

RoutePro 3000 - User Help

© 2014 by Bungard Elektronik, all rights reserved

RoutePro 3000 - User Help

© 2014 by Bungard Elektronik, all rights reserved

All rights reserved. No parts of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the written permission of the publisher.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Printed: Februar 2014 in Germany

Author

R.E. Aué

Publisher

Bungard Elektronik

Table of Contents

Foreword	0
Part I Welcome to RoutePro3000	6
Part II FAQ: What's New?	9
1 User Interface	9
2 License system	10
3 Important Changes	10
4 New and Improved	11
Part III Introduction	13
1 About RoutePro3000	13
2 Why RoutePro3000?	15
3 Installation	16
4 The User Interface	18
5 Getting help	18
6 How to order modules	19
7 Support policy	19
8 Copyright	20
Part IV Quick Start Tutorials	23
1 Find CCD machine	23
2 Create a project: introduction	25
Project Wizard	25
Update a project	37
3 Using the Viewer	39
4 Calibrate the Camera	40
5 How to use the calibration module	42
Part V Advanced topics	52
1 Using the layer viewer	52
2 Using the tool viewer	53
3 How to handle the ATC	59
4 ATC bypass the depth limiter	61
5 Batch processing	63
Part VI License system	70
1 License system Activation	70
2 License system modules Activation	81

3 License system Deactivation	84
-------------------------------------	----

Part VII Reference 87

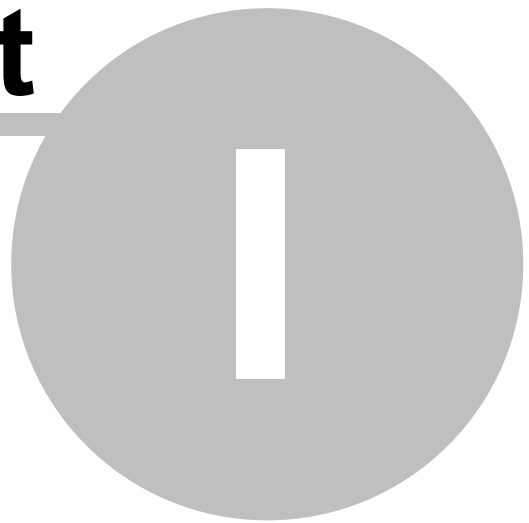
1 The User Interface	88
Run CNC	89
Manual Operations	93
Options	103
Machine Options Overview	106
Machine Options Details.....	109
Machine Options Advanced.....	116
Help	117
Project Group	117
General	118
Material	120
Import	121
View s	122
2 Modules	124
Laser Module LaserPro3000	125
Dispense Module DispPro3000	138
Calibration Module	142
Documentation Module	148
Extra module Plus3000	148
Inspection Module	153
Remote Module	153
Script Module	153
Q-Code Module	153
3 Hotkeys	153
4 Project Wizard	155

Part VIII Frequently Asked Questions 157

1 General questions	157
2 User interface questions	158
3 LaserPro questions	159
4 DispPro questions	159
5 Calibration questions	159
6 License system	160

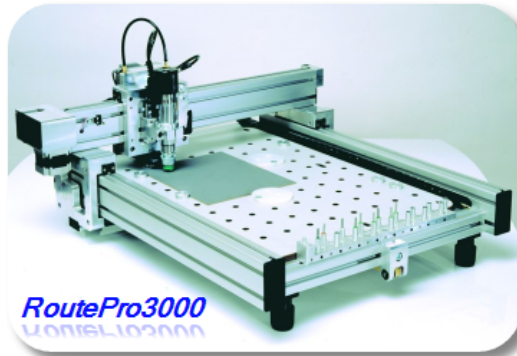
Index 161

Part



1 Welcome to RoutePro3000

RoutePro3000 makes prototyping easy, efficient and fun



RoutePro3000 is an environment for handling drilling, milling of materials.

Modules can be obtained to extend the features of RoutePro3000.

Now available: [RoutePro3000Extra](#) version which will give the user more features and flexibility.

The following modules are available or under development:

▼LaserPro3000

This module is used to produce laser images.
Please note that this module requires a Laser Unit.
[read more...](#)

▼DispPro3000

This module is used for dot and line dispensing
Please note that this module requires a Dispense Unit.
[read more...](#)

▼Calibrate3000

This module is used to calibrate the position of your material, it has also extended camera features.
Please note that this module requires a Camera.
[read more...](#)

▼Document3000

This module is used to create documentation about your machine and your projects
[read more...](#)

▼Plus3000

This module is used to extend RoutePro3000 with extra features.
[read more...](#)

▼Inspect3000

This module is used to inspect your work
[read more...](#)

▼Q-Code3000

This module is used to create Q-codes for your projects.

[read more...](#)

▼Remote3000

This module is used to operate RoutePro3000 from another application.

[read more...](#)

▼Script3000

This module is used to automate RoutePro3000

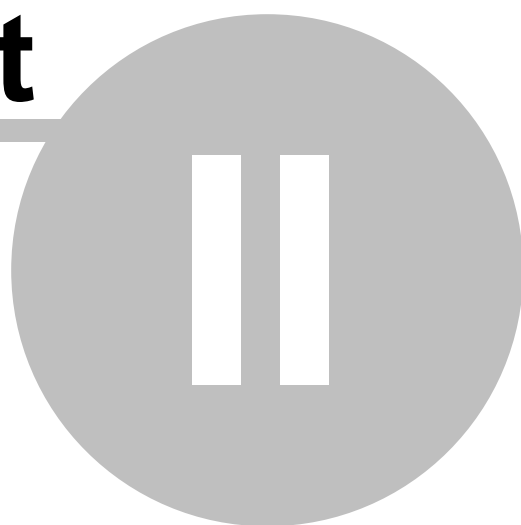
[read more...](#)

This help is designed both as a course in using RoutePro3000 and as an ongoing reference while you are working with the program.

Getting started

- Study the [Introduction](#) and [Quick Start Tutorials](#) sections to familiarize yourself with the basics of the program.
- Check out all the links in the **Help** tab – plenty of help is available!
- Click on any picture to zoom in.

Part



2 FAQ: What's New?

The user interface of RoutePro3000 is completely different then the previous versions of RoutePro3000.

The whole [user interface](#) has been redesigned to meet the latest Windows technology.

So we recommend that you work through the [Introduction](#) and [Quick Start Tutorials](#) chapters before you start working with RoutePro3000.

This will help you to familiarize yourself with the all the features.

2.1 User Interface

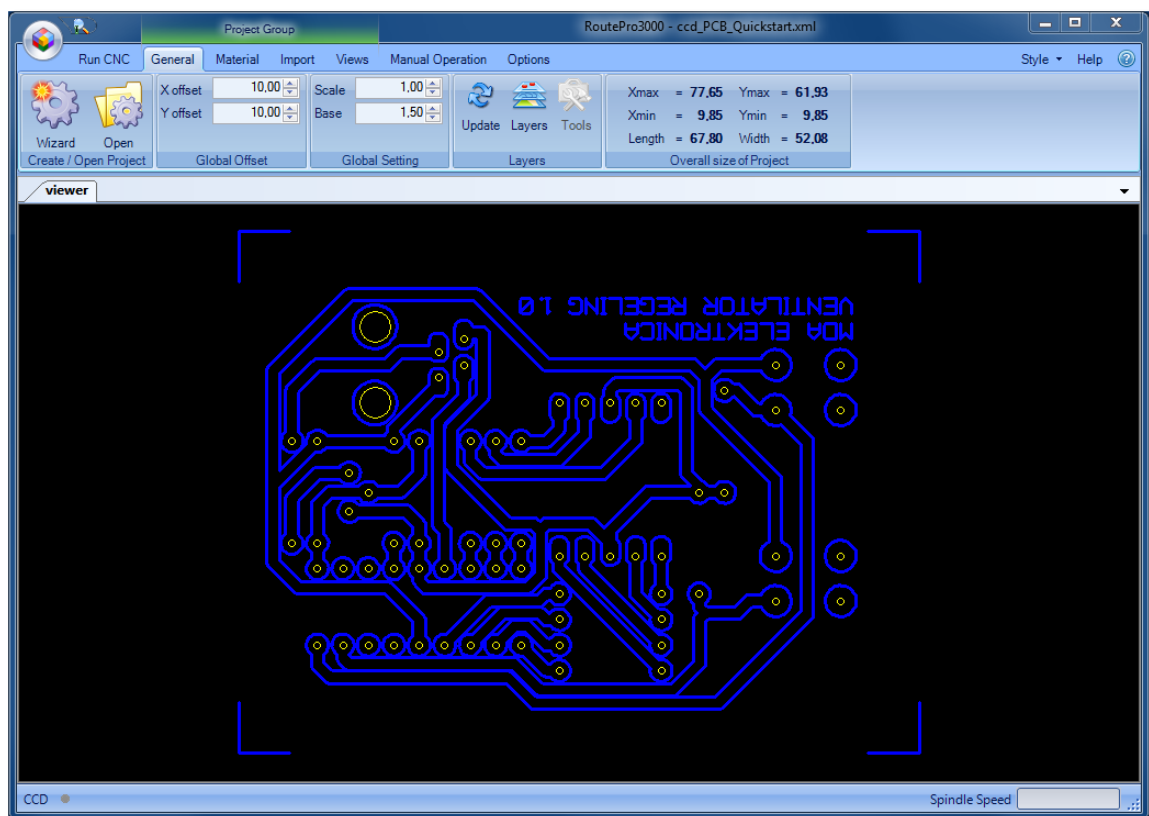
RoutePro3000 has undergone a complete makeover.

The user interface is completely redesigned to make it very user friendly.

All the buttons are now categorized into sections on to a ribbon bar.

So you will only see the buttons you need for the task you are currently performing.

The output screen is integrated into the main screen.



The RoutePro3000 user interface

2.2 License system

RoutePro3000 now operates under a [license system](#).

This system gives RoutePro3000 great flexibility.

Using a license system enables us to provide you with modules for particular features. It gives you the opportunity to select only modules you need so you don't pay for something you will not use.

▼Extra information

When you purchase a CCD machine, the standard RoutePro3000 system is provided free of charge.

The module licenses are not for free. To obtain a module license, please contact your supplier.

When you start RoutePro3000 for the first time, the evaluation period will start, during this period you can use all the features but it is mandatory that you register / activate the program before this period expires.

You can test the extra modules during an evaluation period but you can only activate this modules once you have registered / activated RoutePro3000.

Note: *modules may require extra hardware to operate correctly.*

2.3 Important Changes

The major change is the complete redesign of the user interface

Another important change, compared with the older RoutePro versions is that we now work with projects.

▼Extra information about projects

A project consists of a folder where your data files and configuration files are stored. Building projects is a simple tasks by using the [Project Wizard](#).

Why projects?

- Project data is all stored together so easy to find.
- Easy to maintain.
- Configurations are stored per project.

The data in the project folder does not replace the data that is generated by your designer software

It is just copied to the project folder and keeps the original data intact.

If you change the design, RoutePro3000 will notice that there has been changes and replaces the files in the project folder with the updated ones.

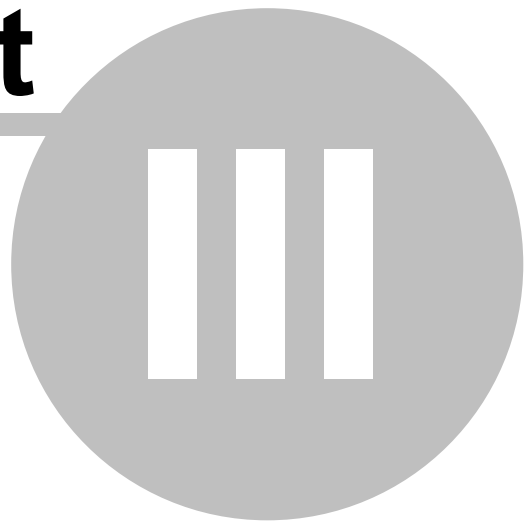
Note: If the original data folder has been renamed or moved the project cannot synchronize anymore

2.4 New and Improved

Although RoutePro3000 is redesigned, all the good old features are still there and a lot of new features have been added.

- First important new feature is the Project Wizard, which creates / updates projects for you.
- In the standard RoutePro3000 version you have now 4 data layers so you can load all the important layers:
 - Drill data
 - Milling data for the top layer
 - Milling data for the bottom layer
 - Fixing hole layer.
- All project dependent parameters are stored with the project, so it's very easy to use your project in future without worrying about these settings again.
- The global options are now categorized in small sections so they are easy to handle.
- There are multiple Global settings, depending on the type of machine, step-size of the motors etc.
- Extensive default tools tables, depending on tool-type, material-type and diameter.
- Floating and docking windows.
- Instructions / tips per layer can be provided while creating a project, which can be showed during processing.
- Error reports can be generated and send for easy support.
- Optional: [laser module LaserPro3000](#)
- Optional: [Calibration module Calibrate3000](#)
- Optional: [Dispense module DispPro3000](#)
- Optional: [Extra module Plus3000](#)
- Optional: [Document3000](#)
- Optional: [Inspect3000](#)
- Optional: [Remote3000](#)
- Optional: [Script3000](#)
- Optional: [Q-Code3000](#)
- From time to time new modules will be added
- ATC, you may now process layers completely without the need of removing the depth limiter.
- ATC, you may now use the batch option to process multiple layers without user intervention.
- and more....

Part



3 Introduction

The topics in this section provide some basic information about RoutePro3000, what it is for and what you can do with it.



How to get started

- See [Getting help](#) for details on using this help and getting more information about RoutePro3000.
- Study this Introduction chapter and [The User Interface](#) sections to familiarize yourself with the program.
- Then work through the [Quick Start Tutorials](#) to familiarize yourself with using RoutePro3000.



Learning more

- See [Advanced Topics](#) for, you guessed it, instructions on more advanced features!
- See the [Reference](#) section for more detailed background information.

3.1 About RoutePro3000

RoutePro3000 is a professional program for processing drilling and milling data.

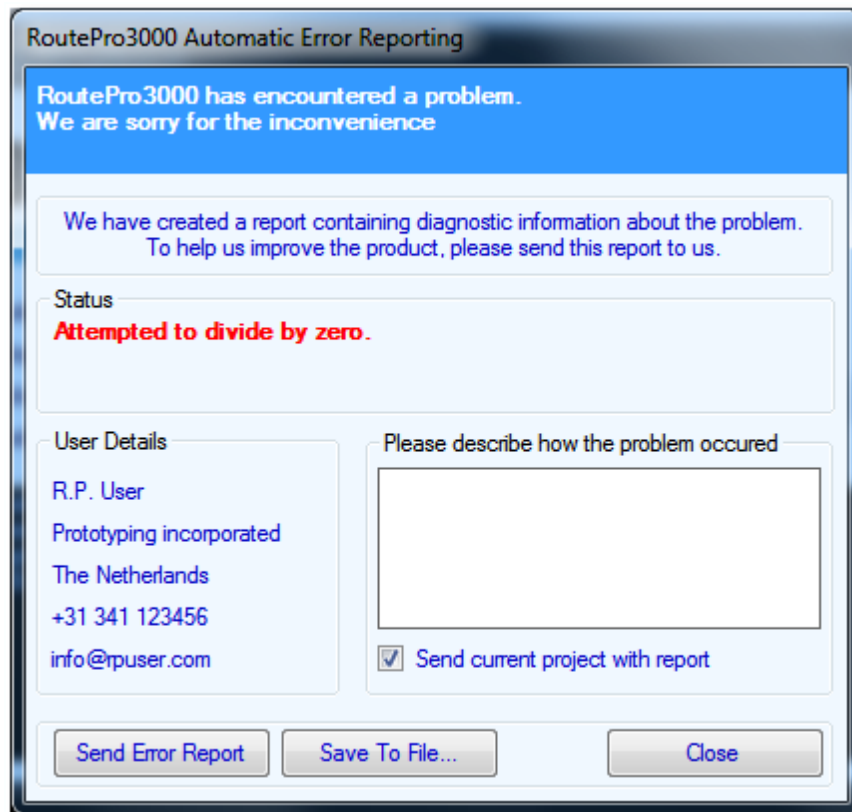
Modules are available for dispensing, laser imaging, material calibration and Remote operations. From time to time new modules will be added.
Import formats are: HPGL and Excellon



▼Error reporting

If for some reason the program generates an error, you will get the option to send an error report. We can use this report to solve this problem and therefore improve the program. In most cases you can continue working.

In case you encounter a problem but there is no error report, you can generate a report by clicking the button in the About box. This will generate the following report:



Please describe your problem and send the error report.

▼Need Special requirements?

If you have special requirements for your CCD machine, please contact your dealer for information in most of the cases our programmers can make a special module for you.

3.2 Why RoutePro3000?



Save time

RoutePro3000 helps you to create better prototypes quicker. Despite its power the user interface and work flow are amazingly intuitive. The time required for setting up and producing prototypes is very short.



Working with RoutePro3000 is fun.

Don't believe it? Give it a try with RoutePro3000...

3.3 Installation

System requirements:

Bungard CCD with Controller 2006 or younger.

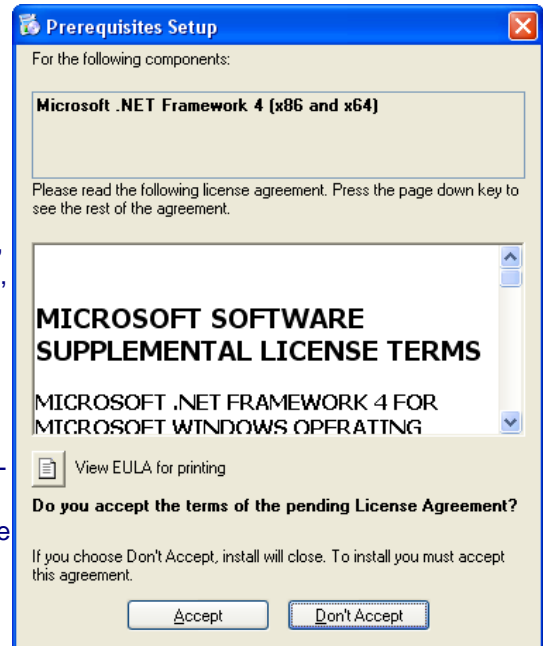
Computer with Windows XP SP3 till Windows 7 64 bit. 900 MHz Processor, 500MB main memory and 100 MB free disc space.

Internet connection during setup and registration. The internet connection is necessary to install updates like Visual C++ and Framework 4. In addition you need to register your RoutePro3000-version and, if so, activate licenses for special modules (laser, dispense, calibrate etc.).

After installation you can of course work offline.

Content:

New machines: all necessary files including the specific parameters for your machine are packed into the file **SetupRoutePro3000.exe**, which is located on the delivered CD. In addition the folders documents, licenses and projects are on the CD, so you can read the help file prior to installation.



Existing machines with RoutePro2008:

all necessary files including our standard parameters for machine and tools are packed into one file. After installation you have to adapt the parameters for your machine from RoutePro2008 into RoutePro3000 (correction factors, table size, values for sensor and tool slots). In addition the folders documents, licenses and projects are on the CD, so you can read the help file prior to installation. Alternatively the software can be downloaded from our website

Existing machines with RoutePro3000:

We created a separate file "UpdateRoutePro3000.exe". This file does not contain the resource data and thus your already existing parameters for machine and tools will not be overwritten.

Make sure your resource data are in the correct location (standard: C:\Program Files\RoutePro3000

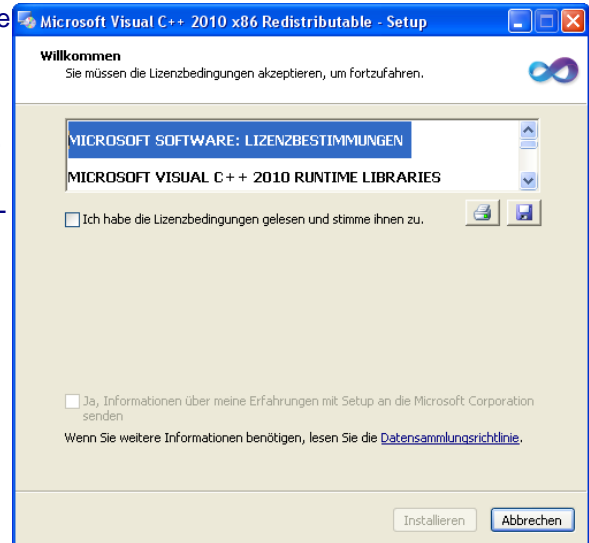
\Resources).

We recommend to make a backup of the resource folder prior to installing the Update.

Procedure:

Read the manual of RoutePro3000. Connect CCD to your computer. Then install RoutePro3000: Double-click on "SetupRoutePro3000.exe" and follow the routine. Depending on your system Microsoft Framework 4 and Microsoft Visual C++ will be installed automatically. If you do not have the latest firmware on your CCD controller, then your controller will be flashed automatically. A restart of RoutePro3000 may be required in this case.

If you use special modules like laser, calibration or dispensing, then please read the special instruction for these modules coming with the hardware and refer to the applying help topics in the RoutePro manual/help system.

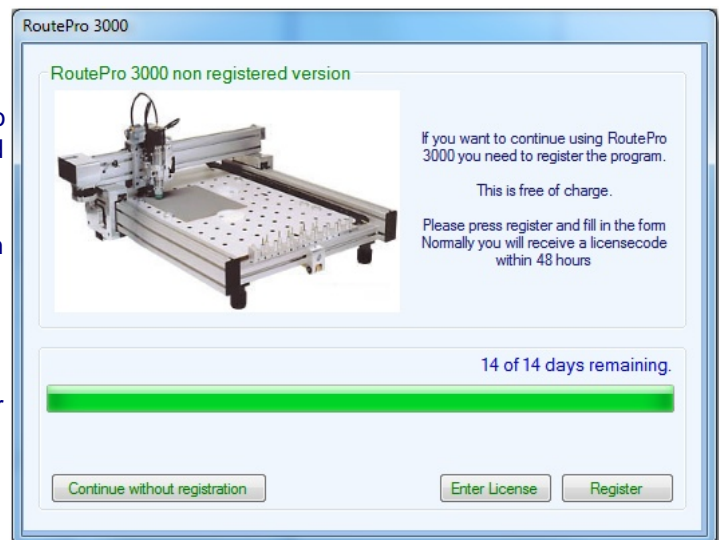


The standard RoutePro3000 is for free, but after a trial time of 14 days, you need to register. The registration process is described in the help file.

All special modules can also be tested for 14 days. After that a license has to be acquired. Please note that special hardware needs to be obtained for the modules (laser head, camera, etc.). To apply for a license or to register the standard RoutePro, you need to have a Computer with internet connection.

If you have a new machine the CD coming with the machine is already adapted to your specific machine. No further action beyond registration and activating licenses need to be done. If you update from RoutePro2008 to RoutePro3000, you need to establish the correct parameters for your machine. Process like this: Start RoutePro3000 and go to options and machine. Hoover over the CCD-picture and insert correct parameters for XYZ-motors, spindle, tool slots, sensor and table. You can copy the values from your RoutePro.ini-file of your older Software RoutePro2008.

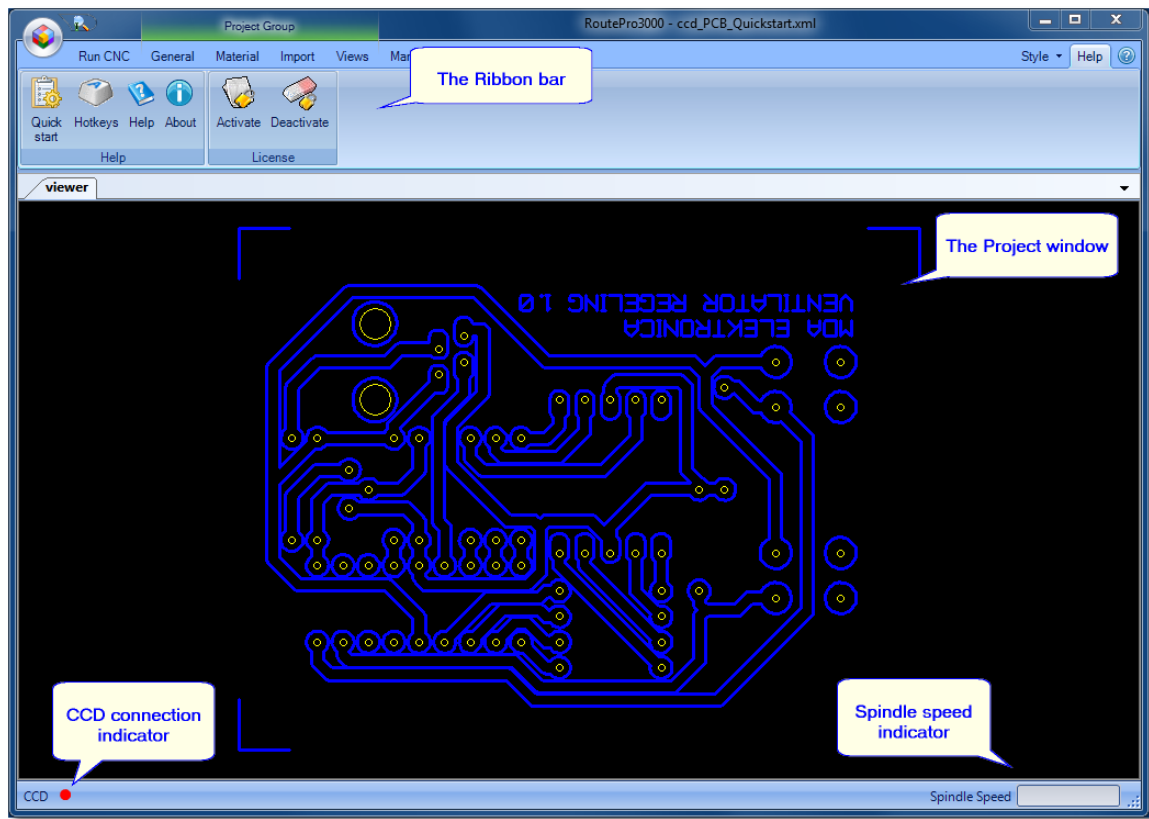
Note: there is one exception concerning the Z-position of the tool slots. In RoutePro2008 the z-position of the tool slots was 0.5 – 1 mm less than z-max. E.g. if z-max was 37.65, then z-position of the tool slots was approx. 37.00mm. In RoutePro3000 the table is the 0-Position of the z-axis and you almost put the tool to 0. So now you have to insert 0.5 – 1.0 mm in the ATC-tool position table. Now your Software RoutePro3000 is ready to use.



Have fun with your CCD and the new software RoutePro3000!

3.4 The User Interface

The RoutePro3000 window has two main components: The Ribbon Toolbar and Viewer.



The RoutePro3000 user interface

The Ribbon Toolbar

RoutePro3000's functions are accessed primarily through the Ribbon Toolbar (or Ribbon for short).

It is divided into tabs that group functions according to tasks.

All the buttons, fields and tabs are explained in detail, in the [reference](#) section.

Viewer

The Viewer is used to display the data and to select data to process.

3.5 Getting help

RoutePro3000 has an extensive help system.

To get started, your main source of information should be this help file.

We have designed it to provide all the information you will need for using and learning RoutePro3000.

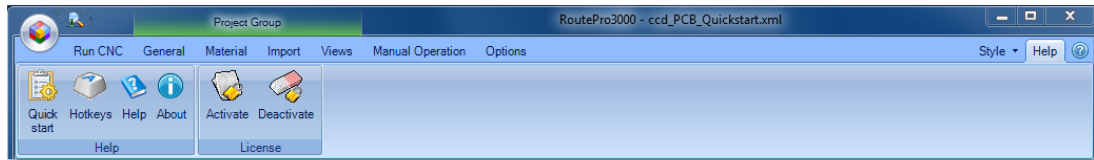
▼Help on this Help system

- If you see a picture you may click on it to see it's actual size.
- If we suggest to click a button, the button text will have a yellow background
- If you see an arrow in front of text, clicking the text will expand the text. ▼click now
This is the expanded text, clicking the arrow again hides this text again.

 if you see the hot key symbol then the command can also be executed by pressing the key that follows it.

► Displaying the help

- The quickest way to display the help is to press F1. If context-sensitive help is available it will be displayed automatically.
- To get started click on the Quick Start button.



- Select the [Help tab](#) in the Ribbon for additional help options.

► Contacting support

Note: first read our [support policy](#) to see which type of support applies to you.

- Contact your local supplier directly or send an Email.
- Before contacting support, please make sure that you really can't find the information in this help manual

► Getting a printed user manual

You can print out the complete RoutePro3000 help manual if you like, you will find it as PDF in the document folder.

3.6 How to order modules

You can order modules for RoutePro3000 by contacting your local supplier.

Information on the different module you get in this help file at: **reference - modules**

3.7 Support policy

About our support policy.

RoutePro3000 has been build from scratch so you can imagine how many hours of work our developers have spent in programming.

However we feel that every customer should be able to use the new RoutePro3000 with our machines.

That includes customers that use our machine and old RoutePro versions for many years now. So will give you this state of the art program for free.

Over the years we have sold many machines worldwide.

You can imagine, if we have to handle support for all this customers at no costs, for a program that was given for free, it would give us many hours of non payed work extra.

RoutePro3000 comes with an extensive user-manual where you can find answers to 99.9% of your questions.

So we do not expect that there will be a great need for support, but we want to prevent getting

overloaded
with questions for which the answers can be found in the manual, just because support is free.

Existing customers

If you have purchased a new CCD machine, from one of our dealers, before 01 July 2012
And you really need support you can purchase support tickets. Which can be used to solve your problem.
This could be by telephone or if necessary a team-viewer session with our support center.
Please contact your local dealer to purchase support tickets.

New customers

If you have purchased a new CCD machine, from one of our dealers, after 01 July 2012
You are entitled for a maximum of 1 hour free support during 1 year after the purchase of the CCD machine.

If you encounter problems

After many many hours of testing RoutePro3000 it is always possible that RoutePro3000 does not what it supposed to do.

If you find a problem with the software you can send us an email with detailed description of the problem plus screen shots,
and most important, how did it occur. Can it be reproduced?
We will try to solve the problem directly if it is a problem that effects the whole program else it will be solved in the next release.

Note: Sometimes RoutePro3000 gives you the opportunity to send an error report, please do that as well, this makes problem solving much easier.

See also: [Error reporting](#)

User input

We highly appreciate your input.
If you have suggestion of how to improve RoutePro3000 please tell us, if we think it is useful for other users as well we can implement this in a next version.

3.8 Copyright



All rights reserved.

No parts of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the written permission of the publisher.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from

the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Part

IV

4 Quick Start Tutorials

The tutorials in this section provide a quick introduction to using RoutePro3000.

They are intentionally kept brief so that you can actually start using the program as quickly as possible.

The objective is not to teach you every single detail but to familiarize you with the basic principles and the way the program works.

For full details on the procedures described in the tutorials please refer to the [Reference](#) section.

Once you get used to working in the program you will also find plenty of more useful help and support in the [Advanced Topics](#) section.

Your best start with RoutePro30000 is to work down the list we provided for you. (click on an item)



Quick start

- Register / Activate Licenses
- Find CCD machine
- Creating a project
- Updating a project
- Using the layer viewer
- Using the Viewer
- Calibrate the Camera
- How to use the calibration module

4.1 Find CCD machine

RoutePro3000 can work with or without a ▼connection to a CCD machine.

A CCD machine should be connected to a serial port or a USB port (using an USB to Serial converter)

If there is no CCD machine attached you have the option to work in the ▼demo-mode.

In demo mode you can perform almost all the actions you can perform in normal mode.

So you will be able to get familiarized with the program.

You can also create your projects, they will work fine for an attached machine.

However there are some limitations.

In demo mode: the ATC option does not work because this is not simulated.

Work in demo-mode: Continue with [Create a project](#)

If you have a CCD machine connected to the computer.

Start RoutePro3000

The program shows the license screen, if you have already activated RoutePro3000 the screen will show your details and will hide after a few seconds.

If RoutePro3000 is not yet [activated](#), you have the choice to run the program during the evaluation period.

Searching for a CCD

Now the program will search for an attached CCD.
Expand the text below that apply.

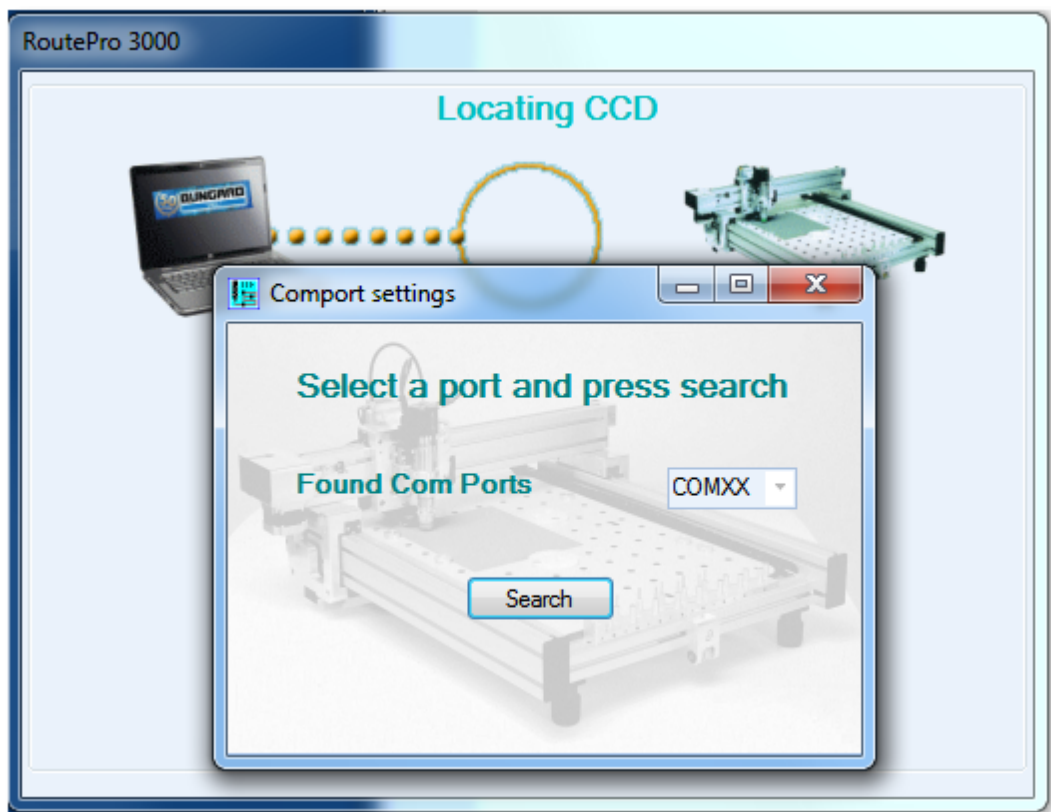
▼ CCD found.

If the CCD is found the program will start.
Continue with [Create a project](#)

▼ CCD not found

▼ Try to find in manually

The following screen appears:



Open the drop-down box and select the [port](#) where the CCD is attached to (available ports will be shown) then press [search](#).

- ▼CCD still not found
 - ▼Enter demo mode

If the CCD is not found the program will run in demo mode.
Continue with [Create a project](#)
 - ▼Exit RoutePro3000

Close the program.
- ▼Stop searching
 - ▼Enter demo mode

If the CCD is not found the program will run in demo mode.
Continue with [Create a project](#)
 - ▼Exit RoutePro3000

Close the program.

4.2 Create a project: introduction

Creating a ▼project in RoutePro3000 is a simple task.

A project consists of a folder where your data files and configuration files are stored.
Building projects is a simple tasks by using the Project Wizard.

Why projects?

- Project data is all stored together in a project folder, so projects easy to find.
- You can give your project a sensible name.
- Easy to maintain.
- Configurations are stored per project.

The data in the project folder does not replace the data that is generated by your designer software

It is just copied to the project folder and keeps the original data intact.

If you change the design, RoutePro3000 will notice that there has been changes and replaces the files in the project folder with the updated ones.

Please note: **If the original data folder has been renamed or moved the project cannot synchronize anymore**

Projects are always created using the ▼Project wizard

This wizard collects all the data files for you and creates the project, it searches for default tools

[Read more....](#)

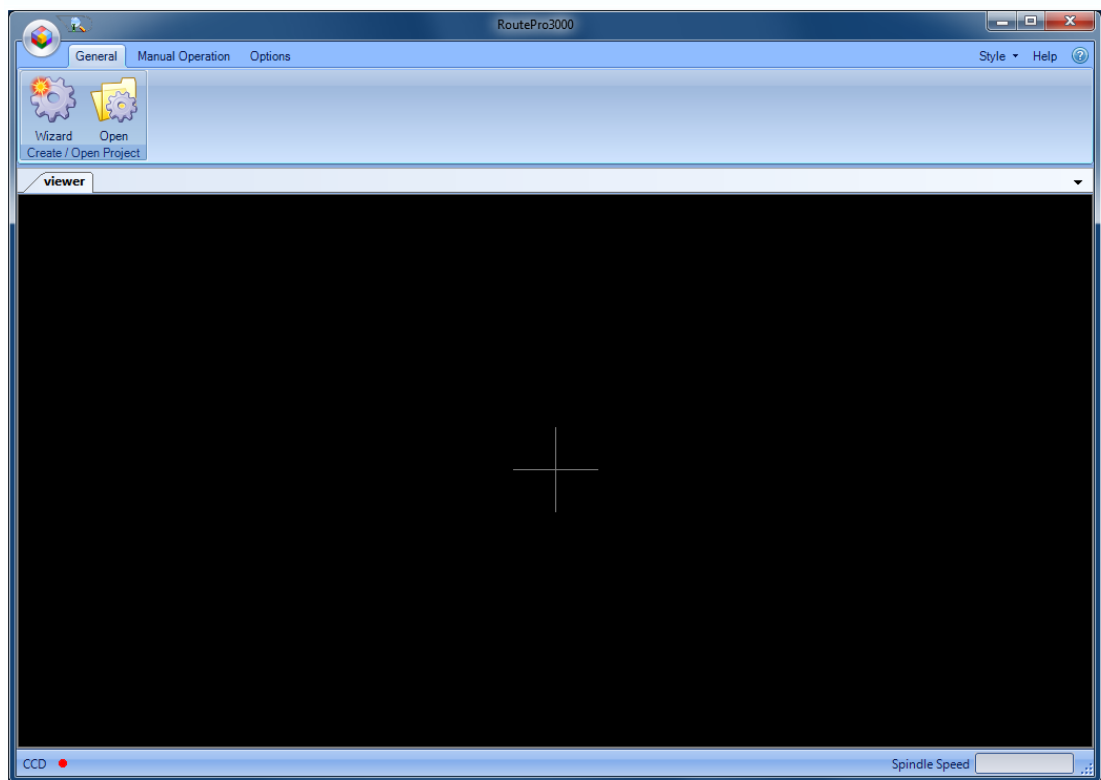
4.2.1 Project Wizard

Start RoutePro3000

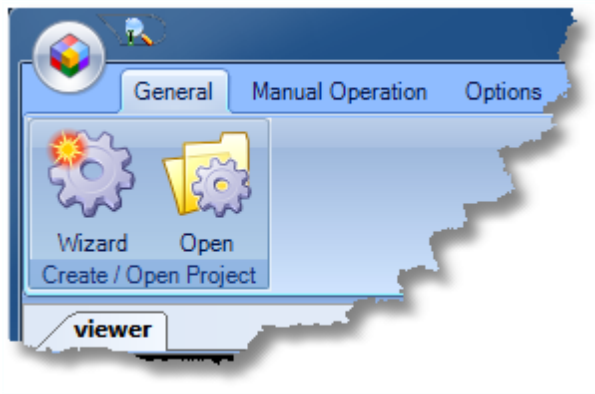
The next screen appears if the following conditions are true:

- RoutePro3000 is activated or runs under the trial period.

- There is a CCD connected or it runs in demo mode.

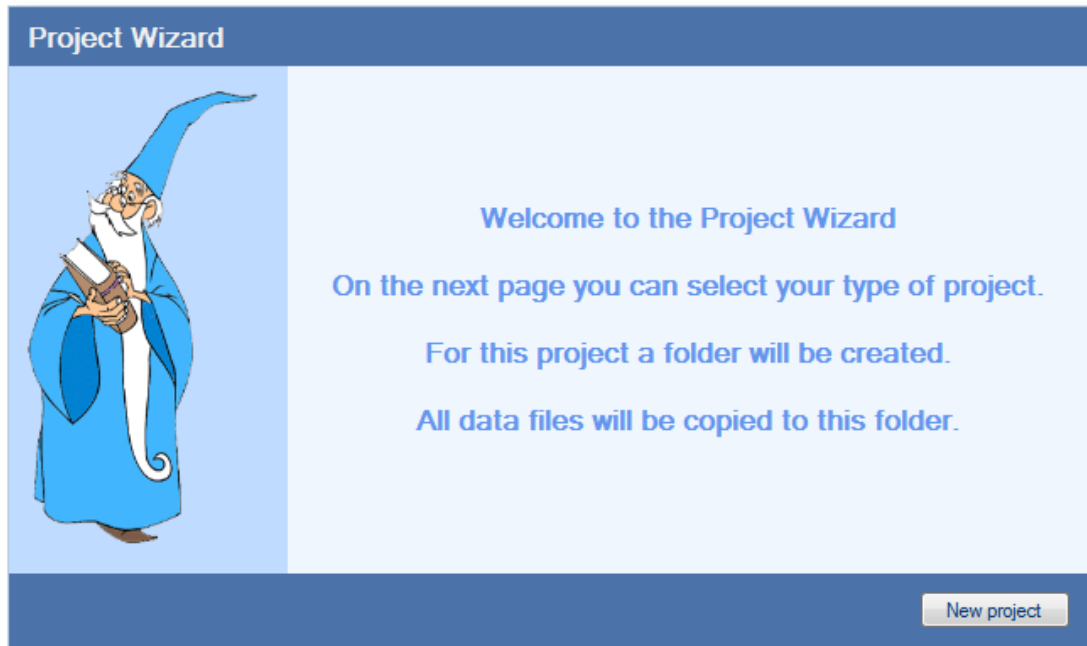


There are four Ribbon tabs visible, please select the **General tab** if this is not the active tab.



Click the **Project Wizard** button.

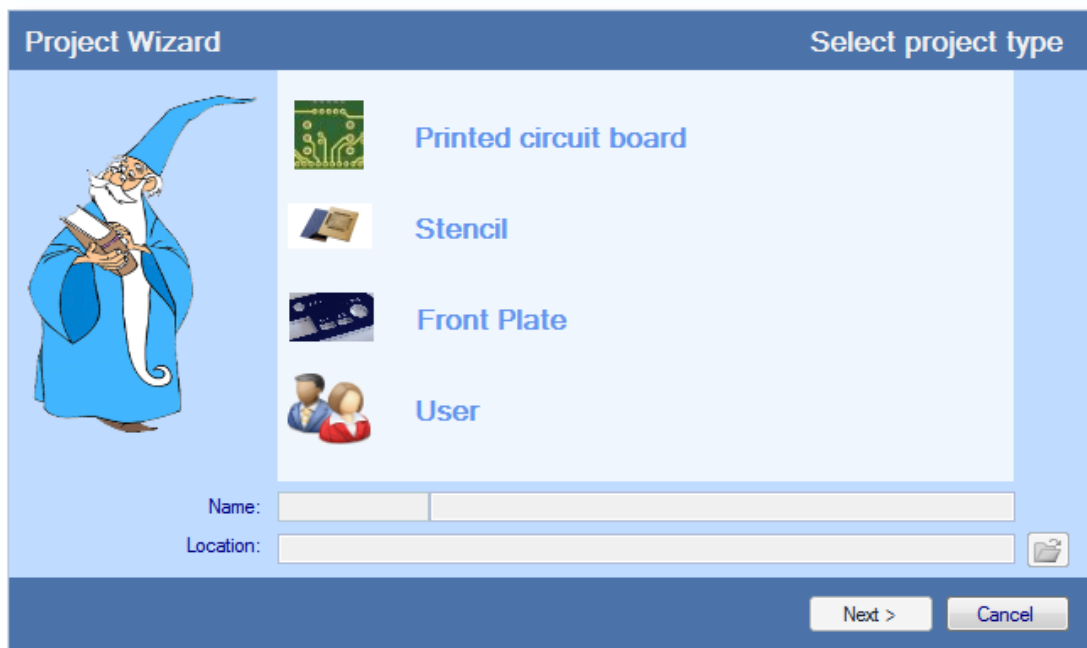
The Project Wizard will show the welcome screen.




Note: If you start the Wizard while there is an active project, there will be an Update Project Button visible.

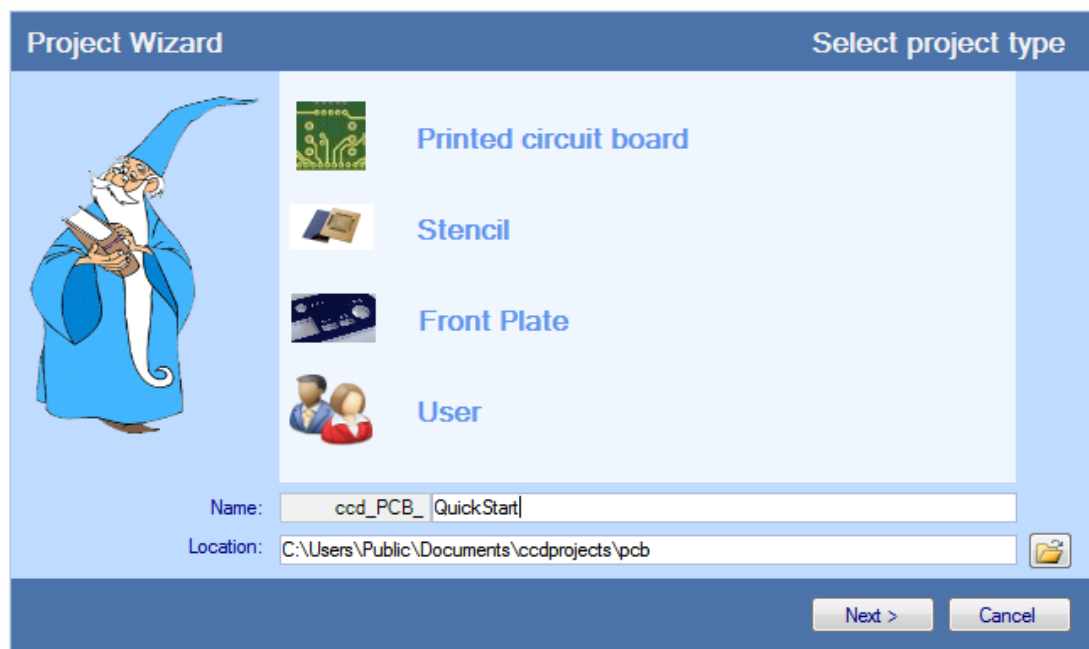
Press **New project**

The following screen will show.



 In the standard RoutePro3000 version, you may only select **Printed circuit board** for your project.

Here you can make a selecting for your project type.

Select Printed circuit board

Now the Name and location fields are filled in with the default values.

You only need to enter a project name, in this case we have entered **QuickStart**.

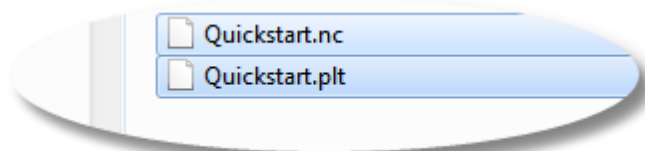
Note: To identify RoutePro3000 projects, the name of your project will always be preceded by the type of project, in this case **ccd_PCB_** you cannot change that.

By pressing the folder button you may select a different folder to store your project.

Press Next

This will open the load file dialog window,

Go to the data files folder on your CD and select both files (Quickstart.nc and Quickstart.plt)



Quickstart.nc contains the drill coordinates

Quickstart.plt contains the milling data.

Note: In RoutePro3000 standard you may load up to 4 files per project, in the RoutePro3000Extra version you can load up to 16 files per project.

Press Open to load the files

The next window will show:



You will see, at the top of this window, the name of the data-file. In this case it is Quickstart.nc but, depending on your file system, it could also show Quickstart.plt first.

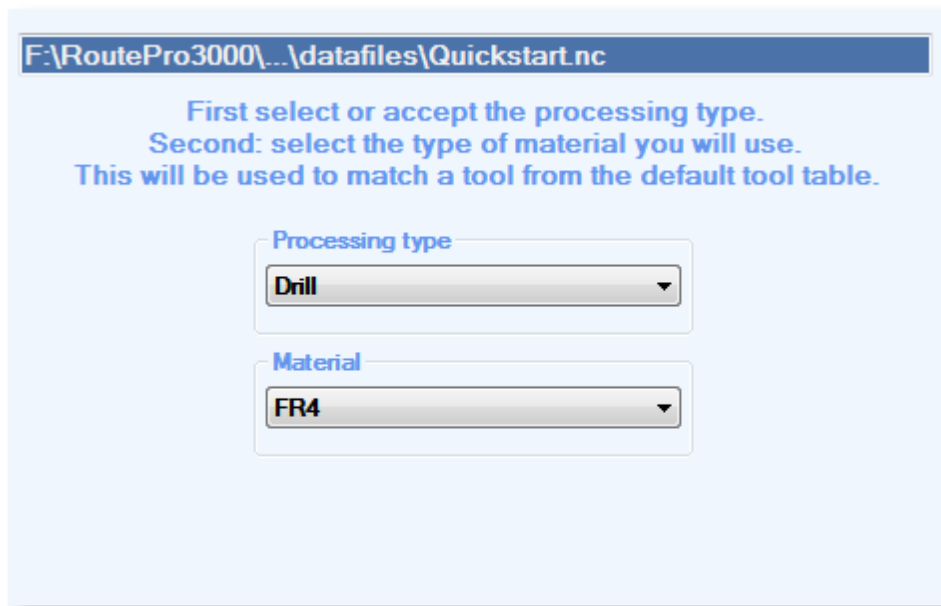
Note: The explanation that follows assumes that the first data-file is Quickstart.nc. this is no problem for this tutorial because both files are handled.

You may enter instructions for this layer (not required) in the Instruction field, this could be useful for later reference or if you need to instruct your machine operator.

You may also select the Side for which the data is intended. This is useful for future reference and will be used in the RoutePro3000Extra version for automation (running scripts).

Press **Next**

The next window will show:



F:\RoutePro3000\...\datafiles\Quickstart.nc

First select or accept the processing type.
Second: select the type of material you will use.
This will be used to match a tool from the default tool table.

Processing type
Drill

Material
FR4

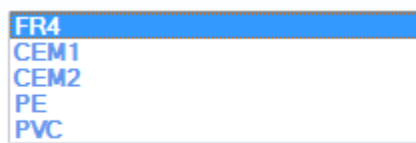
RoutePro3000 determines automatically the **Processing type** it needs to handle.

Normally you do not have to change the Processing type here, however it could be the case that you

have a module installed that needs to handle the data in a different way. Like laser or dispensing.

In that case you can select the correct Processing type.

You may select the material type you are going to use or just leave it on FR4

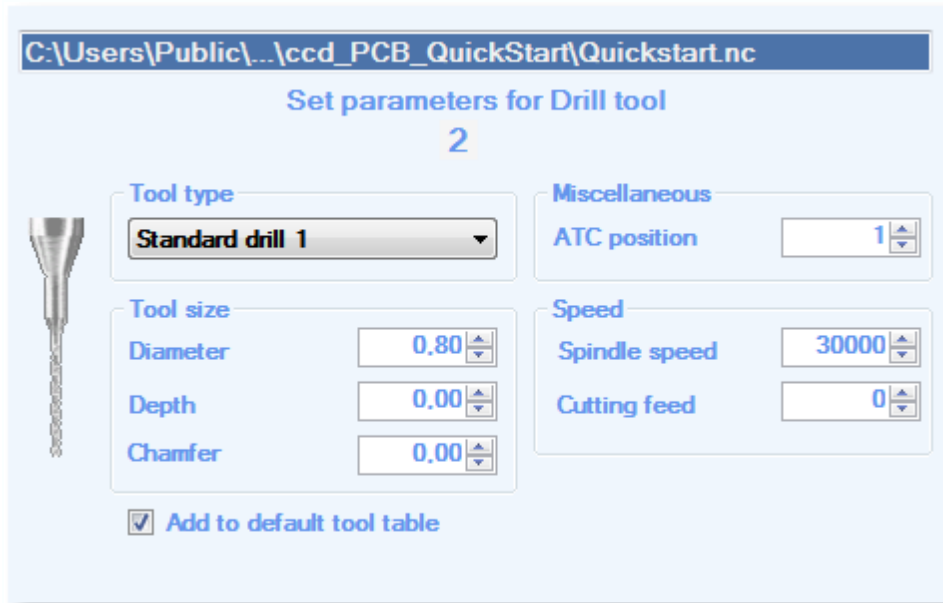


FR4
CEM1
CEM2
PE
PVC

Note: The material type is used to get the correct tools from the default tool table.

Press **Next**

The next window will show:



C:\Users\Public\...\ccd_PCB_QuickStart\Quickstart.nc

Set parameters for Drill tool 2

Tool type

Standard drill 1

Tool size

Diameter: 0.80

Depth: 0.00

Chamfer: 0.00

Miscellaneous

ATC position: 1

Speed

Spindle speed: 30000

Cutting feed: 0

☒ Add to default tool table

Now we are getting somewhere, the tools that are found in the data file needs to get the process parameters.

The tool that needs to get parameters is in this case tool 2. As you can see, a few fields are already filled in for you.

Note: The data file could contain a lot of tool definitions but only the tools that are actually used will be showed.

Note: If a tool is found in the default table, all the fields would be filled automatically.

▼Field descriptions

Tool type

You may select here the type of tool you want to use for the current tool.

Note: The tool type is used to determine which tool to get from the default tool table.

Diameter

Defines the diameter of the current tool.

Note: If the data-file contains tool parameters, like diameter this value will be used else you need to select the diameter manually.

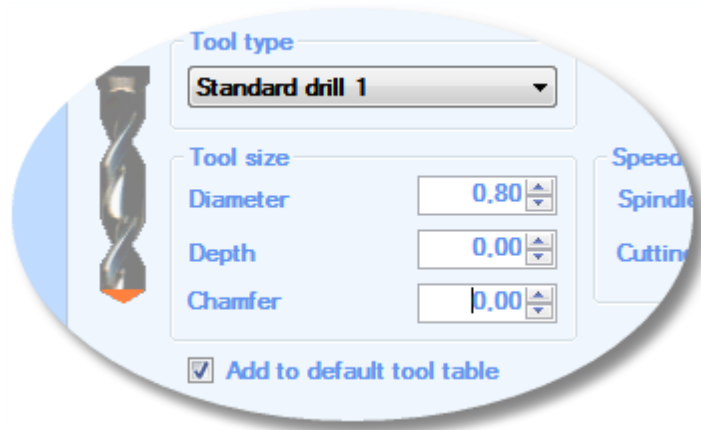
Depth

Here you can define the drill depth.

Note: If you leave this field on 0,00 the drill depth is calculated automatically, using the thickness of the used material.

Chamfer

This defines the extra depth you need to drill the hole completely. The picture shows you the chamfer.



ATC position

This parameter instructs the Automatic Tool Changer, where to find the current tool.

Note: *this field will be hidden if the ATC is disabled in the option menu..*

Spindle speed

You may select the required spindle speed here.

Cutting feed

This determines the speed at which the drill will lower into the board.

Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height ([Z free](#)), from there it uses the Cutting feed..*

Add to default table

If a tool does not exist in the default tool tables, this box is checked and the tool will be automatically added to the tables, unless you uncheck the box.

If the tool was retrieved from the default tool table, this box is unchecked, checking it will overwrite the default tool with your entered values. (not recommended)

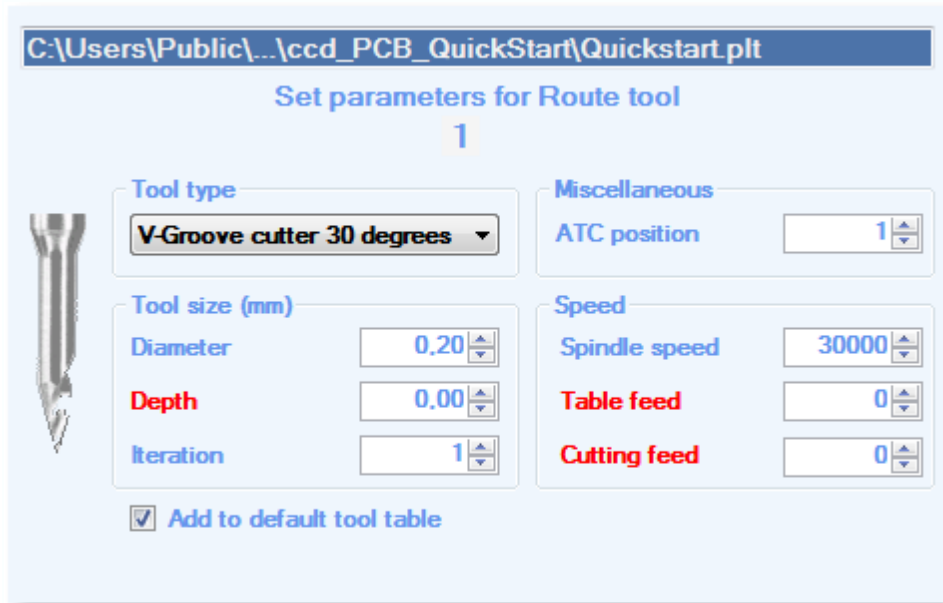
Fill in the required fields and **press Next**, do the same for the other drill tools.

When all the drill tools have their settings, the next data-file will be handled by the Project Wizard.

The first two screens (Instructions, Process type and Material selection) are the same for all the data-files

so we do not spend more time in explaining them, just fill them in.

Press Next



C:\Users\Public\...\ccd_PCB_QuickStart\Quickstart.plt

Set parameters for Route tool

1

Tool type

V-Groove cutter 30 degrees ▼

Tool size (mm)

Diameter 0.20

Depth 0.00

Iteration 1

☒ Add to default tool table

Miscellaneous

ATC position 1

Speed

Spindle speed 30000

Table feed 0

Cutting feed 0

The parameters for the milling data are almost the same with a few exceptions. There is no chamfer parameter, instead there is an iteration and a table feed parameter.

Note: If a required field is not filled by the user and Next is pressed, it will show you a warning and the required fields will be shown in red.

▼Field descriptions

Tool type

You may select here the type of tool you want to use for the current tool.

Note: The tool type is used to determine which tool to get from the default tool table.

Diameter

Defines the diameter of the current tool.

Note: If the data-file contains tool parameters, like diameter this value will be used else you need to select the diameter manually.

Depth

Here you can define the milling depth.

Iteration

If this parameter is greater than 1, milling will be done in multiple steps.

Example: requested depth = 3 mm, Iteration = 3 The first milling action will have a depth of 1 mm the next depth will be 2 mm etc.

ATC position

This parameter instructs the Automatic Tool Changer, where to find the current tool.

Note: this field will be hidden if the ATC is disabled in the option menu..

Spindle speed

You may select the required spindle speed here.

Table feed

This determines the speed that will be used while the tool is actually milling, the lower the speed the higher the result.

Note: If the tool is raised the highest speed setting will be used to travel to the next location..

Cutting feed

This determines the speed at which the drill will lower into the board.

Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height (Z free), from there it uses the Cutting feed.*

Add to default table

If a tool does not exist in the default tool tables, this box is checked and the tool will be automatically added to the tables, unless you uncheck the box.

If the tool was retrieved from the default tool table, this box is unchecked, checking it will overwrite the default tool with your entered values. (not recommended)

Fill in the required fields and **press Next**, do the same for the other router tools.

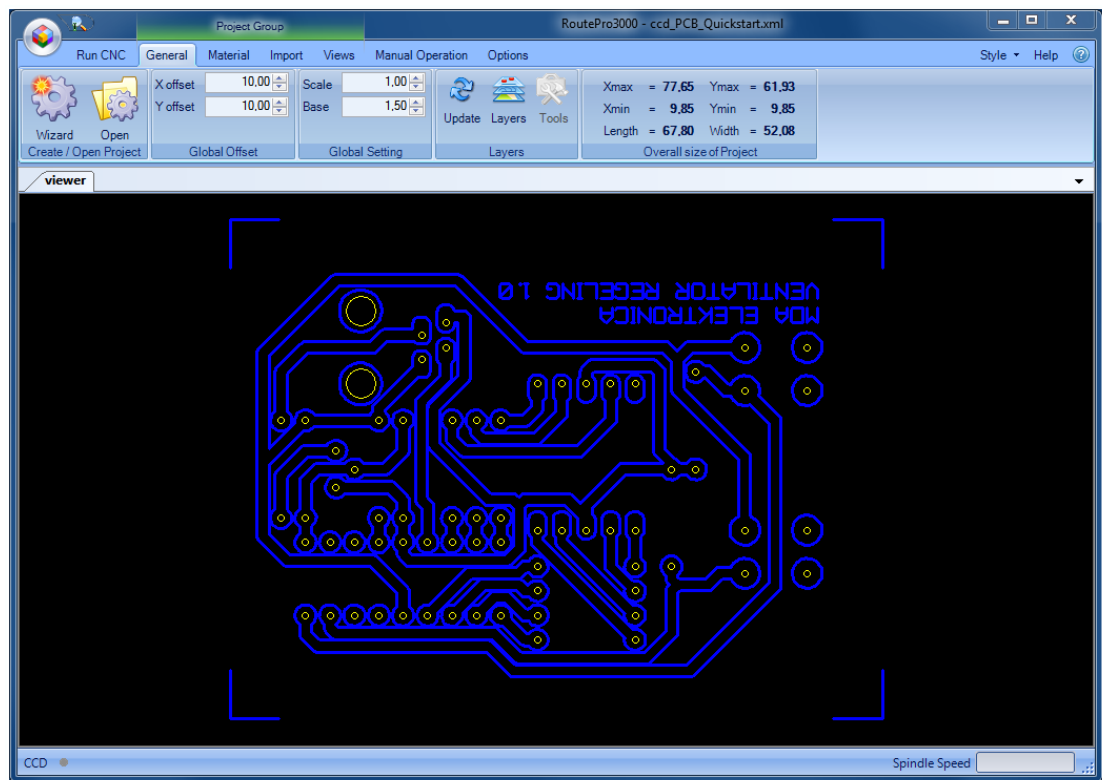
When all the tools have their settings, the next data-file will be handled by the Project Wizard until all files are handled.

When all the data-files are handled the next window will appear:



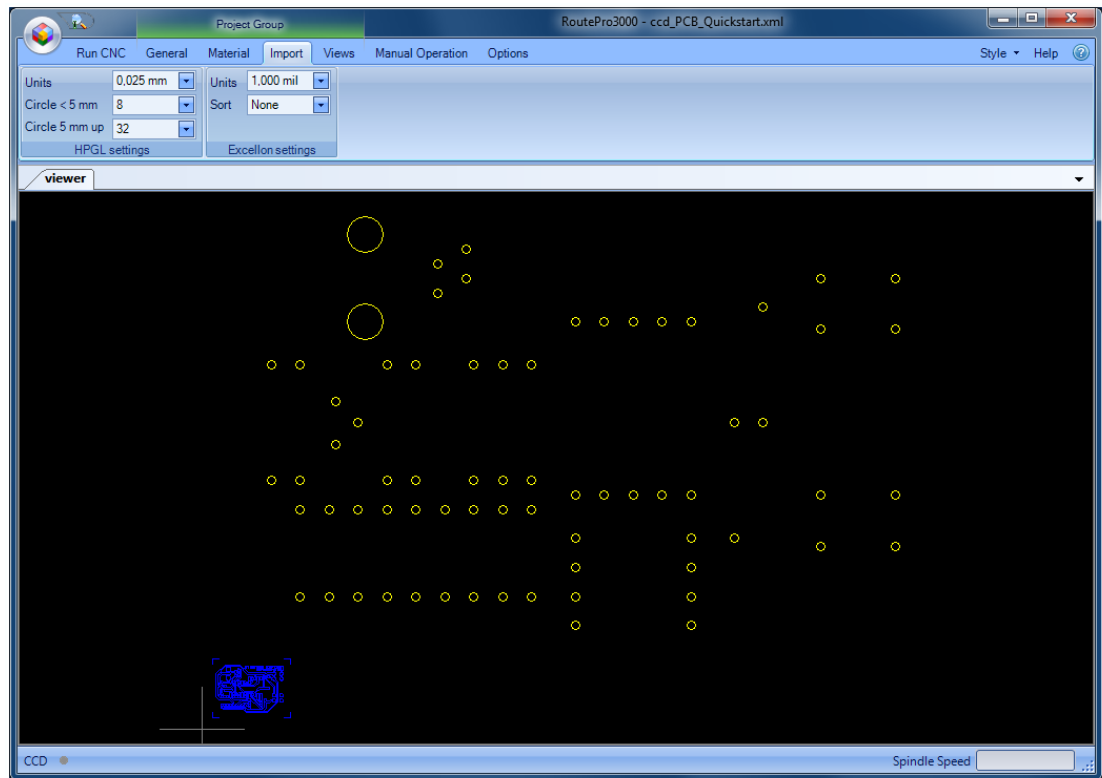
Press Finish and in the next screen **OK**.

Now the wizard is ready and your project will look like this



OOPS my screen looks different!

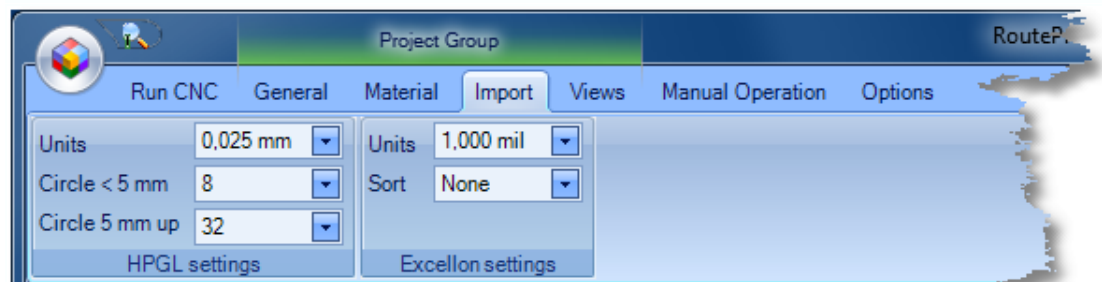
Depending on the used format in the data file, your screen could look something like this:



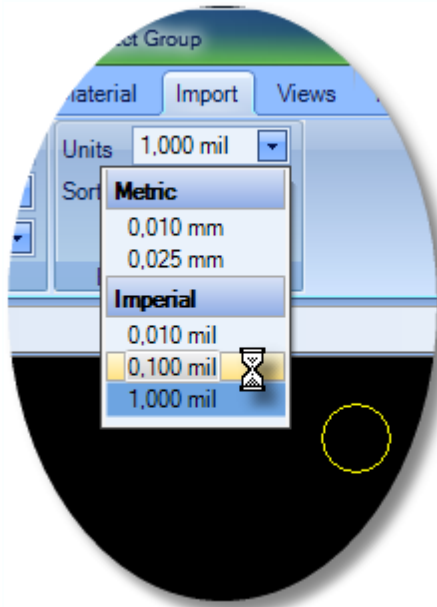
If this happens, most of the time the Import setting of the drill file (Excellon) is not correct. Don't worry in RoutePro3000 this is very easy to solve.

Note: HPGL (milling data) is normally produced with 0,025 mm step, this is the standard, Excellon can come in different varieties.

Select the **Import Tab** under the Project Group



Now select a different step size from the Excellon settings



As soon as you've done the selection, the data will be read using the new settings and your screen will update immediately.

Just for fun give it a try with some other settings so you see the power of this feature.

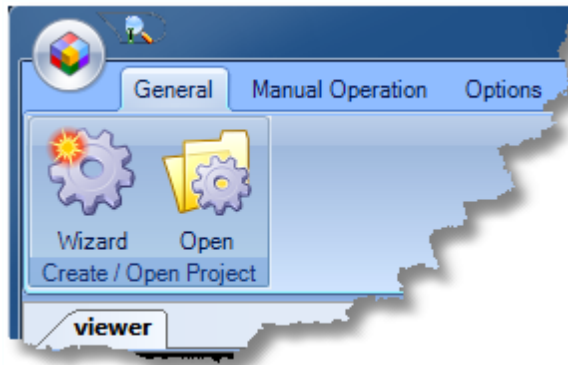
Note: *These settings are stored within your project so you only do this once.*

This concludes the Project Wizard tutorial.

4.2.2 Update a project

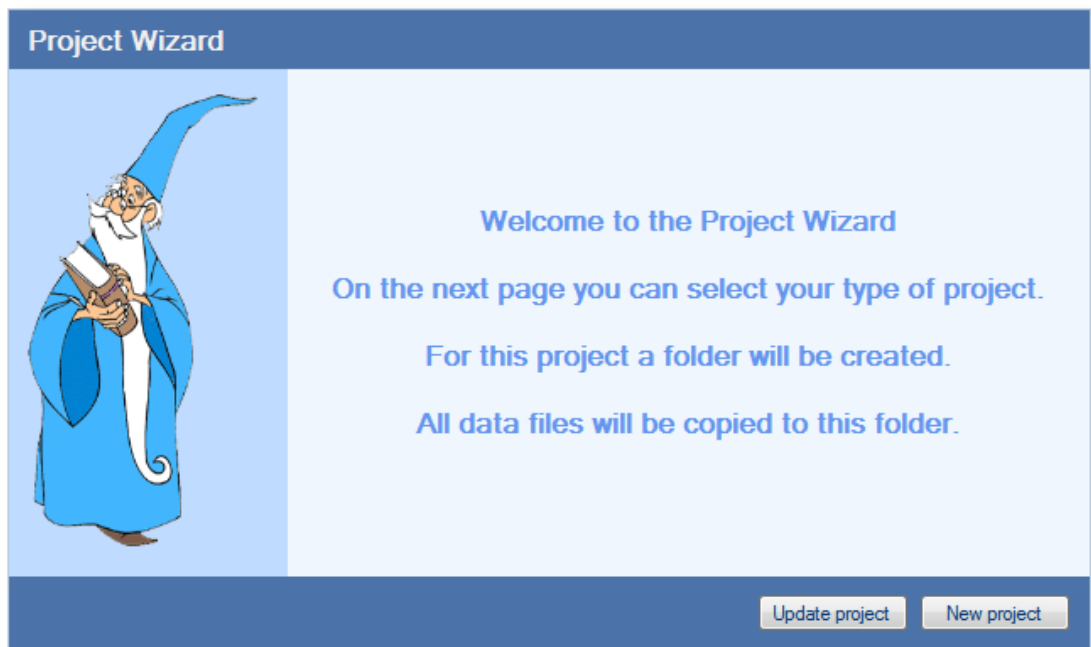
In case you want to add or delete data-files to your project, you can use the Project Wizard.

Note: *The project must be active before you can update it.*



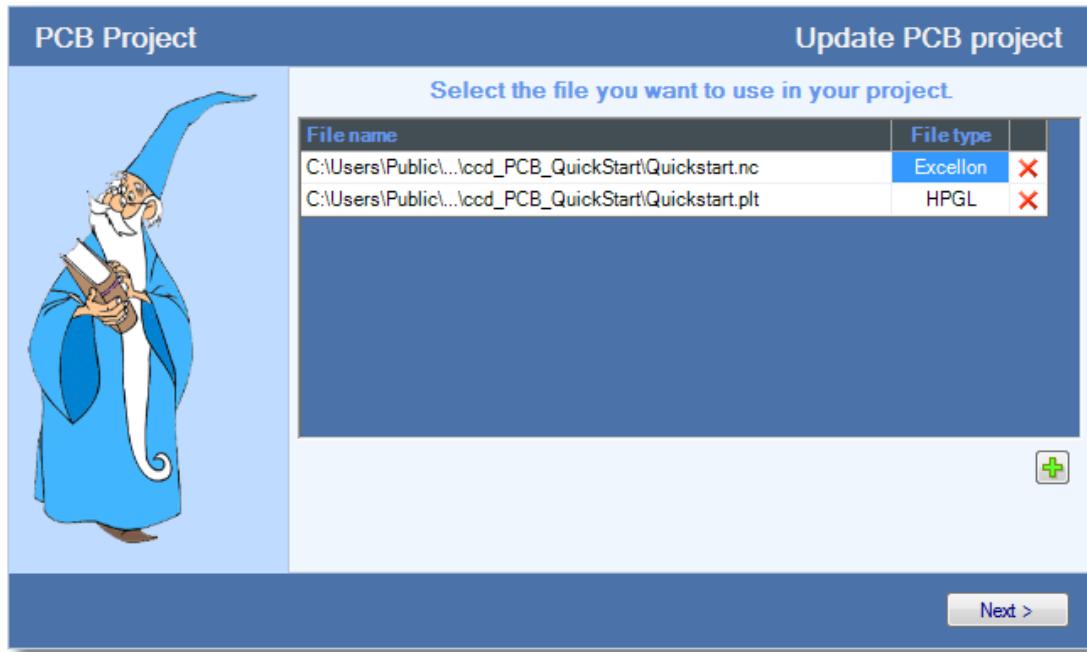
Press the **Project Wizard** button.

The Project Wizard will show the welcome screen.



Press the **Update project** button.

The next window will appear:



Here you can add or delete data files

Press this button to add data file(s) to your project

Then Press **Next** to continue, depending on the kind of data, you will be guided through the same windows as in [creating a project](#).

Note: In the standard RoutePro3000 you can add up to maximal 4 data files per project.

Press this button to remove file(s) from your project

Note: The selected file will be removed from the project folder but will remain untouched in your design folders.

Then Press **Next** to continue, depending on the kind of data, you will be guided through the same windows as in [creating a project](#).

Note: if you did not add new files you will be guided to the end screen.

This concludes the Update project tutorial.

4.3 Using the Viewer

The Viewer is used to display and select the data on the screen.

Several other windows, like tool windows, will be docked here when opened.














A tool window is a docking type of window, you may undock it by holding the mouse pointer on the tab at the bottom and drag the window to another place. Now you can have both windows

in view

The following commands are available in the viewer.

The viewer hot-keys

These hot keys are only available if the viewer is the active window
Click in the viewer area to make it the active window.

	F8	Zoom all
	F5	Refresh Window
	z	Zoom in
	Z	Zoom out
	Ctrl +	 Draw zoom window  Add data to selection by drawing a window around the objects  Add data to selection
	Shift +	
	Alt + Mouse Wheel	Zoom in Zoom out
	Only Mouse wheel	Pan up and down
	Shift + Mouse Wheel	Pan left and right

Note: you need to click in the viewer area to be able to use the hot-keys

4.4 Calibrate the Camera

RoutePro3000 comes with a camera feature, which you can use for Capturing Route and Drill data. If you purchased the [Calibration Module](#), the camera will also be used for calibrating your boards.

But before you can use the camera, the camera position itself must be calibrated. This means we need to determine the offset to the center of the spindle.

This tutorial assumes that there is a camera mounted on the machine roughly at **X value 8,00** and the **Y value 50,00** from the spindle center.

Note: These values are actual negative offset values from the spindle center of view but they will be added to the actual head position while the camera mode is active, therefore they are presented as positive values.

Step 1

Place a piece of PCB material on the table and secure it so it cannot move.
Make sure it lays completely flat.

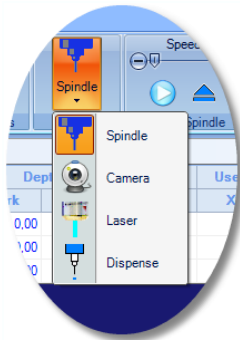
Step 2

Now open the **Manual Operation** tab and position the head on **X = 10, Y = 10, Z = 5**

Step 3

Start the spindle and set the step size to 0.1 mm, lower the head until a hole has been drilled. Raise the head and stop the spindle, wipe away the dust particles.

Step 4



Press **Show Camera**, there will be another button visible: **Calibrate Camera**, press this as well.

This will enable a special panel in the camera viewer, for calibrating the camera.

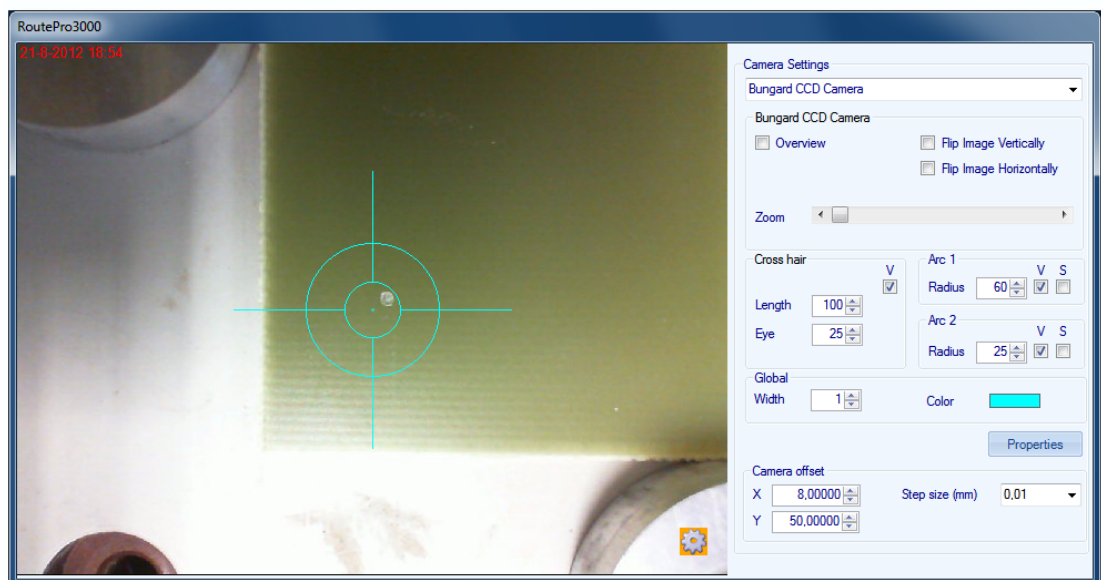
Note: *Calibrating is only available in the Manual operations Tab*

Step 5

The camera window shows up, press the little wheel in the lower, right hand corner to show the camera properties.

Under Camera offset in the camera property window, set the **X value to 8,00** and the **Y value to 50,00** this is roughly the offset.

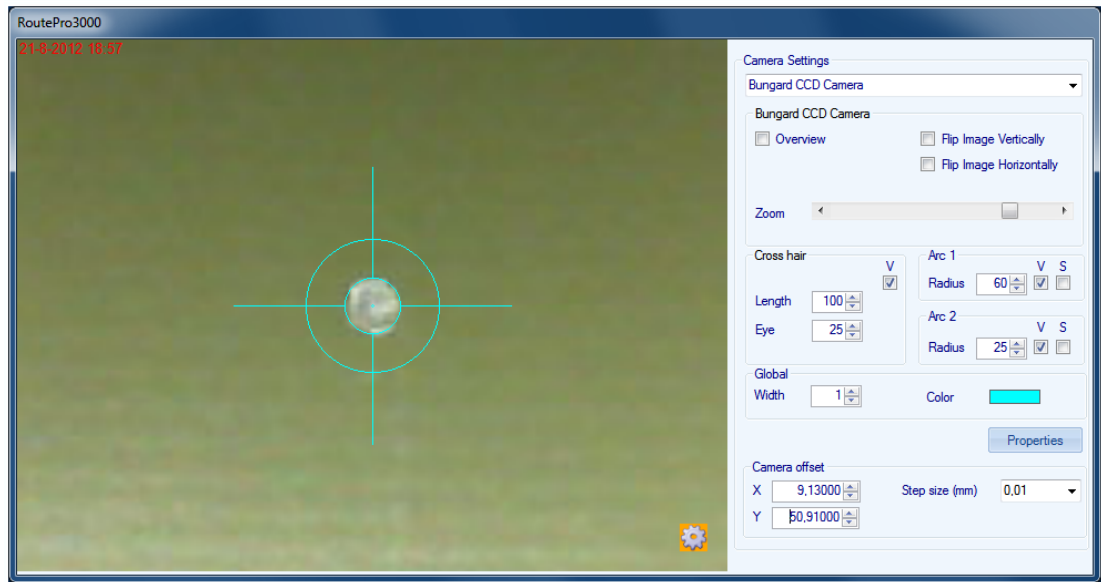
Note: *the value will be set as soon as you go to another field.*



Step 6

Now set the step size to 0,1 mm, and use the up/down buttons in the X,Y fields to move the camera until you are nearly in the center, then set the step size to the smallest step: 0,01 mm and position exactly in the middle.

Note: *If the calibration unit is activated, you can use the zoom option for more accurate calibration.*



Step 7

Testing.

Switch of the camera, the head will move over the hole again. Switch the camera on, now the camera must be exactly over the hole.

Note: *the camera position (offset) is stored automatically.*

This concludes the camera calibration tutorial.

4.5 How to use the calibration module

Using the calibration unit is very easy but you need to know a few basic principles.

Calibration is performed by using 2 points that are visible on your material.

These points will be automatically calculated from the current data file.

If the current data file is an Excellon file (drill data), the lowest left hand hole, and the highest right hand hole will be used for calibration.

Note: *you could use the fixing hole file (if available) for this.*

In case you have a HPGL file (route data) the lowest left hand vector start point, and the highest right hand vector end point will be used for calibration.

Note: A file with drill data is preferred for calibration, because it is easier to position the camera.

Note: Calibration effects all the layers in the project at the same time.



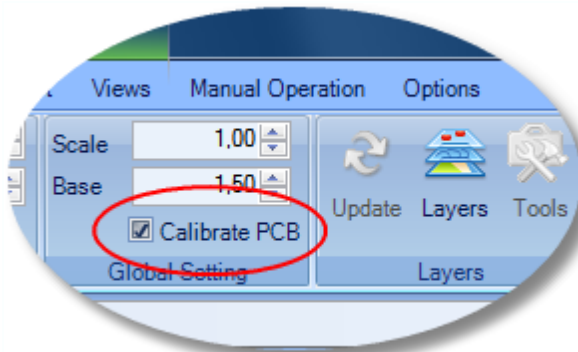
Because the camera has an offset from the spindle, it cannot reach approximately 6 centimeters in the Y direction.

Please keep this in mind while calibrating or using the camera as inspection device.

Requirements

Before you can use the Calibration module, the following items are required:

1. There must be a camera available and mounted on your machine.
2. The camera is [calibrated](#).
3. Make sure you have a calibration license
4. Calibrate PCB must be checked in the General Tab under the Project Group.
5. The [distance calibration](#) for automatic fiducial centering has been performed.



Note: This check-box will only be visible if you enabled the Calibration module under Installed Options.

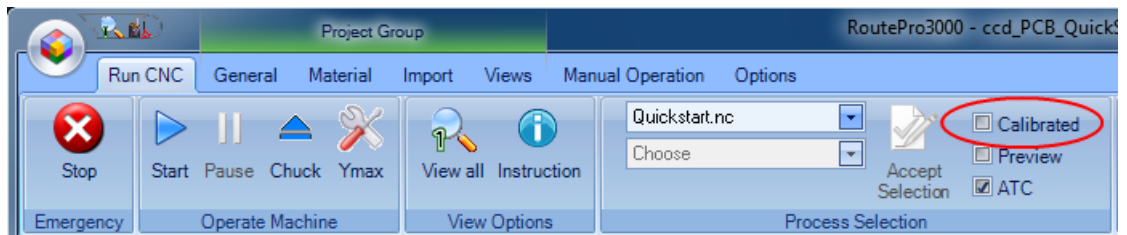
Step 1

For this tutorial we have drilled a board in the normal position and placed it after that under an angle on the table.
to be able to show you the power of the calibration module.

Open the Quickstart project.

Step 2

Click the **Run CNC** tab, you will notice a check-box under Process selection, named: **Design is Calibrated**.



Note: it should be unchecked. If not: uncheck it now.

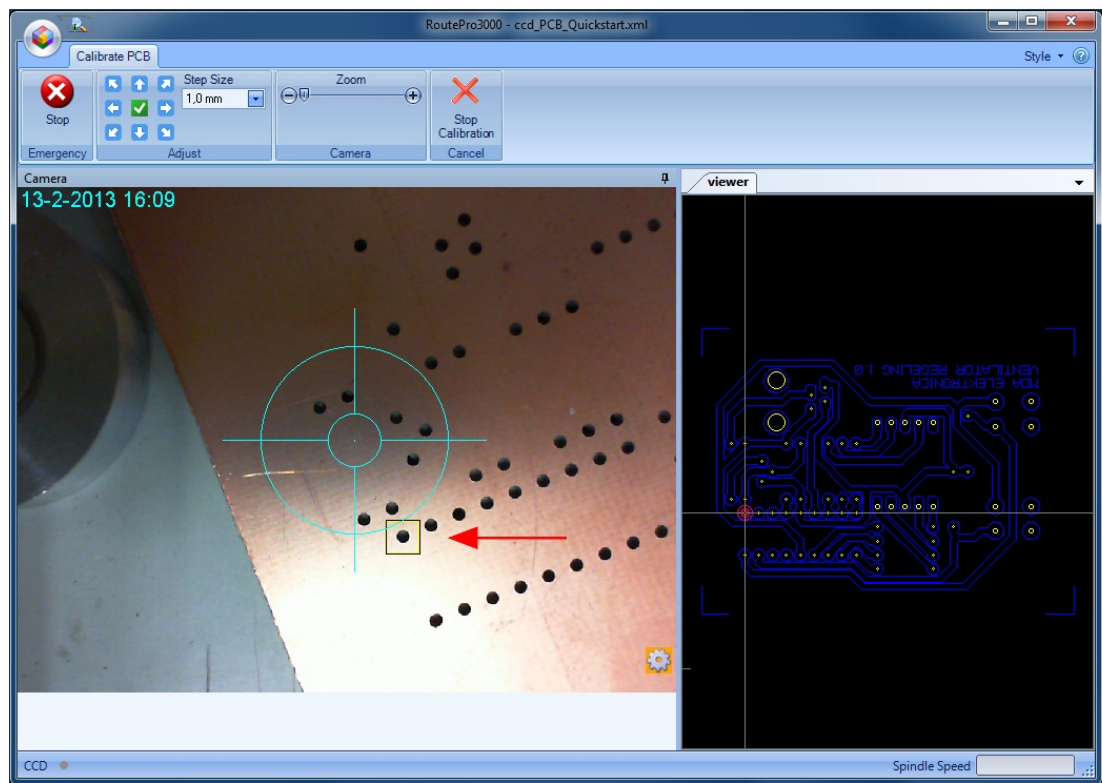
Note: If you check the box, the program assumes that the design is calibrated and therefore will skip calibration and start processing.

Step 3

Press **Start**.

Now the following will happen:

1. The camera window will open.
2. In the viewer will show the first reference point marked.
3. The machine will travel near the reference point.
4. The Calibration tab, that is normally invisible, will open.



Step 4

Just position the square over the fiducial (drill hole) and click.

The camera will now move over the hole and automatically centers it.

If it does not center correctly you might need to set the threshold to another value. (be careful

not to hit the calibration button while setting the threshold)



Note: All the buttons on the calibration tab, work the same as in the manual operation, except the green check button, pressing this will accept the current position and will move the camera near the next calibration point.

You might want to use the buttons if the result is not optimal due to bad lightning.

To abort the calibration press **Cancel**.



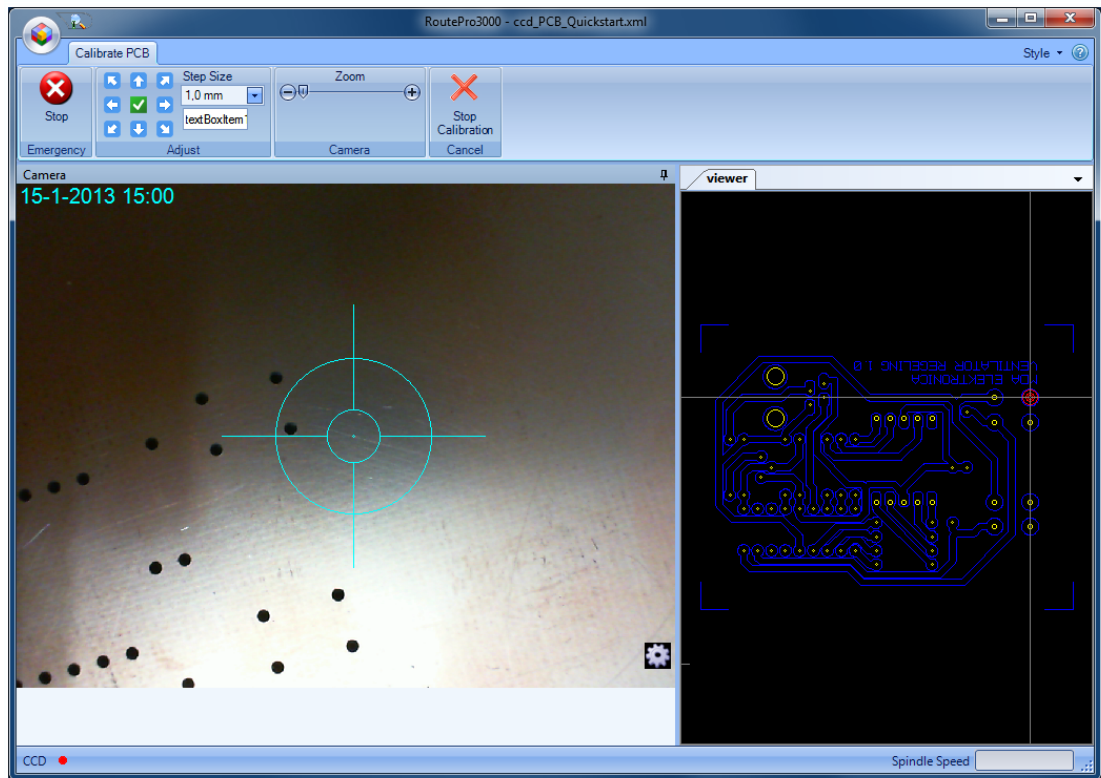
Note: you may use the zoom to fine tune if needed.

When you are satisfied press the green check button to accept the current position.

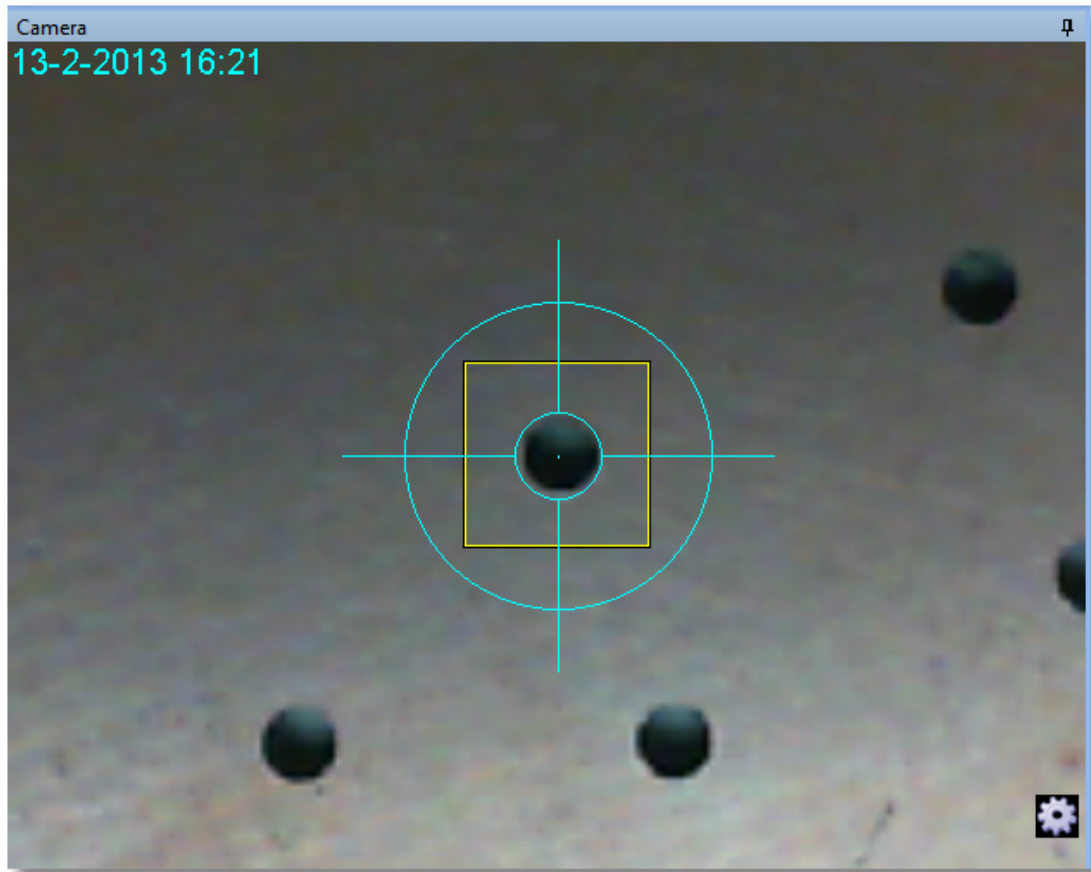
Step 5

We perform here exact the same as in step 4.

Note: The zoom value is automaticly set back to be able to spot the second calibration point.



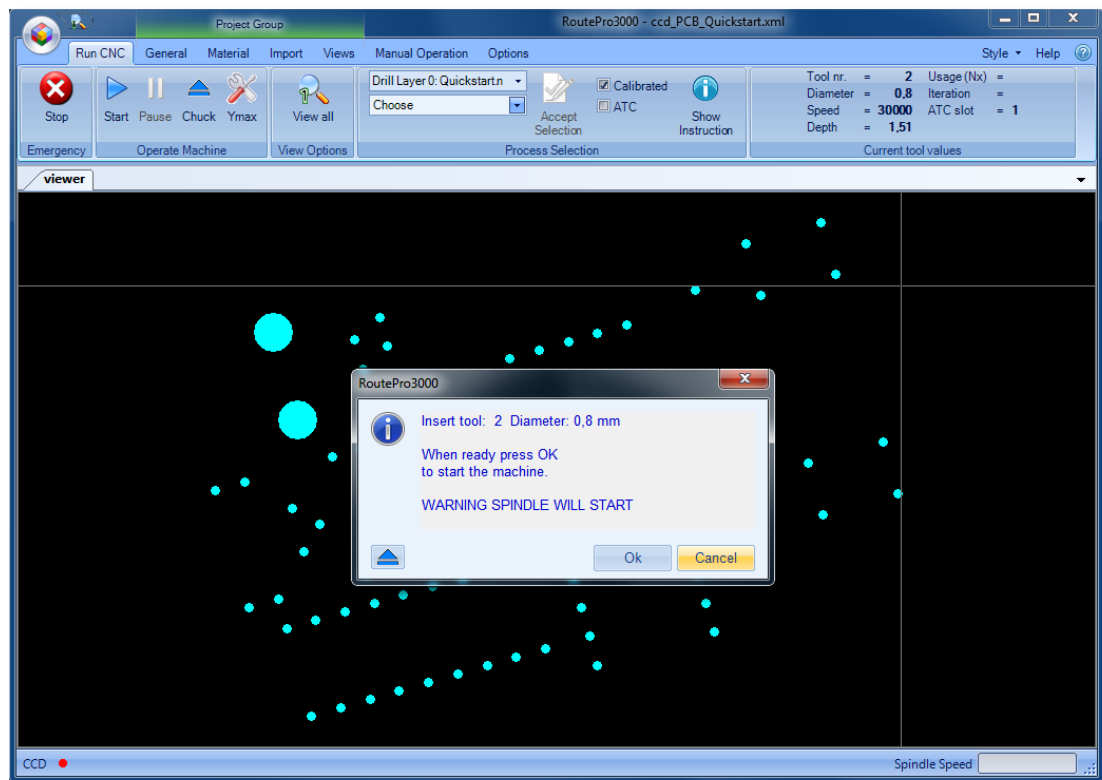
Note: Always use step-size 0,01 for the final touch.



When you are satisfied press the green check button to accept the current position.

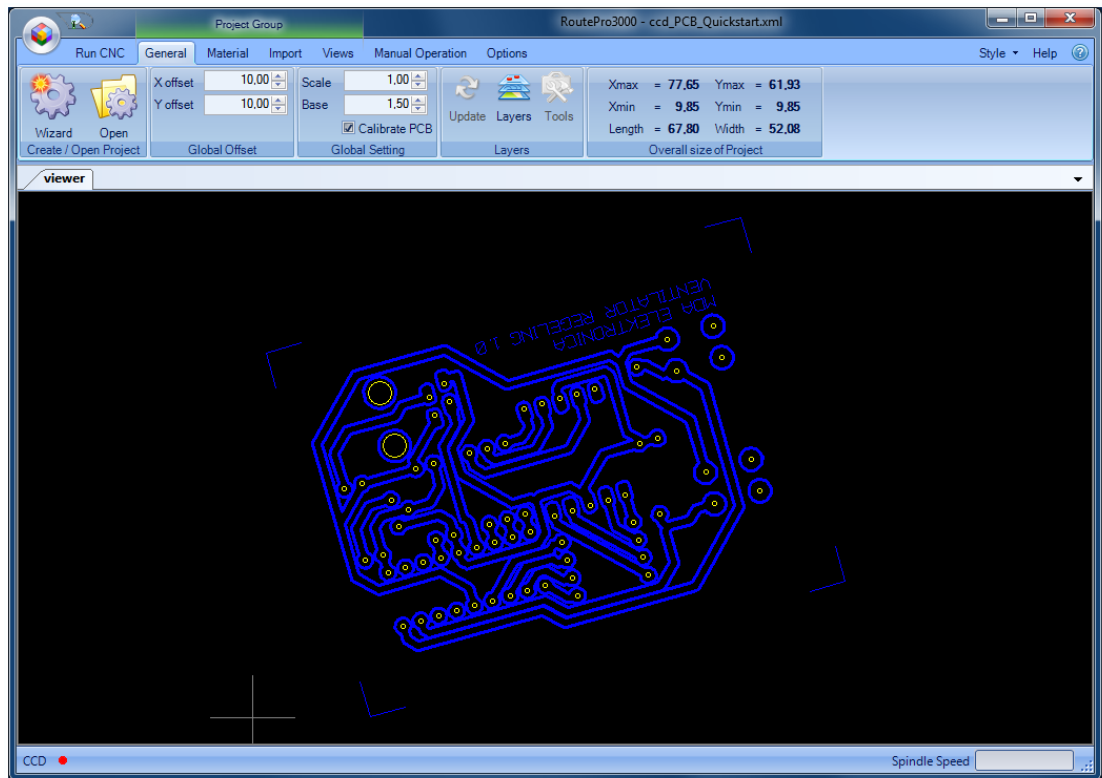
Step 5

All the layers of your project will now be adjusted and you may start processing.



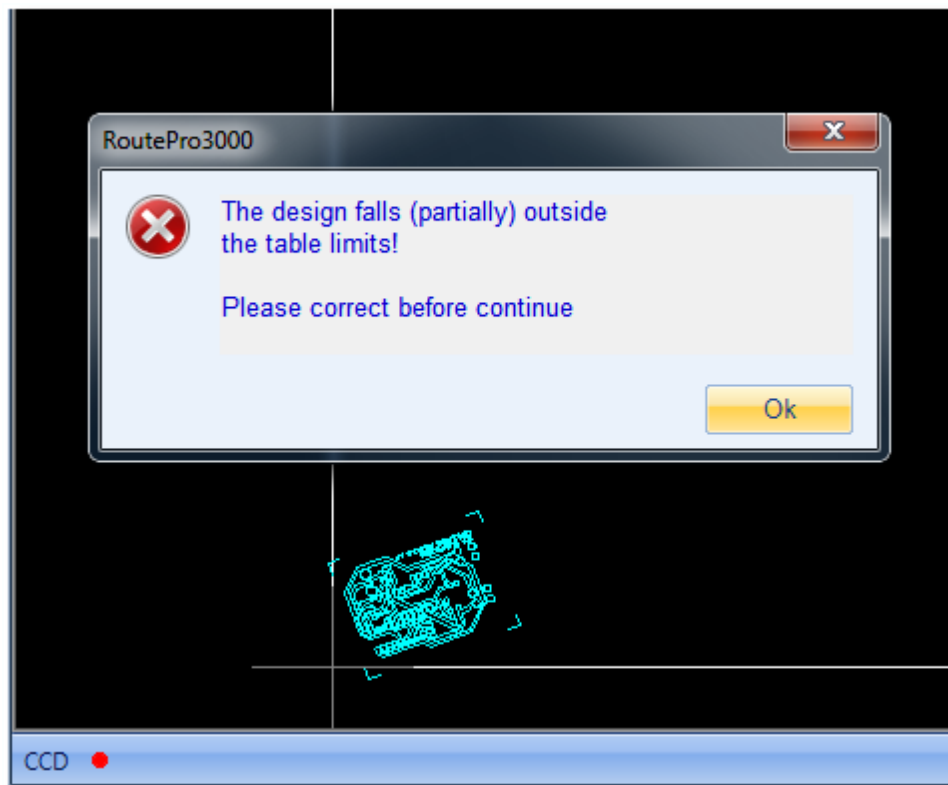
Note: If, at this point, you would like to select different tools, you can cancel the window and do the data selection.

The project stays calibrated as long as you do not change the project itself or reload the project.



Remark

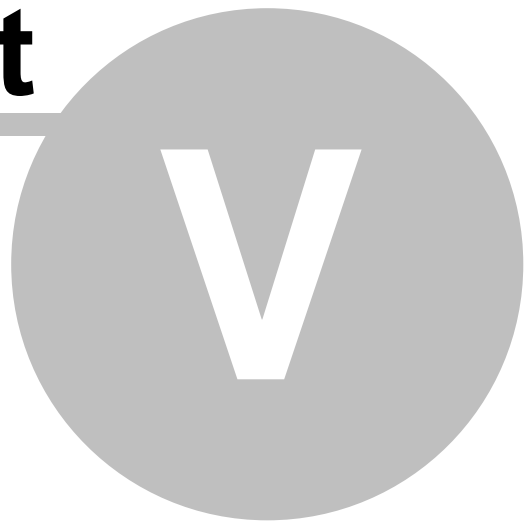
If a design is calibrated, it is possible that some parts of other layers fall outside the table limits, in that case you need to place the material in a way that this is prevented.



Note: Just for demonstration purposes in this tutorial we have placed the board under an extreme angle, normally you should prevent that if it is not really necessary.

This concludes this tutorial.

Part



5 Advanced topics


The chapters in this section describe functions and procedures that are more advanced. And should be done by skilled engineers only.



Advanced Topics

- Using the layer viewer
- Using the tool viewer
- How to handle the ATC

5.1 Using the layer viewer

Changing parameters here should be done by skilled engineers. Wrong setting could end up in a  project that is not working correctly anymore.

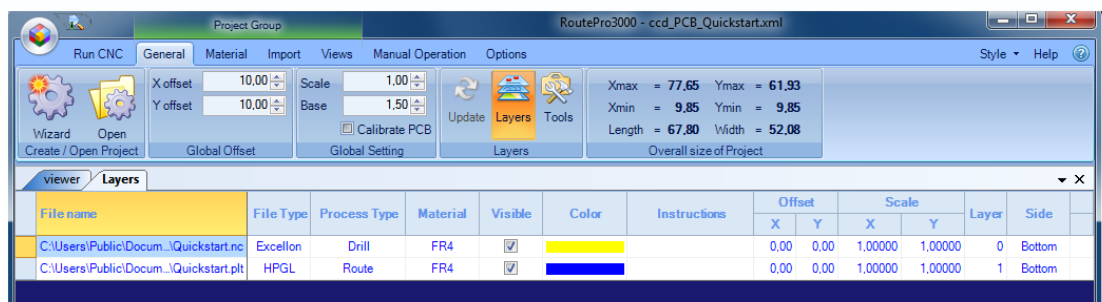
If that happens we suggest to delete the project and start all over using the Project Wizard again.

Projects are created by using the Project Wizard to make things easy for you. However sometimes you would like to change some parameters and this can be done using the Layer viewer.

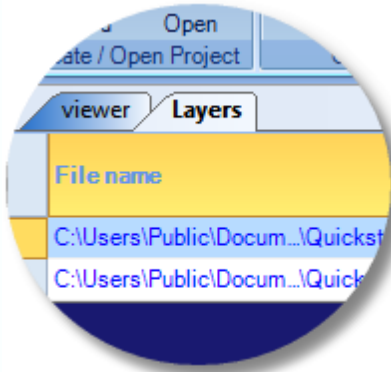
Press **Layers** in the General tab.

Now two things will happen:

1. It opens the layer table, here you see the data that has been loaded in the project.
2. On the right side of the Layers button, an extra button: **Tools** is now enabled.



At the bottom of the screen, the project name is shown and you see 2 tabs at the top of the window: **viewer** and **Layers**.



If you click the tabs, you can change the current view window.

In the layer screen you see the following fields:

▼Material

This is the overall material type used for this layer.

▼Visible

Shows or hides the layer.

▼Color

Here you may change the color of the layer

Note: A drill layer is always yellow, you cannot set a different color.

▼Instructions

Type or change here the instructions for this layer

▼Offset

The offset here is used to synchronize the layers, only needed if the offsets are different.


Note: The best practice is to set the offsets correct while producing the data files from your design program.

▼Side

Select here the side for the current layer, this has no influence on the processing in the standard RoutePro3000

While using the [RoutePro3000Extra](#) version, it will be used to inform the user when to turn over the board in case of a double sided PCB

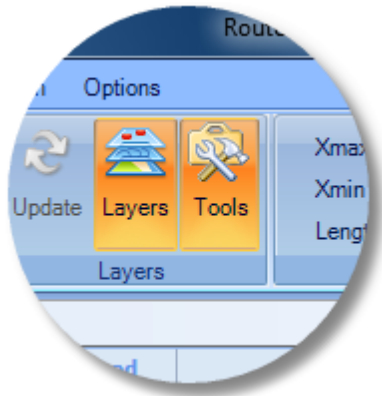
5.2 Using the tool viewer

Changing parameters here should be done by skilled engineers. Wrong setting could end up in a  project that is not working correctly anymore.

If that happens we suggest to delete the project and start all over using the Project Wizard again.

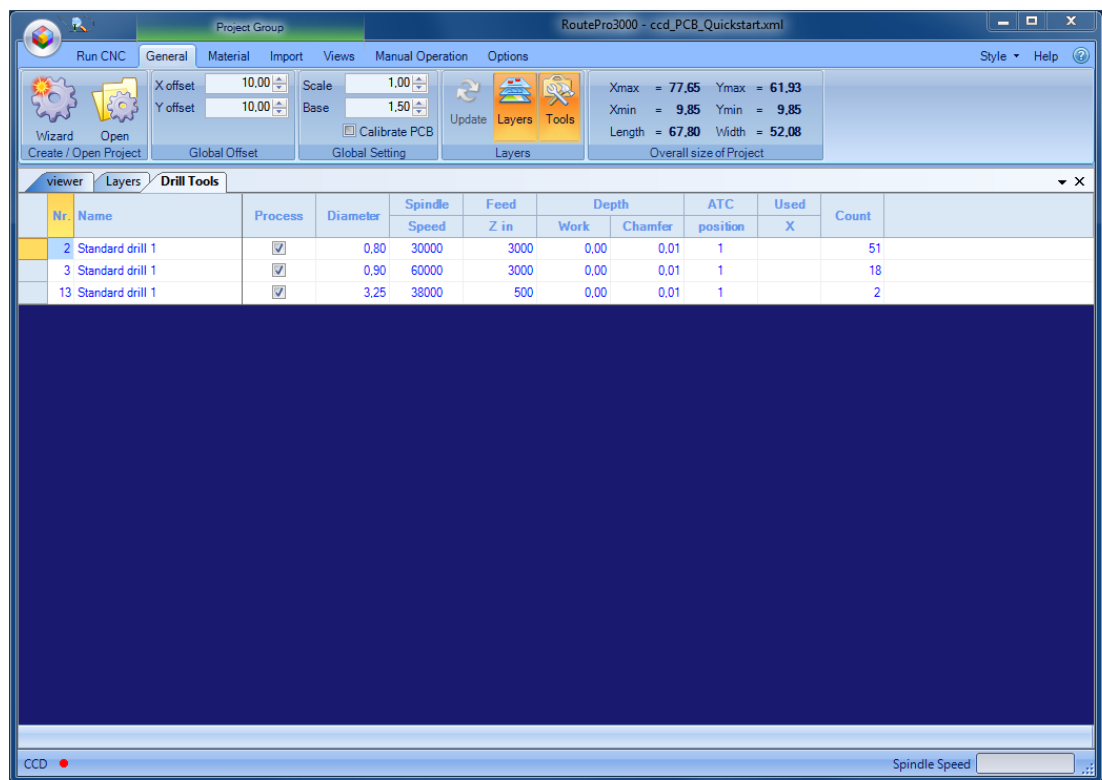
Each layer has its own tool table, to open a tool table, you need first to open the layer table.
(see [using the layer viewer](#))

Select a layer and then press the **Tools Button**.



The tool window will be displayed, depending on the processing type, parameters can differ.

▼Open to show a Drill Tool window



The following fields are available.

▼Name

You can select a different type of tool here.

Note: *Changing the tool does not influence the project processing. i.e. it does not change the tool parameters accordingly.*

▼Process

Used to select tools for processing, this is done when you are in the selection mode under the Run CNC tab. [read more....](#)

▼Diameter

Here you can set the tool diameter.

Note: *The tool diameter does not influence the behavior of the machine, it's an indication for the user and it's used to display the tools in the correct scale in the viewer.*

▼Spindle Speed

Select here the desired speed for the spindle.

▼Feed Z in (Cutting feed)

This determines the speed at which the drill will lower into the board.

Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height ([Z free](#)), from there it uses the Cutting feed..*

▼Depth Work

Here you can define the drill depth.

Note: *If you leave this field on 0,00 the drill depth is calculated automaticly, using the thickness of the used material.*

▼Depth Chamfer



This defines the extra depth you need to drill the hole completely.
The picture shows you the chamfer.

▼ATC position

This parameter instructs the Automatic Tool Changer, where to find the current tool.

▼Used X

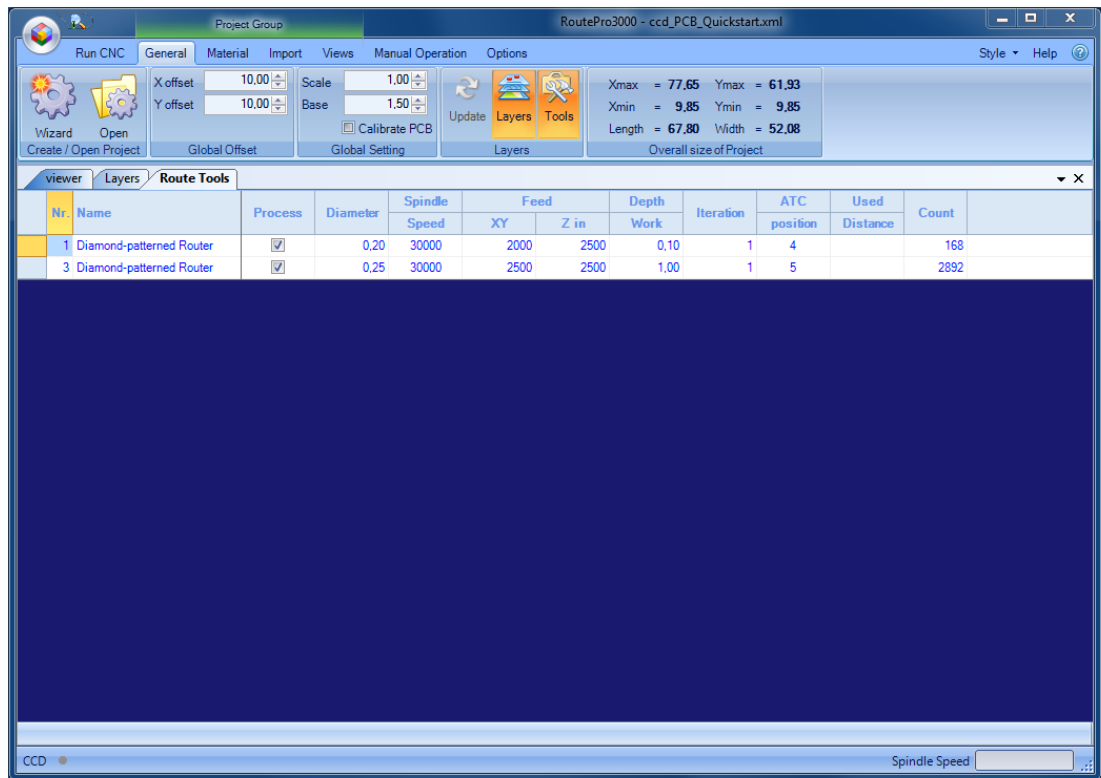
This indicates the number of times the tool has been used.

Note: You may clear this field by clicking it.

▼Count

Indicates the number of drill coordinates for this tool.

▼Open to show a Route Tool window



The following fields are available.

▼Name

You can select a different type of tool here.

Note: *Changing the tool does not influence the project processing. i.e. it does not change the tool parameters accordingly.*

▼Process

Used to select tools for processing, this is done when you are in the selection mode under the Run CNC tab. [read more....](#)

▼Diameter

Here you can set the tool diameter.

Note: *The tool diameter does not influence the behavior of the machine, it's an indication for the user and it's used to display the tools in the correct scale in the viewer.*

▼Spindle Speed

Select here the desired speed for the spindle.

▼Feed XY (table feed)

This determines the speed that will be used while the tool is actually milling, the lower the speed the higher the result.

Note: *If the tool is raised the highest speed setting will be used to travel to the next location..*

▼Feed Z in (Cutting feed)

This determines the speed at which the drill will lower into the board.

Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height ([Z free](#)), from there it uses the Cutting feed..*

▼Depth Work

Here you can define the Route depth.

▼Iteration

If this parameter is greater than 1, milling will be done in multiple steps.

Example: requested depth = 3 mm, Iteration = 3 The first milling action will have a depth of 1 mm the next depth will be 2 mm etc.

▼ATC position

This parameter instructs the Automatic Tool Changer, where to find the current tool.

▼Used Distance

This indicates the distance the tool has traveled.

Note: You may clear this field by clicking it.

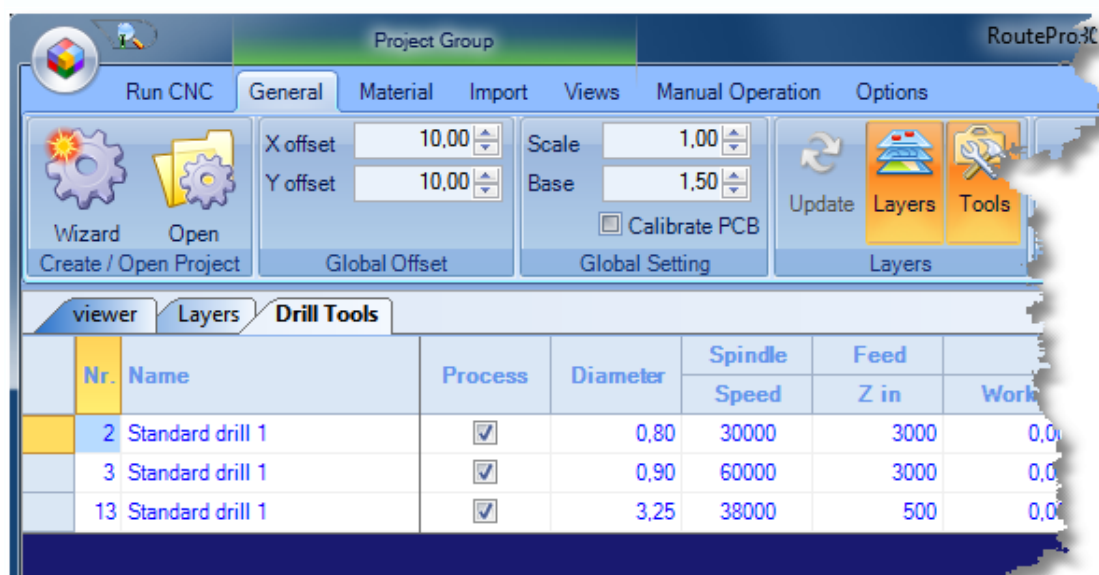
▼Count

Indicates the number of vectors for this tool.

▼Changing the processing order of the Tools

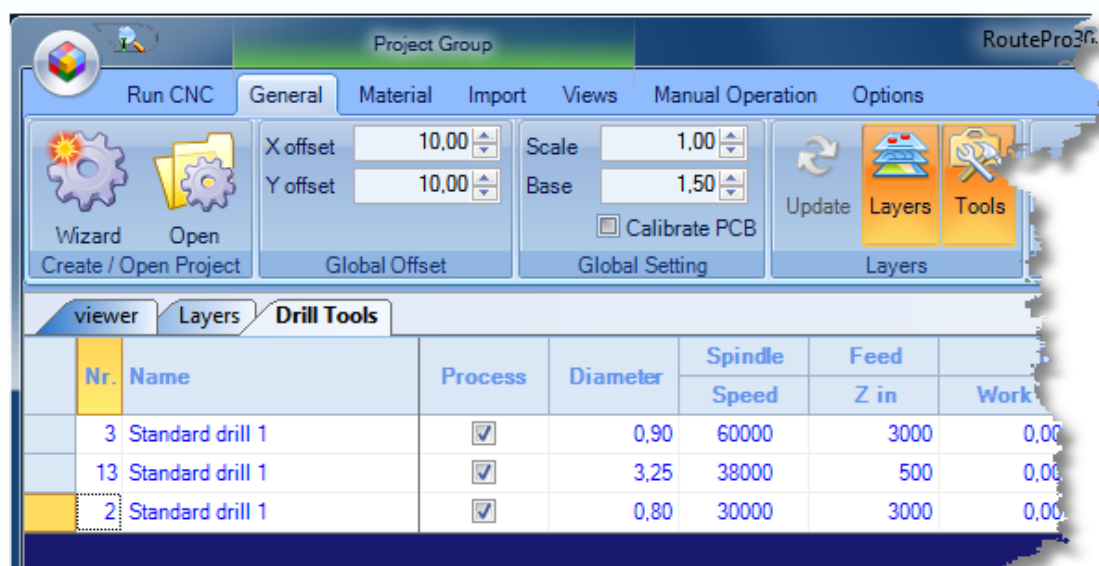
Sometimes it is necessary to change the processing order of the tools, below we show you how

to do this.



This is how your screen looks before the tool order is changed.
The order of processing will be: tool 2, 3, and 13.

Now click with the left mouse button on the very first field of the tool, you would like to move in the list,
hold the button while dragging the tool to the desired position.



We have dragged tool 2 to the bottom of the list.
Now the order of processing will be: tool 3, 13 and 2.

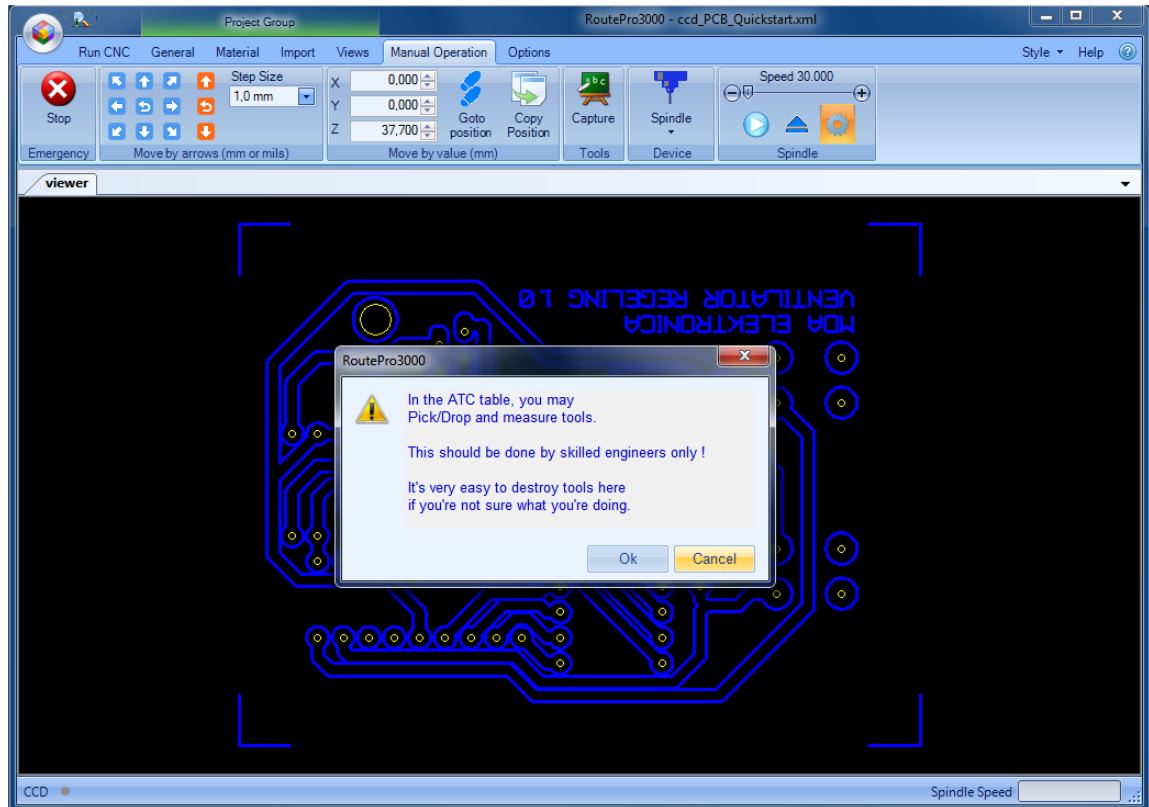
Note: The same applies for the Layers however changing the layer order is only useful in RoutePro3000Extra while running an automation script.

5.3 How to handle the ATC



Please be careful, managing the tools using the ATC table should only be done by skilled engineers!

It is very easy to destroy or damage the machine if you are not careful.



When you press the ATC button, the first thing you will see is the warning screen.

If you are not a skilled engineer, please press Cancel now.

It is very easy to destroy tools or damage the machine if you are not careful.







- ▼ OK, you read the warnings, so we can continue

The next screen will appear:

Automatic tool change table

Nr.	Tool Status
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Ok

Show Clear Pick Drop Measure Chuck

▼Nr.



The number corresponds with the Tool slot on the machine.

Note: Slot number 0 is used to store the Test Tool and cannot be used for other purposes.

▼Tool status

Here you will see the status of the tools, it will also show the measured length of the tool.

There are 4 different messages:

- Tool OK 21,06 mm
- Tool to Short 18,00 mm
- Tool to Long 22,05 mm

- No tool found or broken

Note: the correct length of the tool should be 21,00 mm, measured from the top of the ring to the point of the tool.

▼OK

Closes the ATC table window.

▼Help

When pressed, the tool tips in the table are shown.

▼Clear

Clears all the status messages in the table.

▼Pick tool



Before you use this button, make sure that the **spindle has no tool inserted!**

First select a tool in the table, then press the button to pick the tool.

▼Drop tool



Before you use this button, make sure that the **selected tool slot has no tool inserted!**

First select a tool in the table, then press the button to pick the tool.

▼Measure tool

Measure the current tool, the status will be displayed in the table.

▼Chuck

Opens or closes the chuck

5.4 ATC bypass the depth limiter

Some milling jobs require a depth limiter to get a perfect result.

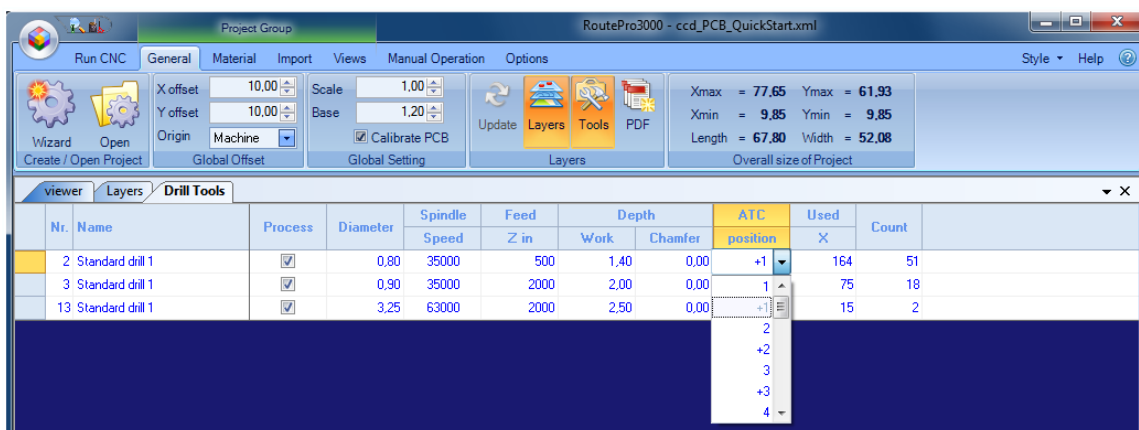
In combination with the ATC this always presented the problem that the limiter needed to be removed before you could do other jobs, like drilling or cutting out the board.

Now it is possible to process a complete layer without the need of removing the depth limiter.

The way the system works is that the tool needed, for say drilling, will be picked in a way that it will stick out about 2-3 mm of the depth limiter.

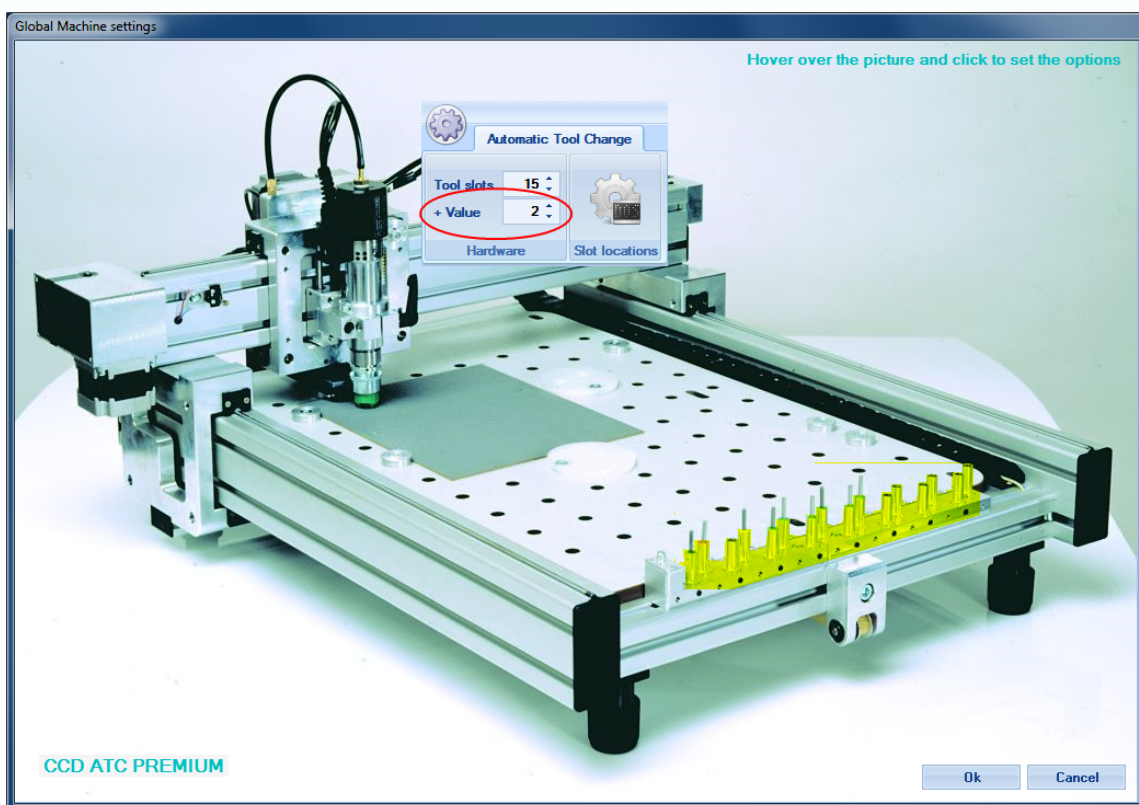
The software then compensates the extra length.

The only thing you need to do is to indicate that the tool should be picked higher. To do this, open the tool window by first clicking on Layers and then Tools, in the General tab.



You will notice, that if you select an ATC tool slot position, a + sign.
Just select the tool slot position with the + sign to add the extra picking length.

You may adjust the extra length in the option menu.



5.5 Batch processing

This feature allows you to process a range of layers without the need of selecting them individually. The explanation is lengthy but not complicated, we just go through every step in detail. Once you grasp the idea it is very simple.

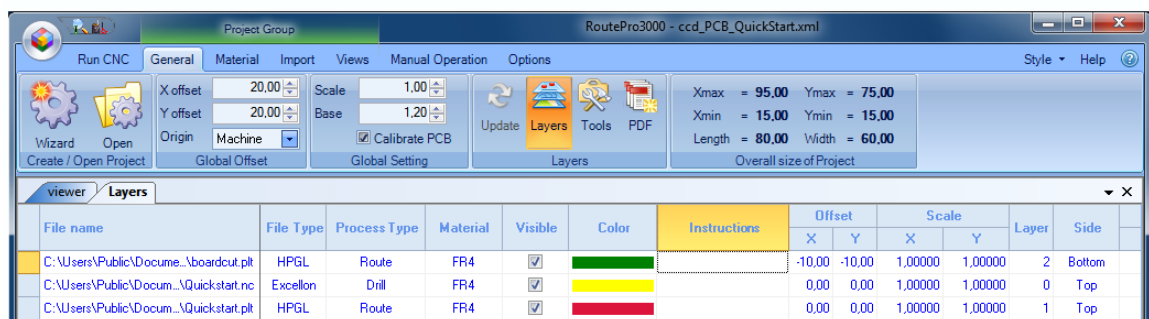
Before you use the batch processing you need to setup the following:

- the side to work on.
- the order in which the layers are processed, it is obvious that a board cut should be the last process.
- the order in which the tools are used, for the same reasons as mentioned above.

We will start to set up the layers.

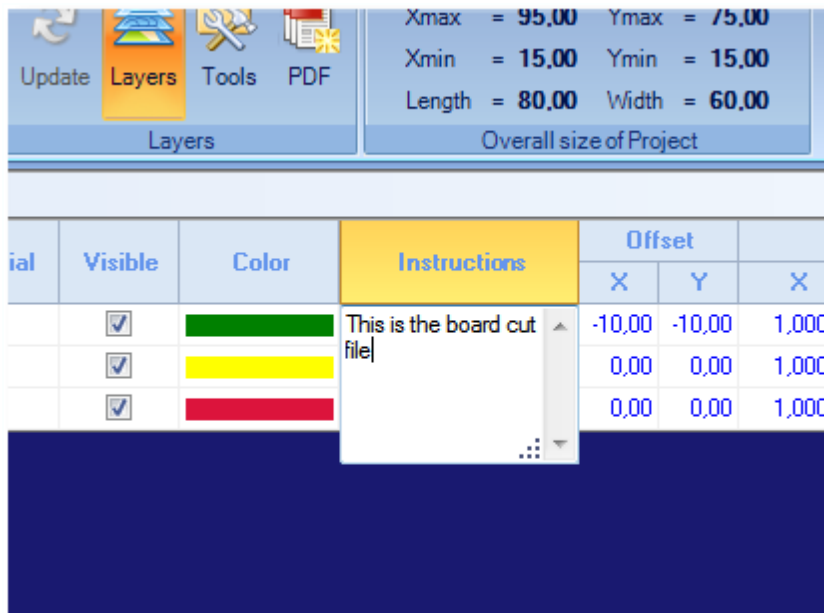
The example handles a single sided board, a milling, drilling and a board cut file.

Open the Layers window in the General tab.



It will show you the first layer, in this case the board cut.

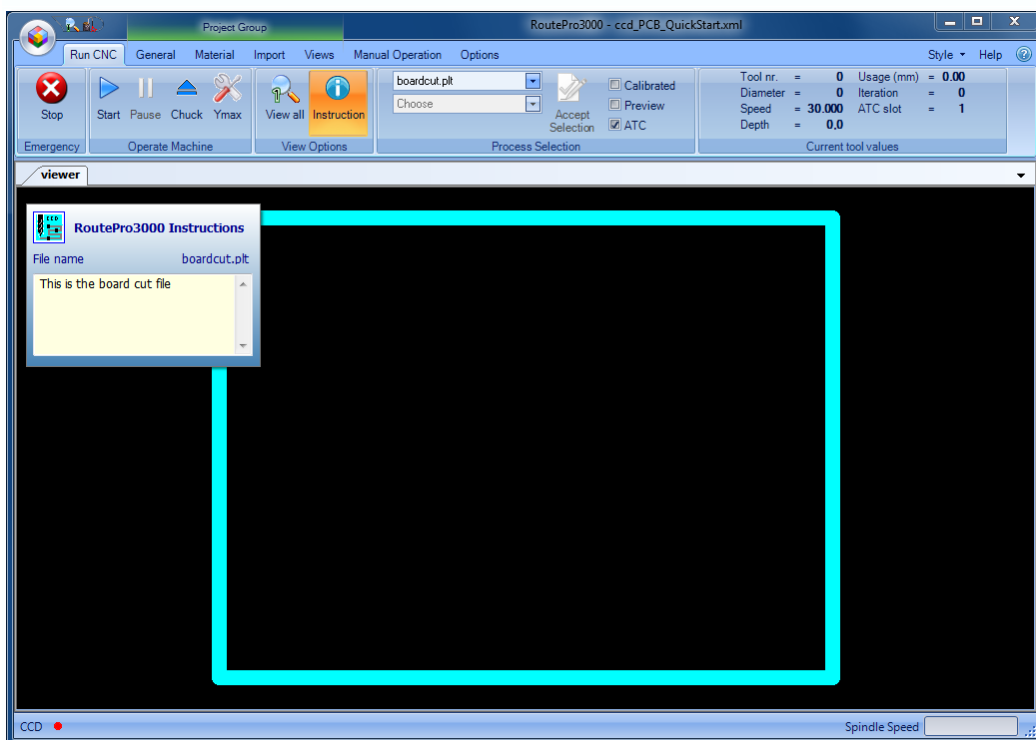
A short description of the layers could be sometimes handy so click on the instruction field for the first layer and type some text there.



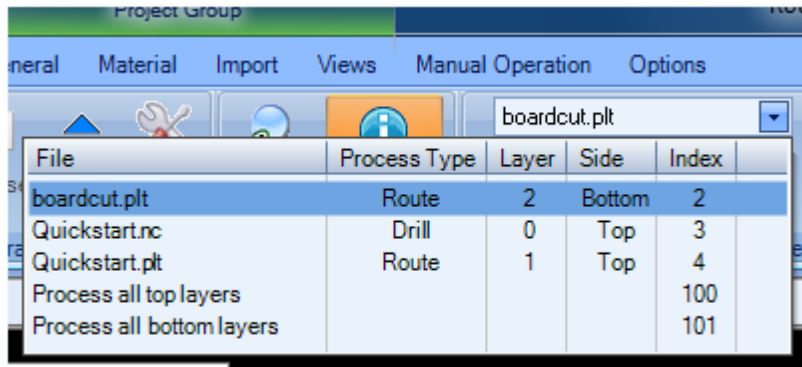
You may do the same for the other layers.

You will notice that the first layer side indicates Bottom.
 Just leave it for now and go to the Run CNC tab.

Click Instruction, it will show the process file name and the instructions.



Now click on the **Layer to process** combo box.

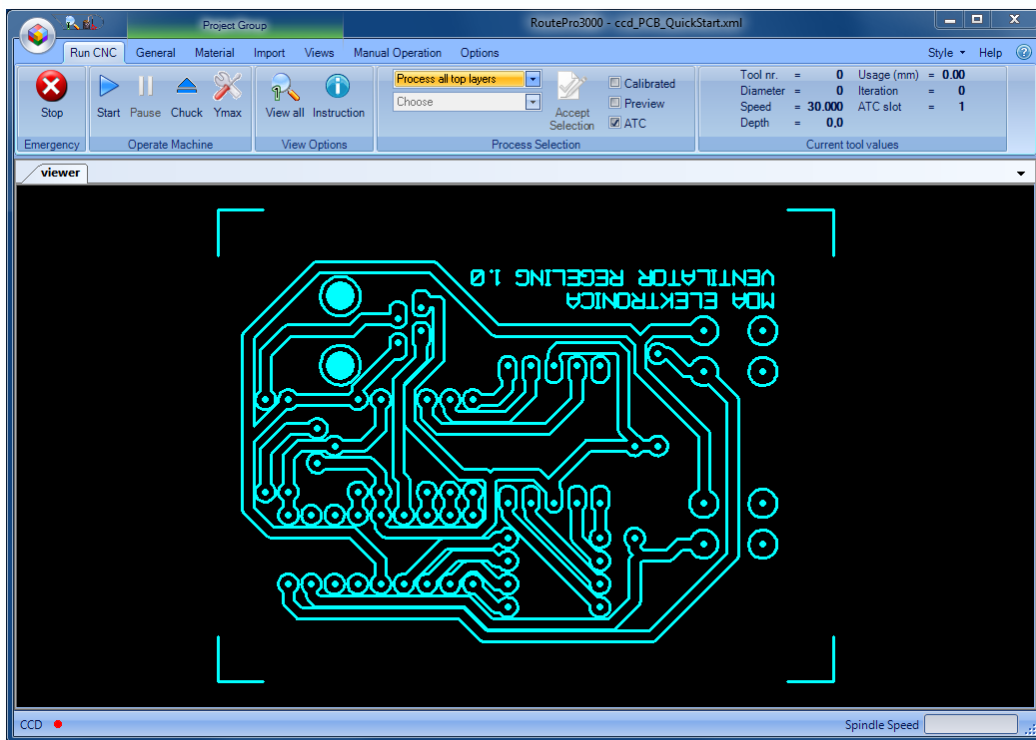


File	Process Type	Layer	Side	Index
boardcut.plt	Route	2	Bottom	2
Quickstart.nc	Drill	0	Top	3
Quickstart.plt	Route	1	Top	4
Process all top layers				100
Process all bottom layers				101

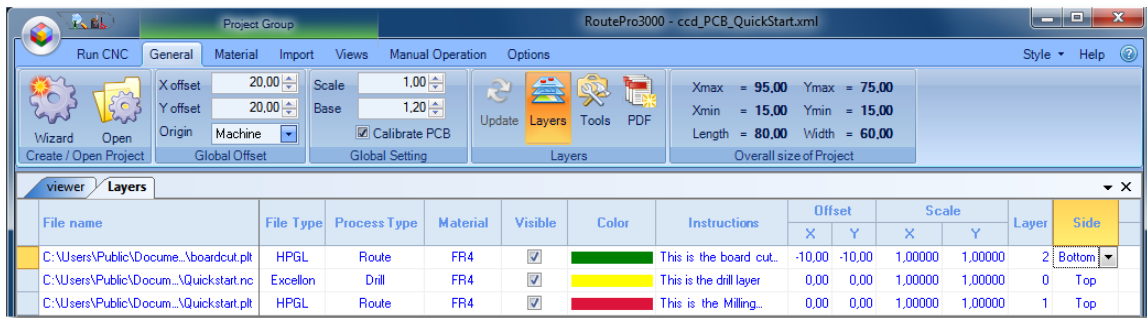
You may select an individual layer to process or a batch of layers.

If you select Process all top layers, all the layers assigned with the **Top** attribute will be displayed. In this case you will see Quickstart.plt and Quickstart.nc.

Note: Only the layers that are enabled will be processed and displayed.



So let us go back to the General tab and look at the layers again.



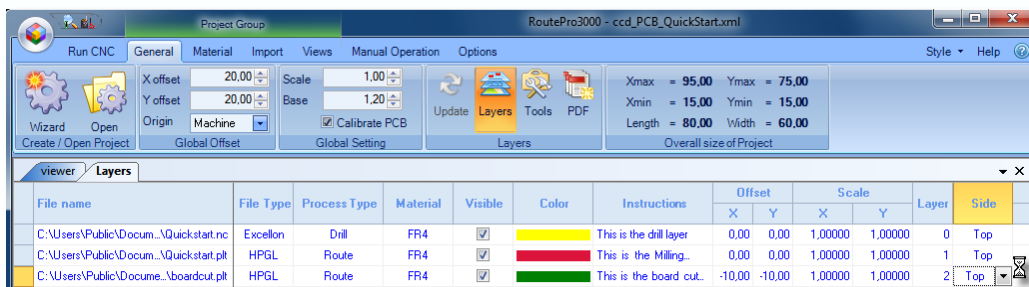
Now change the side, for the board cut layer to top.

The next important thing is the processing order of the layers. In the current situation the board cut would be processed first, which is undesirable because the board, once cut, cannot be fixed any more.

So we need to change the order.

To do that, place the mouse in the first field (just before the file-name), then drag the selected layer up or down in the list by holding the left mouse key down.

The order of the layers determines the processing order.



In this case the process order will be:

1. Quickstart.nc
2. Quickstart.plt
3. Boardcut.plt

If you prefer, you may also alter the order so milling will be processed before drilling. It is up to you. In case you have multiple layers but you do not want to process all of them, you can disable them by setting them invisible.

Each process layer has 1 or more tools, it is also important to set the process order of the tools. This is done by the same procedure as for the Layers.

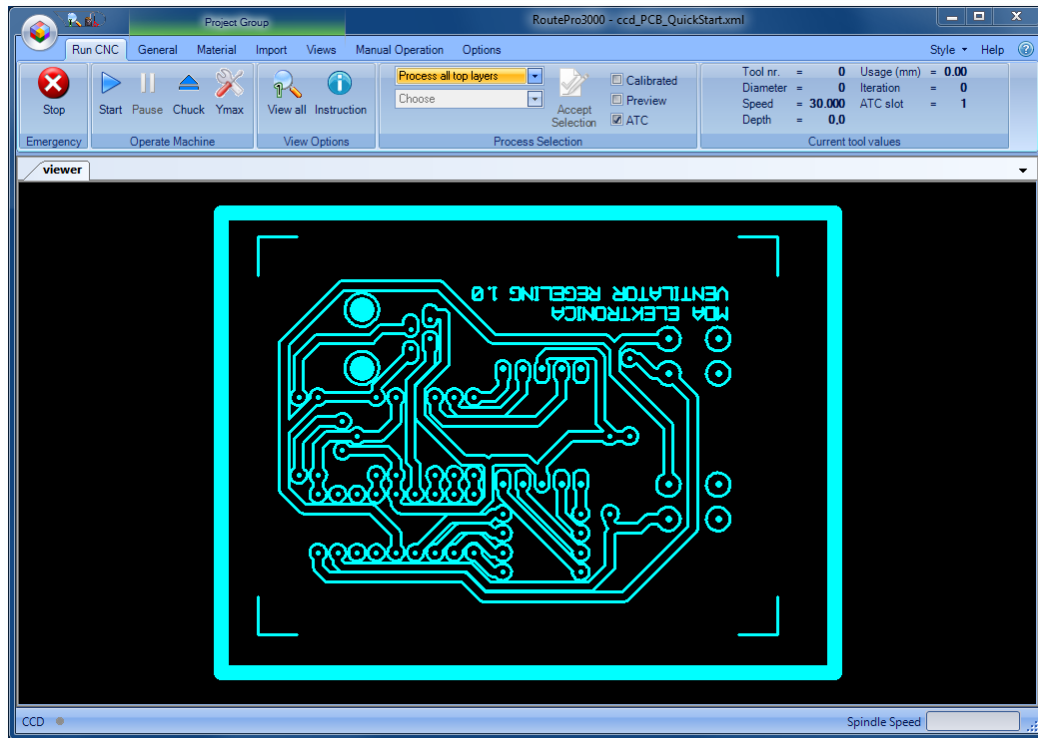
You place the mouse in the first field (just before the tool Nr.), then drag the selected tool up or down in the list by holding the left mouse key down.

You may exclude tools from the process by disabling them under the process field.

⚠ When using the ATC, take care that the tools are assigned to the appropriate tool slots for each process layer.

Now go back to the Run CNC tab and select Process all top layer again, as you will see the board cut layer is now included.

If you press start it will ask you to place a tool, or in case you have an ATC, to place the tools for all the processes in the appropriate slots.



Final Note: In the batch mode, it is not possible to select data or parts of the data as for individual layers.

Part

VI

6 License system

The chapters in this section describe how to activate / deactivate licenses.

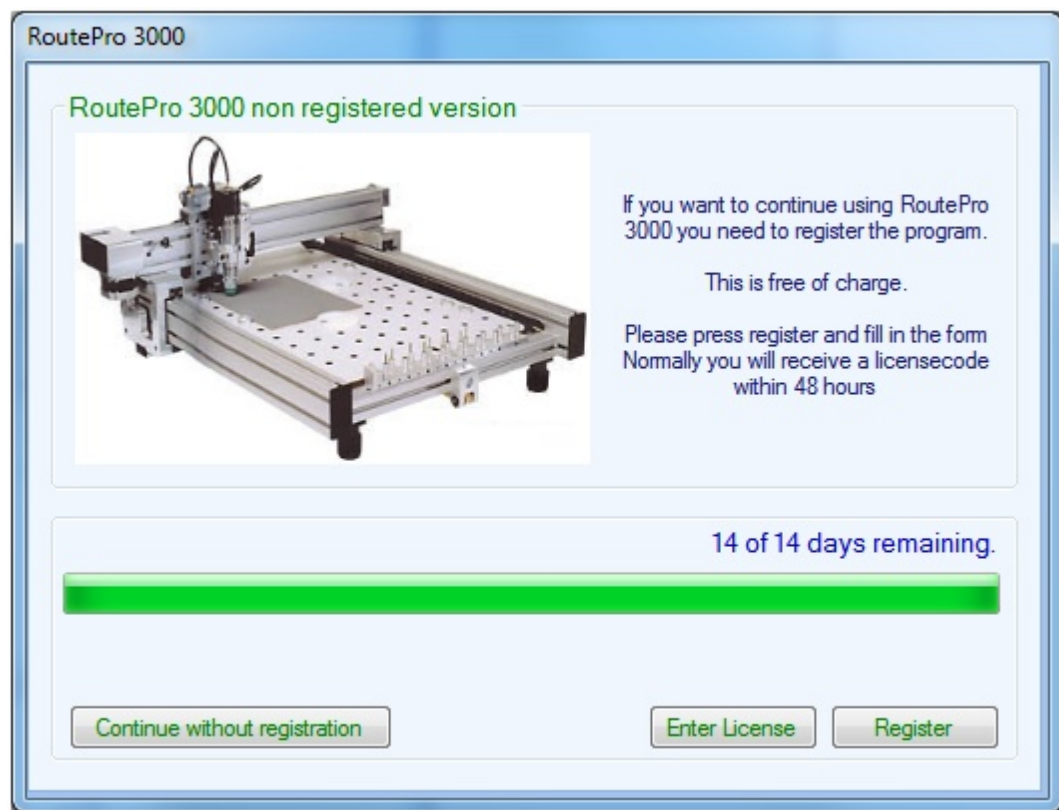


License system

- Activating RoutePro3000
- Activating a module
- Deactivating RoutePro3000

6.1 License system Activation

When you start RoutePro3000 for the first time you will see the next screen:



You have 3 options here:

▼Continue without registration

You may use RoutePro3000 during the evaluation period without activation.

After the evaluation period has expired you need to activate RoutePro3000 to continue working.
Please note:

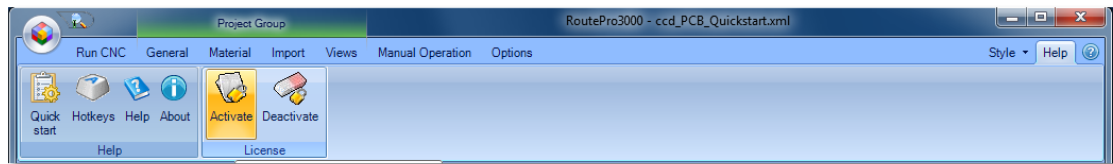
We advise you not to wait with your registration / activation until the period is expired because it can take up some time before you receive your activation code and during this time you can't use RoutePro3000.

For Quick start: continue with [Find CCD machine](#)

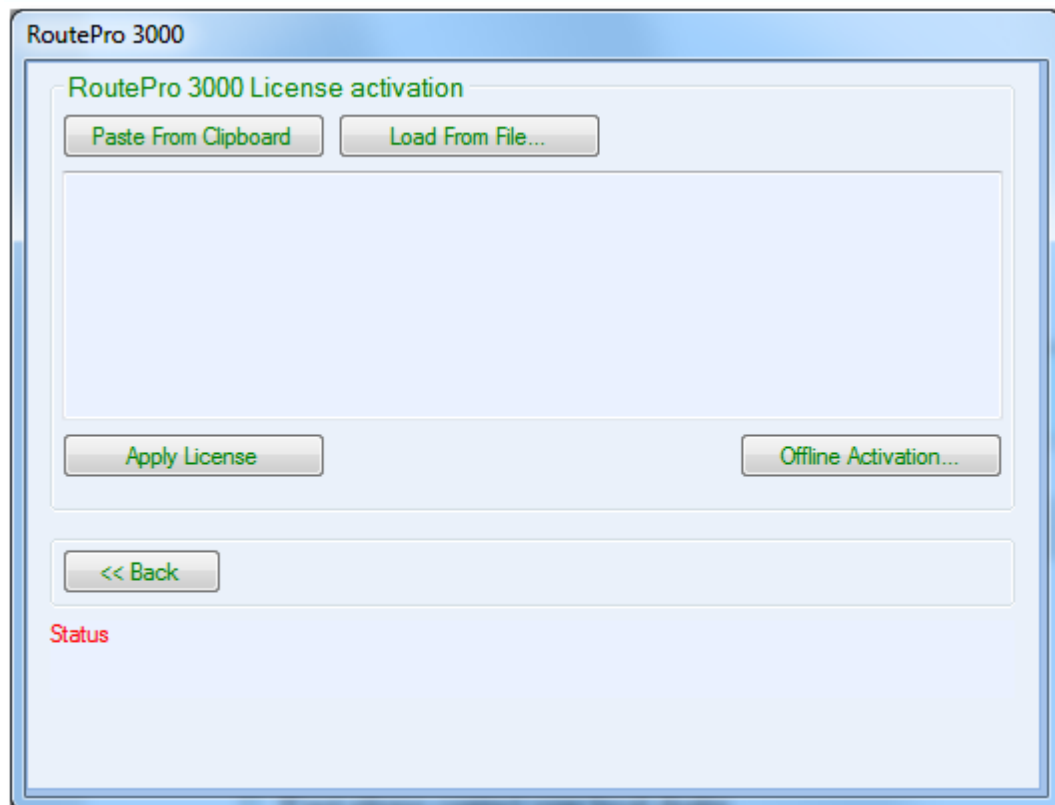
▼ [Enter License](#)

If you have received a license file by email you may use the following procedure to activate it. Start RoutePro3000 to start the license manager.

▼If RoutePro3000 is already running you may press the Activate button on the ribbon bar to start the License manager



Press in the main license screen: **Enter License**, the following screen will appear:



Press **Load from file**, the file selection window opens, select the license file and press **Enter**. The file name looks like: *RoutePro3000 129860531936279995 06-07-2012.lic* The gray area will be different per license. The license data will be loaded into the screen automatically.



Apply License



As you can see the license has been personalized to you.
You may now enter a module license or press **OK** to start the program.

For Quick start: continue with [Find CCD machine](#)

▼Register

Before you can activate your copy of RoutePro3000 you need a license.
You can request a license by pressing the **Register** button.
Your browser will open and the next screen will appear:

RoutePro 3000 License request



Name:

Company:

Country:

Telephone:

Email:

Email again:

Comments:



Enter Code:

It is important that you fill in all the required fields. (The Comments field is not required.)
Enter the code (this is to prevent misuse) and press **Submit Message**.

An email with your request will be send to us and you will receive a copy.

On success, you will get the following response.

Thanks!

Thank you for your RoutePro 3000 License request.
A copy has been sent to your email address.
Normally you will receive your license within 48 hours.
If not please contact your local dealer.

After you have received your license, use the [Enter License](#) button to activate it.

▼Offline registration / activation

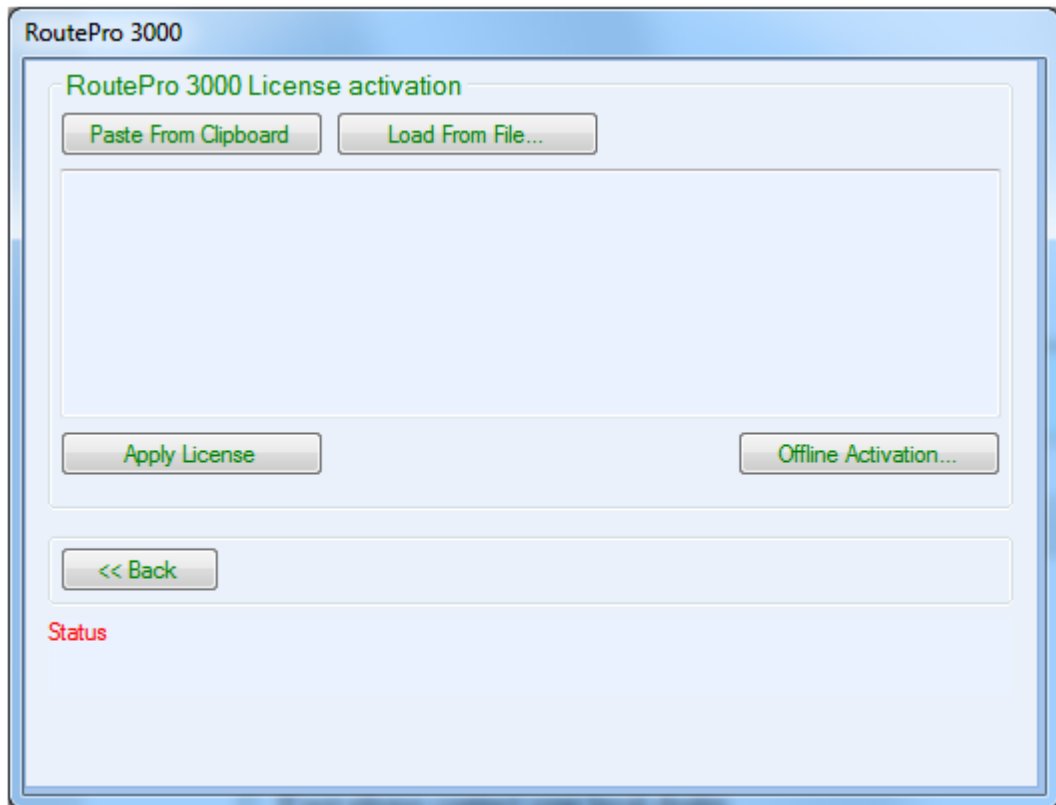
If your machine is not connected to the Internet you can register / activate RoutePro3000 offline. However we do not recommend this, because the process takes more time.

And if you want to move the license to another computer you need to create an email with the deactivation details, send it to us and wait for a new license. During this time you cannot use RoutePro3000.

Another solution could be to connect the computer temporary to the internet for registration / activation.

If you choose to do the registration offline, you should install RoutPro3000 on the offline computer first,

run the program and in the License screen press **Enter License**, you will see the next screen:



Now press **Offline Activation**, the next screen will be displayed:

RoutePro 3000

RoutePro 3000 offline registration

To activate your license offline, fill in the complete form.
And mail it to us so that we can send you a pre-activated license.
Use the Copy to Clipboard button and paste the data into your email.
Email to: info@mdaelektronica.nl

Name

Company

Country

Telephone

Email

Email (check)

Machine ID

<< Back Copy To Clipboard

To request your license offline, fill in the complete form.
And mail it to us so that we can send you a machine locked license.
Use the Copy to Clipboard button and paste the data into your email.
Email to: info@mdaelektronica.nl

▼The data will look like this:

RoutePro 3000 offline license request

** Do not change the data below **

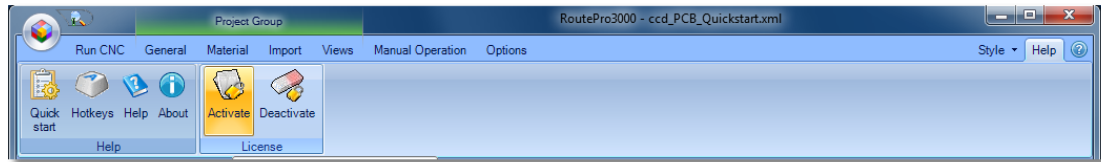
Field0=R.P.User
Field1=Prototyping incorporated
Field2=The Netherlands
Field3=+31 341 123456
Field4=info@rpuser.com
Field5=V/5ruU/YPASNN83VKah0yw==
Field6=dinsdag 31 juli 2012 16:16:04

Please note: *the license is machine locked, this means: it checks the machine ID and will only work on the machine you have created the request form on.*
After you have received your license, use the [Enter License](#) button to activate it.

6.2 License system modules Activation

After you are registered / activated RoutePro3000 you may activate module licenses.

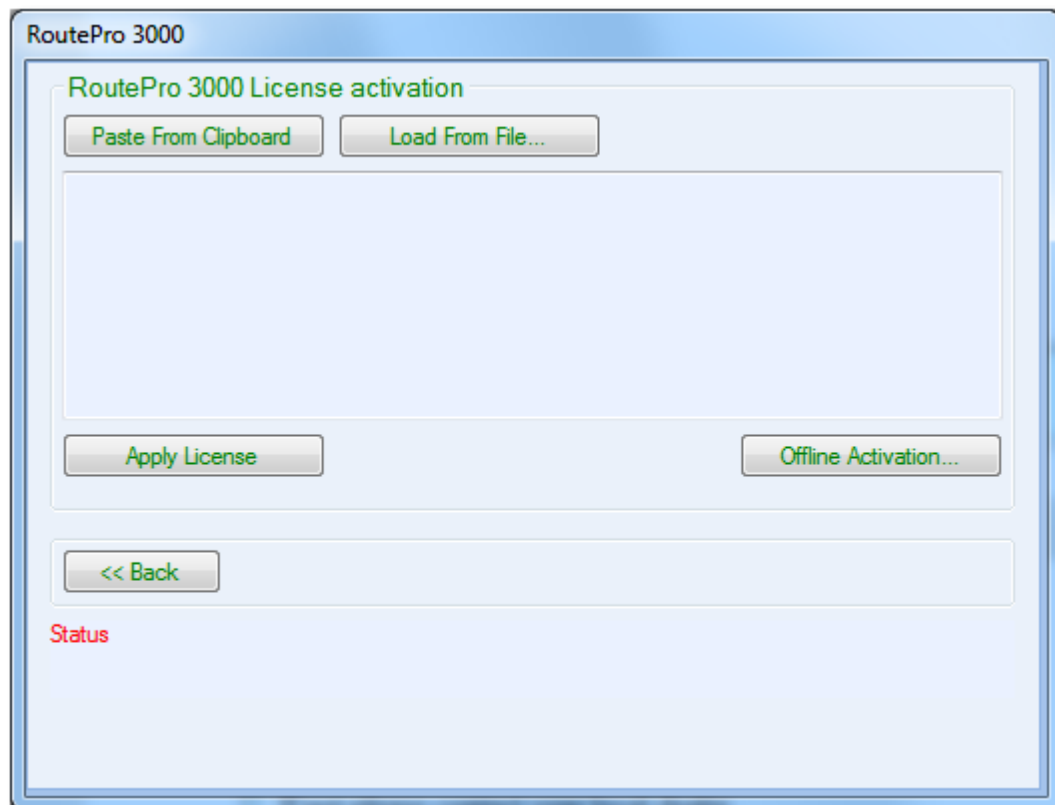
To activate license module(s) press the **Activate button** in the Ribbon bar under the Help tab.
(as example we use the Calibration license)



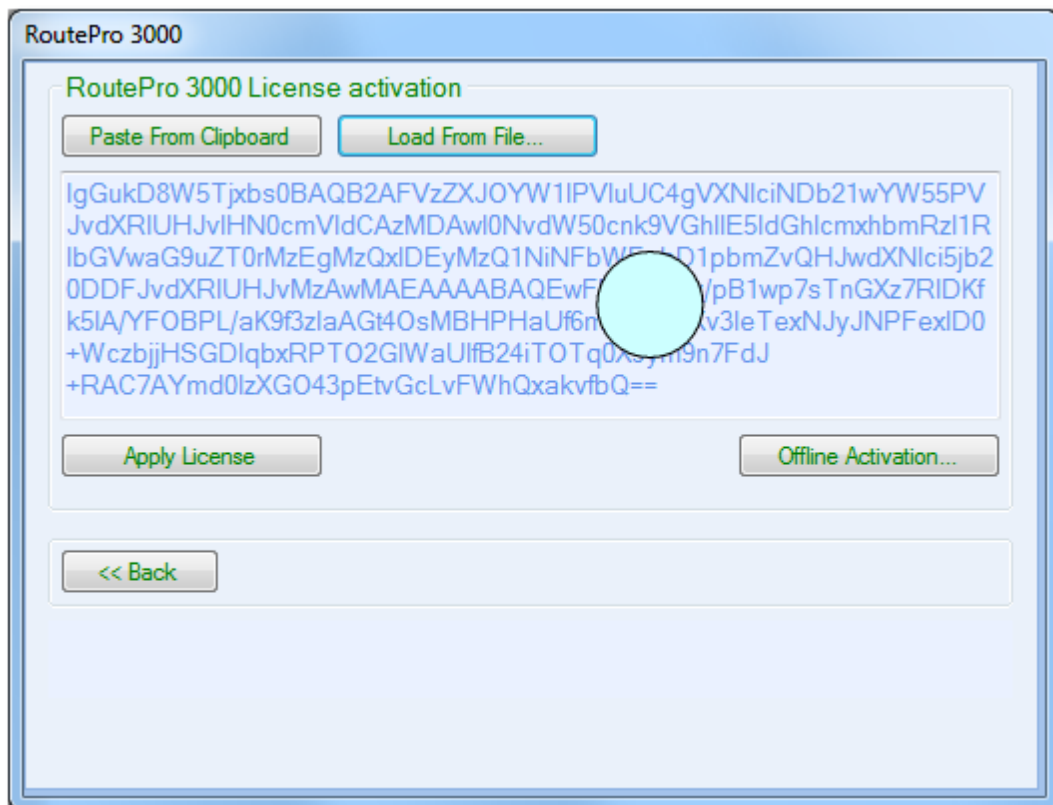
the following window will appear:



Press **Enter License**, the following screen will appear:



Press **Load from file**, the file selection window opens, select the license file and press Enter. The file name looks like: *PCBCalibrate 129860531936279995 06-07-2012.lic* The gray area will be different per license. The license data will be loaded into the screen automaticly.



Now press **Apply License**, checking will take a few moments, if the license is accepted the following screen will be showed.

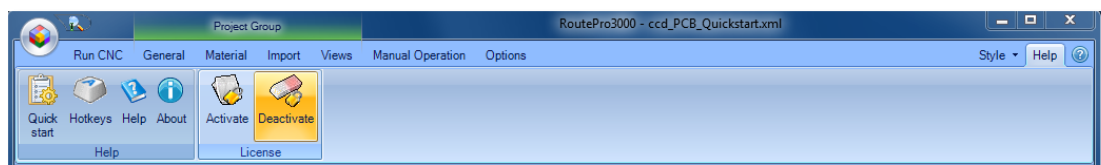


As you can see the license has been added to the list..
 You may now enter the next module license or press **OK** to start the program.

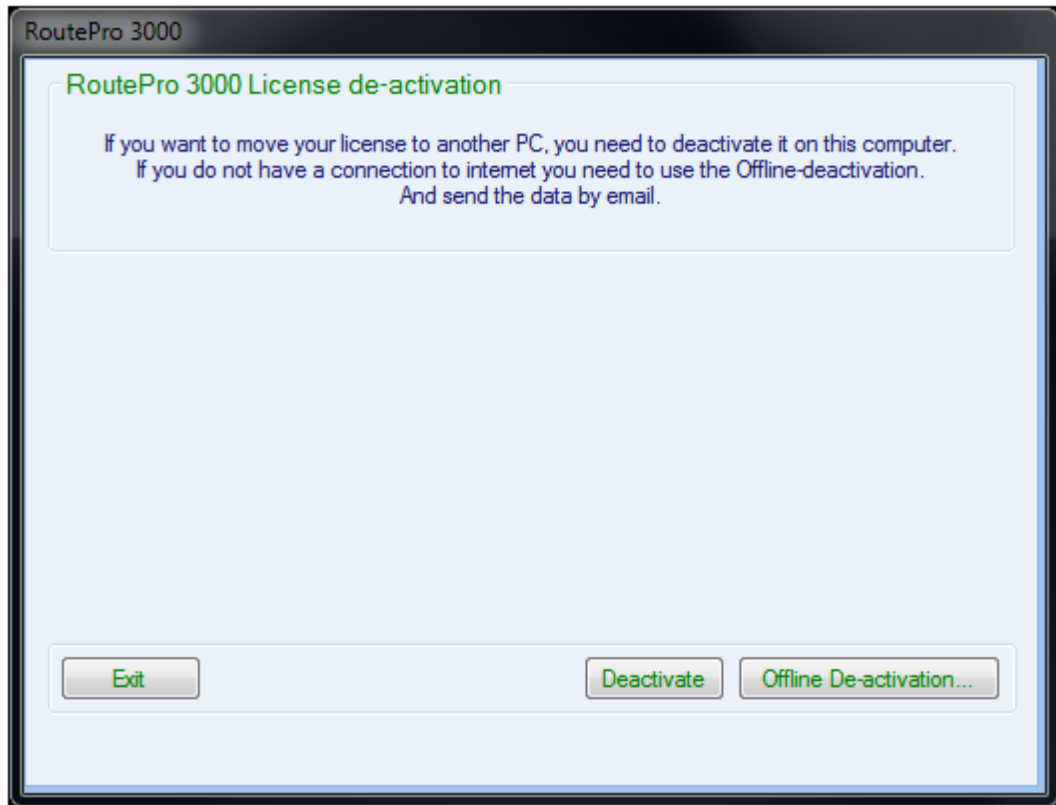
6.3 License system Deactivation

In case you need to switch from one computer to another you need to deactivate the licenses first on the old computer before you can use them on the new one.

Press the **Deactivate** button in the Ribbon bar under the Help tab.



then the following screen appears:



You can then press **Deactivate** a warning will appear if you are sure.
Pressing **OK** will deactivate all the licenses.
After that RoutePro3000 will close.
Now you can [activate](#) your licenses on a different computer.

Please note that registration is not needed again because all the user details are embedded in the license.

▼Offline deactivation

Only use this when you have activated your licenses offline.
Click the Offline Deactivation button and follow the instructions on the screen.
Send an email with the deactivation details to us and wait for a new license.
Please Note: **In the mean time you can't use RoutePro3000.**

Part



7 Reference

This section contains documentation of all RoutePro3000's menu options and the associated dialogs

The other sections in Reference contain more detailed background information on a number of key subjects that will help you to gain a better understanding of how RoutePro3000 works. Studying these sections is not absolutely essential but it will make it much easier for you to use RoutePro3000 efficiently and effectively.

There are extensive cross-references and links to the Procedures sections so that you can always find the instructions you need to show you how to do what is being described in the reference topics.

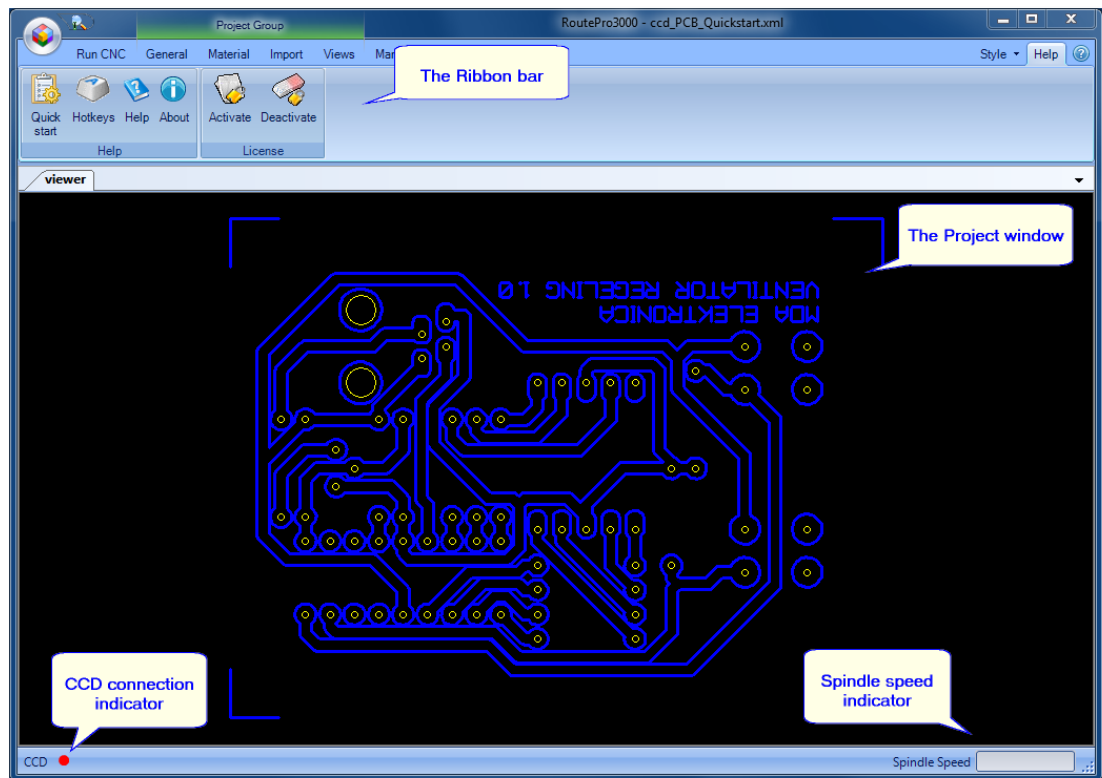


Reference

- The User Interface
- Modules
- Hotkeys
- Project Wizard

7.1 The User Interface

The RoutePro3000 window has two main components: The Ribbon Toolbar and Viewer.

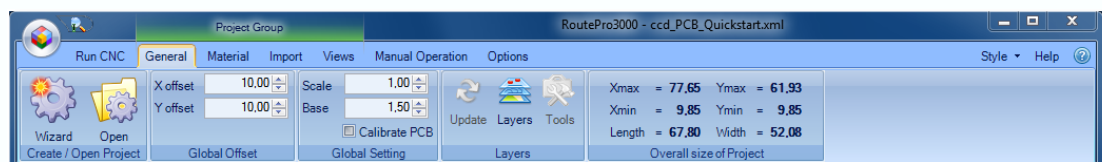


The RoutePro3000 user interface

▼The Ribbon Toolbar

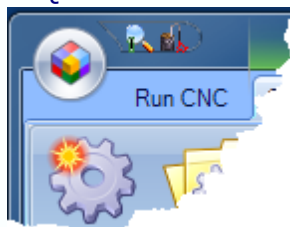
RoutePro3000's functions are accessed primarily through the Ribbon Toolbar (or Ribbon for short).

It is divided into tabs that group functions according to tasks



Click on a tab to go to the description.

▼The Qat bar



Here you find a global View-All button.

For the Premium CCD you also find a button to start the vacuum manually.

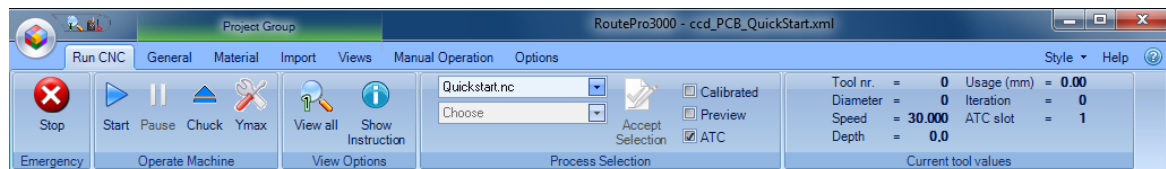
▼The Viewer

The [Viewer](#) is used to display and select the data on the screen.

Several other windows, like tool windows, will be docked here when opened.

7.1.1 Run CNC

The Ribbon tab Run CNC is used for the actual processing of the data.



Click on a button or field for a description (some buttons or fields are only available if the required module is enabled)

Emergency Stop

When the machine is running, hitting this button will interrupt the process by stopping the spindle and disabling the motors.

The position in the data list that was currently processed will be preserved so starting the machine will continue where it was stopped

When the machine is started again, it will go first through the initialization before continue, this is because all the motors were disabled.

Note: if the emergency is used while the ATC is active and you press start again, the question for the correct placement of the tools is asked again.

you need to place all tools in the appropriate slots and place the test tool in the chuck again.



Operate machine

Start

Start the machine. The selected data will be processed.

Pause

When the machine is running, hitting this button will finish the current vector or drill hole and then pauses the process.

The position in the data list that was currently processed will be preserved so starting the machine will continue where it was stopped

When the machine is started again, it will go not go through the initialization first, because the motors are still enabled.

▼Chuck

Opens and closes the spindle chuck.

Note: Only visible if the [ATC option](#) is installed.

▼Ymax

When pressed it will move the head to the Maximum Y position for easy access of the board.

Note: If Ymax is used, the motors stay enabled during all processing of the layers.

View all

Zooms all the data within the Viewer

Process Selection

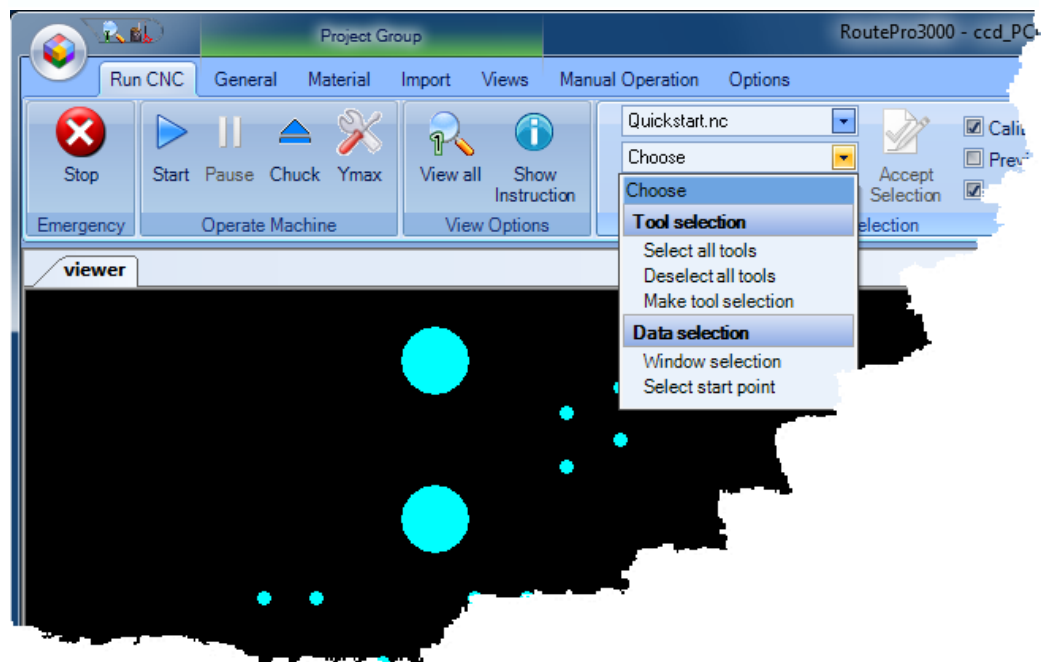
Process Layer Select

This drop-down box hold the process layers, you may select a layer for processing. Only the data for the current layer to process will be shown.

Data Select

By default all the data will be selected for processing.

By clicking this drop-down box you have several options for selecting data.



Click on the drop-down box for a description

Tool selection

Select all tools

All the tools available for this layer will be selected.

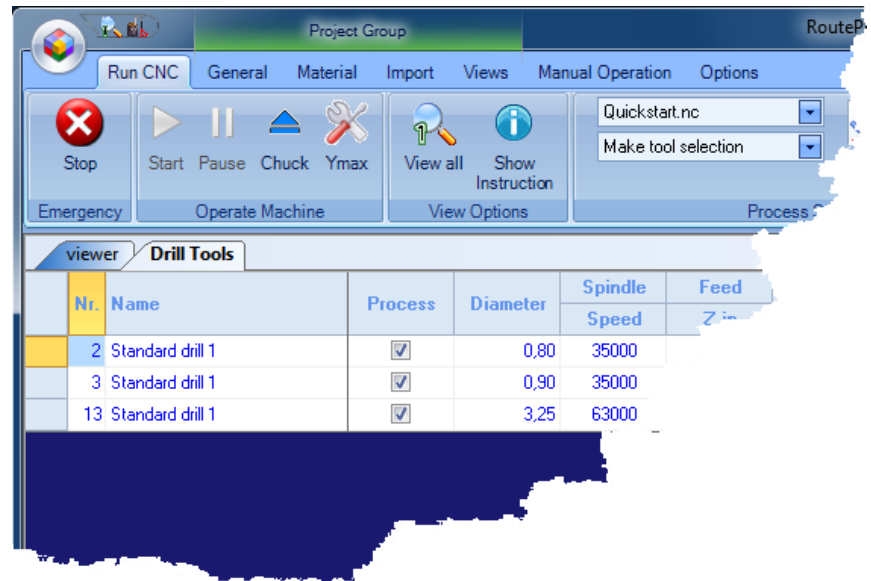
Deselect all tools

All the tools available for this layer will be deselected.

Make tool selection

You can select or deselect the tools in the tool table as shown.

The Accept Selection button will be enabled, you need to press this when finished.



The tool window is a docking type of window, you may undock it by holding the mouse pointer on the tab at the bottom and drag the window to another place. Now you can have both windows in view.

Select data

Window selection

If you need to select one or more data items, you can use the window selection.

Select the items by drawing a window around them or by clicking them. Holding the shift key while selecting enables you to add more items.

The Accept Selection button will be enabled, you need to press this when finished.

Select start point

This feature is very handy when your tool did not perform correct on a part of

your design.

Just replace the tool and select the last item that was processed correctly.

All the data items that follows will be enabled as soon as you press the Accept Selection button.

Accept Selection

You need to press this button to accept the selections you have made in: Make Tool , Window and Startpoint Selection.

Show Instruction

This is a toggle button and it will show a little pop-up window that displays the instructions you typed in for the current layer.

▼Calibrated

If checked, the design is calibrated. [Show the calibration procedure.](#)

note: Only visible if the [Calibration option](#) is enabled.

▼ATC

If you have the ATC option enabled, you can temporarily disable it by unchecking this field.

Note: Only visible if the [ATC option](#) is installed.

Current tool values

Here the current tool values will be displayed during processing

Note: The values will be shown for the current tool, until a new tool has been selected for processing

Tool nr

The current tool number that is processed

Diameter

The Diameter of the current tool that is processed

Speed

The speed of the current tool that is processed

Depth

The Depth of the current tool that is processed

Usage

For drilling this shows the number of times the current tool is used.


For Routing this shows the total distance the current tool has traveled.

Iteration

This show the number of iterations used for this tool and how many iterations were already performed.

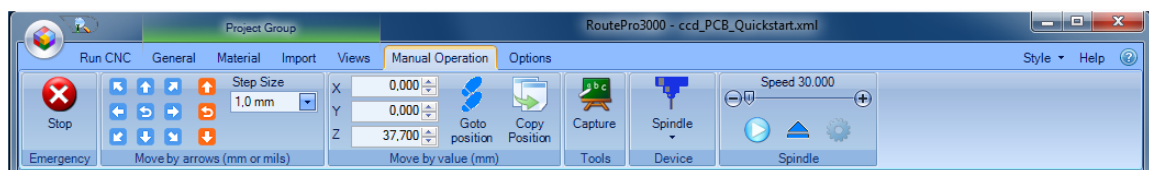
7.1.2 Manual Operations

Warning, when operating the machine manually, please be aware what you are doing.

 Example: if you drill a hole and forget to raise the head before you move the head the tool will certainly break.

The Ribbon tab Manual Operations is used for:

- Manual positioning of the spindle
- Defining offset points
- Capture Mode
- Camera calibration



Click on a Tab, button or field for a description.

Emergency Stop

When the machine is running, hitting this button will interrupt the process by stopping the spindle and disabling the motors.

The position in the data list that was currently processed will be preserved so starting the machine will continue where it was stopped

When the machine is started again, it will go first through the initialization before continue, this is because all the motors were disabled.



▼Move by arrows

XY Arrows



Use these arrows to move the head in the desired **XY** direction.

You may use also the arrows on the keyboard. (hold them for repeating the movement)

If you use the **numeric keypad** the keys correspond to the **1-9** keys

So diagonal movements are performed by pressing key **1, 7, 9, 3**

You may use in this case the **5** as the XY home key.

Z Arrows



Use these arrows to move the head in the desired **Z** direction. (up / down)

You may use also the **Ctrl + up / down arrows** on the keyboard. (hold them for repeating the movement)

If you use the **numeric keypad** the keys correspond to the **2,5,8** keys

You may use in this case the **Ctrl + 5** as the Z home key.

Step Size

When you are moving the head manually you may set the desired step size by selecting it from this drop-down box
You can choose for Metric or Imperial values.

	Shift + Up	Increment Metric step size
	Shift + Down	Decrement Metric step size
	Alt + Up	Increment Imperial step size
	Alt + Down	Decrement Imperial step size

Move by value

XYZ Position

Here the current XYZ position is displayed
You may type a value here or use the up/down button.
If you type an invalid value, it will be corrected automatically.

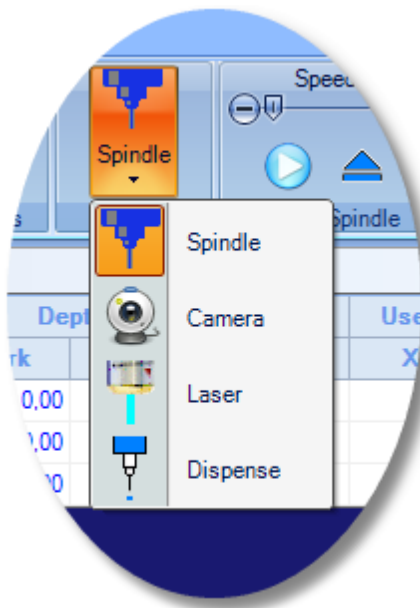
Goto Position

If you have typed a value, use this button to goto the requested position.

Copy Position

The current displayed XY position will be copied to the XY offset

Device



Camera

It shows the [Camera](#) tools

Note: Only visible if a camera is installed.

Laser

It shows the Laser tools

Note: Only visible if the laser module is installed.

Dispense

It shows the dispense tools

Note: Only visible if the dispense module is installed.

Spindle

Speed

Select a spindle speed from the drop-down box

Start Spindle

Start the spindle and speed up to the requested speed.

ATC



Please be careful, managing the tools using the ATC table should only be done by skilled engineers!

It is very easy to destroy or damage the machine if you are not careful.







It opens the ATC tool table and gives you the opportunity to handle the tools in the Tool rack.

See the Advanced tutorial in [how to handle the ATC](#).

Automatic tool change table

Nr.	Tool Status
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Ok

Show Clear Pick Drop Measure Chuck

Note: Only visible if the [ATC option](#) is installed.

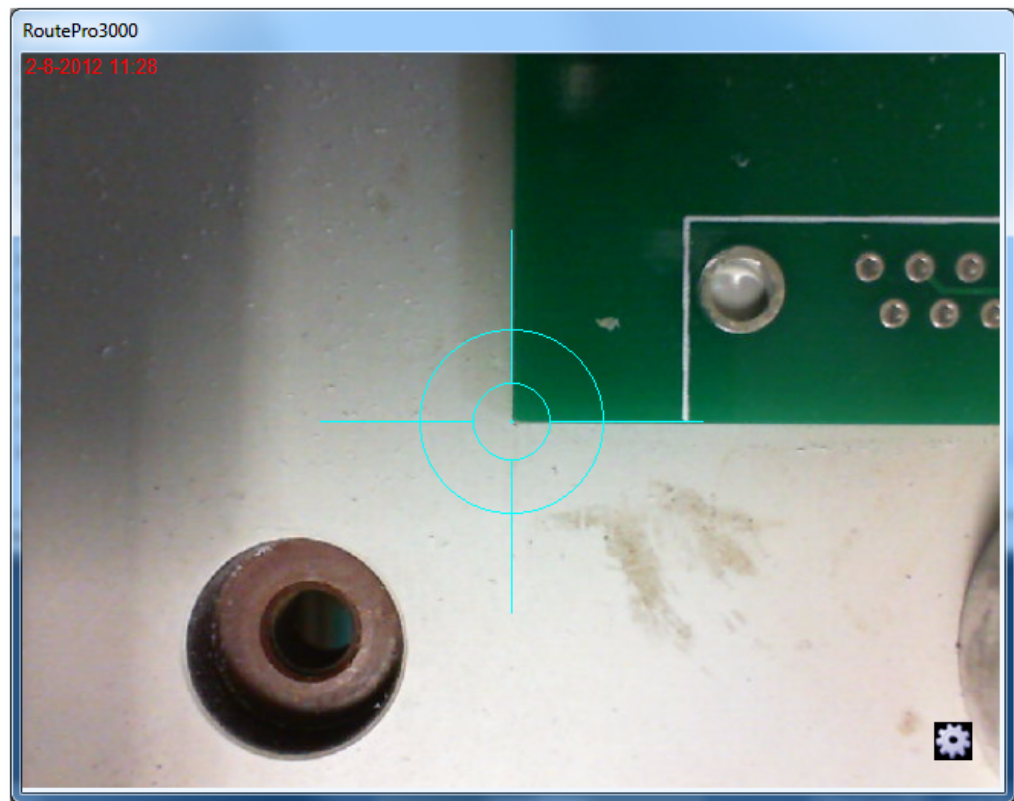
Tools

Show Camera



Please be careful, pressing this button activates the machine and the camera will be positioned.

If you have a camera attached, this will show the camera window.
The head will add the offset from the camera to the XY offset.
Then the camera is positioned in place of the head.

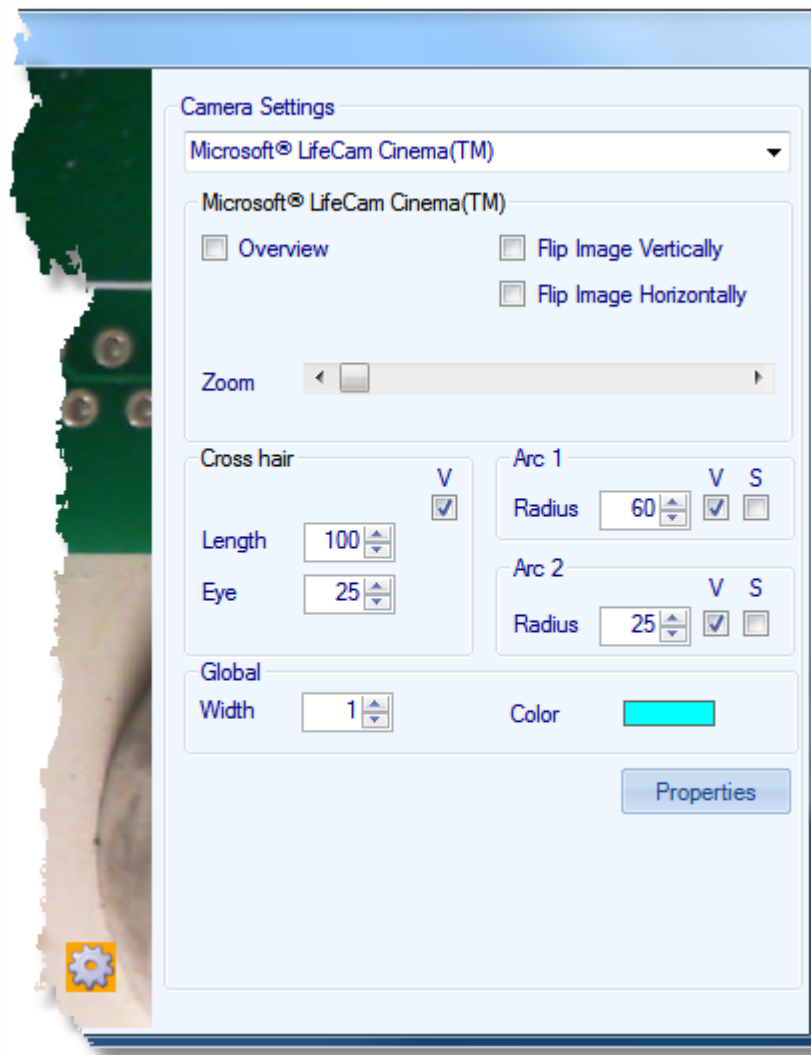


Camera Options

This is a toggle button



Display the Camera Options



Click on a button or field for a description.

Camera Settings

Camera Selection

Here you can select the camera that is mounted on the CCD machine

Overview



This option is only available under the Calibration license

Display the camera overview window, this is useful when your main screen is zoomed in.

Flip Image Vertically



This option is only available under the Calibration license

Flip Image Horizontally



This option is only available under the Calibration license

Zoom

This option is only available under the Calibration license



Note: *There is a zoom (belonging to the camera) under the camera properties, **do not use that**, it's not precise.*

Cross-hair

Length

Adjust the length of the cross-hair.

Tip: *If you set it to maximum, you can use it for PCB alignment.*

Eye

Adjust the eye of the cross-hair

Visible

Show the cross hair

Arc1



This option is only available under the Calibration license

Radius

Size of the outer Arc

Visible

Show the outer Arc

Synchronize

Synchronize the outer Arc with the end points of the Cross-hair

Arc2



This option is only available under the Calibration license

Radius

Size of the inner Arc

Visible

Show the inner Arc

Synchronize

Synchronize the outer Arc with the inner points of the Cross-hair

Global

Width

This is the line width of the Cross-hair and Arcs

Color

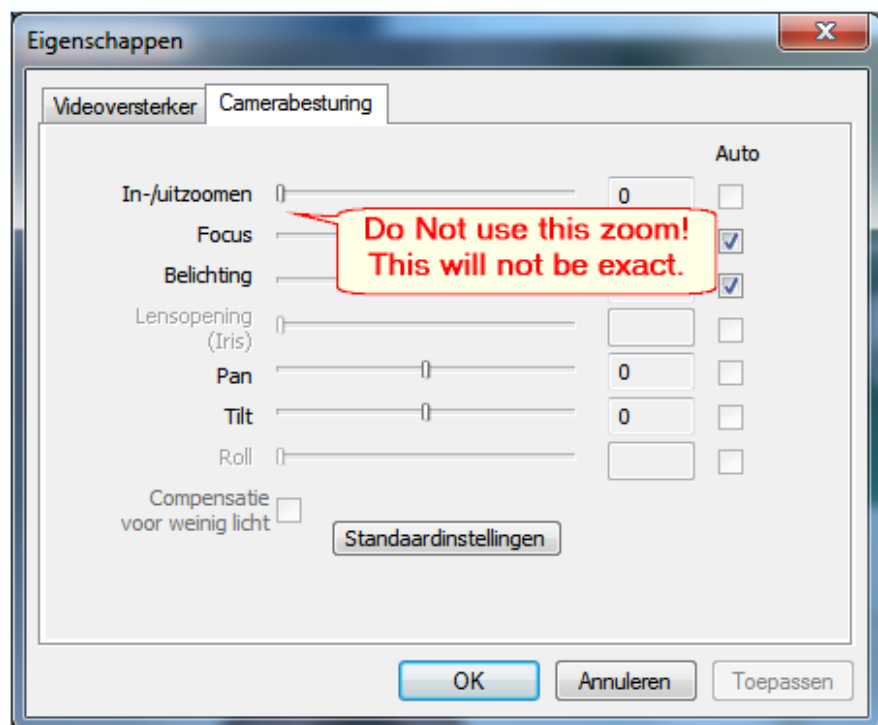
You may choose a different color here for the Cross-hair and Arcs

Properties

Here you can set some camera properties but normally you do not need these.

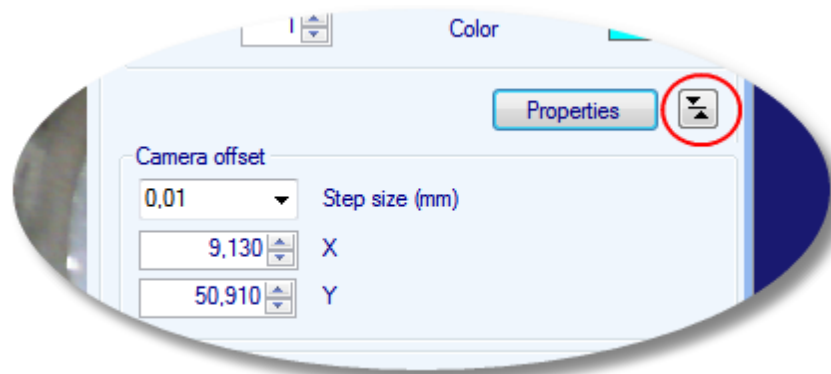
If the auto focus is not optimal you can try to set the focus manually.

Note: Use the zoom feature from RoutePro3000 to zoom in. Do not set it here because it is not precise.



Calibrate Camera

This will enable a special panel in the camera viewer, for [calibrating the camera](#)



Click on a field for a description

XY offset

Use the up / down buttons to move the camera to the desired position, the movement is defined by the step size.

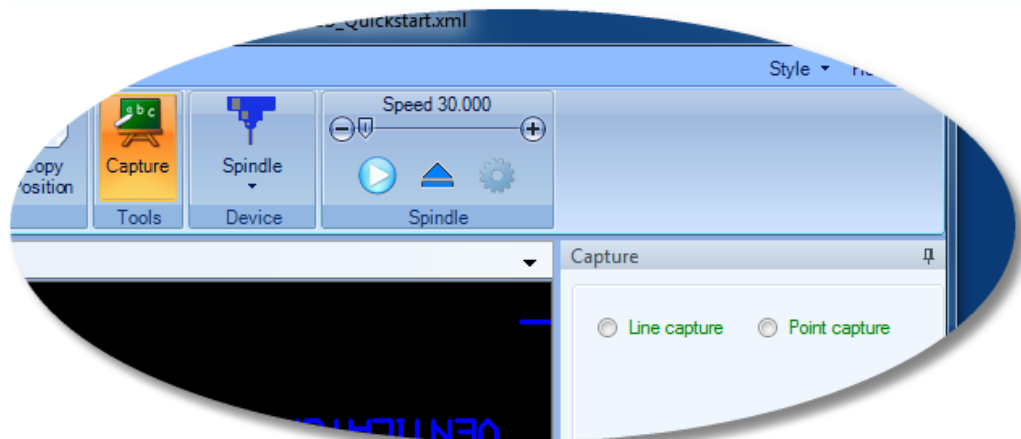
Note: Do not type in the values because they will not reflect immediately.

Step size

Select the step size for camera calibration

Capture Mode

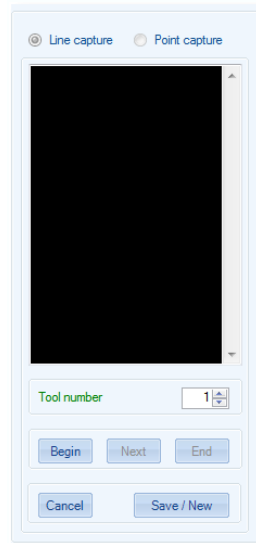
In this mode you can capture the current position and create a Line or point file.



Line Capture

In this mode you can capture lines. It is not meant to build complicated data but it

is a handy tool to create outlines.
The output will be stored in a HPGL file.



To start:

Position the head to the required start position of the line(s) you want to capture.

Then press **Begin**, this will mark the current position as a start-point.

The commands are automatically added to the panel.

Position the head to the next position.

If you have just a single line you may press **End**.

If you want multiple line connected to each other press **Next** and position again

and add the lines as long as required.

If you need to end the sequence: press **End**.

You can select a different tool, but only while the pen is UP (not in a sequence)

When done press **Save / New** to store your file.

Point Capture

In this mode you can capture points (drill data). The output will be stored in a Excel-
lon file.



To start:

Position the head to the required start position of the point you want to capture.

Then press **Add**, this will mark the current position as a co-ordinate.

The commands are automatically added to the panel.

Position the head to the next position.

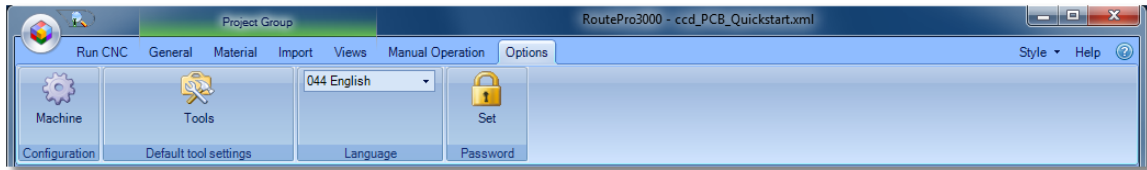
And press **Add** again.

You can select a different tool if you prefer.

When done press **Save / New** to store your file.

7.1.3 Options

The Ribbon tab Options is used to set the global parameters.



Machine Options

Pressing this button will open the [machine options](#) window.

Here all the machine specific parameters are set, these are global settings used for all your projects.

Note: *Project also have there own specific parameters, which are stored in the project folder.*

Default Tools

RoutePro3000 comes with a set of default tools which should make setting up projects very easy.

There are currently default tools for Routing, drilling and laser

When you press the Default Tools button a list box appears showing the currently displayed tool list.

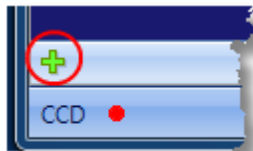
Tools are selected by a combination of the type of Tool used, Material and Diameter.

This implements that there could be more tools with the same diameter but for different purposes.

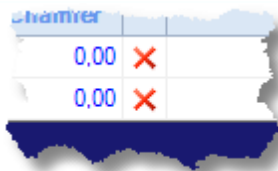
Example: there could be a tool for FR4 with a diameter of 1,00 mm and also a tool with the same size but now for PVC.

So selecting PVC as the material type in the Project Wizard will take the parameters for the tool set for PVC.

You may add your own tools by clicking the plus sign in the lower left corner of the list.



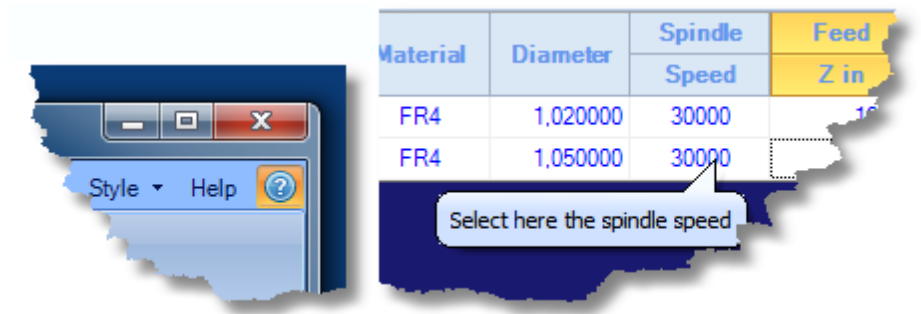
You can delete tools by clicking the X in the list.



By the way, did you notice the little question mark in the top right hand corner?

This is a toggle button, it enable the hints while hovering over the list.

But if you are experienced, hints could be annoying so you can leave them off in that case.



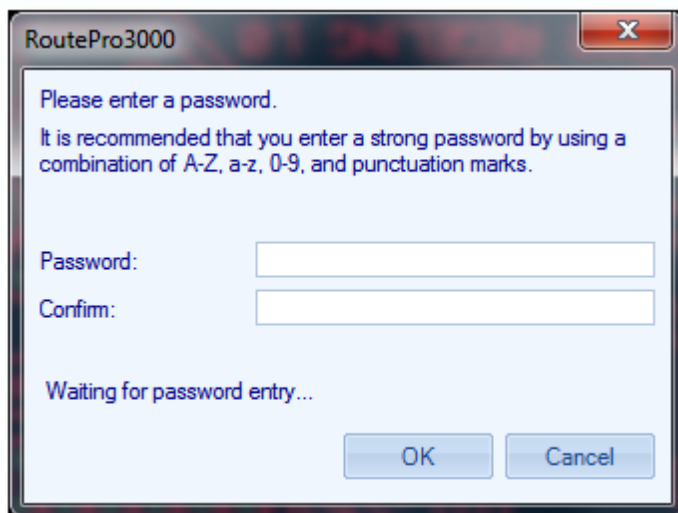
Note: If a tool is not found by the Project Wizard, you need to type the parameters by yourself then this tool can be added automatically to the default tool table, so the next time you need this tool it will be selected from the default tool table.

Language

All the languages currently available for RoutePro3000 will be listed here. You may select the language you prefer.

Password

To prevent unauthorized changing of machine parameters, you may set a password.



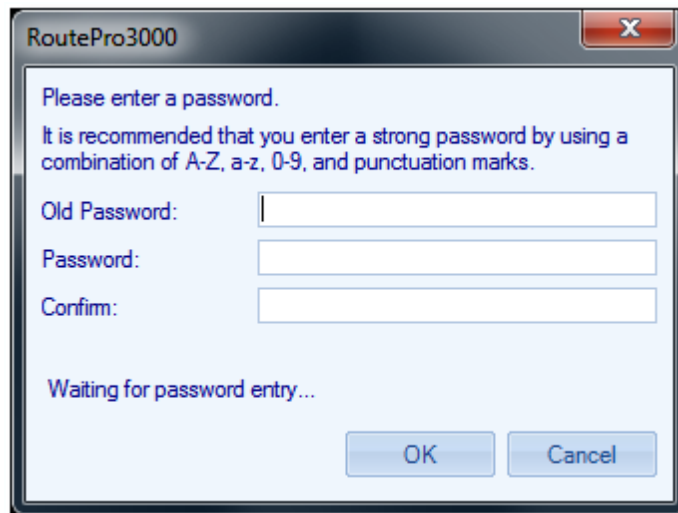
Please note:

Store a copy of the password in a save place because if you lose it, you are not able to set the machine options anymore. reinstalling RoutePro3000 will not recover or delete your password !

▼Change or remove the password

The password can only be changed or removed if you know the password.
Press **Set Password**.

If a password is set, the following screen appears:

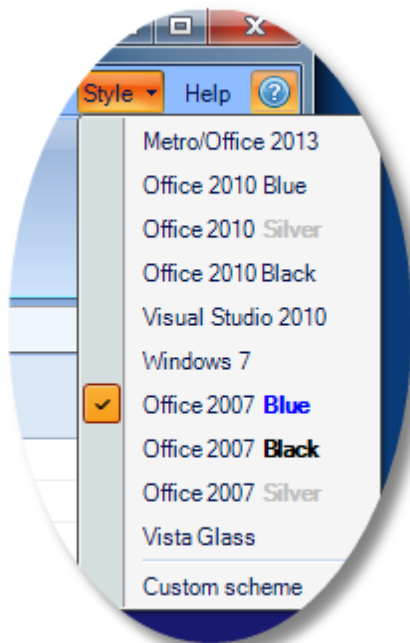


First type the old password, fill in the fields if you want to change the password and press **OK**.

Note: if you leave the **Password** and **Confirm** fields empty, pressing **OK** will remove the password.

Note: if you used the password to open the option screen it will remain in memory until RoutePro3000 is closed.

▼Style



Here you may select the style you want to use for RoutePro3000.
First select the style then you may adjust the colors using the Custom scheme option.



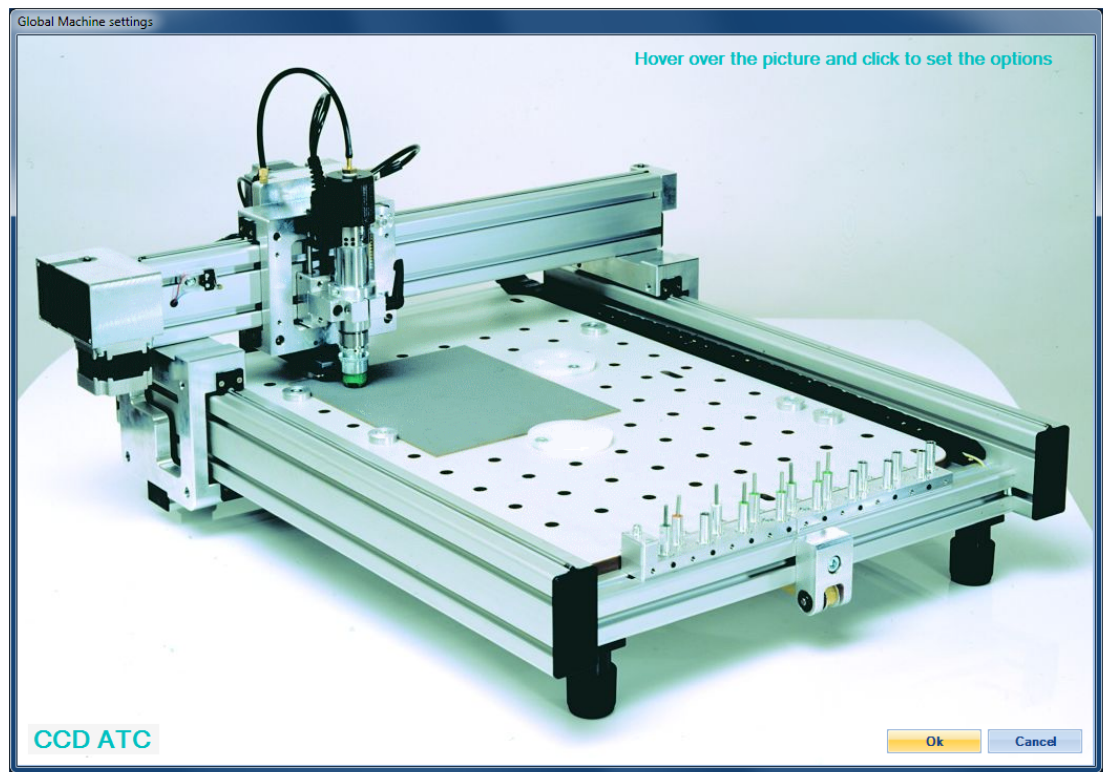
The style is stored along with your project so you can use different styles for different type

of projects if you prefer.

7.1.3.1 Machine Options Overview

Overview

Before going into detail, please read this overview.



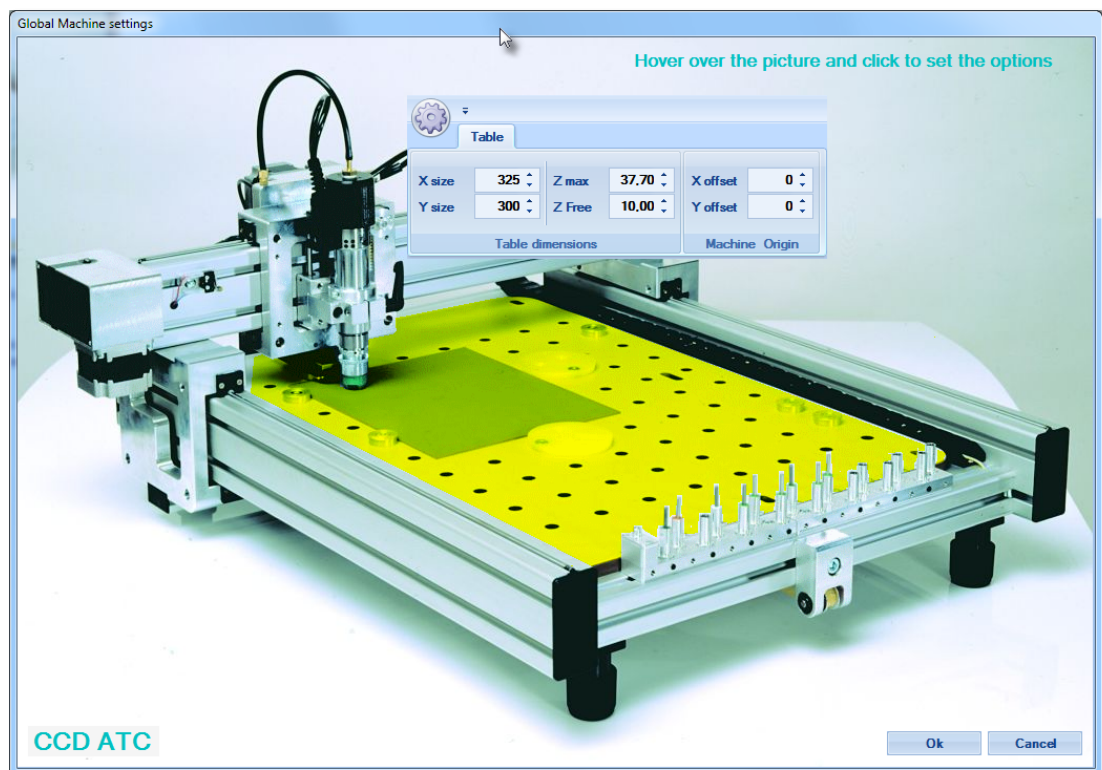
RoutePro3000 has an unique way to handle settings. Big screens and lists with parameters work confusing and are not user very friendly.

So we took a different approach: we only show you the parameters you are interested in. If you have the Global Machine setting screen in front of you, just hover over the picture, you will notice that different parts of the machine will give you a hint.

So if you hover over the table it shows:

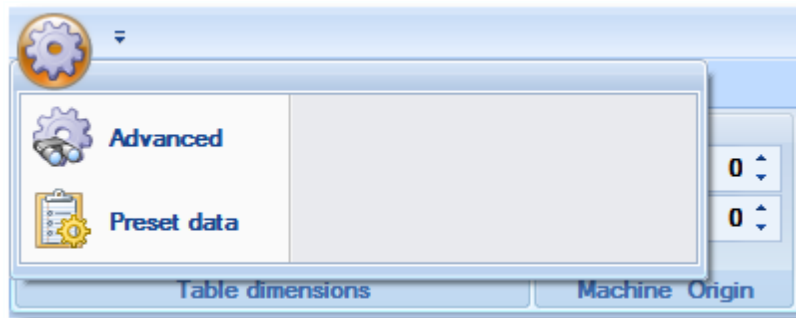


Now click on the table !



Notice that the table is high lighted and **only** the parameters, you need to set for the table, are displayed.
This system works for all the main components on the machine.

▼Advanced Parameters

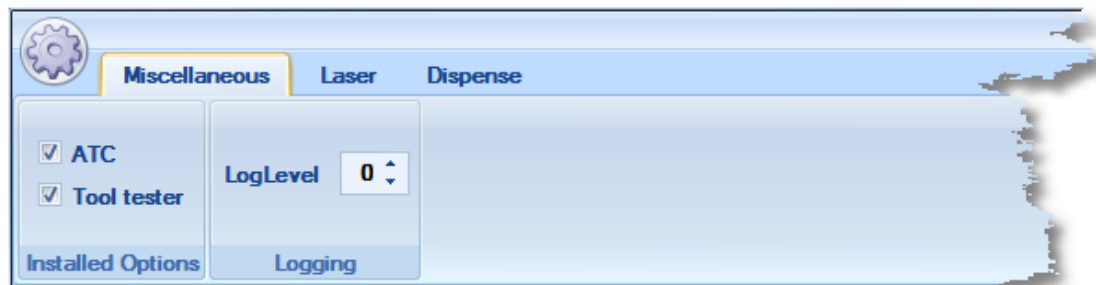


However your machine has a few extra parameters like calibration, but it is advised that only a skilled technician should alter these.

There are also parameters in case you have purchased extra modules, you will find them by clicking on the little wheel in the top left hand corner of the parameter window and then advanced.

This will enable the rest of the parameters

Note: the picture below may differ depending on the installed options.



▼Preset data

Load machine specific parameters.

These parameters are set by the manufacturer while preparing and calibrating your machine.

Normally you do not need them because they are installed during installation.

But in case you have lost your CD and need to install the program again. (loaded from internet)

You may request your dealer of a copy of the settings.

Note: You will also find the file on the CD in the folder resources.

To load the file, click the button **Preset data** and browse to the folder containing RoutePro3000.xml.

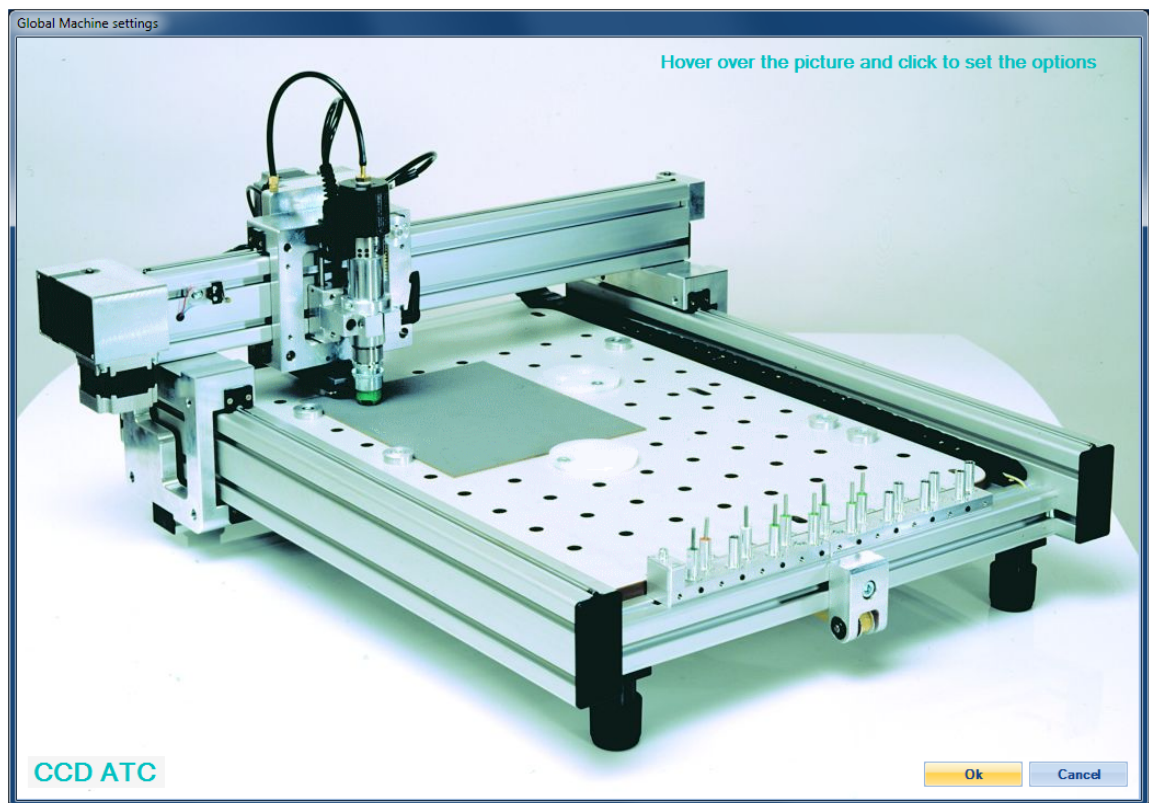
Select this file and press open.

Now your machine has been setup with the correct machine settings.

[Now explore each option in detail](#)

7.1.3.1.1 Machine Options Details

When you enter the Machine Option screen it opens the following window.

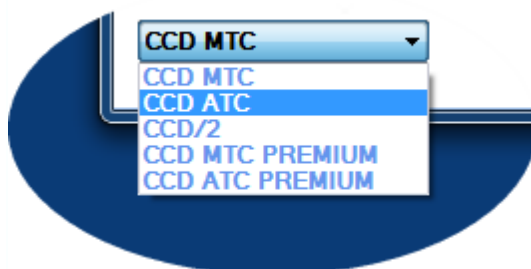


▼Selecting a machine type

On the lower left hand corner you may select the type of machine you own, click on the text:



This will open a list from which you may select your machine type.



Note: Depending on the type of machine currently connected some selections are not possible

▼Table Settings

Table			
X size	325	Z max	37.70
Y size	300	Z Free	10.00
Table dimensions		Machine Origin	
		X offset	0
		Y offset	0

▼Table Dimensions

Table size

The actual workspace (limits) on the machine is defined here.

This values will be used to determine if your design fall within the limits of the machine.

Z Max

This is the maximum height the head can be lifted.

Z Free

When a board is being processed, whenever the head needs to be lifted to travel to the next coordinate, this value indicates the height the head will travel above the board and is used instead of raising the head to the maximum. This will speed up the process.

Note: set this value so all obstacles, when moving the head, will be avoided.

The lower the value the faster the machine runs, this is especially the case when drilling or dispensing.

Note: normally you do not need to change these values they are preset by the manufacturer.

▼Machine Origin

Offset

This is a calibration value to determine where the Machine Origin (0,0) starts. (X + Y end switches are triggered)

Note: normally you do not need to change these values they are preset by the manufacturer.

▼XY motor settings

XY Motor	
Max. speed	10000
Ref. speed	2000
Start/Stop	1000
Ramp steps	4
Base Step	0,0508
Stepsize	0,00635
Step rate	1/2
Cal. X	0,941
Cal. Y	0,941
Torque	100%

Motor specifics

▼Speed Setting

Max. Speed determines the maximum speed the XY motors can handle.

Reference is used to set the speed used when the machine is performing a reference run (determine the zero positions)

Note: normally you do not need to change these values they are preset by the manufacturer.

▼Start/Stop Speed

When the machine starts moving, it rapidly goes to the speed set by the **Start/Stop** parameter, from there it accelerates, using the **Ramp Steps**, to the required speed. These values are also used when decelerating.

Note: if another spindle or device is mounted with more weight, it could influence the working of the machine in this case you can adjust these parameters to overcome loss of steps.

▼Calibration

The setting are used to calibrate the motors on your machine.

X Calibration is performed by setting the X motor value first to 1, the run the machine over a length of 20 cm measure the difference and use the calculated factor as calibration factor.

Y Calibration is performed by setting the Y motor value first to 1, the run the machine over a length of 20 cm measure the difference and use the calculated factor as calibration factor.

Note: normally you do not need to change these values they are preset by the manufacturer.

▼Step Size

The only value you may change here is the Step rate.

You may select 1/2, 1/4 or 1/8 step for the standard CCD and 1/8 or 1/16 for the Premium types

The smaller the step, the smoother the machine runs, however it also makes the machine slower.

Note: The step size for a standard CCD is for both XY and Z axis the same, so setting the XY will automatically give the the Z axis the same step rate.

▼Torque

This is used to control the power to the motor drivers, only applicable for the Premium CCD.

▼Z motor Settings

▼Speed Setting

Max. Speed determines the maximum speed the Z motor can handle.

Reference is used to set the speed used when the machine is performing a reference run (determine the zero positions)

***Note:** normally you do not need to change these values they are preset by the manufacturer.*

▼Start/Stop Speed

When the machine starts moving, it rapidly goes to the speed set by the **Start/Stop** parameter,

from there it accelerates, using the **Ramp Steps**, to the required speed.

These values are also used when decelerating.

Note: if another spindle or device is mounted with more weight, it could influence the working of the machine

in this case you can adjust these parameters to overcome loss of steps.

▼Calibration

The setting is used to calibrate the motor on your machine.

Z Calibration is performed by setting the Z motor value first to 1, then run the machine over a length of 2,5 cm

measure the difference and use the calculated factor as calibration factor.

***Note:** normally you do not need to change these values they are preset by the manufacturer.*

▼Step Size

The only value you may change here is the Step rate.

You may select 1/2, 1/4 or 1/8 step for the standard CCD and 1/8 or 1/16 for the Premium types.

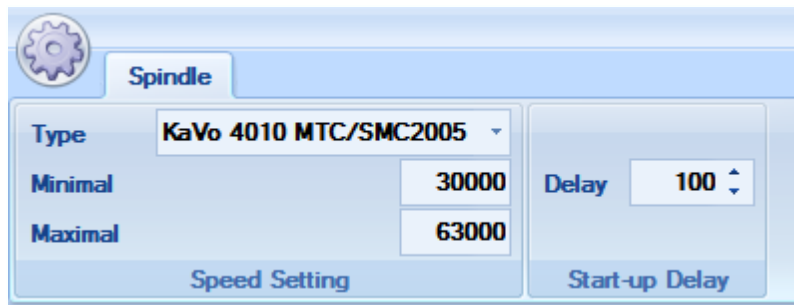
The smaller the step, the smoother the machine runs, however it also makes the machine slower.

***Note:** The step size for a standard CCD is for both XY and Z axis the same, so setting the Z will automatically give the XY axis the same step rate.*

▼Torque

This is used to control the power to the motor drivers, only applicable for the Premium CCD.

▼Spindle Settings



▼Type

Here you can select the type of spindle in combination with a driver. It will display the minimum and maximum speed (rpm) the spindle can run.

Note: you cannot change these values they are preset by the manufacturer.

Be care full when the machine is placed in a protective cabinet or confined place:

The spindle used on our machines are KaVo high speed spindles, If your machine is placed in a protective cabinet or confined place, please make sure that the vacuum cleaner is always running, with enough suction, while the spindle is running. This to prevent dust, circulating in the cabinet or confined place, get sucked into the spindle. Cluttering up the ball bearings.


▼Start-up delay

The spindle initial speed is the minimal speed and for every speed increase the delay will be used to get the spindle running at the required speed.

▼Tool test Settings



Use this option only if your machine is equipped with an Automatic Tool Change unit.



▼Tool tester Position

These are the XY coordinates of the Tool tester. The Z reference is determined by the switch, i.e. this is the position where the switch is activated. It should be calibrated with a tool that has the correct length.

Note: The tool tester is always located outside the table boundaries.

Note: normally you do not need to change these values they are preset by the manufacturer.

▼Length correction

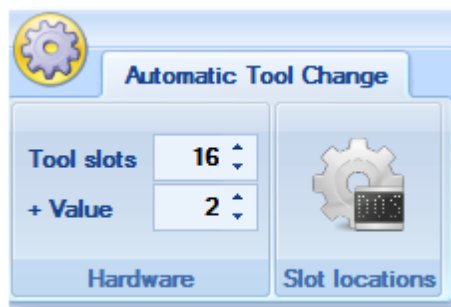
If the Tool tester finds a tool that is shorter or longer than the standard length, it can automatically correct the behavior of this tool by adding or subtracting the difference to the required work depth. The maximum correction used is set with this parameter.

Example: if the value is set to 1 mm and the tool is 1 mm shorter or longer, it will be corrected, if it's outside these boundaries it will fail.

▼Automatic Tool change (ATC) Settings



Use this option only if your machine is equipped with an Automatic Tool Change unit.



▼Hardware

Here you set the number of tool slots your machine is equipped with (starting with number 1). The + Value you indicate the extra length that will be used while picking a tool. (see [ATC by-pass the depth limiter](#))

Note: The tool slots are always located outside the table boundaries.

Note: you will notice a tool slot 0 as well, this is used to store the test tool and cannot be used as a standard tool holder.







▼Slot Locations

Clicking this button opens the ATC tool table, where the slot location are registered for each tool holder.

Automatic tool change table

Nr.	Location			Tool Status
	X	Y	Z	
0	646,07	20,57	1,1	
1	636,07	40,57	1,1	
2	646,07	60,57	1,1	
3	636,07	80,57	1,1	
4	646,07	100,57	1,1	
5	636,07	120,57	1,1	
6	646,07	140,57	1,1	
7	636,07	160,57	1,1	
8	646,07	180,57	1,1	
9	636,07	200,57	1,1	
10	646,07	220,57	1,1	
11	636,07	240,57	1,1	
12	646,07	260,57	1,1	
13	636,07	280,57	1,1	
14	646,07	300,57	1,1	
15	636,07	320,57	1,1	

Cancel Ok

Show Clear Pick Drop Measure Chuck

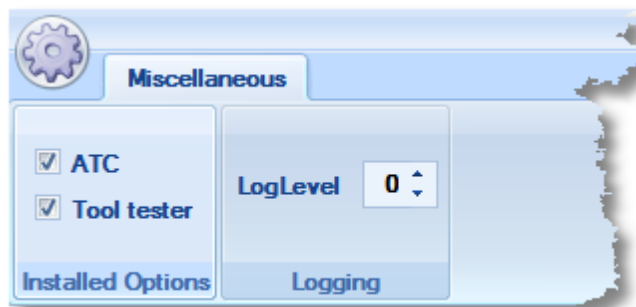
Do not use the buttons at the bottom of the screen before reading [How to handle the ATC](#).



Using this buttons could destroy your tools and damage your machine if not handled by a skilled technician.

Note: normally you do not need to change these values they are preset-ted by the manufacturer.

7.1.3.1.2 Machine Options Advanced



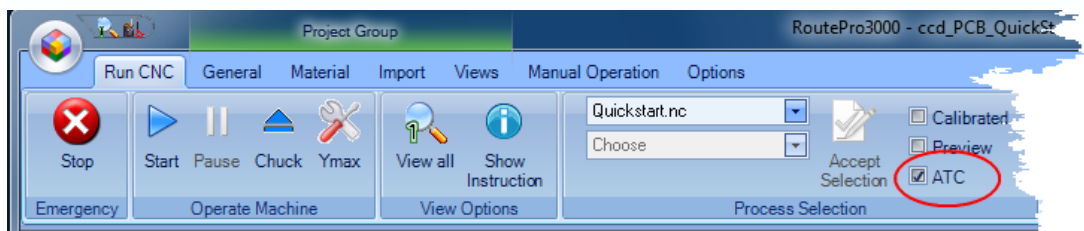
▼ATC



Use this option only if your machine is equipped with an Automatic Tool Change unit.

This box should be checked if you have an Automatic Tool Change installed on your machine and you want to use it.

It is possible to skip the ATC for the current project, if ATC is enabled, there will be a checkbox visible under Run CNC



Uncheck this box to disable ATC.

▼Tool tester

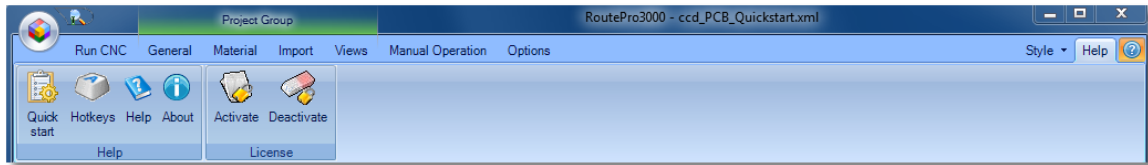
This box is automatically checked if you have the ATC box checked and indicates that an ATC is available.

▼Log Level

In case you experience some problems running the machine, you can set the log level to 4, this will create a log file which you can send to your support center for examination.

7.1.4 Help

The Ribbon tab Run Help provides the help and the license manager.



Show Help

Shows the Help file. And if context sensitive help is available it jump to the correct topic.



F1

Quick Start

This will open the [Quick start Tutorials](#) pages in the help file for you



Ctrl + F1

Show Hotkeys

This will show the [HotKey table](#) in the help file



Alt + F1

About RoutePro3000

Shows information about RoutePro3000 and the installed modules.

Activate License

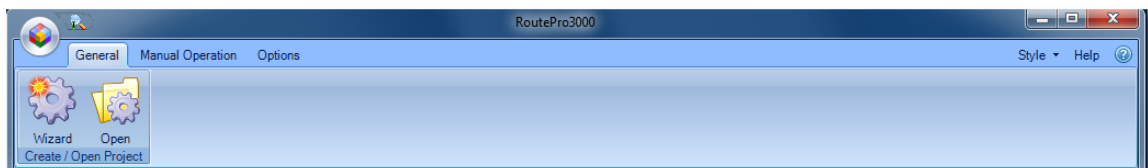
Use this button to [activate licenses](#).

Deactivate License

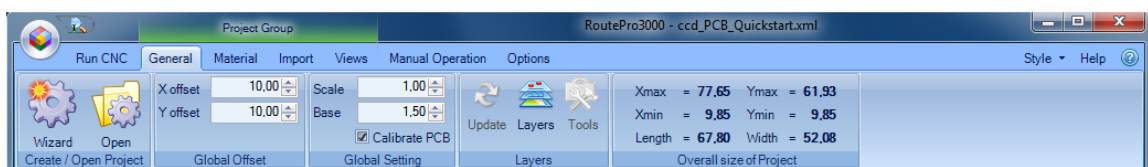
Use this button to [deactivate](#) licenses

7.1.5 Project Group

When you start RoutePro3000 the Project Group shows only the General tab.

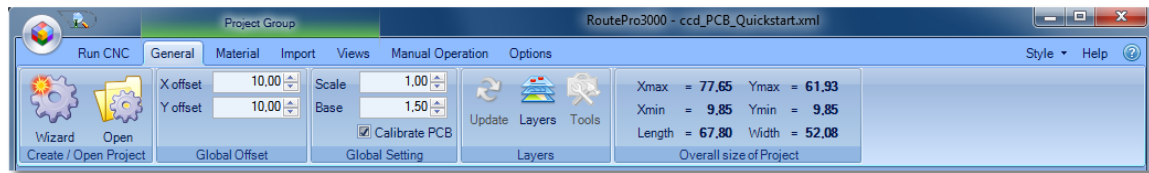


When a project is created or loaded it will show all the tabs and expand to more buttons and fields.



7.1.5.1 General

The Ribbon tab General is a part of the Project Group and contains the basic project data.



Click on a button or field for a description

▼Project Wizard

[Create](#) a new or [update](#) the current project.

Open

Opens an existing project.

Global Offset

This will offset all the layers with the same distance, if you need to offset only one or more layers, use the offset in the layer table

Scale

Here you may set the scale for the design, this scale is set to all layers.

Note: if you want to set the scale per layer, you may do so in the Layer itself.

Base

This is the thickness of the base-plate used as underlayment on your table.

Calibrate PCB

If this option is only visible, you have a calibration module.
Setting it will enable the Calibration mode.

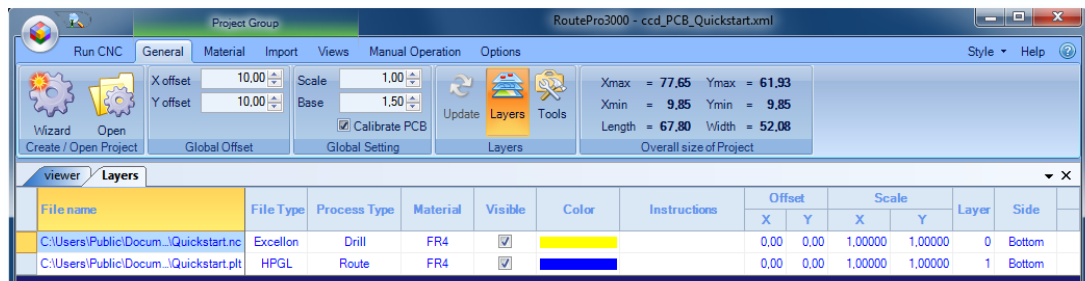
[How to use the Calibration....](#)

Update

This button will be enabled each time parameters are changed that influences the design, so it needs to be recalculated.

Layers

This is a toggle button.
It will display the layer info



You may change here:

- Visibility
- Color **Note:** a drill layer color cannot be changed, it will always be yellow, because it needs to indicate a hole.
- Instructions
- XY Offset (you can use this if there is an offset difference between the layers)
- Side

If you place the mouse in the first field (just before the file-name), you may drag the selected layer up or down in the list

The order of the layers determines the processing order.

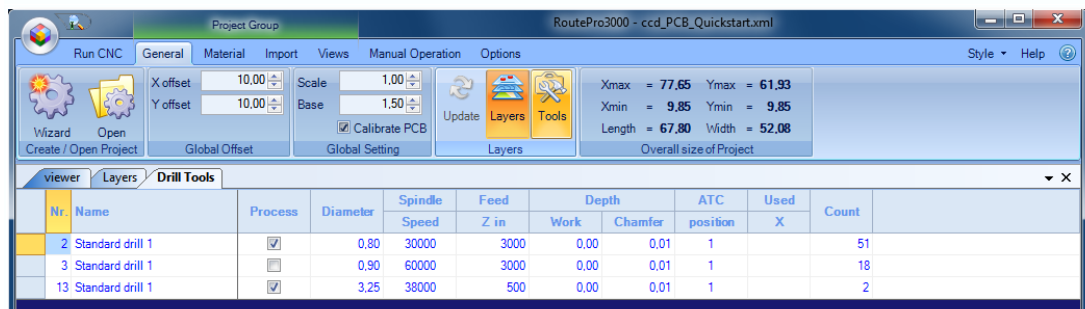
Note: you can switch between the displayed screens by clicking the tab at the bottom of the screen, you may also dock it in another place.

Note: if you press the right mouse button you can add this button to the Ribbon Qat
[Detailed description....](#)

Tools

This is a toggle button. (only visible when the Layers are visible)

It will display the tool info for the currently selected layer.



Note: depending on the tool type the fields may vary

You may change here:

- Tool type (Name)
- Process, but normally this is done by selecting data in the Run CNC tab)
- Diameter
- Spindle Speed
- Feed
- Depths
- Iteration (for routing)
- ATC position
- Used

If you place the mouse in the first field (just before the tool Nr.), you may drag the selected tool up or down in the list

Which will change the processing order for the tools.

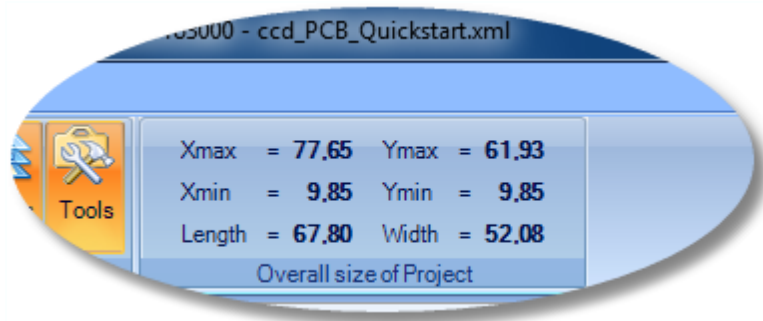
Note: you can switch between the displayed screens by clicking the tab at the bottom of the screen, you may also dock it in another place.

[Detailed description....](#)

Dimensions

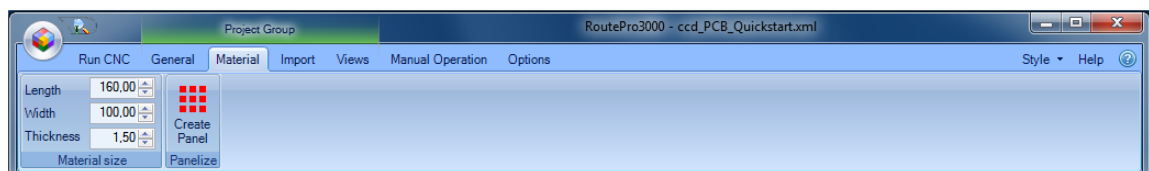
This is a toggle button.

It displays the dimensions of your design.



7.1.5.2 Material

The Ribbon tab Material is a part of the Project Group and contains the material data.



Click on a button or field for a description

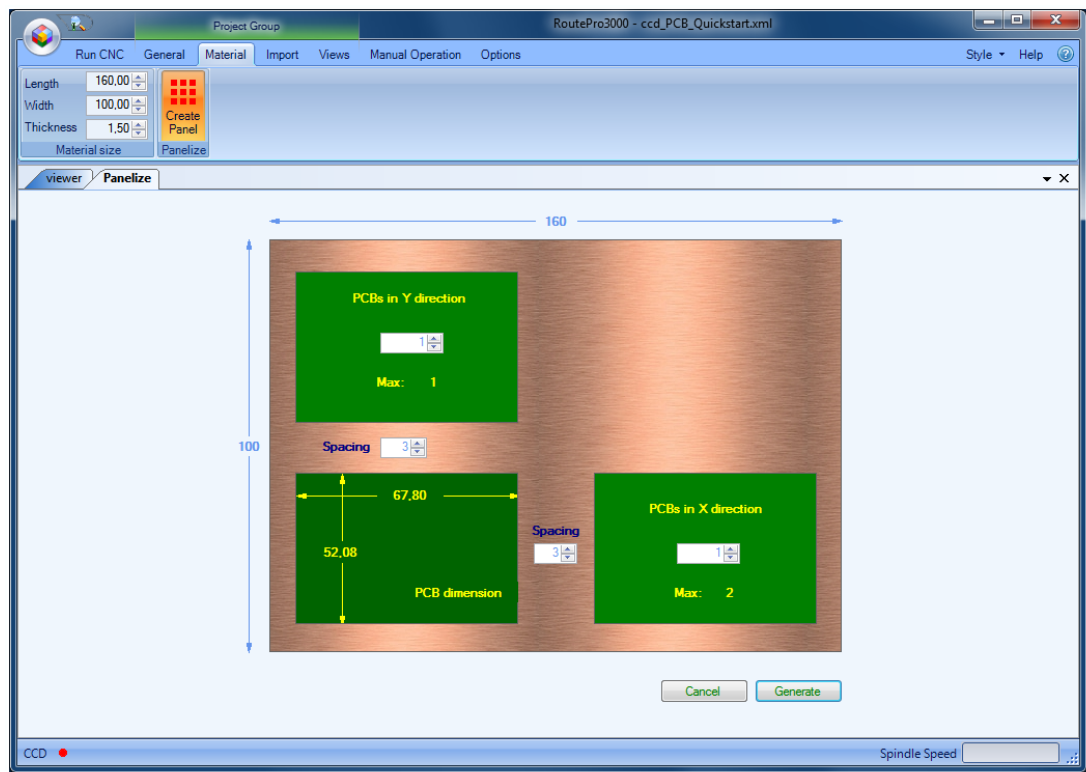
Material size

Here you can set the size of the material you placed on the table.

This value is used to calculate the number of PCB's you can place using Panelize.

Panelize

With this tool you can place multiple PCB's on your material.

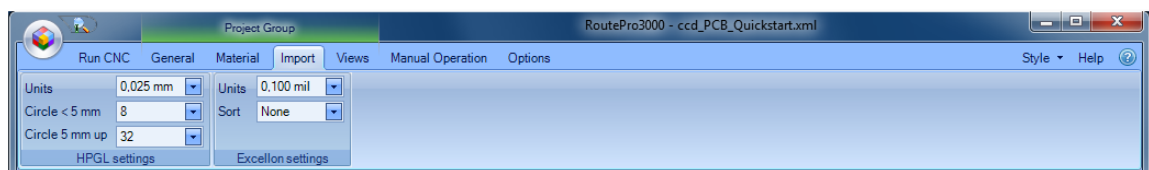


Depending on the material size the number of PCB in X and Y direction is calculated. Fill in the number of PCB's for the X and Y direction, give the desired spacing and press **Generate**.

Please note: if you change a parameter that influences the position or size from your design the number of PCB's will be default to 1. In that case just generate it again.

7.1.5.3 Import

The Ribbon tab Import is a part of the Project Group and contains import parameters.



Click on a button or field for a description

HPGL Settings

Circle < 5 mm

The value set here determines the number of vectors that will be used to build an Arc or Circle if such a command is found by the HPGL interpreter and if the diameter is < 5 mm

Circle 5 mm up

The value set here determines the number of vectors that will be used to build an Arc or Circle if such a command is found by the HPGL interpreter and if the diameter is 5 mm or greater.

Step

This value determines the step-size that is used in the HPGL file. The standard value for HPGL is 0.025 mm.

Excellon Settings

Step

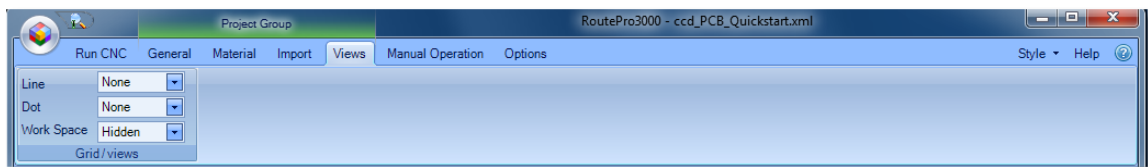
This value determines the step-size that is used in the Excellon file. If you have created a project and the data files do not match you can change the step size. [Read more....](#)

Sort

If you set Sort to Path the points will be sorted in a way that the head needs to make as little movements as possible. The sorting routine calculates the shortest way to the next point of the same tool. If you leave it to None, the points will be processed in the order they were read from the file.

7.1.5.4 Views

The Ribbon tab Views is a part of the Project Group and contains the view settings.



Click on a button or field for a description

Grid

RoutePro3000 has two grid types:

Line grid

The line grid consists of horizontal and vertical lines with dimension showed so it is easy to determine the size of your design.

It can be set to Metric or Imperial

This grid is only displayed from the lower left point of the table to the top right corner of the design.

Note: You can use the button showed in the red circle, to set the grid anywhere in the program.

Dot grid

The dot grid can be set to Metric or Imperial

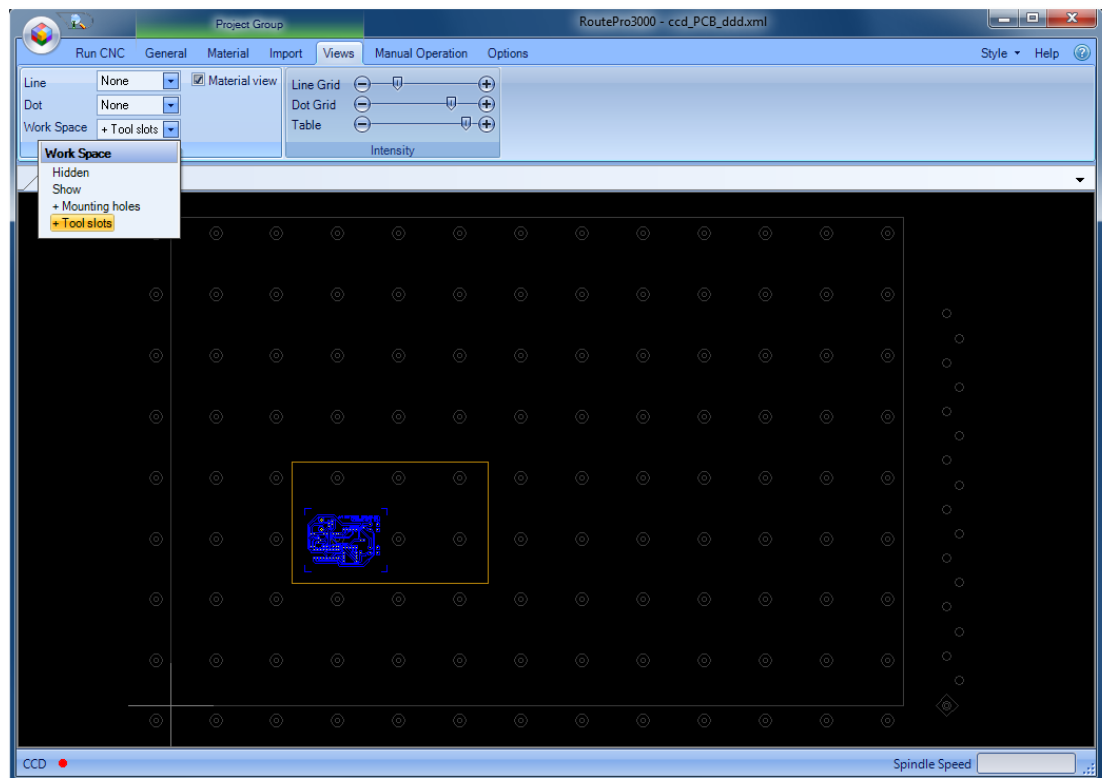
Note: You can use the button showed in the red circle, to set the grid anywhere in the program.

Views (Work area)

This will show the outline from the table.

If the [RoutePro3000 Extra module](#) is installed you will have the following extra view options

- Show material
- Set the intensity of the line grid
- Set the intensity of the dot grid
- Set the intensity of the table view
- Show the mounting holes
- Show the ATC tool-slots and depth sensor



7.2 Modules

The following modules are available or under development:

▼LaserPro3000

This module is used to produce laser images.
Please note that this module requires a Laser Unit.
[read more...](#)

▼DispPro3000

This module is used for dot and line dispensing
Please note that this module requires a Dispense Unit.
[read more...](#)

▼Calibrate3000

This module is used to calibrate the position of your material, it has also extended camera features.
Please note that this module requires a Camera.
[read more...](#)

▼Documentation

This module is used to create documentation about your machine and your projects
[read more...](#)

▼RoutePro3000Extra

This module is used to extend RoutePro3000 with extra features.
[read more...](#)

▼Inspection

This module is used to inspect your work
[read more...](#)

▼Q-Code

This module is used to create Q-codes for your projects.
[read more...](#)

▼Remote3000

This module is used to operate RoutePro3000 from another application.
[read more...](#)

▼Script

This module is used to automate RoutePro3000
[read more...](#)

All available modules can be evaluated for free over a period of 14 days without any obligation.

7.2.1 Laser Module LaserPro3000

Introduction

The laser exposure unit is an add-on-item for the CCD.

Please read the instructions, shipped with the Laser, on how to install the laser on the CCD.

Safety rules



- The laser exposure unit may only be used in connection with a CCD.
- The laser can only be switched on, when it is correctly installed into the spindle holder of the CCD.
- The laser itself has a power 120 mW and is classified as laser class 3B.
- The laser is set into the CCD in a way, which makes it impossible to look directly into the laser light.

Note: *the laser exposure unit may only be operated in a closed rack or hood.*

Please observe the general rules for handling electronic parts, especially ESD-protection.



Before touching the laser head, perform a potential compensation.

E.g put you both hands on an ESD-suitable support before removing the laser from the package.

You need to do the same, before you reassemble the laser from the machine.

By bad conditions like, PVC flooring and shoes with plastic soles, high static charges can occur.

These could damage the laser head.

First steps

we assume that you have set up the CCD correctly, installed RoutePro3000 and the laser head is connected to your CCD.

1. [Activate the license](#) for the laser. The license file is sent via E-Mail or it is on the RoutePro3000 CD.
2. Before you start exposure, remove the cap from the laser lens.
3. Each laser has slightly different values and needs to be calibrated for the CCD it is attached to.
4. For each laser you must first determine the focus point and the thickest line width (we will call it maximum line). Then the values for the other line widths can be calculated by simple interpolation.
5. Enter the correct thickness of your PCB. Otherwise you will get different line widths. Similar to our 30° and 60° V-cut-routers deviations in board thickness or bends in the PCB will show in the line width. Due to the small opening angle of about 10° the effect is rather small.
6. Laser exposure is more sensitive to over swings when the machine is changing direction. That is why the step resolution is generally set to eighth-step-operation. This results in slower speeds and ramps. With the values shown in the screen shot, you can work well. The calibration factors for X-and Y-axis you must not change, as well as the values for table size and the maximum Z stroke (Z).



Menu Tools:

Here we come to the heart of exposure. Now you must enter for each line width the the corresponding height and adjust the speed for X/Y (X feed) and the laser intensity (laser power), so that the laser is both quick and precise and draws the designated line. We will explain further down how to determine the correct values.

The columns in detail:

Name: The tool numbers are imported from the loaded file.

Process: Check-box to select or deselect certain tools

Diameter: Insert the desired line widths

Feed XY: Speed for X- and Y-axis.
The slower you drive, the higher the exposure time.

Distance: Insert the corresponding height

Pre-light: When you want to draw wide lines, it is recommended to drive with some time delay, so the start point gets the same amount of light as the rest of the line. Here you can set this drive delay or pre-light.

Laser Power: In this column you can adjust the laser intensity between 0 and 100%.

Count: Number of vectors in loaded file.

No.	Name	Process	Diameter	Feed XY	Distance	Laser Power	Count
1	Laser Head	<input checked="" type="checkbox"/>	0.100000	800	0.000000	10	276
2	Laser Head	<input checked="" type="checkbox"/>	0.200000	800	2.000000	10	276
3	Laser Head	<input checked="" type="checkbox"/>	0.300000	800	4.000000	10	276
4	Laser Head	<input checked="" type="checkbox"/>	0.400000	800	6.000000	10	276
5	Laser Head	<input checked="" type="checkbox"/>	0.500000	800	8.000000	10	276
6	Laser Head	<input checked="" type="checkbox"/>	0.600000	800	10.000000	10	276
7	Laser Head	<input checked="" type="checkbox"/>	0.700000	800	12.000000	10	276
8	Laser Head	<input checked="" type="checkbox"/>	0.800000	800	14.000000	10	276
9	Laser Head	<input checked="" type="checkbox"/>	0.900000	800	16.000000	10	276
10	Laser Head	<input checked="" type="checkbox"/>	1.000000	800	18.000000	25	276
11	Laser Head	<input checked="" type="checkbox"/>	1.100000	800	20.000000	50	276
12	Laser Head	<input checked="" type="checkbox"/>	1.200000	800	22.000000	75	276
13	Laser Head	<input checked="" type="checkbox"/>	1.300000	800	24.000000	100	405
14	Laser Head	<input checked="" type="checkbox"/>	1.400000	800	26.000000	125	535
15	Laser Head	<input checked="" type="checkbox"/>	1.500000	800	28.000000	150	665
16	Laser Head	<input checked="" type="checkbox"/>	1.600000	800	30.000000	300	735

Calibration

Each laser has slightly different values and needs to be calibrated for each machine.
The laser beam exits from the lens with approx. 2 mm width, focuses at approx. 10 mm distance,
and then expands with an opening angle of approx. 10° to a line width of approx. 5 mm in Z-Max (depending on the machine at about 37.7 mm height).

S:\Projekte\Muster CCD\laser demo\16lines.plt

First select or accept the processing type.
Second: select the type of material you will use.
This will be used to match a tool from the default tool table.

Processing type

Line Laser

Material

Negative

Step 1 Focus point

S:\Projekte\Muster CCD\laser demo\16lines.plt

Set parameters for Line Laser tool

1

Laser type

Laser head

Laser settings

Diameter 0,100000

Distance 0,000000

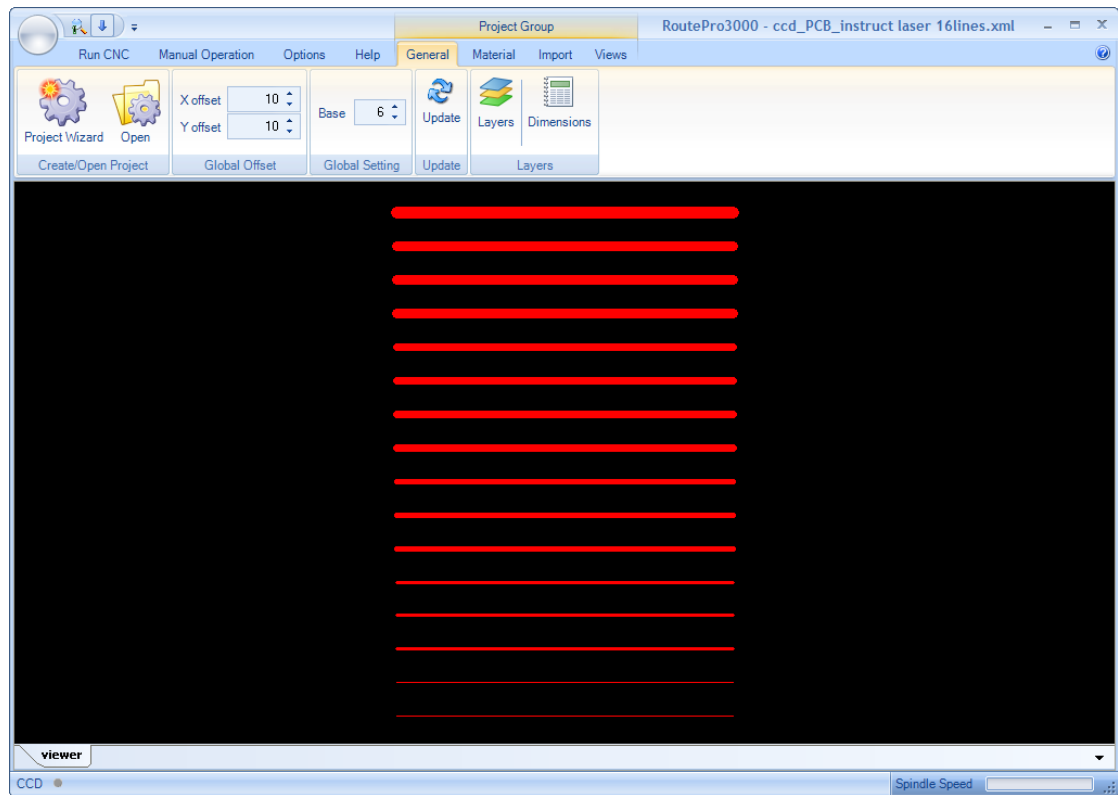
Table feed 800

Pre-lite (ms) 10

Laser power 33%

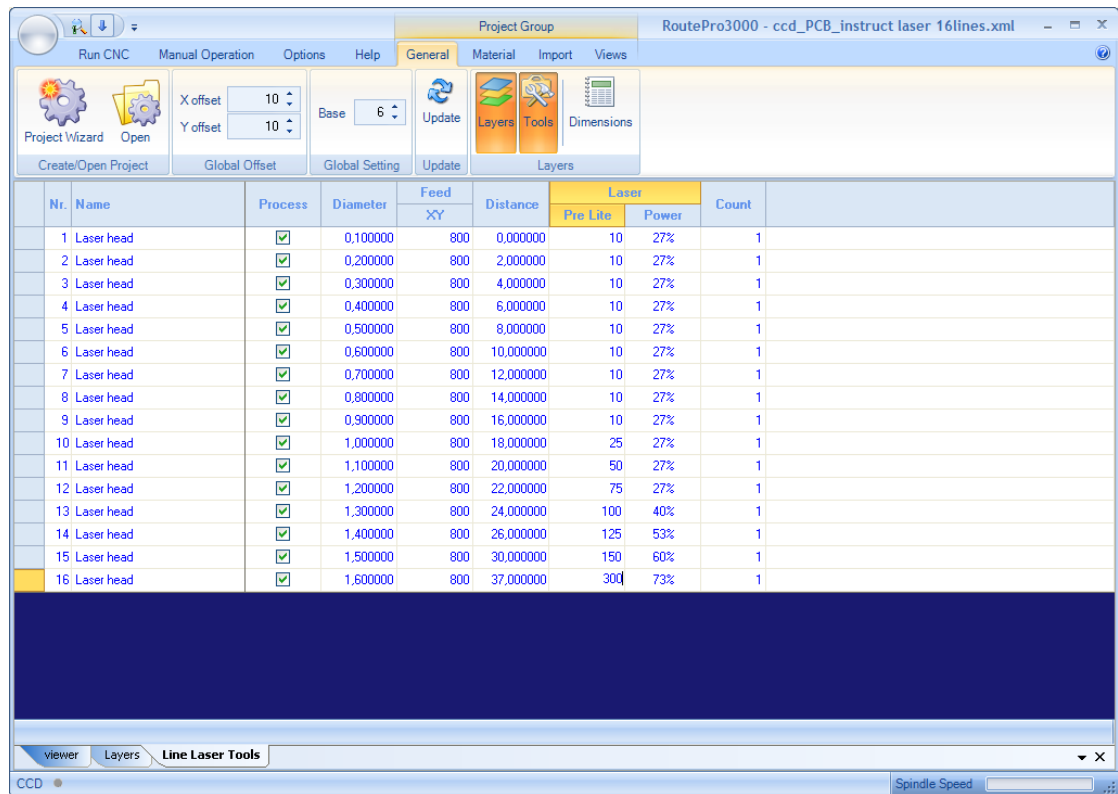
☐ Update the default tool table

Step 1 in the laser calibration is to find the focus point. Enter thickness of your PCB in the main menu and load the file "16lines.plt". Skip the wizard as much as possible. We will edit the tools directly in the tool table.



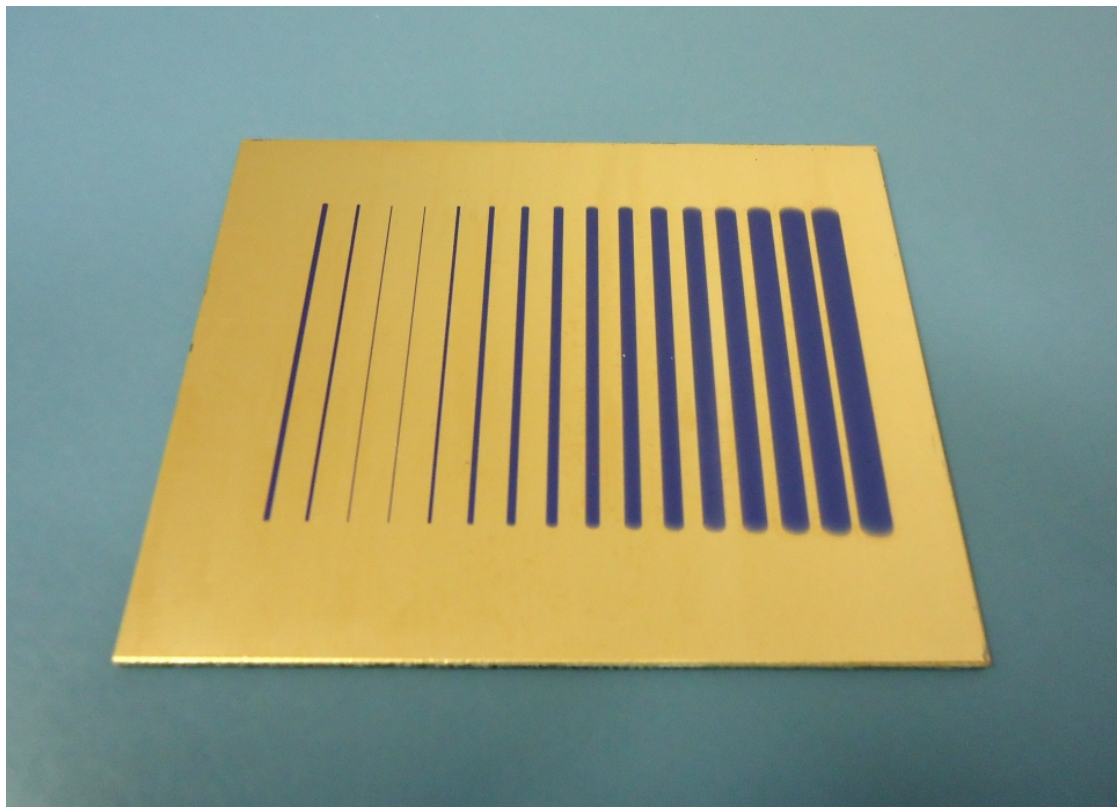
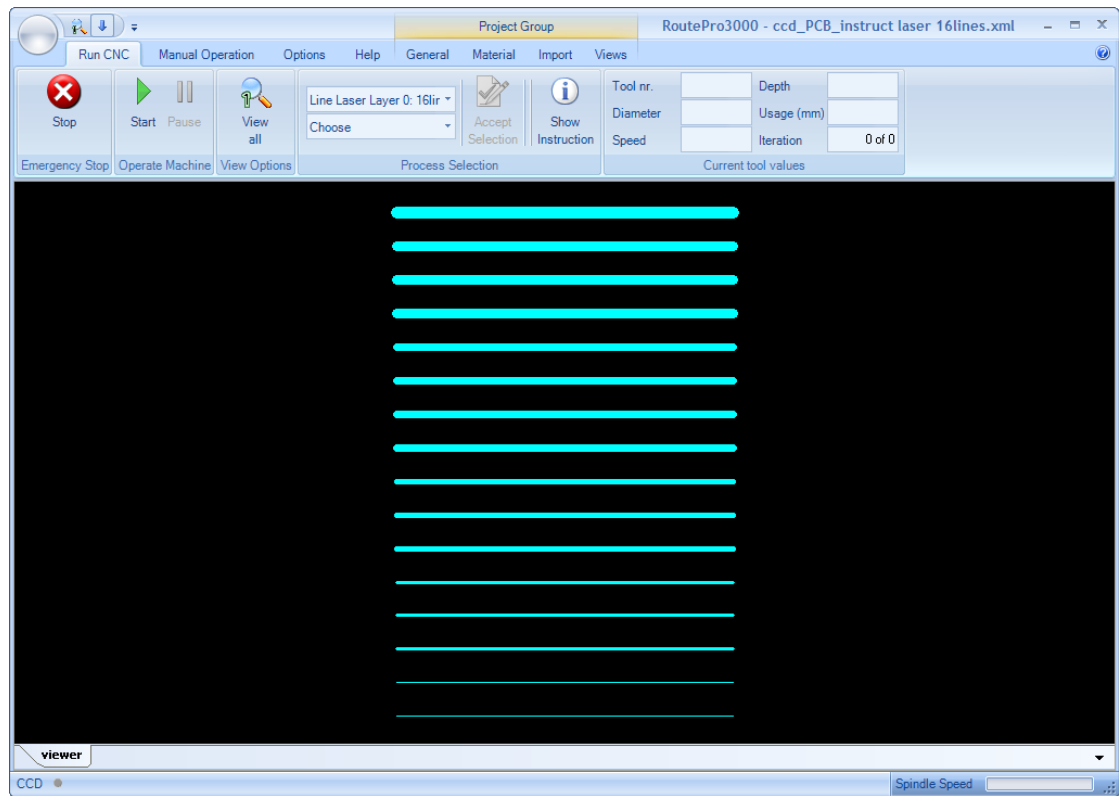
The example here shows a calibration for a negative resist. For positive resist and ALUCOREX the procedure for determining the height is equal, only speeds and laser intensity must be adjusted, since positive resist as well as ALUCOREX require more light for the subsequent development.

For the first tests you need small circuit boards with negative resist (about $80 \times 100 \times 1.5$ mm) and a spray developing machine. As we examine only the correct image of the lines on the resist, you do not need neither copper clad on the PCB nor an etching machine at this time. After loading the file 16 lines your viewer should look like this:



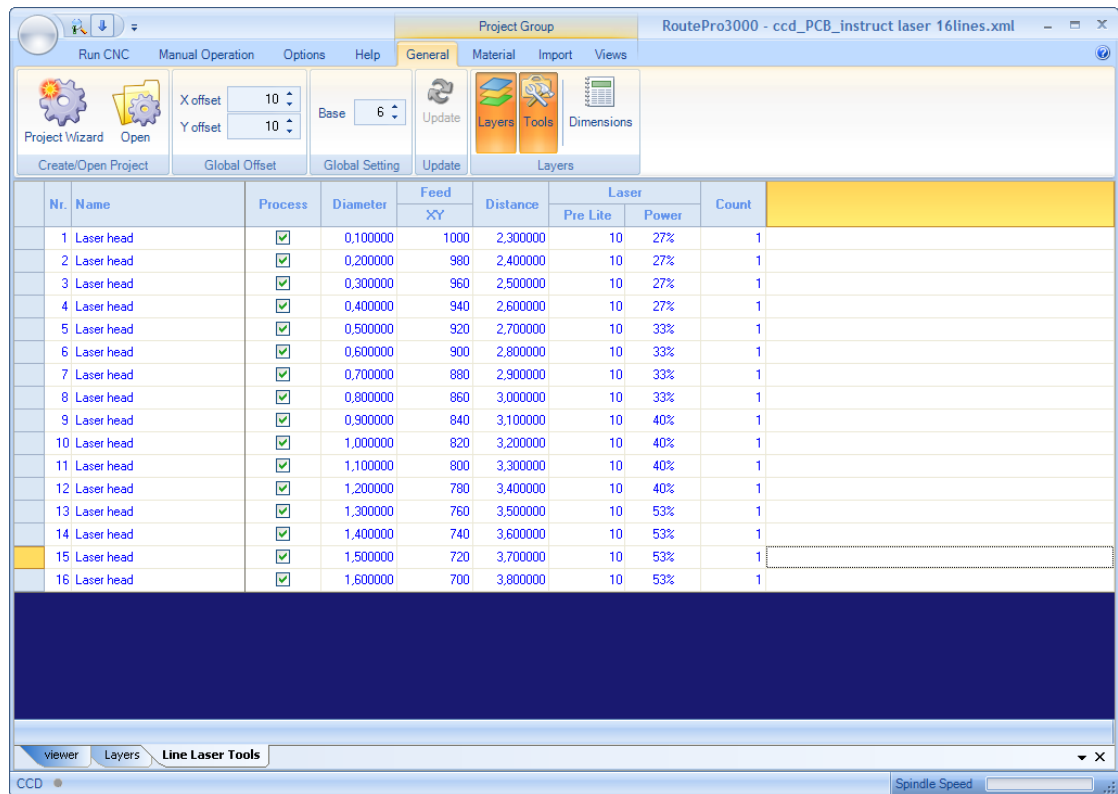
Click on layers, select a layer and click on tools. Here at the tool table you can edit the parameters for each tool. For a first test you can insert the values you see in the picture on the right into your software.

Click on tab "Run CNC" and start the laser exposure.



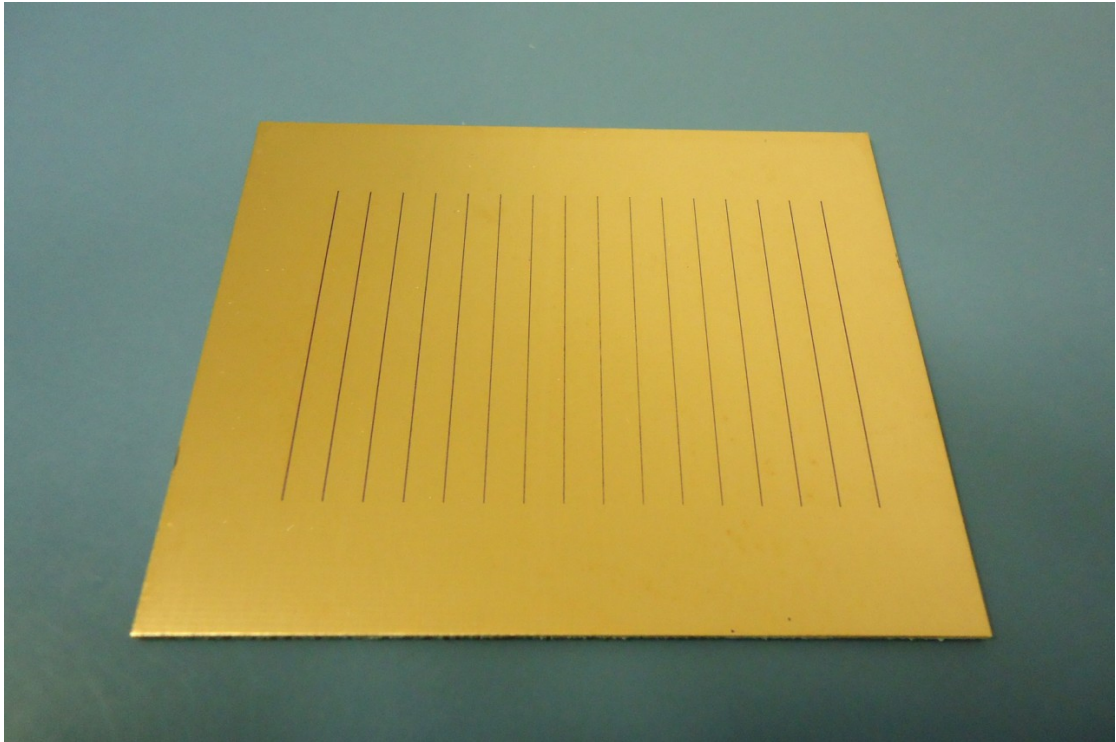
After developing your PCB could look like this:

The thinnest line is approx. at 3 mm height. In this area there has to be the focus point. With one or two more tries we can narrow down the correct height for the focus point.



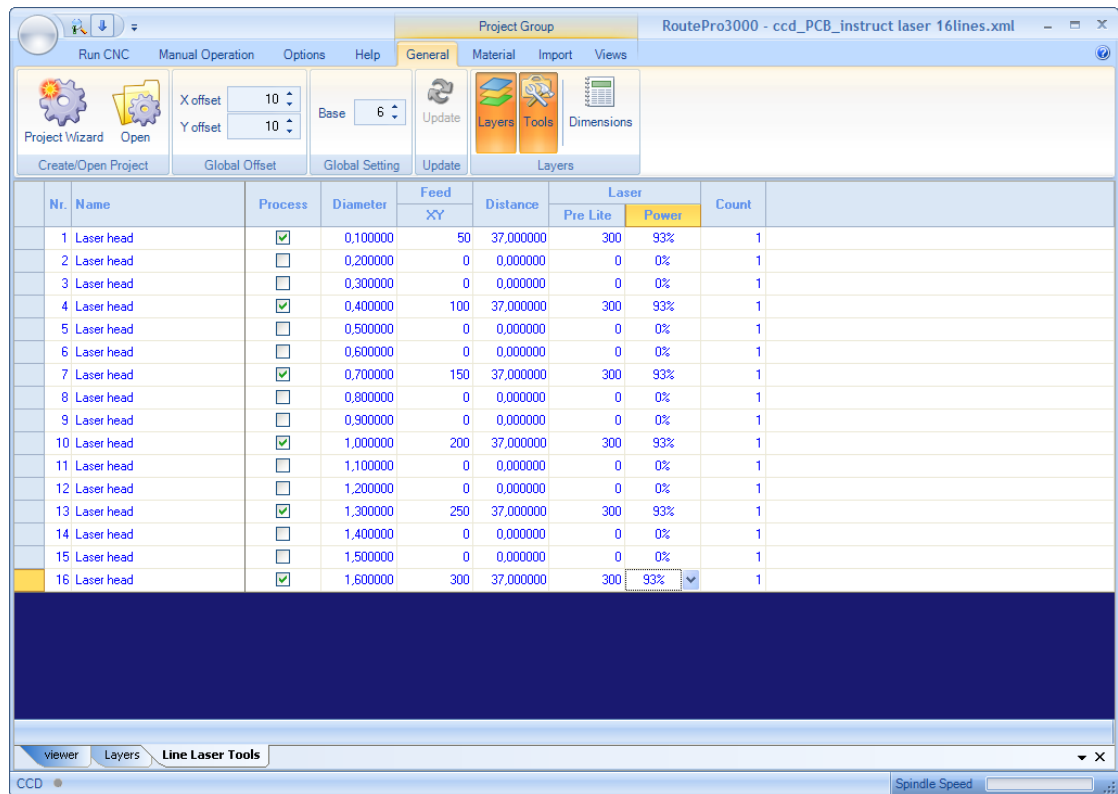
Nr.	Name	Process	Diameter	Feed XY	Distance	Laser Pre Lite	Power	Count
1	Laser head	<input checked="" type="checkbox"/>	0,100000	1000	2,300000	10	27%	1
2	Laser head	<input checked="" type="checkbox"/>	0,200000	980	2,400000	10	27%	1
3	Laser head	<input checked="" type="checkbox"/>	0,300000	960	2,500000	10	27%	1
4	Laser head	<input checked="" type="checkbox"/>	0,400000	940	2,600000	10	27%	1
5	Laser head	<input checked="" type="checkbox"/>	0,500000	920	2,700000	10	33%	1
6	Laser head	<input checked="" type="checkbox"/>	0,600000	900	2,800000	10	33%	1
7	Laser head	<input checked="" type="checkbox"/>	0,700000	880	2,900000	10	33%	1
8	Laser head	<input checked="" type="checkbox"/>	0,800000	860	3,000000	10	33%	1
9	Laser head	<input checked="" type="checkbox"/>	0,900000	840	3,100000	10	40%	1
10	Laser head	<input checked="" type="checkbox"/>	1,000000	820	3,200000	10	40%	1
11	Laser head	<input checked="" type="checkbox"/>	1,100000	800	3,300000	10	40%	1
12	Laser head	<input checked="" type="checkbox"/>	1,200000	780	3,400000	10	40%	1
13	Laser head	<input checked="" type="checkbox"/>	1,300000	760	3,500000	10	53%	1
14	Laser head	<input checked="" type="checkbox"/>	1,400000	740	3,600000	10	53%	1
15	Laser head	<input checked="" type="checkbox"/>	1,500000	720	3,700000	10	53%	1
16	Laser head	<input checked="" type="checkbox"/>	1,600000	700	3,800000	10	53%	1

Here you can see an example for narrowing down. In this test already different values for speed and laser power are tested.



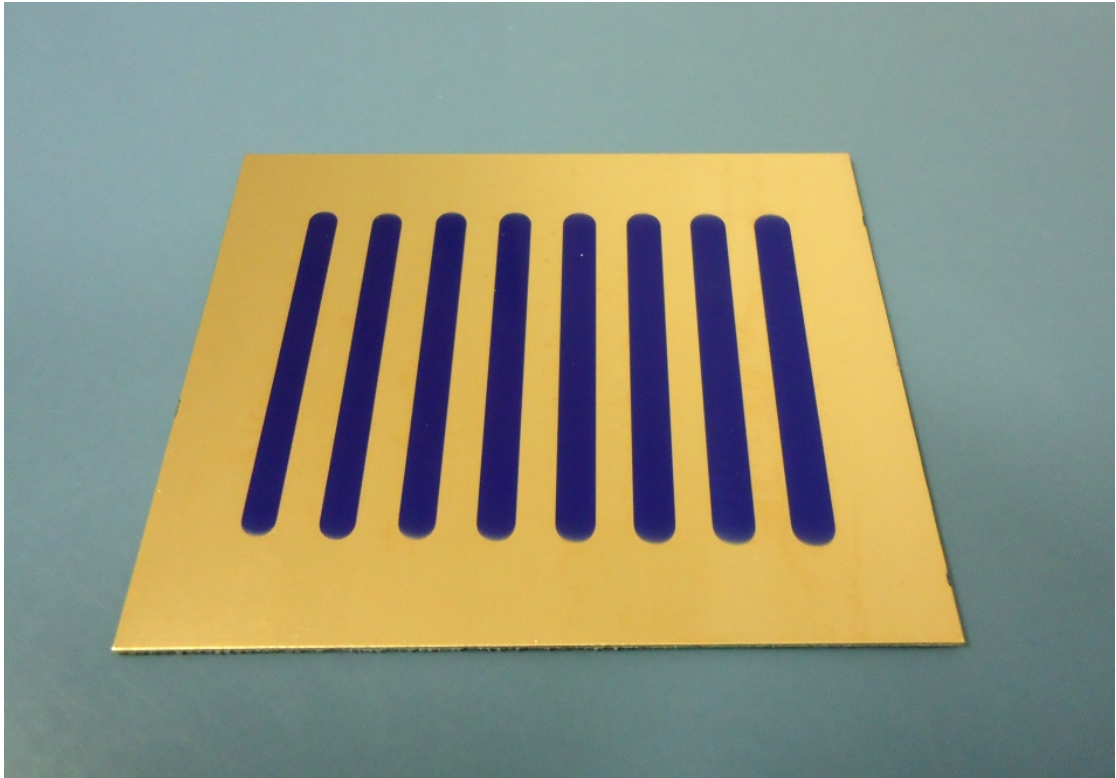
Result after developing:

In this case the focus point is set to 3.7 mm height at a speed of 720mm/min and a laser power of 33.



Step 2 maximum line

In the next attempt we will try to expose the broadest possible line as counter part to the focus point. We will call that line maximum line and you need it to interpolate the other line widths. In the example below, the height is fixed at 37 mm and a few lines are plotted with different settings. Of course wide lines require more light, which means a higher laser intensity and/or a lower speed.



The result could look like that:

In this example we measured with a microscope a line width of 6 mm.
As maximum line width we set 6 mm at 37 mm height. A suitable speed is 50mm/min and a laser power of 15.

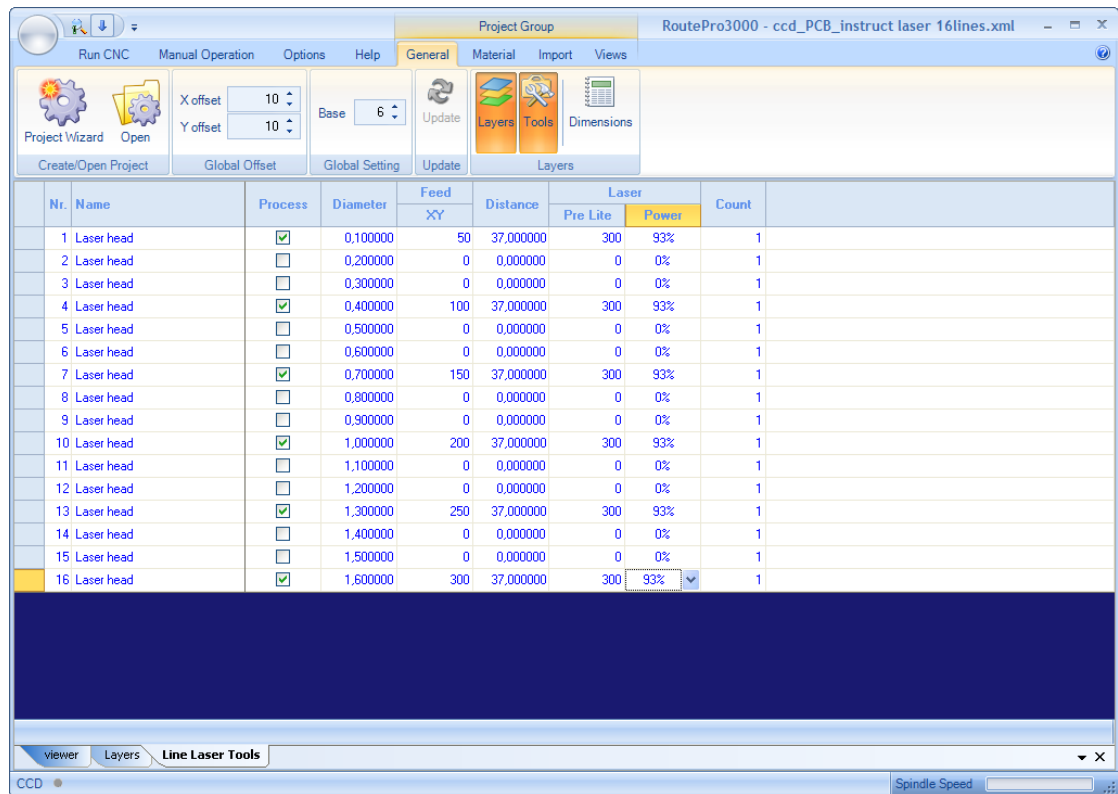
Step 3: Interpolation of focus point and maximum line for the other line widths

An excerpt from the interpolation table you can see below.

How to do:

we divide difference of width between focus point (0mm) and maximum line (6 mm) in parts of 0.1 mm. In this example 60 parts. In the same manner we divide difference of width between focus point

(3.7 mm) and maximum line (37 mm) in 60 segments. This way we get the change of height for 0.1 mm change of width. In this example 0.555mm.

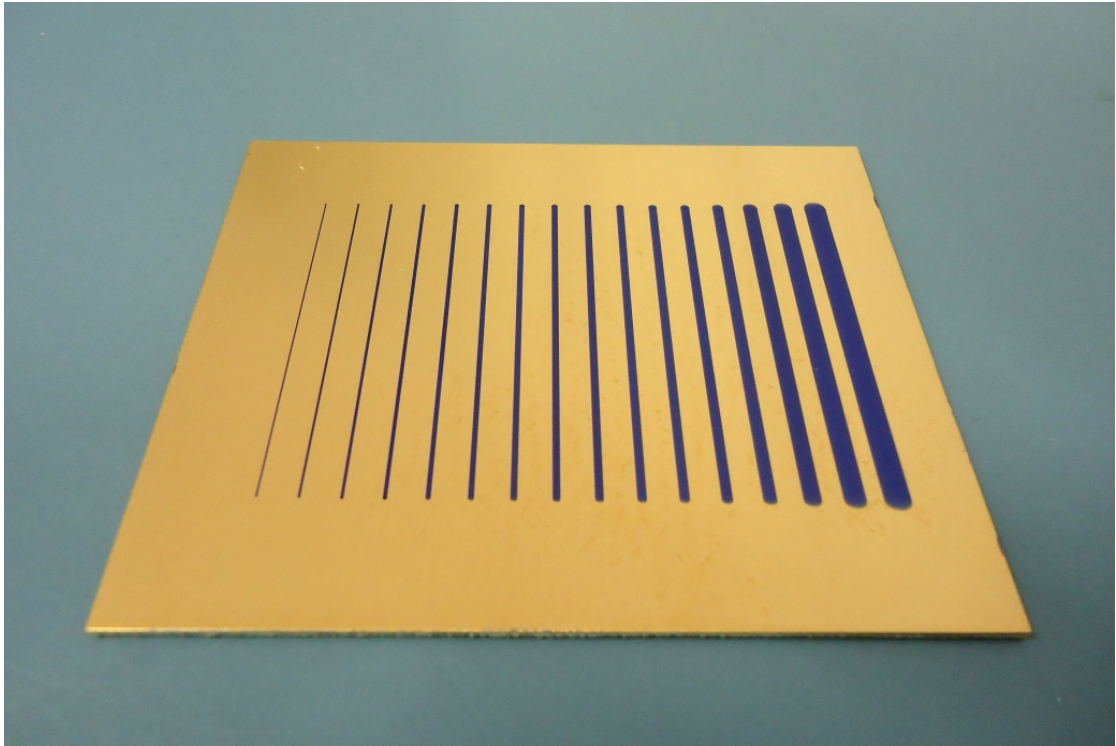


The screenshot shows the 'RoutePro3000' software interface. The title bar indicates the project is 'ccd_PCB_instruct laser 16lines.xml'. The menu bar includes 'Run CNC', 'Manual Operation', 'Options', and 'Help'. The 'General' tab is active, showing settings for 'X offset' (10), 'Y offset' (10), and 'Base' (6). Below these are buttons for 'Project Wizard', 'Open', 'Update', 'Layers', 'Tools', and 'Dimensions'. The main area contains a table with 16 rows, each representing a laser head. The table has columns for 'Nr.', 'Name', 'Process', 'Diameter', 'Feed XY', 'Distance', 'Laser Pre Lite', 'Laser Power', and 'Count'. The 'Process' column has checkboxes, and the 'Laser Power' column has a dropdown menu. The 'Count' column has a dropdown menu. The table is followed by a large blue rectangular area. At the bottom, there is a 'viewer' tab and a 'Line Laser Tools' tab. The status bar at the bottom shows 'Spindle Speed' and a numerical value.

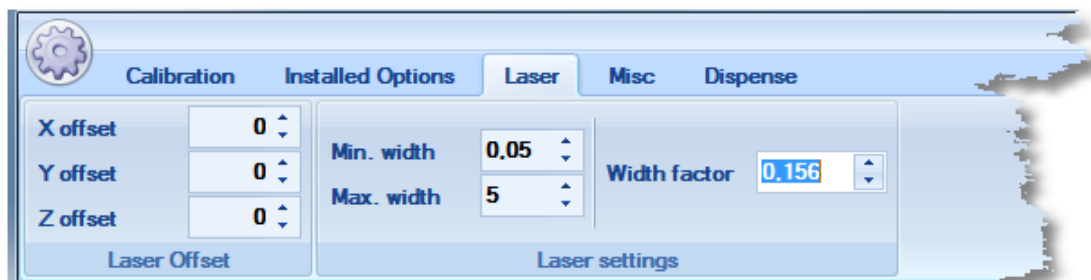
Nr.	Name	Process	Diameter	Feed XY	Distance	Laser Pre Lite	Laser Power	Count
1	Laser head	<input checked="" type="checkbox"/>	0,100000	50	37,000000	300	93%	1
2	Laser head	<input type="checkbox"/>	0,200000	0	0,000000	0	0%	1
3	Laser head	<input type="checkbox"/>	0,300000	0	0,000000	0	0%	1
4	Laser head	<input checked="" type="checkbox"/>	0,400000	100	37,000000	300	93%	1
5	Laser head	<input type="checkbox"/>	0,500000	0	0,000000	0	0%	1
6	Laser head	<input type="checkbox"/>	0,600000	0	0,000000	0	0%	1
7	Laser head	<input checked="" type="checkbox"/>	0,700000	150	37,000000	300	93%	1
8	Laser head	<input type="checkbox"/>	0,800000	0	0,000000	0	0%	1
9	Laser head	<input type="checkbox"/>	0,900000	0	0,000000	0	0%	1
10	Laser head	<input checked="" type="checkbox"/>	1,000000	200	37,000000	300	93%	1
11	Laser head	<input type="checkbox"/>	1,100000	0	0,000000	0	0%	1
12	Laser head	<input type="checkbox"/>	1,200000	0	0,000000	0	0%	1
13	Laser head	<input checked="" type="checkbox"/>	1,300000	250	37,000000	300	93%	1
14	Laser head	<input type="checkbox"/>	1,400000	0	0,000000	0	0%	1
15	Laser head	<input type="checkbox"/>	1,500000	0	0,000000	0	0%	1
16	Laser head	<input checked="" type="checkbox"/>	1,600000	300	37,000000	300	93%	1

For all line widths we can now calculate the corresponding height.

We transfer the results into the tool table:



and expose a sample PCB with the found values (do not forget to interpolate values for speed and laser power as well !!). Result:



Now comes a very important step. If you want to adjust a correct laser height for all tools you read in with any files, we have prepared a special setting. If you go on register "options" and on "machine" and "advanced" you find the following laser menu:

In this menu you can insert the height of the focus point in the field Z offset. If you happen to notice, that there is a deviation from the drilling/routing spindle to the laser, you can also adjust this offset with the fields X offset and Y offset. We will explain further down how this is done.

To get the correct laser height for every desired line, we need a certain factor to calculate the correct height for the laser. In the example above we calculated that we need to increase the height of the laser by 0.555mm, if we increase the line width by 0.1 mm. Or 5.55mm if we change line width by 1 mm. 5.55 mm is our height factor.

If we inverse the calculation we can say: if we increase the height by 1 mm, we increase the line width by $1/5.55\text{mm} = 0.18018$.

0.18018 is our width factor and this factor we insert in the field width factor. With this factor RoutePro3000 will calculate the correct laser height for any possible line width between 0.05 and

5 mm.

Determine Offset between spindle and laser head

It can happen that spindle tip and laser beam do not focus on the same spot. If so, it is very easy to determine and correct that offset.

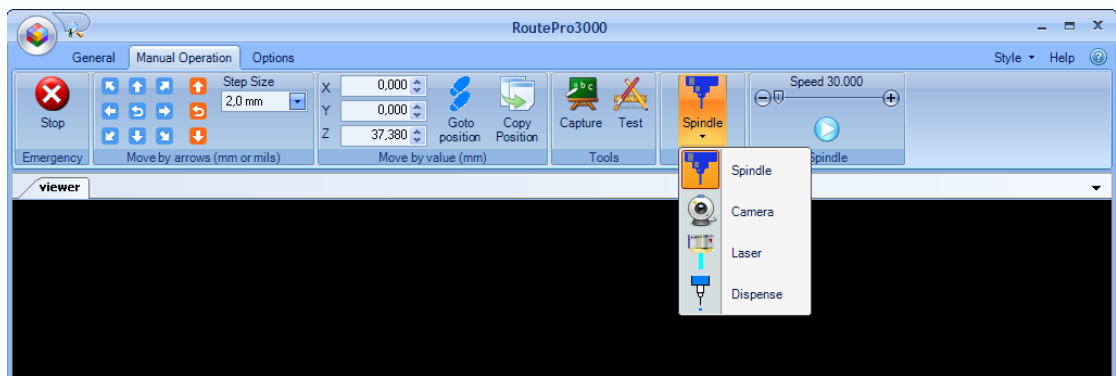
To do so you need the calibration module for RoutePro3000 and a camera. First step is to determine the offset between camera and spindle. Go to manual operation, drill a hole and focus the camera over the hole. This procedure is described in the RoutePro3000 help file at "calibrating camera".

Write down the values for the camera-spindle offset.

Close RoutePro3000, switch off the controller and mount the laser to the machine. Fix a negative coated PCB to the machine.

Turn on controller, start software and go to manual operation. Switch the device from spindle to laser. Turn on the laser and make a spot on PCB. Switch device to camera and center the camera over the exposed spot. Write down the values for the camera-laser offset.

The difference between camera-spindle offset and camera-laser offset is the laser-spindle offset. This value you can insert at machine – advanced – laser – X offset/Y offset.



Guarantee

All machines are submitted before distribution to examination on function and continuous operation firmness. On the machine we grant a work warranty of 12 months to our customers starting from purchase date on accuracy in material and processing. We warrant at our choice by exchange of incorrect parts or by repair of the machine in our house. Old parts change into our possession.

Disclaimer of warranty

All parts subjected to wear are excluded from this warranty. Any direct or indirect damage resulting from over-heat or chemical reaction shall void all warranty claims. This also applies to defects to the machine caused by non-observance of this manual or of parts of it. Unauthorized repairs or interventions to the machine will result in the loss of all warranty claims.

We cannot accept subsequent claims from damage or destruction of workpieces worked on in the machine, because we have no knowledge or control over the operating conditions at your site. This is valid in a general manner also for requirements from damage to articles, buildings and persons as well as the environment.

We do not warrant that the function of the machine will meet the customer's requirements or that the operation of the machine will to this regard be error free.

In no event will we be liable to the customer for any incidental, consequential, or indirect damages of any kind, including loss of profit and prosecution for environmental pollution, even if we could have been aware of the possibility of such damages.

All information was arranged with great care. We reserve ourselves however mistake and technical changes without previous announcement.

7.2.2 Dispense Module DispPro3000

Introduction

The dosing module DispPro3000 is an extension of the CCD for dispensing solder paste or glue. A manual dispenser controlled with a switch contact instead of the foot pedal. The dosing cartridge is mounted in the spindle holder of the CCD instead of the spindle.

DispPro3000 is not a fully automatic dosing system, but a dosing aid for a manual dispenser.

The dosing positions are exactly approached and the dosing height and dosing time are precisely controlled. Additional settings such as viscosity control and control of the dosing volume are not supported. The control of these parameters is subject to the user.

You need a CCD, a manual dispenser, a switch contact for communication between CCD and dispenser and a dosing license DispPro3000.

Safety regulations

- Please note the general safety rules when handling electrical and electronic equipment.
- Read the safety instructions in the manual of the dispenser.
- Read the material safety data sheets of your solder paste and glue.

First steps

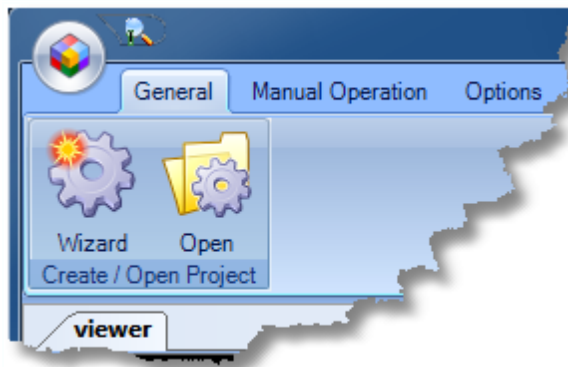
we assume that you have set up the CCD correctly, installed RoutePro3000 and the machine is working correctly in drilling and milling mode.

Your dispenser is set up, connected to the required compressed air and a function test is performed.

The contact switch is mounted and connected to the CCD, the dispenser is connected to the contact switch and at last a dosing cartridge is mounted in the spindle holder. Questions on these issues are answered in the manual of the dispenser and in the setup instruction for the contact switch

1. [Activate the license](#) for the dispensing module. The license file is sent via E-Mail or it is on the RoutePro3000 CD.
2. For a first test fix a dummy board on your CCD.
3. Make yourself familiar with cleaning of cartridge and dispenser. Read the instructions of your solder paste and glue supplier.
4. Maybe fill the cartridge with a liquid that is easy to clean.
5. Go to Tab **Manual Mode** and change the application to Dispensing. Perform a function check by switching the dispenser on and off.

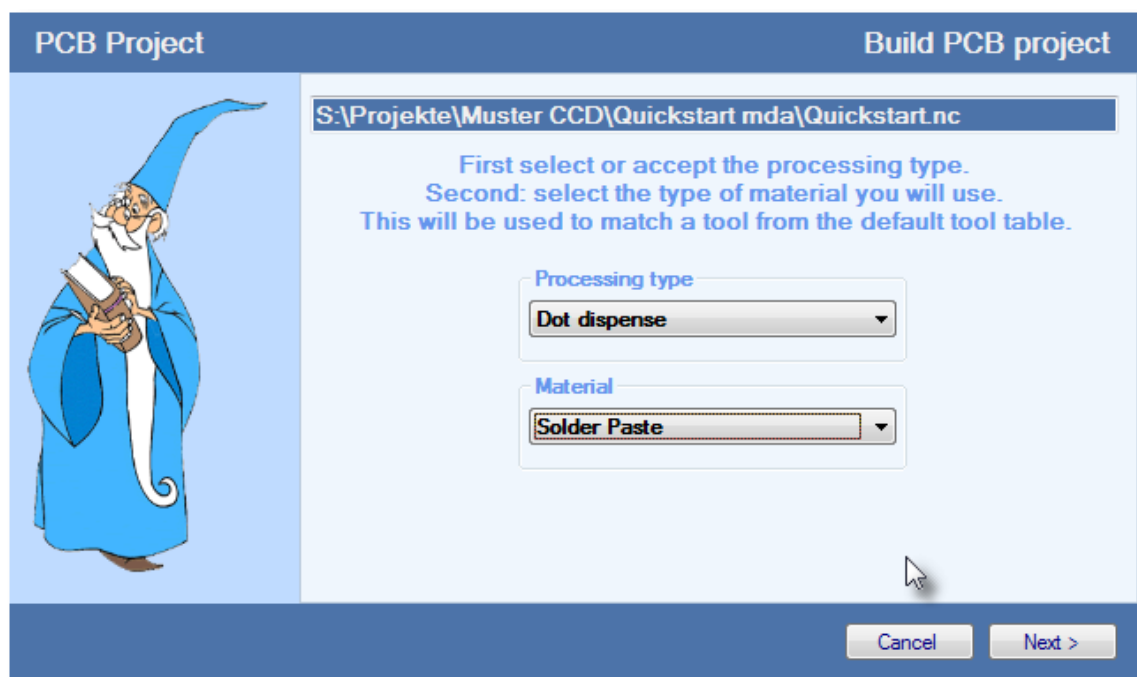
6. Make yourself familiar with the differences in the software for this application.
7. Create a new project by loading e.g a drill file.



Click on **Wizard**.

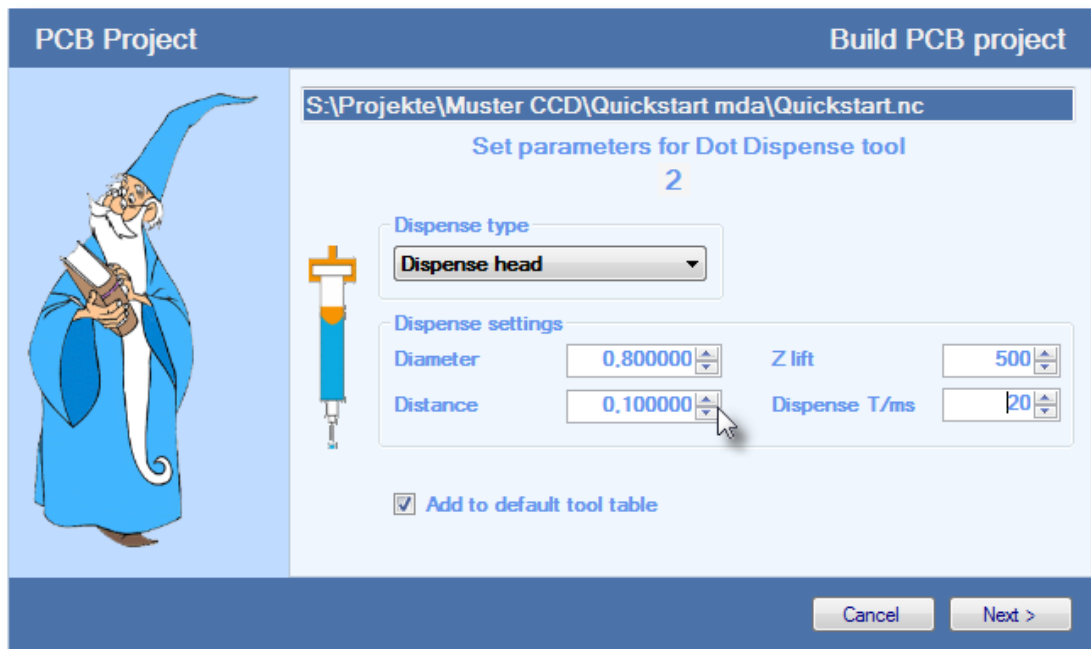
Click on **New Project**

This screen appears:



Change processing type to Dot dispense. This will change the options for material
For dispense applications solder paste and glue are available at the moment.

Note: the material determines the tools RoutePro3000 suggests.



Now let's get serious:

The tools of the file need to get equipped with correct parameters.

In this case we need parameters for tool 2. Some parameters were already filled out by the software.

The amount of solder paste depends on the viscosity, the pressure, thickness of the needle and dosing time, but also of dosing height and speed of the z-axis lift.

You will understand that it is really difficult to supply parameters for a complex process like that. This concludes that you will have to do some tries on your own.

Note: The file may contain a big number of tools. Only tools with coordinate data (dosing points / lines) will be displayed

Note: if the tool already exists in the default tool table, all parameters will be filled in automatically.

▼Description of the fields

Dispense head

here you can select the kind of dispense head you are using. At the moment there is no selection available.

Diameter

Defines the diameter of the current tool.

Note: If your file contains the diameter, the diameter will be displayed.

If not, you have to insert the diameter manually.

The amount of glue and solder paste depends on the diameter. Big solder pads require more glue/solder paste than small ones.

Distance

Here you can insert the distance of the needle to the pcb surface.

Z-Lift

the Z-Lift determines the speed of the z-axis when lifting from the dosing spot. This has influence of the breaking point of the glue and thus on the amount of glue/paste.

Dispense T/ms

Please insert in this field the desired dosing time.

The dosing time has direct influence on the dosing amount.

Add to default tools

If a tool is not existing in the defaults, this checkbox is active.

The values you insert for his tool are automatically copied to the default table unless you uncheck the box.

If the tool is already existing in the defaults, then the checkbox is inactive.

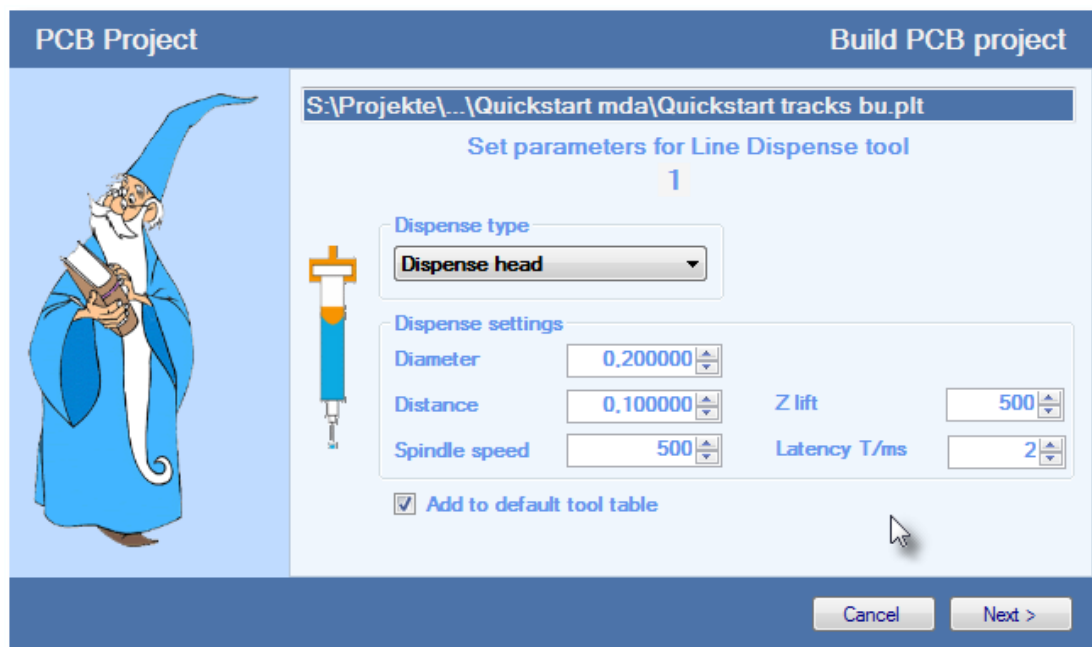
If you change the parameters and activate the check box, the existing parameters are overwritten (do this only if you are sure what you are doing)

Fill in the fields and click on **Next**, to define the other tools of this file.

If this is done, the next file will be processed. In our example it is a line dispensing file.

The first two dialogues are the same (instructions, processing type, material), that is why we skip them here.

Fill in the fields and **click Next**



▼Description of the fields

Dispense head

here you can select the kind of dispense head you are using. At the moment there is no selection available.

Diameter

Defines the diameter of the current tool.

Note: If your file contains the diameter, the diameter will be displayed.

If not, you have to insert the diameter manually.

The amount of glue and solder paste depends on the diameter. Big solder pads require more glue/solder paste than small ones.

Distance

Here you can insert the distance of the needle to the pcb surface.

Spindelspeed

Uhh, a Bug. The line is supposed to name Speed XY. The speed in XY-direction of course influences the thickness of the dosing line.

Z-Lift

the Z-Lift determines the speed of the z-axis when lifting from the dosing spot. This has influence of the breaking point of the glue and thus on the amount of glue/paste.

Dispense T/ms

Please insert in this field the desired dosing time.

The dosing time has direct influence on the dosing amount.

Latency T/ms

You can only make a correct line, if the solder paste has contact to the pcb from the start point to the endpoint. This often requires a latency (waiting time) after lowering/ opening the dosing valve and before driving the needle in XY-direction. This latency can be set here.

Add to default tools

If a tool is not existing in the defaults, this checkbox is active.

The values you insert for his tool are automatically copied to the default table unless you uncheck the box.

If the tool is already existing in the defaults, then the checkbox is inactive.

If you change the parameters and activate the check box, the existing parameters are overwritten (do this only if you are sure what you are doing)

To define parameters for dispensing you can proceed equivalent as explained in the chapter Laser moduel LaserPro3000. A precise documentation may follow later.

7.2.3 Calibration Module

With a calibration module you will be able to use a camera, mounted on the machine, to calibrate a PCB placed on the machine table.

This is especially handy when you want to do rework on a PCB.



Because the camera has an offset from the spindle, it cannot reach approximately 6 centimeters in the Y direction.

Please keep this in mind while calibrating or using the camera as inspection device.

Rework could be:

- You have a PCB from a client but some mounting holes are too small, so you need to drill them

with a bigger tool.

- You have the dispense unit installed and want to calibrate the PCB so the dots will be placed correctly
- You want to cut a hole in a PCB that was already finished.
- etc.

The calibration module has an unique feature that will automatically center the fiducial.

You may also click in the calibration screen to travel to the position instead of using the arrows.

If you have the calibration module installed, extra camera options will be available, like zoom. (see [camera options](#))

Note: *you need a camera to use the calibration unit.*

Calibrating for mouse positioning.

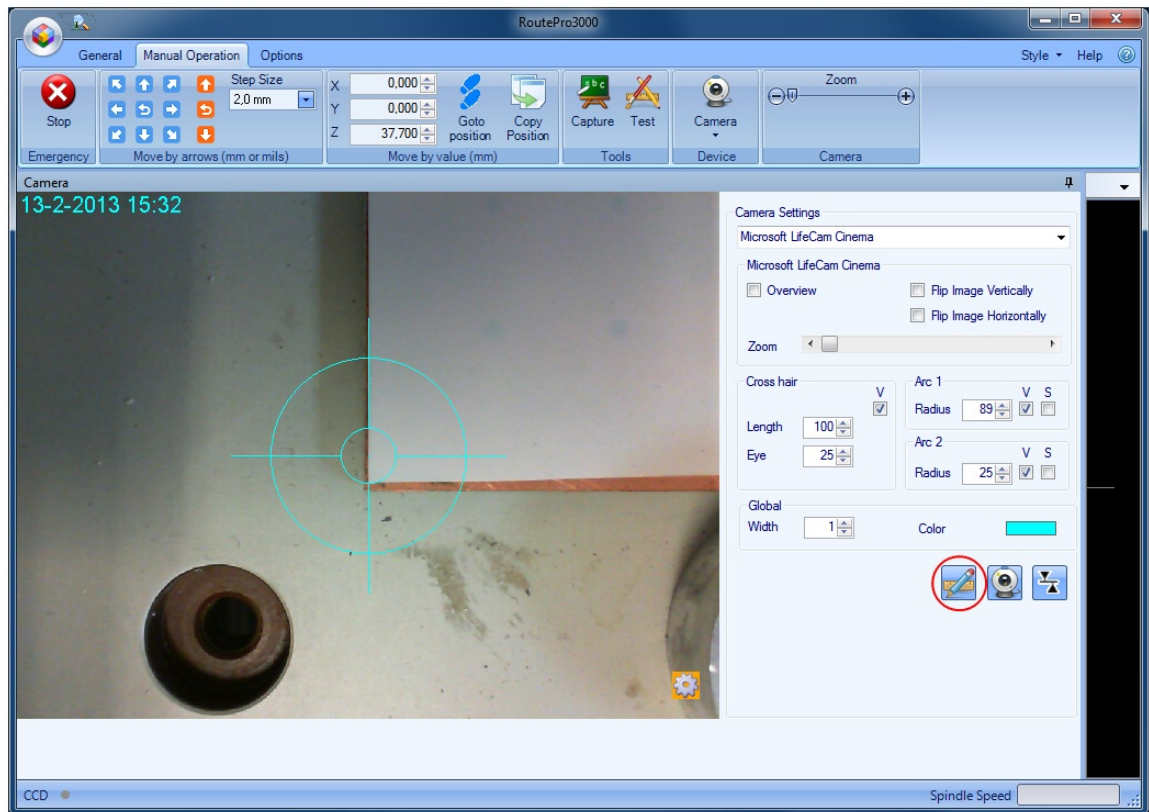
Before you can use positioning by pointing with the mouse, you need to calibrate the screen with the design.

Points you need to take in account:

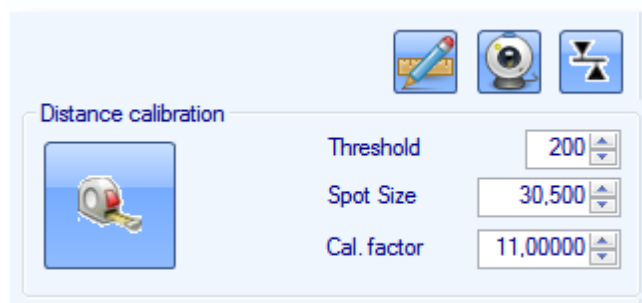
- The Calibration factor need to be adjusted if the distance from the camera and the board changes.
- So calibrating is optimal if you have your board and underlayment on the table.
- However with the new automatic center option it does not have to be that precise.
- You need reasonable lightning.
- You need a white paper with a black spot for measurement (provided by your dealer when purchasing the calibration module)

Goto **manual operations** and select the **camera mode**.

Open the **Camera settings** screen



Press the **calibration button** this will open the next window:



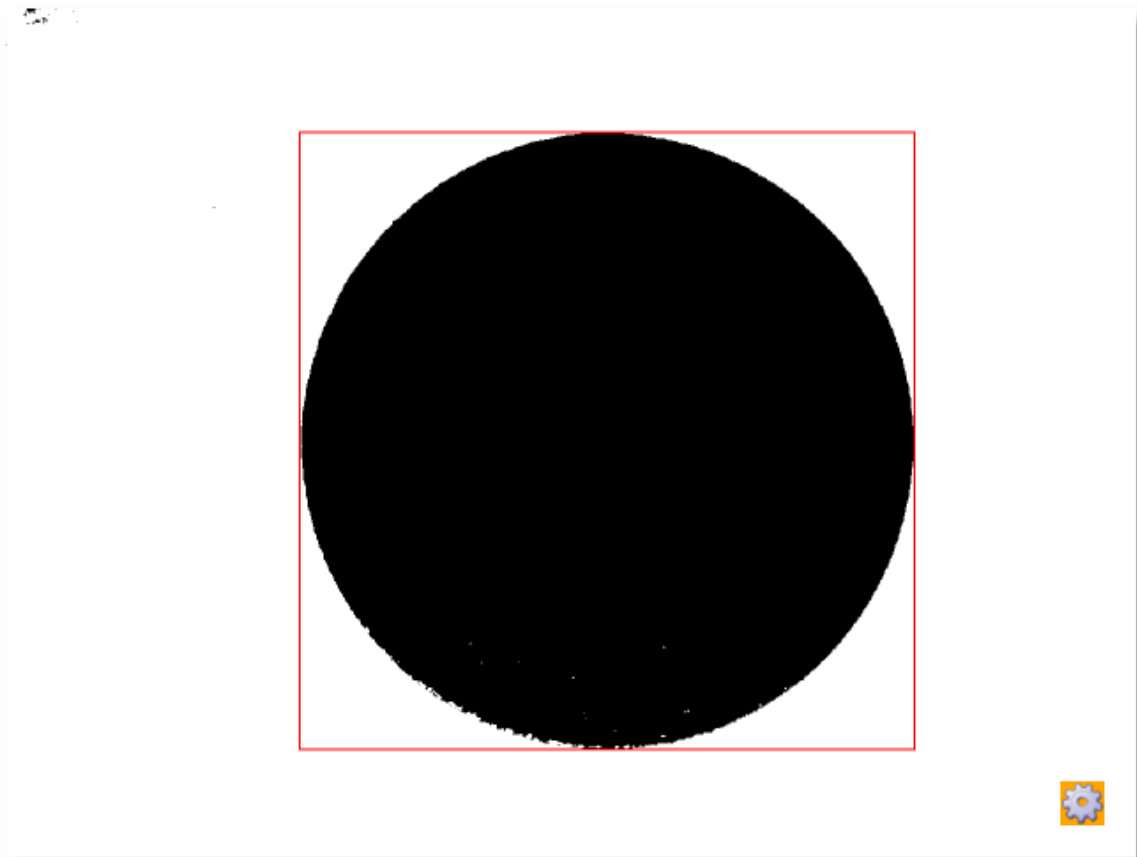
- ▼ **Threshold**
You may change the value to obtain a better measure result.
- ▼ **Spot Size**
This is the size of the spot, used for calibration
- ▼ **Cal. factor**
This holds the calculated calibration factor
- ▼ **Calibration button**
Start the calibration

Now position the spot under the camera so the whole spot is visible. (it does not have to be precise)



Press the **Calibration Button**.

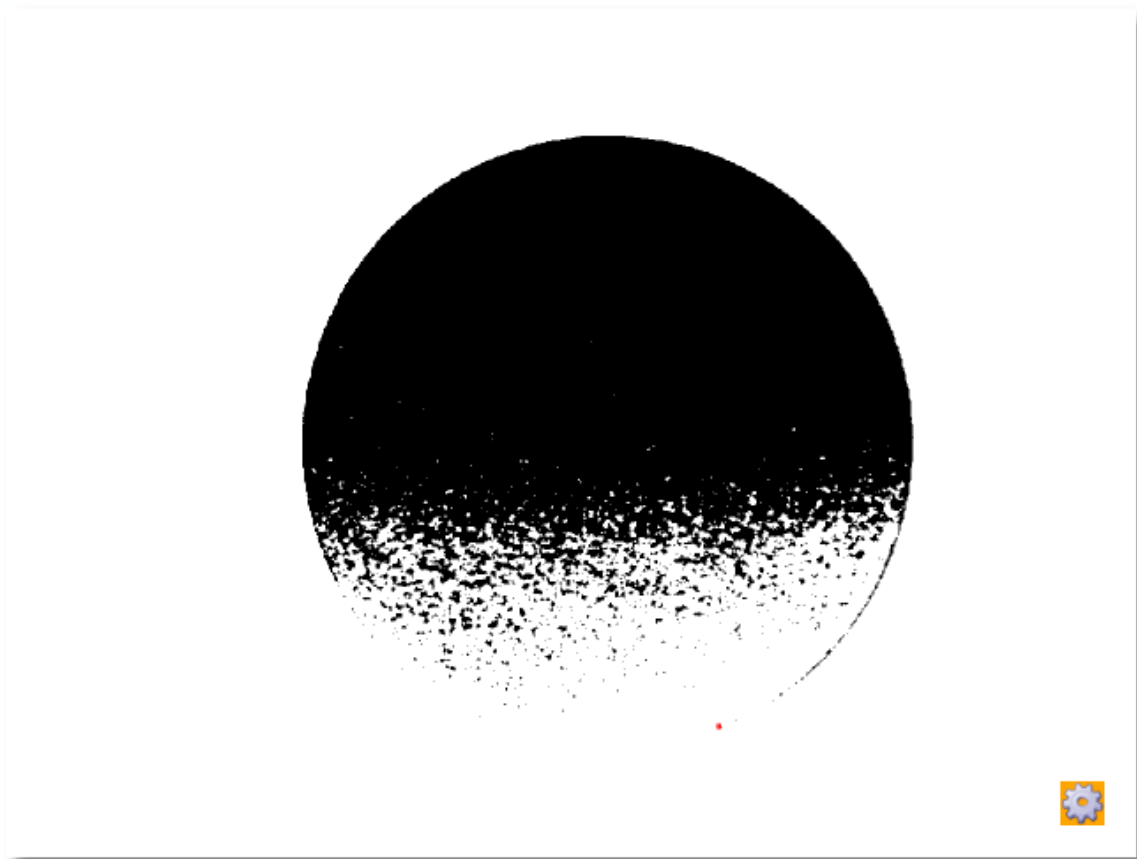
After that hover over the little white window, showing the spot to check the measurement. The window will expand and if the spot is surrounded by the red line, the measurement was successful.



The calibration factor is now stored, you may close this option.



If not successful you will get something like the following picture.
You need to increase in this case the threshold and measure again.



Note: *if measurement was unsuccessful the calibration factor will be set to 11,1111*

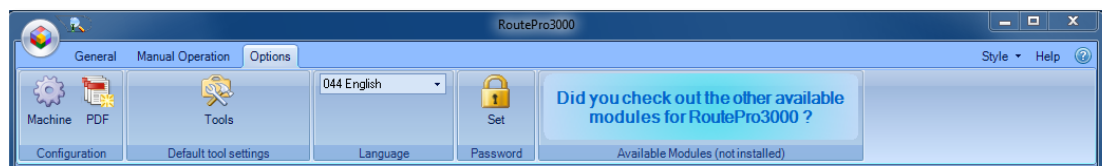
See also: [Calibrating the camera](#)

How to Calibrate a PCB [read more....](#)

7.2.4 Documentation Module

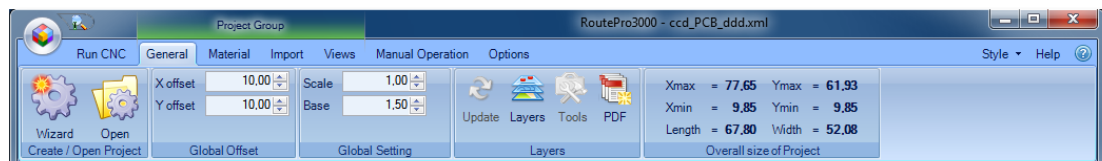
This documentation module will provide outstanding documentation which you can use for future reference.

You may also handout the project documentation to your customer along with the finished boards.



When the documentation module is activated you'll find a new button under **options**: **PDF**. Pressing this button will generate a complete **PDF** document, containing all the machine settings.

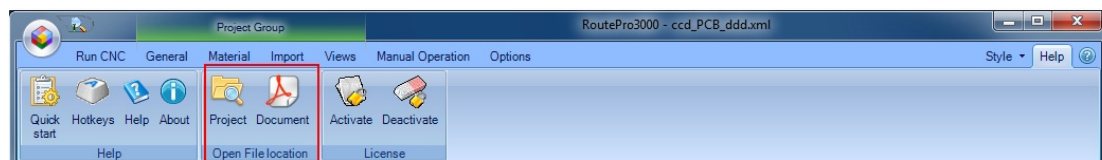
When a project is loaded you'll find also such a button under the **general** tab.



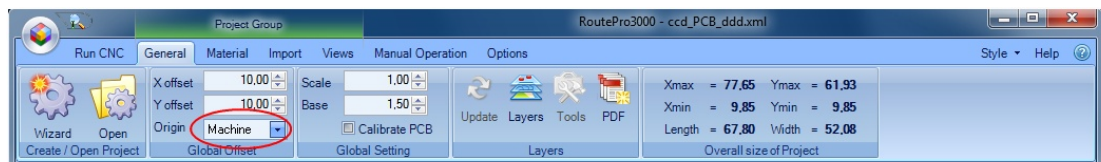
Pressing this button generates a complete PDF document of your current project, including screen shots of every layer, all the settings and much more.....

7.2.5 Extra module Plus3000

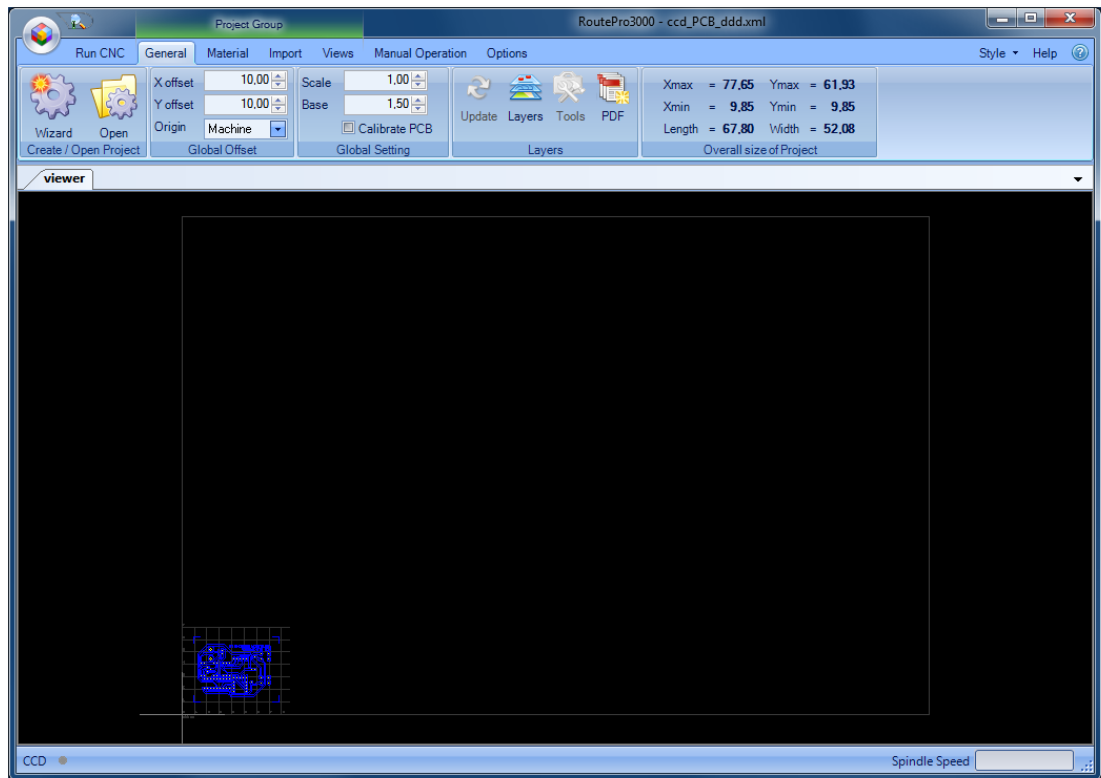
With this module activated you will get the following extra features:



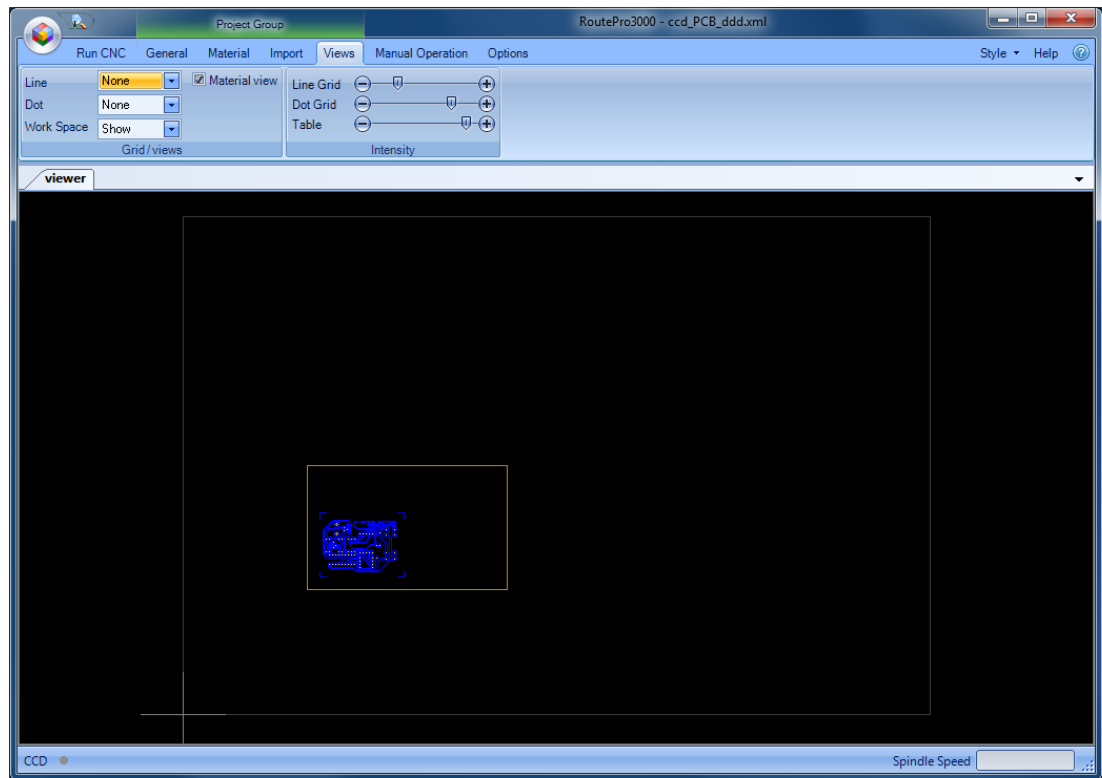
Under the Help tab you'll find two buttons to open the location of the current project and the documentation.



Under the General tab you may now set the origin of your material.
This can be the zero position of machine but can also be calculated from the material position.

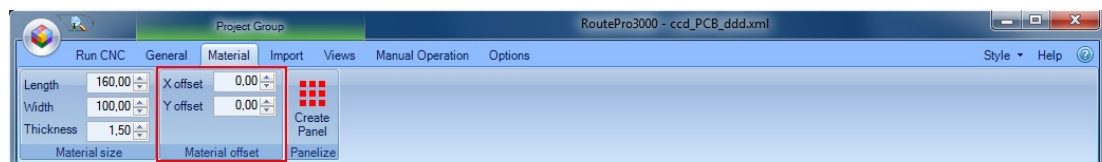


Machine origin



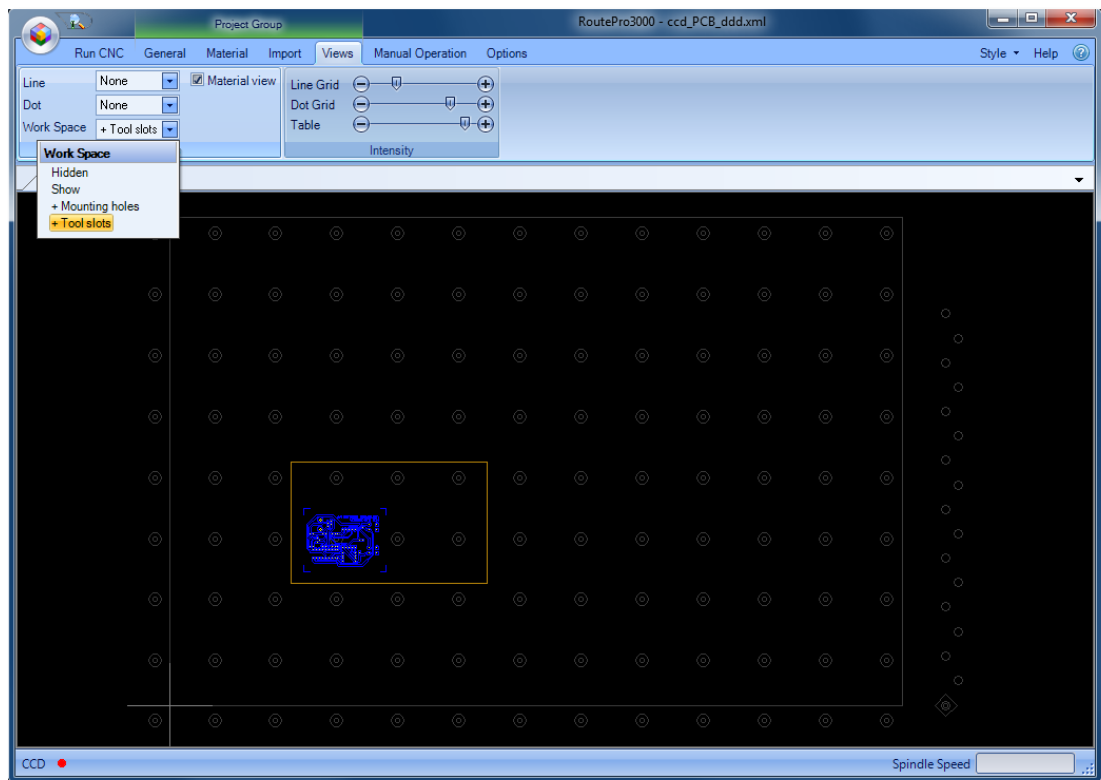
Material Origin

If the material origin is used the program checks if your design fits the material.
You may set an offset for the material under the Material tab



Under the Views tab you now have the following extra's:

- Show material
- Set the intensity of the line grid
- Set the intensity of the dot grid
- Set the intensity of the table view
- Show the mounting holes
- Show the ATC tool-slots and depth sensor



In the Wizard you may now select the type of project, depending on your selection, the project will be stored under the project type name. This can be useful to separate projects meant for PCB or stencils etc.



But that's not all.....

You may use the mouse to position while the camera screen is open, it will also try to center the drill hole.

This can be useful if you want to capture the holes from an existing PCB.

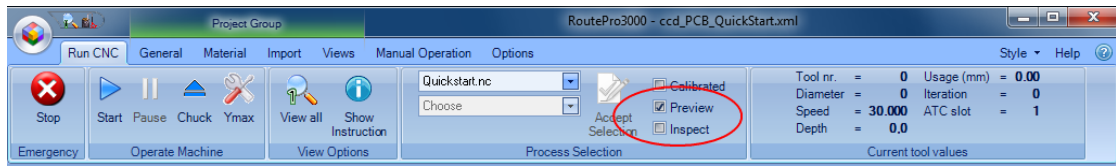
Please make sure that you [calibrate the distance](#) first.

And.....

You may now use up to 32 layers per project !!

7.2.6 Inspection Module

With this module you can inspect your project.



With Preview activated you may simulate a machine run.

In case of a drilling layer the camera will show the drilling positions, as if you were actually drilling.

If you are processing a route layer it will follow the route pattern.

Note: if the calibration is active for this project, it will first go through the calibration stage.

If you have checked Inspect, the machine will travel to the first drill position and waits there, so you have time to look at this position closely.

If you press start, the next position will be showed.

Note: This function will only work on drill layers.



Because the camera has an offset from the spindle, it cannot reach approximately 6 centimeters in the Y direction.

Please keep this in mind while calibrating or using the camera as inspection device.

7.2.7 Remote Module

This module is under construction, it will be available soon

7.2.8 Script Module

This module is under construction, it will be available soon

7.2.9 Q-Code Module

This module is under construction, it will be available soon.

7.3 Hotkeys

If you have a numeric keypad please turn **Num Lock** off then you can make full use of the hot keys for driving the machine





The Emergency Button



Esc

Emergency stop

Help hot-keys

 F1	Shows context sensitive help if available
 Alt + F1	Show the hot-key table
 Ctrl + F1	Show the Quickstart tutorials
 Shift + F1	Show the reference section

Change step size hot-keys

 Shift + Up	Increment Metric step size
 Shift + Down	Decrement Metric step size
 Alt + Up	Increment Imperial step size
 Alt + Down	Decrement Imperial step size

Move in XY direction hot-keys

The selected step size determines the distance to travel

 Home	Move the head X- Y+
 Up Arrow	Move the head Y+
 Page Up	Move the head X+ Y+
 Right Arrow	Move the head X+
 Page Down	Move the head X+ Y-
 Down Arrow	Move the head Y-
 End	Move the head X- Y-
 Left Arrow	Move the head X-
 5 (Num pad)	Move the head to 0,0

Move in Z direction hot-keys








The selected step size determines the distance to travel

 Ctrl Up	Move the head up
 Ctrl 5 (Num pad)	Move the head completely up
 Ctrl Down	Move the head down

The viewer hot-keys

These hot keys are only available if the viewer is the active window
Click in the viewer area to make it the active window.

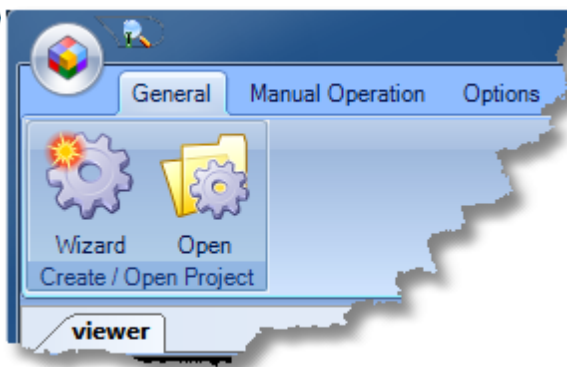
 F8	Zoom all
 F5	Refresh Window
 z	Zoom in
 Z	Zoom out

 Ctrl +	 Draw zoom window
 Shift +	 Add data to selection by drawing a window around the objects
	 Add data to selection
 Alt + Mouse Wheel	Zoom in Zoom out
Only Mouse wheel	Pan up and down
 Shift + Mouse Wheel	Pan left and right

7.4 Project Wizard



The Project Wizard is used to create or modify your projects.



Just click the Project Wizard button to [create](#) or [modify](#) your project.

Part



8 Frequently Asked Questions

This section covers some problems that are frequently encountered by users of RoutePro3000. The questions are organized by category and where necessary links are provided to relevant sections of the help.



Frequently Asked Questions

- General questions
- User interface
- Laser
- Dispensing
- Calibration
- Documentation
- RoutePro3000 Extra
- Remote
- Scripting
- Q-Code

8.1 General questions

► Why can I not load a single file for processing?

In the old RoutePro versions, you could load a single file for processing, this is not possible in RoutePro3000.

Parameters used to process the data can only be set in projects, there is no way to set these parameters for single files.

Projects are build using the Project Wizard, which does a lot of complicated stuff, but is very easy to use. So there is really no need in loading single files.

▼ I have a special purpose for my machine, is it possible you provide a module for that?

Yes, our programmers can integrate special modules to handle all your specific needs.

Contact your supplier and provide a global wish list. We will investigate what's possible and provide you an offer for that.

▼ I have found a problem in RoutePro3000, what should I do?

After many many hours of testing RoutePro3000 it is always possible that RoutePro3000 does not what it supposed to do.

If you find a problem with the software you can send us an email with detailed description of the problem plus screen shots, and most important, how did it occur. Can it be reproduced?

We will try to solve the problem directly if it is a problem that effects the whole program else it will be solved in the next release.

Note: Sometimes RoutePro3000 gives you the opportunity to send an error report, please do that as well, this makes problem solving much easier

▼I have an idea for a feature in RoutePro3000

We highly appreciate your input.

If you have suggestion of how to improve RoutePro3000 please tell us, if we think it is useful for other users as well, we can implement this in a next version.

▼I have read the help manual but still need support, what can I do?

We can offer you support, [read more about our support policy](#).

8.2 User interface questions

▼I have loaded my data files but the drill data has a different size then my other data.

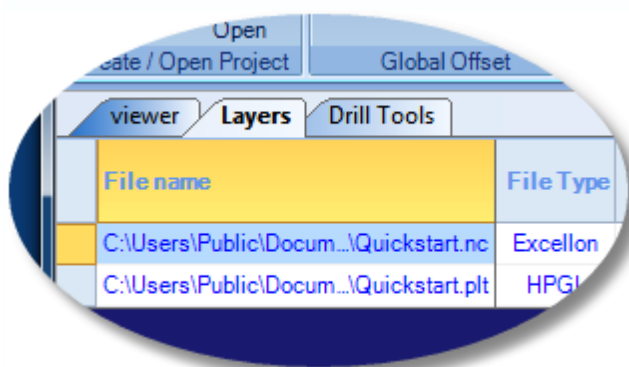
The problem is that the import settings are not correct, [show solution...](#)

▼Can I change the processing order of the layers / tools in the table?

Yes you can, [read more....](#)

▼I only see the tools from the first layer.

To see tools from other layers, select the **layers tab** to show the layer window and select a layer. The tool window will change for the tools of the selected layer.



8.3 LaserPro questions

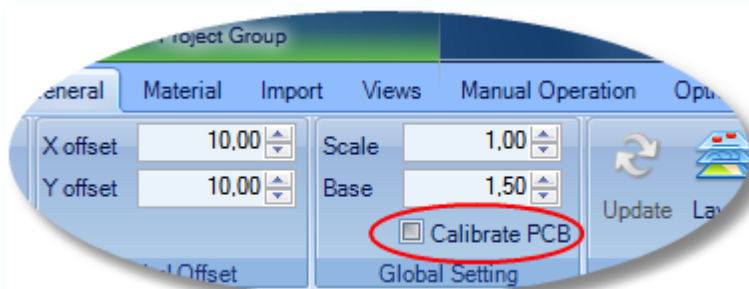
8.4 DispPro questions

8.5 Calibration questions

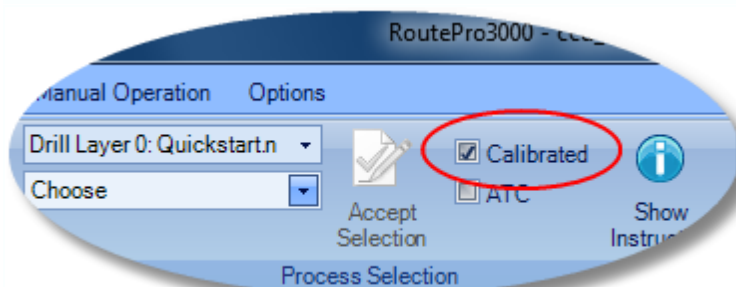
▼ I have the calibration unit enabled but I do not need calibration for now, what do I do?

You have two options here:

Uncheck the **Calibrate PCB box** in the General tab.

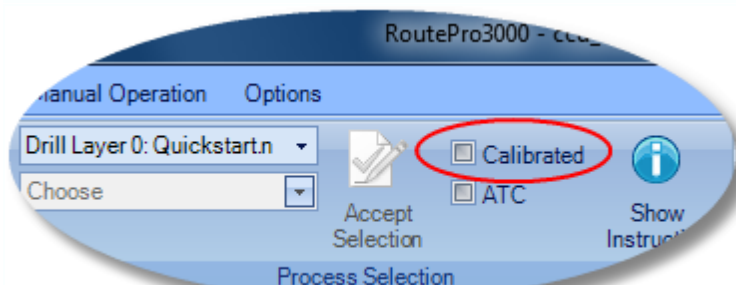


Check the **design is Calibrated box** under the Run CNC tab



▼ I want to do another Calibration, because I moved the material.

Just uncheck **design is Calibrated box** under the Run CNC tab.



8.6 License system

▼ Why do I need to register / activate RoutePro3000?

Using a license system enables us to provide you with modules for particular features.

It gives you the opportunity to select only modules you need so you don't pay for something you will not use. [Read more.....](#)

Index

- A -

abort 42
 abort the calibration 42
 about RoutePro3000 13
 Accept Selection 89
 Activate button 70
 Activate License 117
 Activating a module 70
 Activating RoutePro3000 70
 activation 70
 add data file 37
 Advanced Parameters 106
 Advanced Topics 52
 Apply License 70
 Arc1 93
 Arc2 93
 ATC 116
 ATC position 25, 53, 118
 ATC tool table 109
 Automatic Tool change (ATC) Settings 109

- C -

Calibrate Camera 40, 93
 Calibrate PCB 118
 Calibrate the Camera 23, 40
 Calibrate3000 6, 124
 calibrated 40, 42
 Calibration 116, 157
 Calibration Module 40, 142
 calibration unit 42, 116, 142
 camera 40, 93, 142
 Camera calibration 40, 93
 Camera Options 93
 Camera Selection 93
 Camera Settings 93
 Capture Mode 93
 careful 93
 ccd_PCB_ 25
 Chamfer 25

Change or remove the password 103
 Circle < 5 mm 121
 Circle 5 mm up 121
 clear 53
 Color 52, 93, 118
 Configurations 25
 Contacting support 18
 Continue without registration 70
 Copy Position 93
 Copy to Clipboard 70
 Copyright 20
 Count 53
 Creating a project 23
 Cross-hair 93
 Current tool values 89
 Cutting feed 25

- D -

data layers 11
 Data Select 89
 Deactivate License 117
 Deactivating RoutePro3000 70
 Deactivation 84
 Default Tools 103
 Defining offset points 93
 demo 23
 Depth 25, 89
 Depth Chamfer 53
 Depth Work 53
 Depths 118
 Deselect all tools 89
 Design is Calibrated 42
 Diameter 25, 53, 89, 118
 Dimensions 118
 Dispense unit 116
 DispPro 157
 DispPro3000 6, 124
 docking 11, 39
 Dot grid 122
 Draw zoom window 39
 Drill 11
 drill data 42, 93
 Drill Tool window 53

- E -

Emergency Stop 89, 93
 Enter demo mode 23
 Enter License 70
 Error reporting 13
 ESC 93
 evaluation 70
 evaluation period 70
 Excellon 13, 42, 93
 Excellon Settings 121
 Existing customers 19
 Eye 93

- F -

F5 88
 F8 88
 Feed 118
 Feed XY (table feed) 53
 Feed Z in (Cutting feed) 53
 Find 23
 Find CCD machine 23
 Fixing 11
 Flip Image Horizontally 93
 Flip Image Vertically 93
 Floating 11
 Floating and docking windows 11
 Frequently Asked Questions 157

- G -

General 118
 General questions 157
 General tab 52
 Getting a printed user manual 18
 Getting help 18
 Getting started 6
 Global 93
 Global Offset 118
 Global Setting 118
 Goto Position 93
 green check button 42
 Grid 122

- H -

Hardware 109
 Help 117
 Hotkeys 87
 How to Calibrate a PCB 142
 How to get started 13
 How to order modules 19
 How to use the calibration module 23, 42
 HPGL 13, 25, 42, 93
 HPGL Settings 121

- I -

Import 121
 Improved 11
 Installed Options 42, 116
 Instructions 52, 118
 Iteration 25, 53, 89, 118

- L -

Language 103
 Laser unit 116
 LaserPro 157
 LaserPro3000 6, 124
 Layers 11, 118
 Learning more 13
 Length 93
 Length correction 109
 License 70
 license file 70
 License manager 70
 license system
 activating 70
 deactivating 70
 License system Activation 70
 License system Deactivation 84
 License system modules Activation 81
 licenses offline 84
 Line Capture 93
 Line grid 122
 Load from file 70
 Load Preset data 23
 Log Level 116

- M -

machine 42
machine ID 70
machine locked 70
Machine Options 103
Machine Options Details 109
Machine Options Overview 106
Machine Origin 109
Make tool selection 89
manual operation 40, 42
Manual Operations 93
Manual positioning of the spindle 93
manually 93
Material 52, 53, 120
Material size 120
Material type 25, 118
Max. Speed 109
maximum speed 109
Milling 11
Miscellaneous 116
Modules 19, 87, 124
Motor Calibration 116
Motor Step Size 116
Move by arrows 93
Move by value 93

- N -

Name 53
Need Special requirements 13
New 11
New customers 19

- O -

Offline registration / activation 70
Offset 52, 109
Open 118
Open Chuck 93
Operate machine 89
Options 103
Overview 93

- P -

Panelize 120
Password 103
Pause 89
Point Capture 93
points 42
Preset 106
Preset data 40, 103, 106
prevent misuse 70
problems 19
Process 53, 118
Process Layer Select 89
Process Selection 89
processing 89
processing order 53
Processing type 25
project folder 25
Project Group 117
Project Wizard 11, 25, 87, 118
Project Wizard tutorial 25
projects 10
Properties 93
protective cabinet 109

- Q -

Quick Start 23, 117
QuickStart 25
Quickstart project 42

- R -

Radius 93
Ramp Steps 109
Reference 13, 87, 109
Reference section 87
Refresh 39
Register 70
Register / Activate 23
Register / Activate Licenses 23
registration 70
Remark 42
Remote3000 6, 124
remove file 37

Requirements 15, 42
 Rework 142
 Ribbon Qat 93, 122
 Ribbon Toolbar 18, 88
 route data 42
 Route Tool window 53
 RoutePro3000
 about 13
 Quick Start Tutorials 23
 RoutePro3000Extra 6, 25, 124
 Run CNC 42, 89

- S -

Select all tools 89
 Select data 89
 Select start point 89
 Selecting a machine type 109
 Show Camera 40, 93
 Show Help 117
 Show Hotkeys 117
 Show Instruction 89
 Side 52, 118
 skilled engineers 52, 53
 Slot Locations 109
 Sort 121
 Spare 116
 Special 15
 Speed 89, 93
 Speed Setting 109
 Spindle 40, 93
 Spindle Settings 109
 Spindle Speed 25, 53, 118
 Start 42, 89
 Start Spindle 93
 Start/Stop Speed 109
 Start-up delay 109
 Step 121
 Step Size 42, 93
 Submit Message 70
 support 19
 Synchronize 93

- T -

Table Dimensions 109

Table feed 25
 Table Settings 109
 Table size 109
 Testing 40
 The User Interface 18, 87, 88
 Tool nr 89
 Tool selection 89
 Tool test Settings 109
 Tool tester 116
 Tool tester Position 109
 Tool type 25, 118
 Tools 52, 93, 118
 Tools Button 53
 tutorial 37, 40, 42
 tutorials
 Quick Start 23

- U -

Update 37, 118
 Update a project 37
 Update project 37
 Updating a project 23
 Usage 89
 Used 118
 Used Distance 53
 Used X 53
 User input 19
 User interface 9, 157
 Using the layer viewer 23, 52
 Using the tool viewer 52
 Using the Viewer 23, 39

- V -

View all 89
 Viewer 18, 42, 88
 Views 122
 Views (Work area) 122
 Visibility 118
 Visible 52, 93

- W -

Warning 93
 Welcome 6

welcome page 6
What's New 9
Why projects 25
Width 93
Window selection 89
windows 11

- X -

XY Arrows 93
XY motor settings 109
XY Offset 93, 118
XYZ Position 93

- Z -

z 88
Z Arrows 93
Z Free 109
Z Max 109
Z motor Settings 109
Zoom 39, 93

