After start of the program open the file with "Datei → Openen".

Pay attention to open the correct file-type "Datei-type CAD (.DWG)"

Then with "Datei → Export (\*.plt)" Save the file.

## **15. Table Tool-type.**

1. Drill bits
2. Milling tool
3. Engraving tool
4. PCB engraving tool
5. Flat end mill
6. Contour router
7. Bull nose
8. HSS mill
9. Tungsten carbide mill
10. Spherical
11. Tapered flat
12. Tapered bull nose
13. Tapered spherical

14. Bore
15. Tap
16. Sink
17. Center drill
18. Ream
19. Other

## **16. Table Material-type.**

1. None
2. Wood soft.
3. Wood hard.
4. Metal aluminium.
5. Metal Copper.
6. Metal iron soft.
7. Metal iron hard.
8. Print board soft.
9. Print board glassfiber.
10. Plastic soft.
11. Plastic hard.
12. Acryl (Plexiglas).
13. Paper/carton.
14. Other.

## **17 References.**

1. Elektuur nr 519 january 2007 pag.14.

Elektor nr 536 june 2008 pag. 66.

2. www.elektor.nl/ forum/profiler.

A. Millingtips in Elektor Profiler forum.

<http://www.stanford.edu/group/prl/documents/>

B. Wat plaatjes kijken (Looking to Profiler pictures).

Part 1: <http://www.elektor.nl/forum/forum/actuele-projecten/wat-plaatjes-kijken.220781.lynkx>

Part 2: <http://www.elektor.nl/forum/forum/actuele-projecten/wat-plaatjes-kijken-part-2.336989.lynkx>

And Zeigt her eure Arbeiten (Looking to Profiler pictures):  
[http://www.elektor.de/forum/foren-ubersicht/foren-zu-elektor-projekten/zeigt-her-eure-arbeiten--\).290177.lynkx](http://www.elektor.de/forum/foren-ubersicht/foren-zu-elektor-projekten/zeigt-her-eure-arbeiten--).290177.lynkx)

C. 3D program by Lukacs Sudar: B2G converts bitmap to g-code.

<http://www.inf-el.com/cnc/cnc.htm>

D. Colidrive struikelt bij 3D. By Vibo (28-03-2008).

E. BOcnc from [www.bocnc.de/bocncV2.htm](http://www.bocnc.de/bocncV2.htm).

Or see [Werner.Stratman@skydsl.de](mailto:Werner.Stratman@skydsl.de).

3. Franklin Industries BV. Belgium.

[www.Colinbus.com](http://www.Colinbus.com) and [www.Colinbus.com/Profiler](http://www.Colinbus.com/Profiler)

4. Manuals: MAN 100524-0003 REV.1

Colinbus controller manual REV.2