Milling Circuit Boards with CircuitPro and S63 LPKF Machine

Instituto Tecnológico de Morelia
Maestría en Ciencias en Ingeniería Electrónica
"José María Morelos y Pavón"

June 15, 2018

Índice

Machine Setup

Figure: Hardware configuration

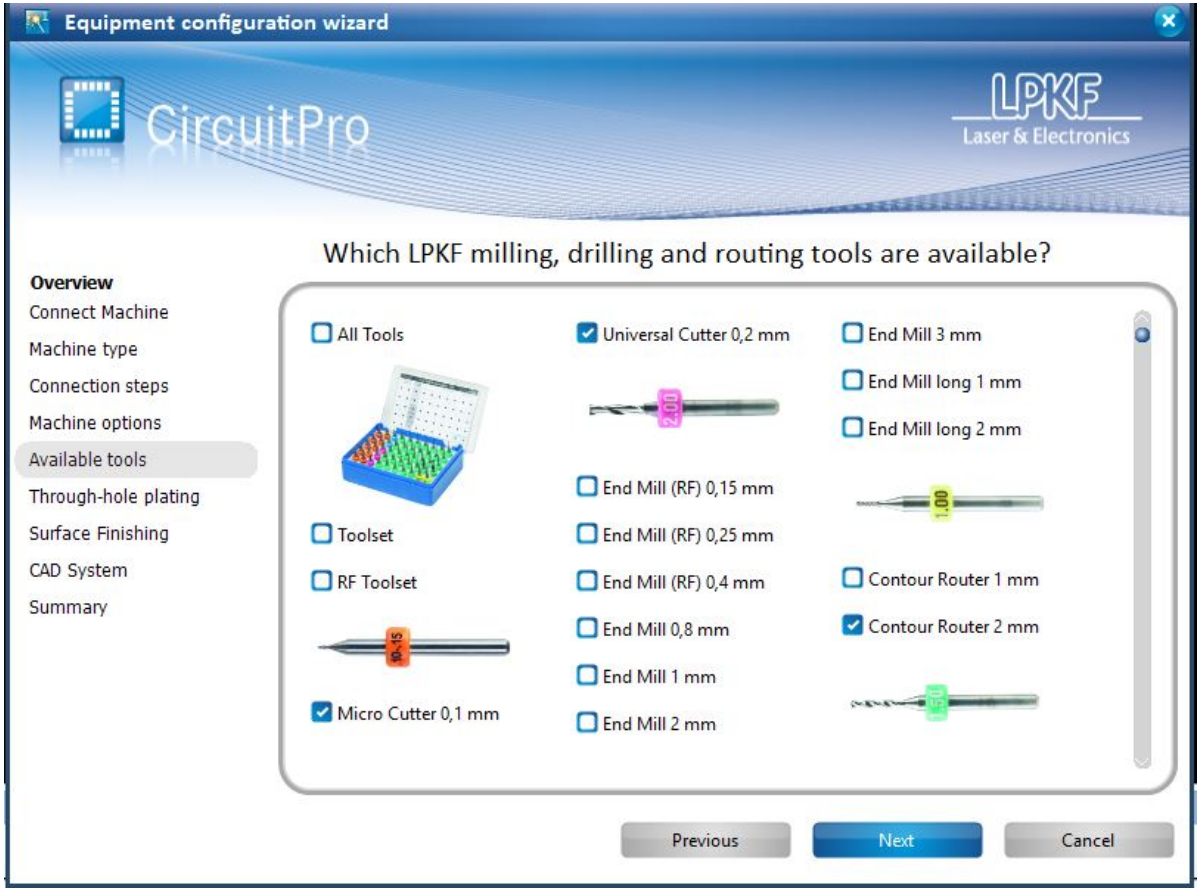
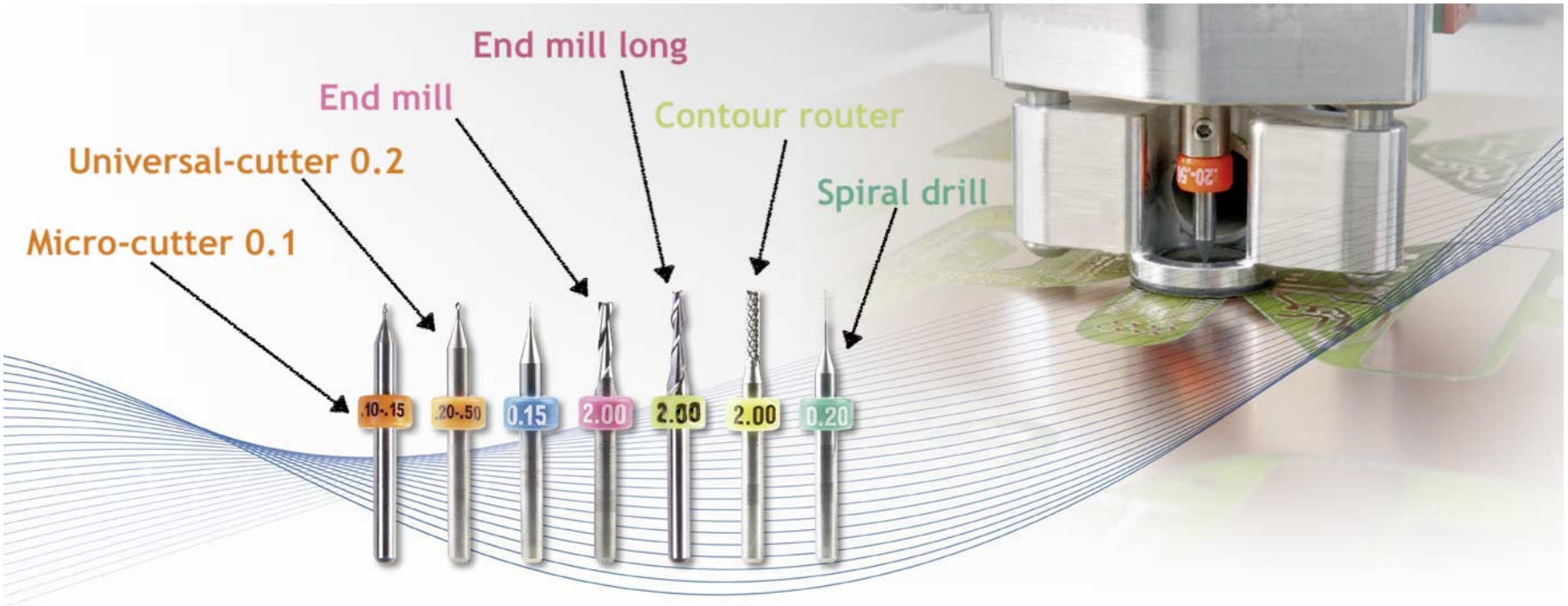
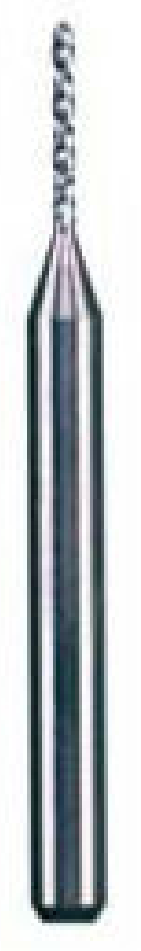


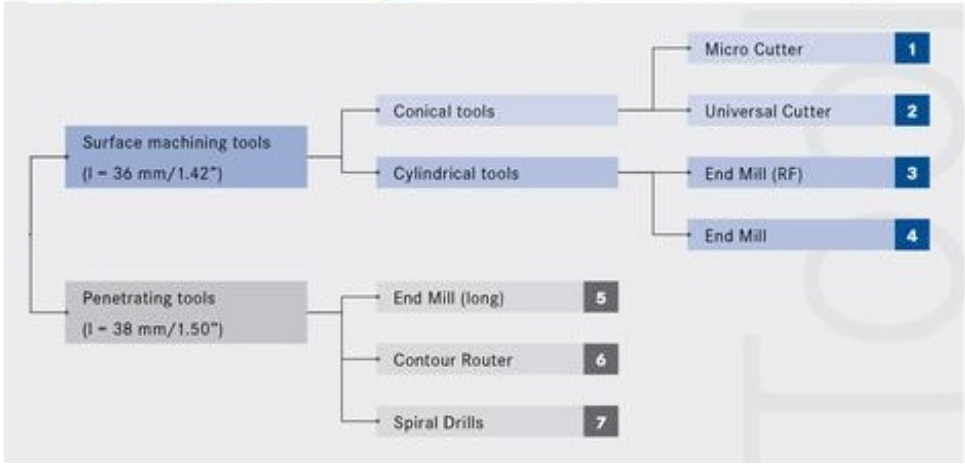
Figure: Tool selection window

Milling and Drilling Tools






38 mm (1.5")
36 mm (1.42")
.10-.15
.20-.50
0.15
2.00
2.00
2.00
0.20
1
2
3
4
5
6
7


Surface machining tools
(l = 36 mm/1.42")
Conical tools
Cylindrical tools
Micro Cutter 1
Universal Cutter 2
End Mill (RF) 3
End Mill 4
Penetrating tools
(l = 38 mm/1.50")
End Mill (long) 5
Contour Router 6
Spiral Drills 7

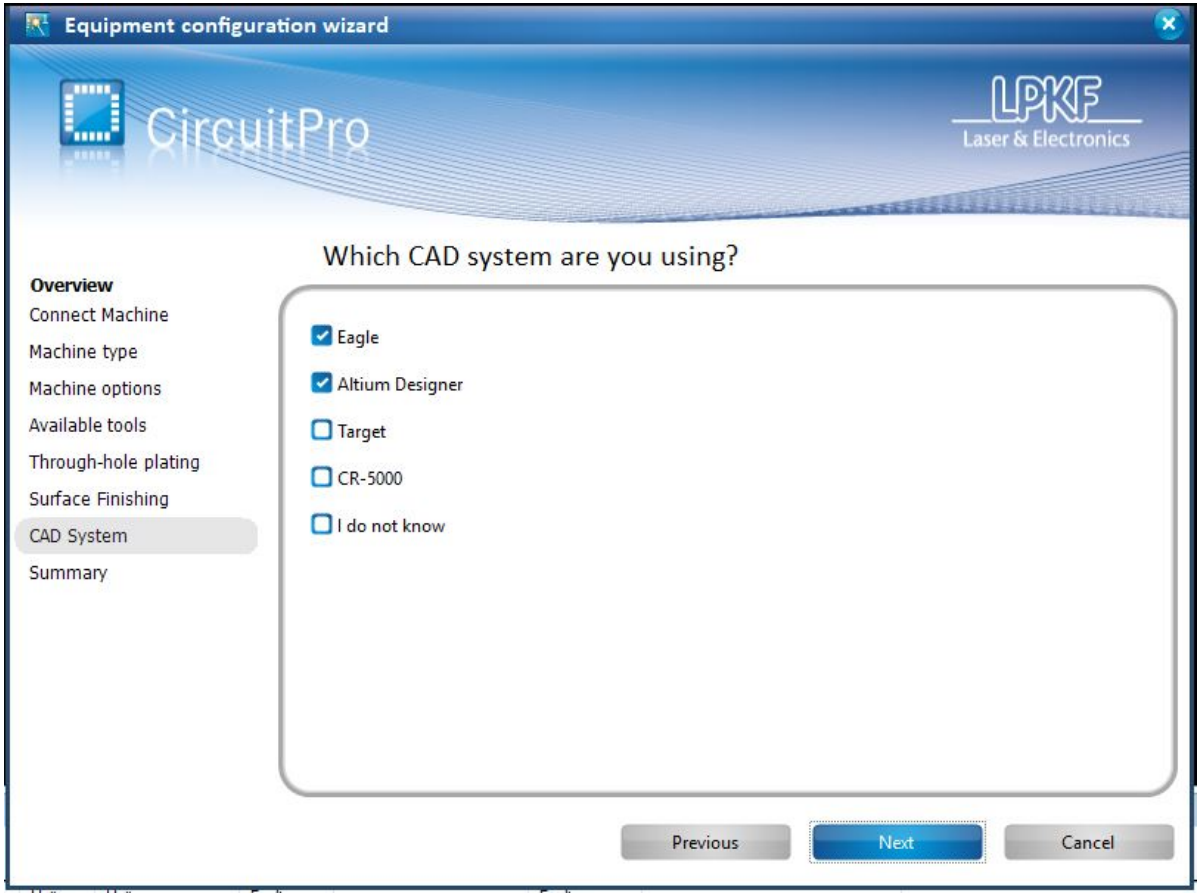


Figure: CAD Software Selection

GUI

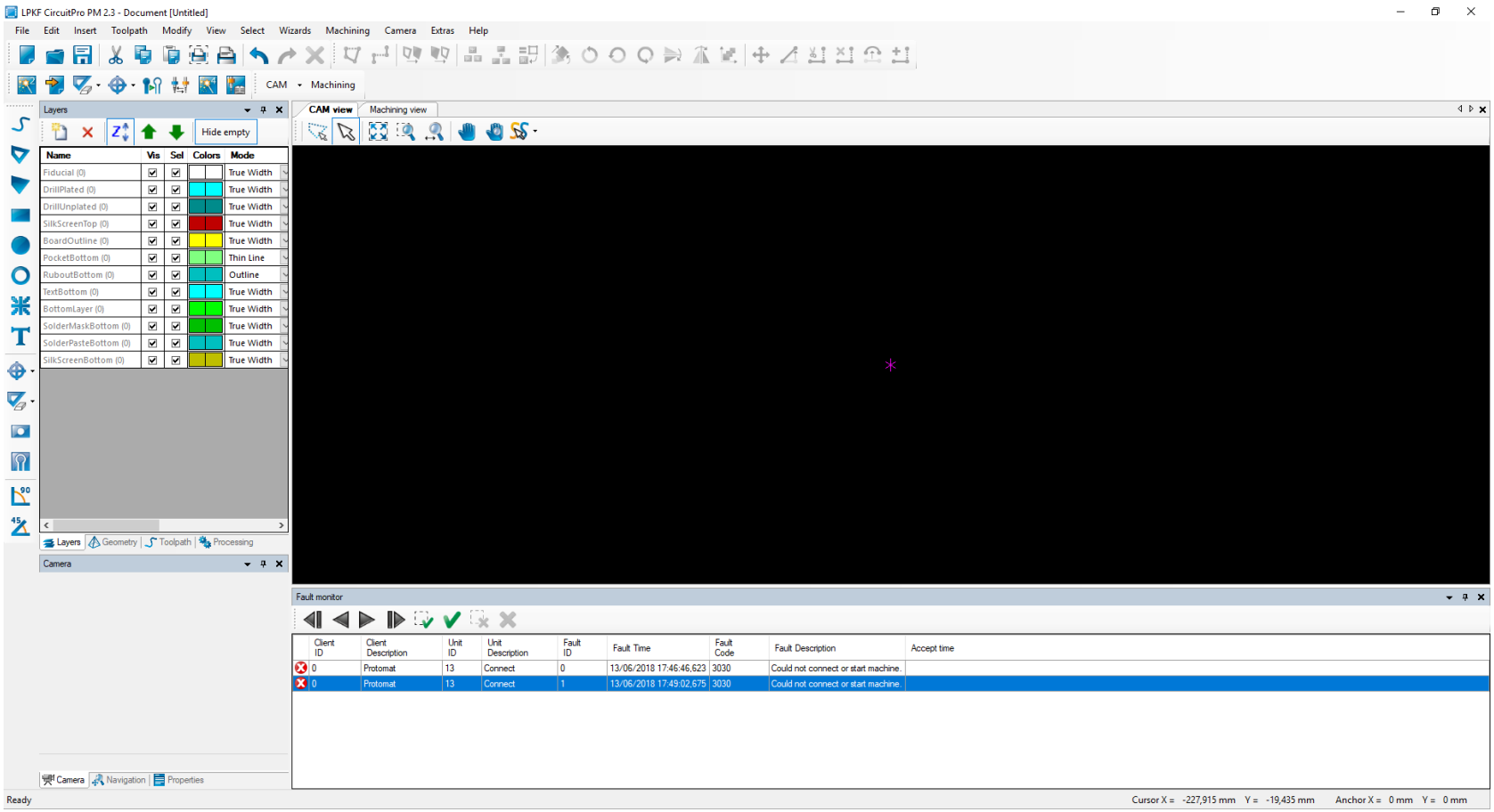


Figure: The CircuitPro Graphic User Interface

Project stages

Once the machine has been configured, most of the PCBs follow the next process:

- Load a template project **(Single Side, Double Side, ...)**
- Import the **Gerber** files
- Create the tool-paths and link the tools
- Board Production

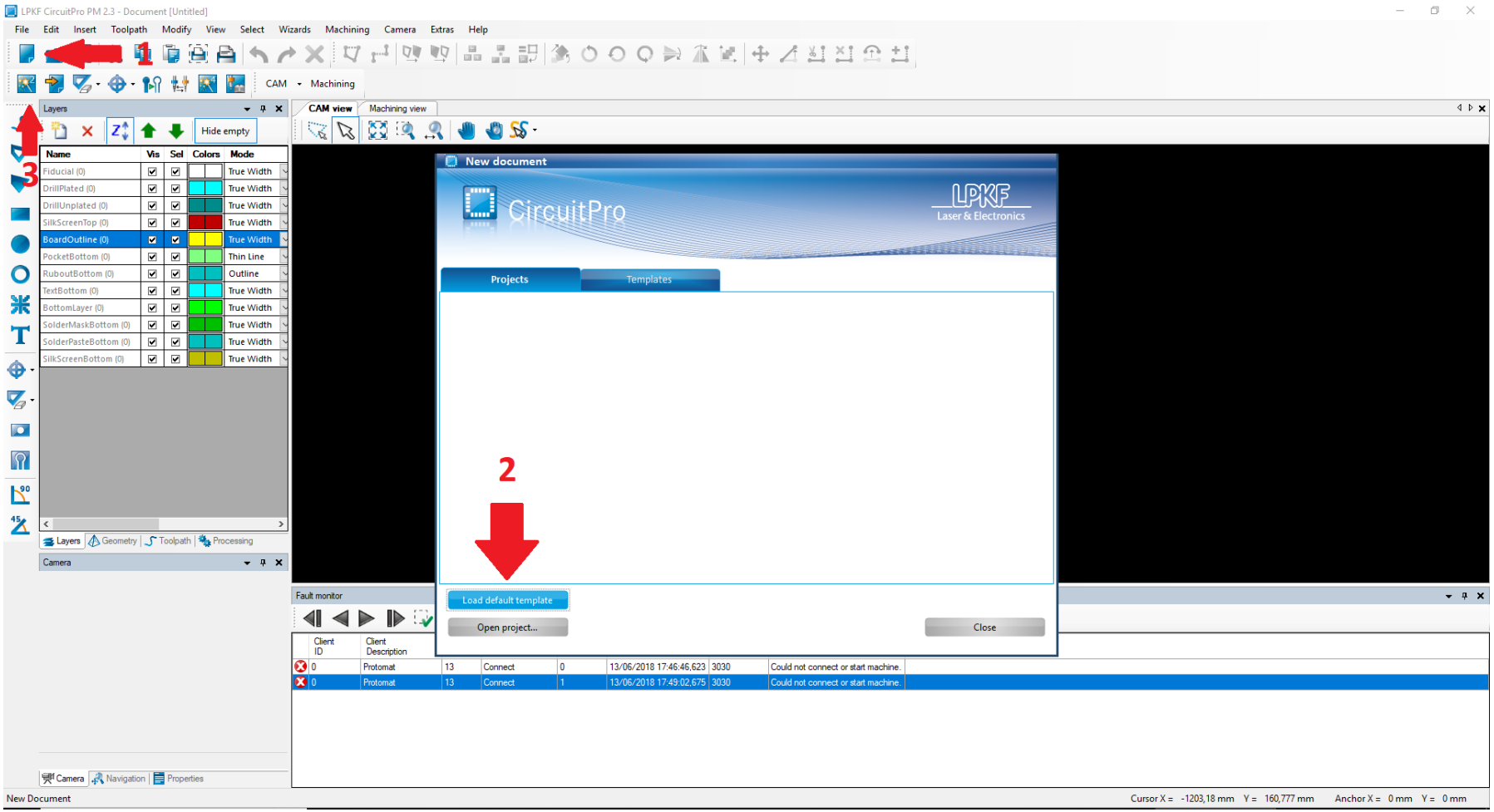


Figure: Cargar plantilla predeterminada

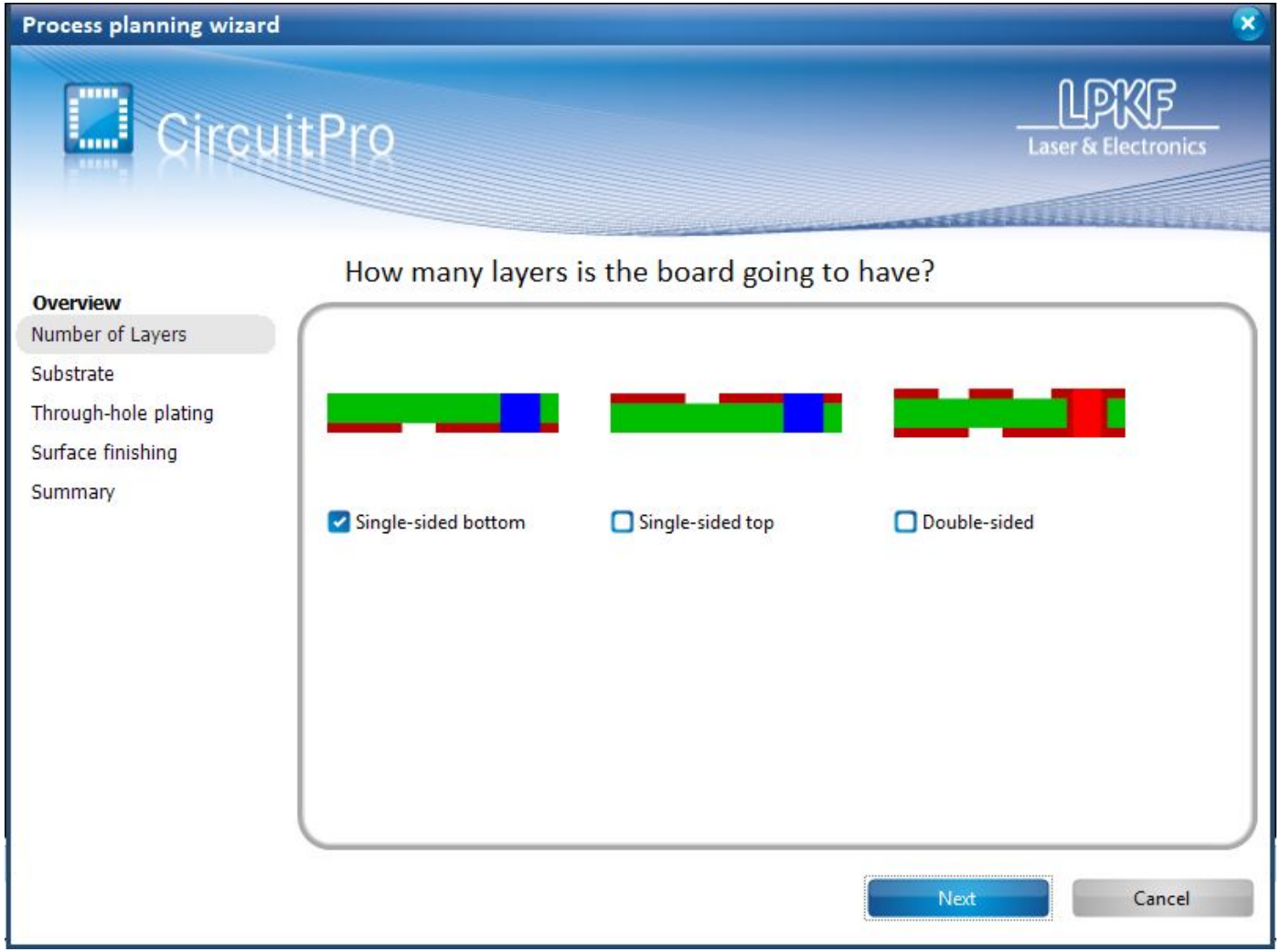


Figure: Selección de tipo de PCB

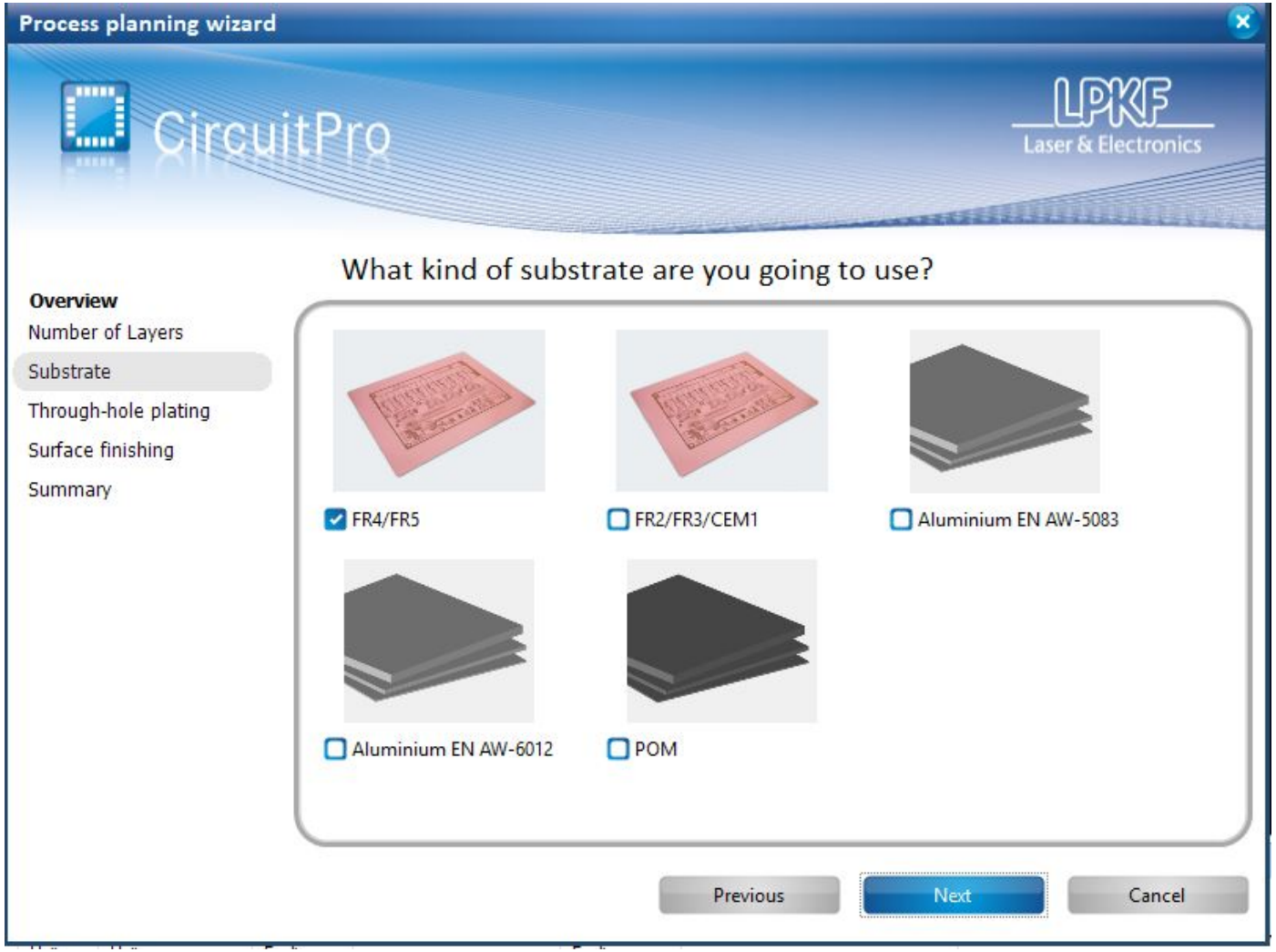


Figure: Selección de material

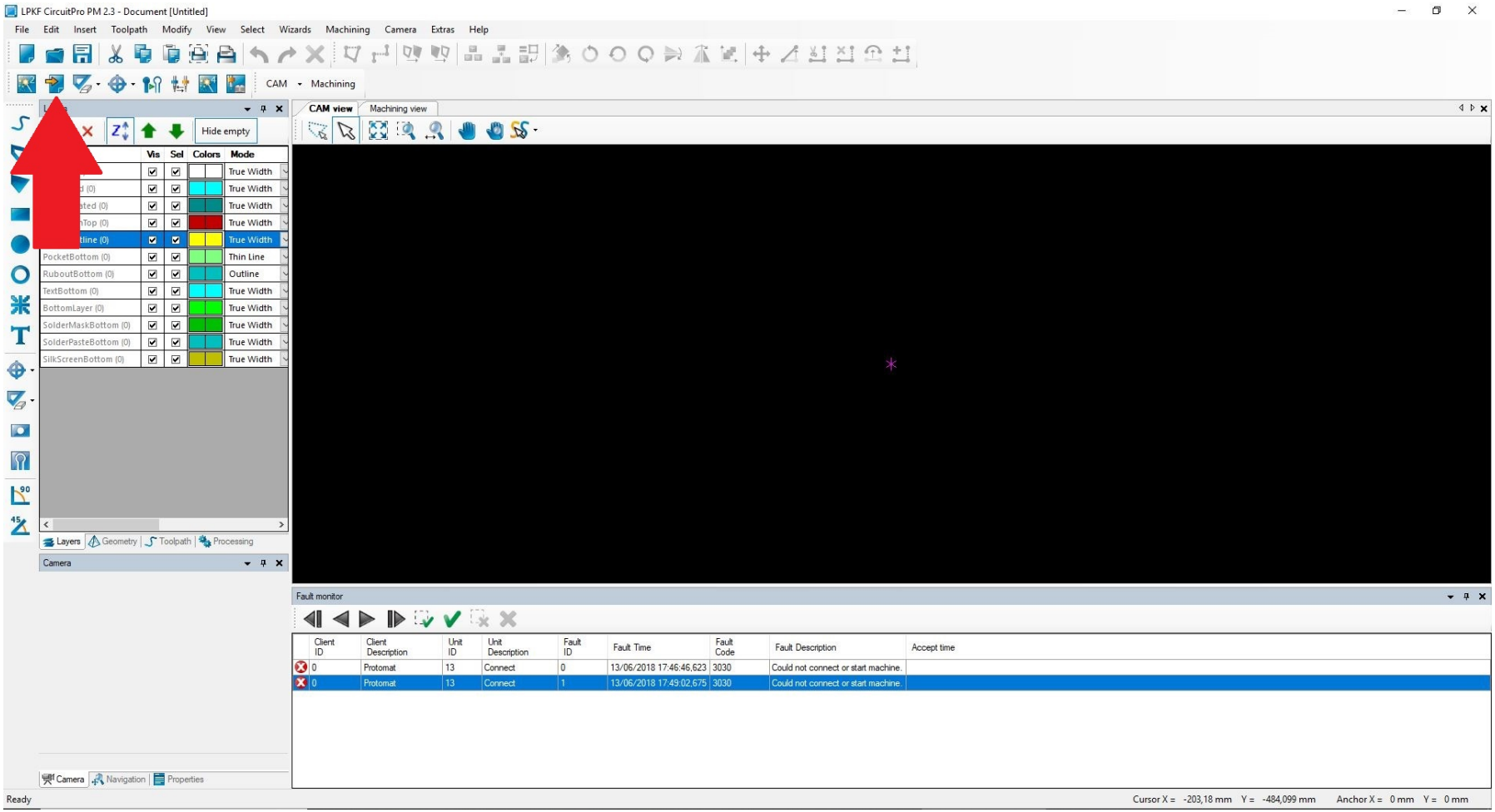


Figure: Layer files importing

Allowed files

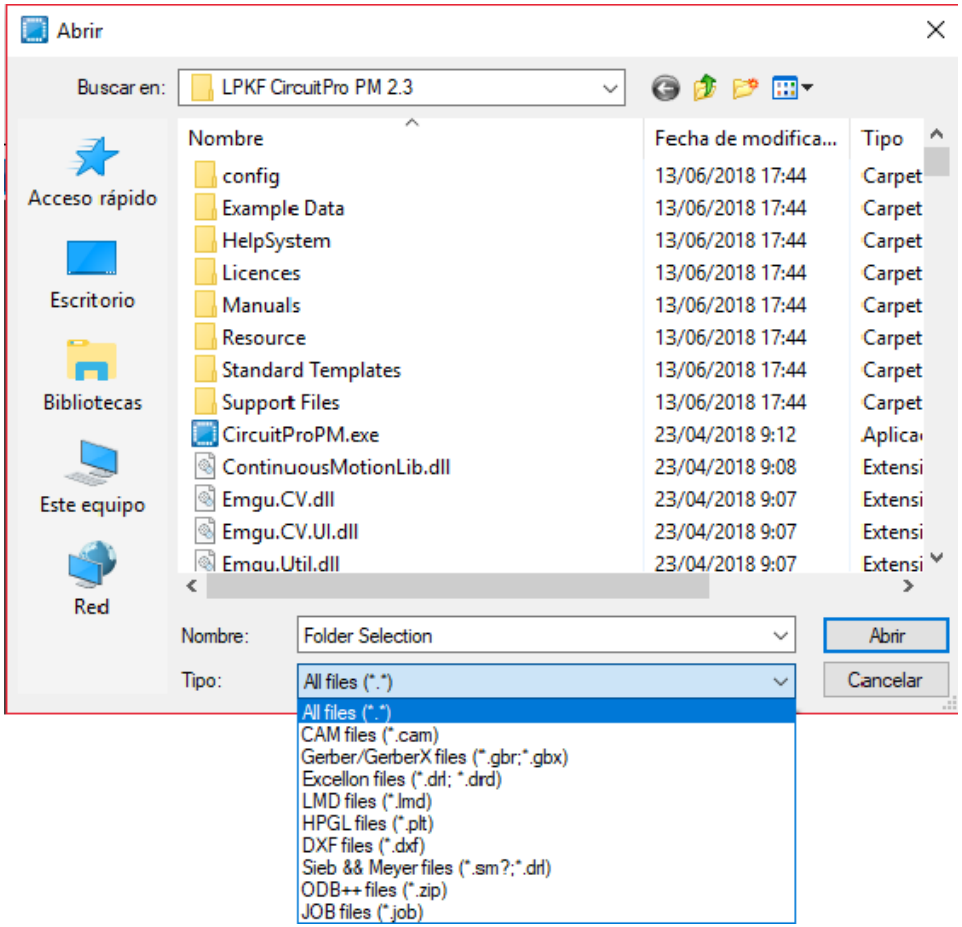


Figure: Archivos admitidos

The file extension depends on the CAD software used. For Altium, the layers generated are the KeepOut, Botton Layer and Top Layer, respectively (`*.GKO, *.GBL y *.GTL`).

Botton layer

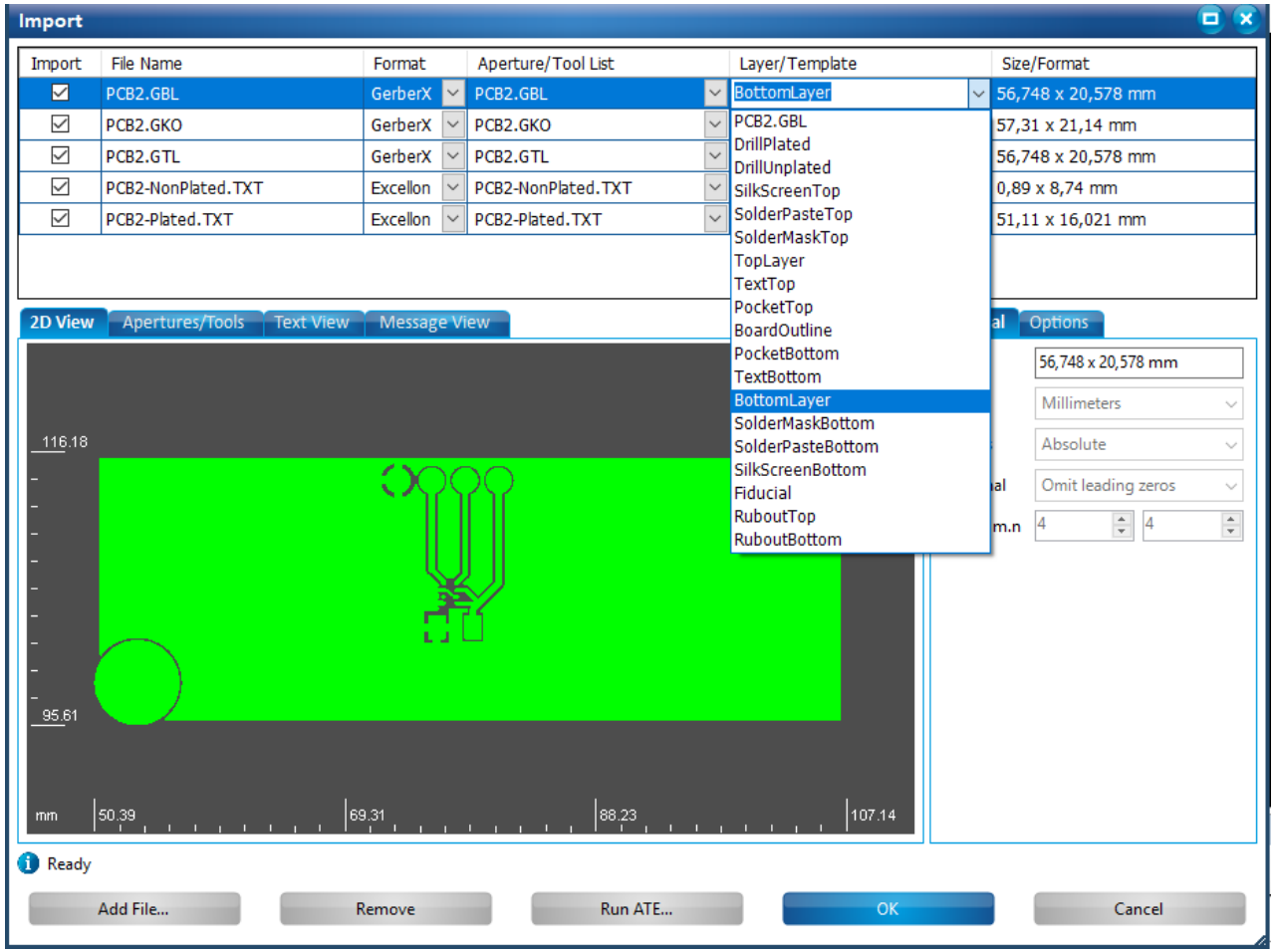


Figure: Botton layer file

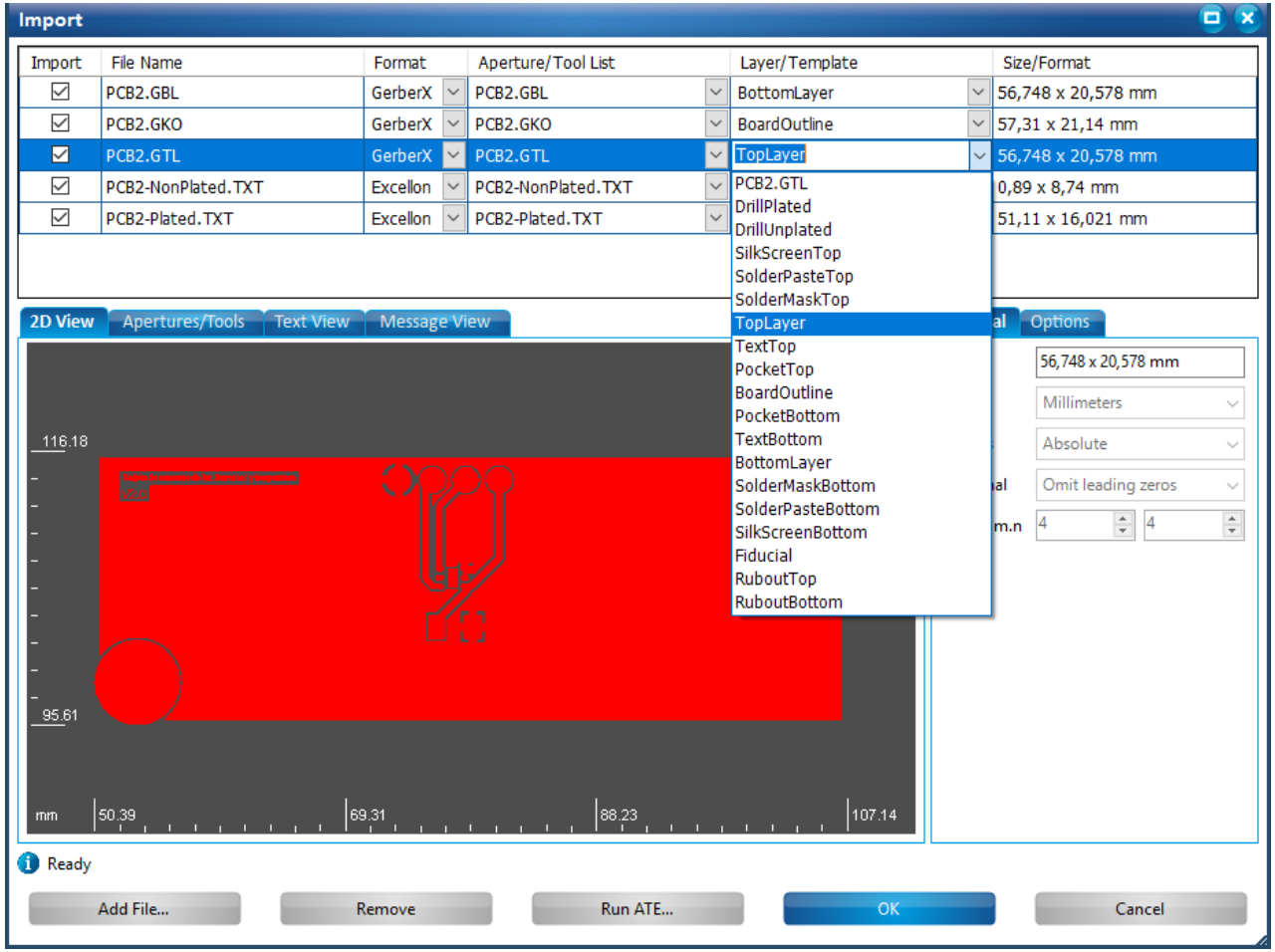


Figure: Top layer file

The Drill Layers

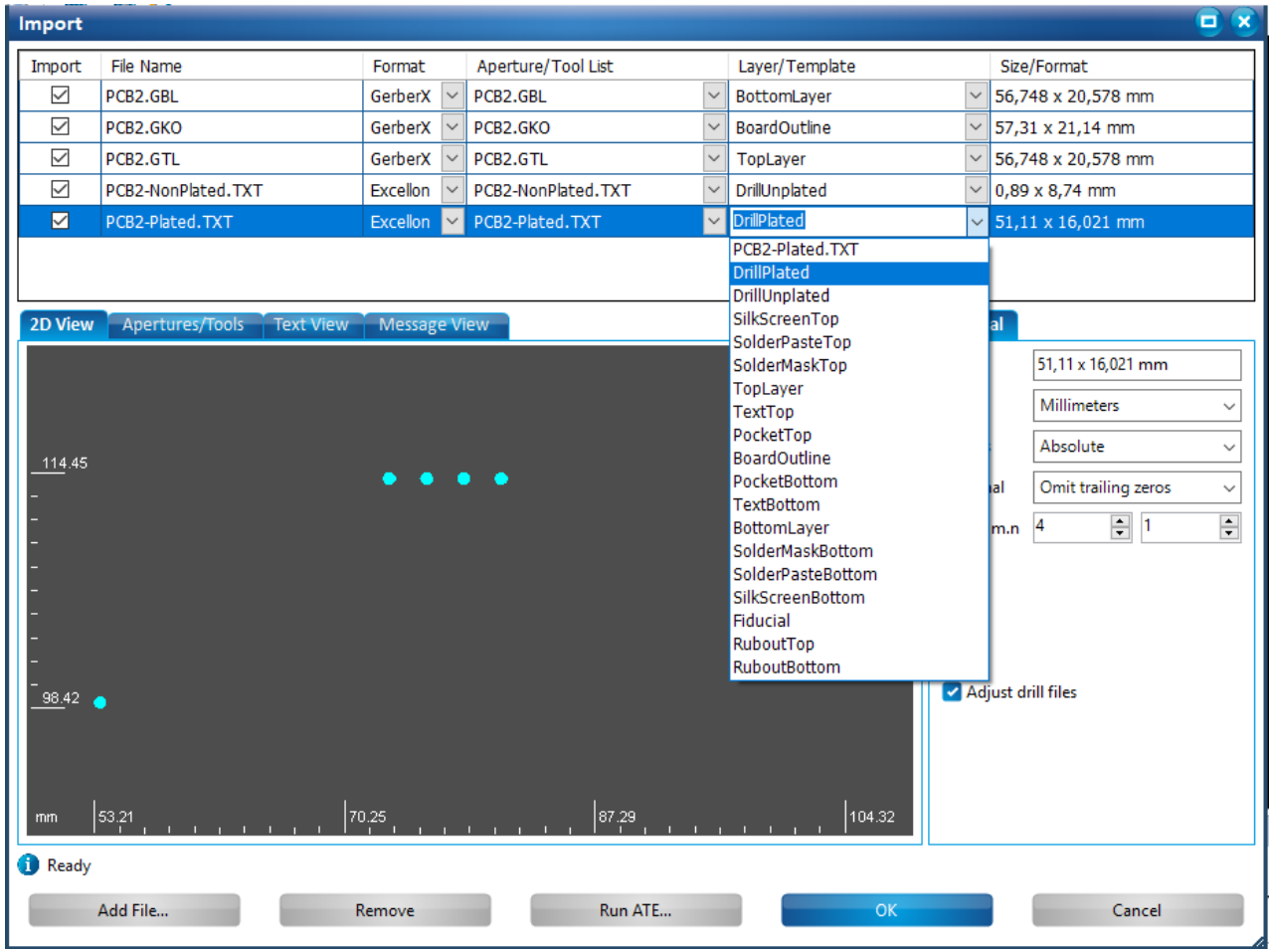
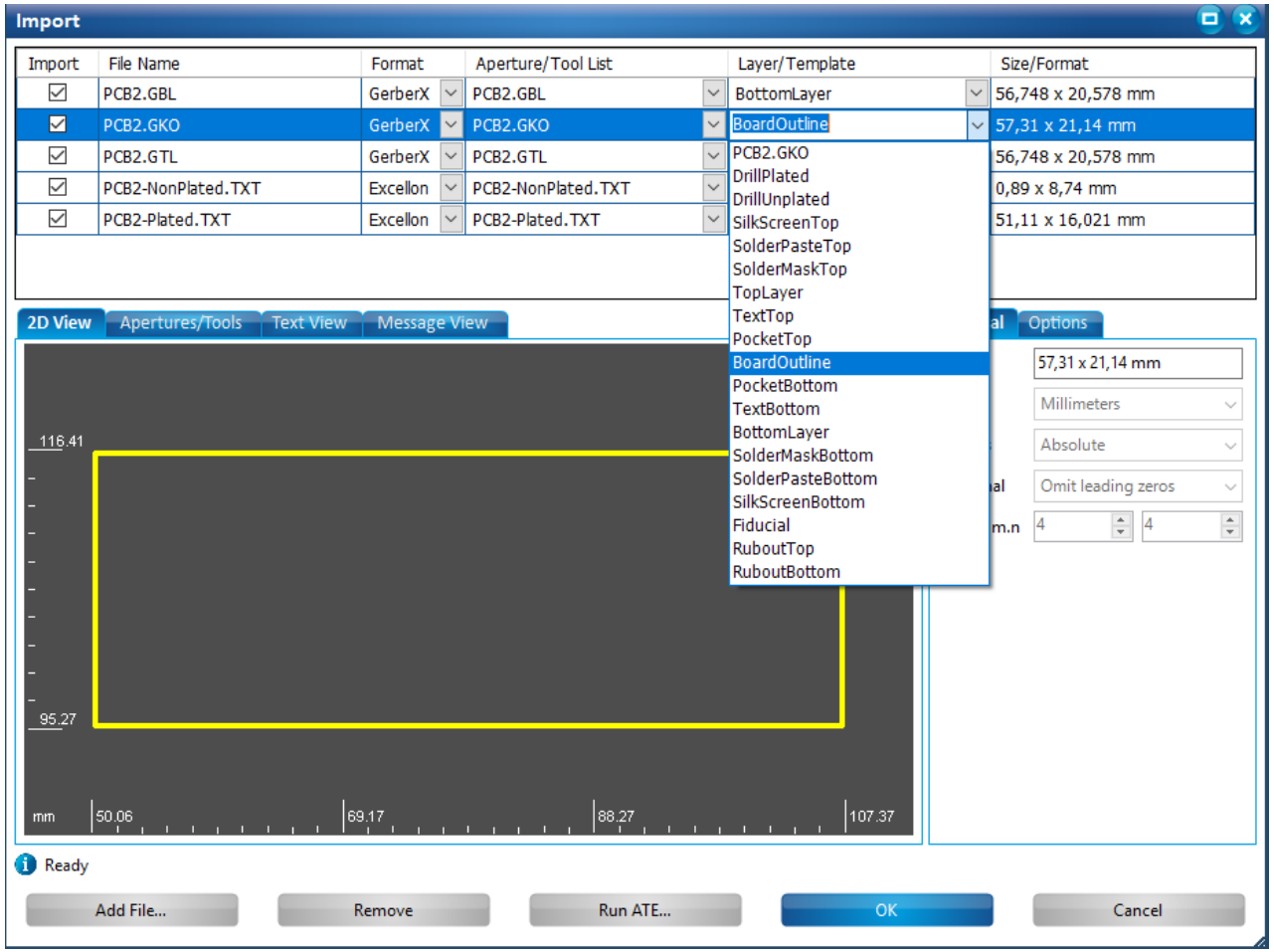
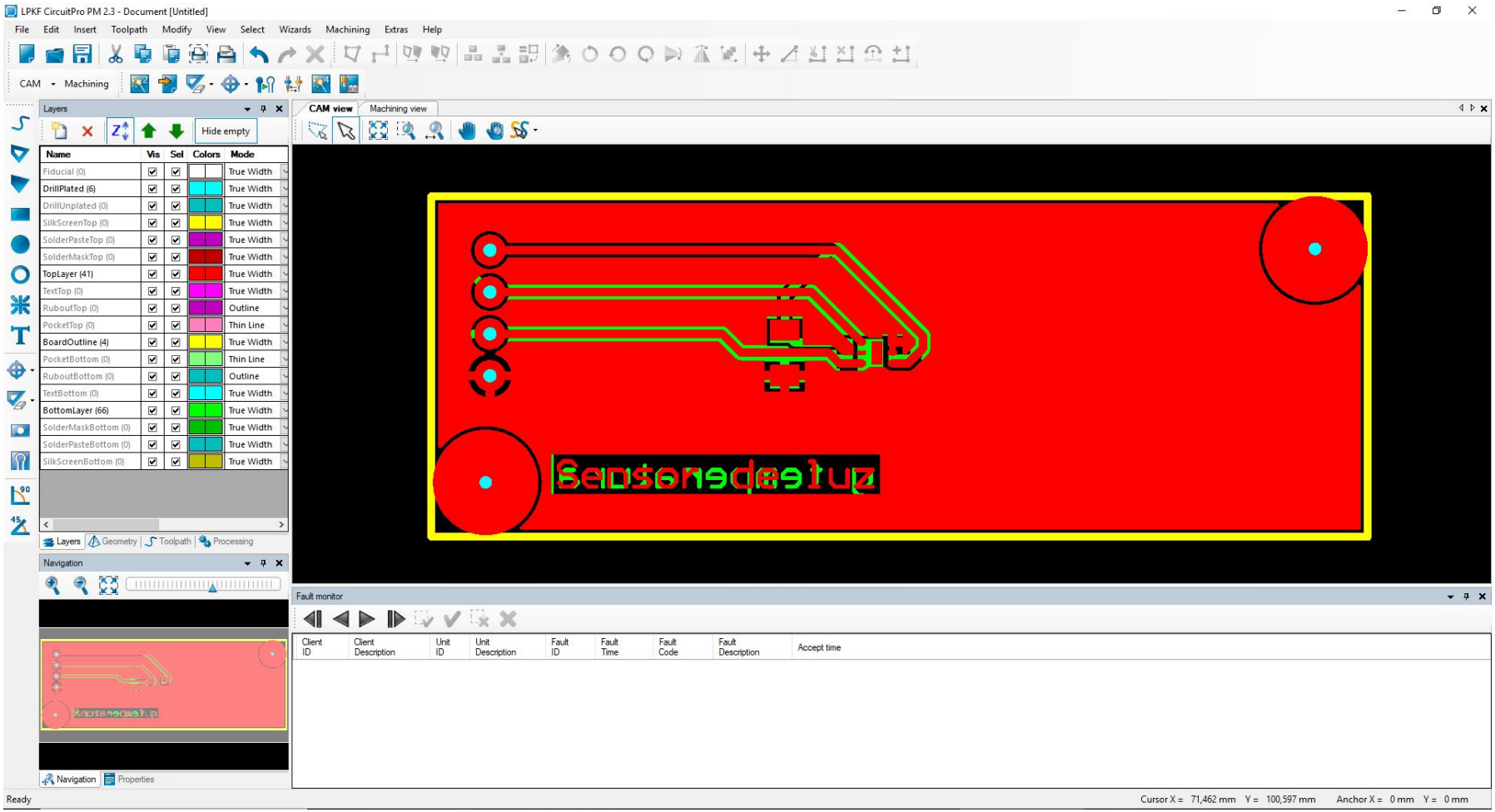


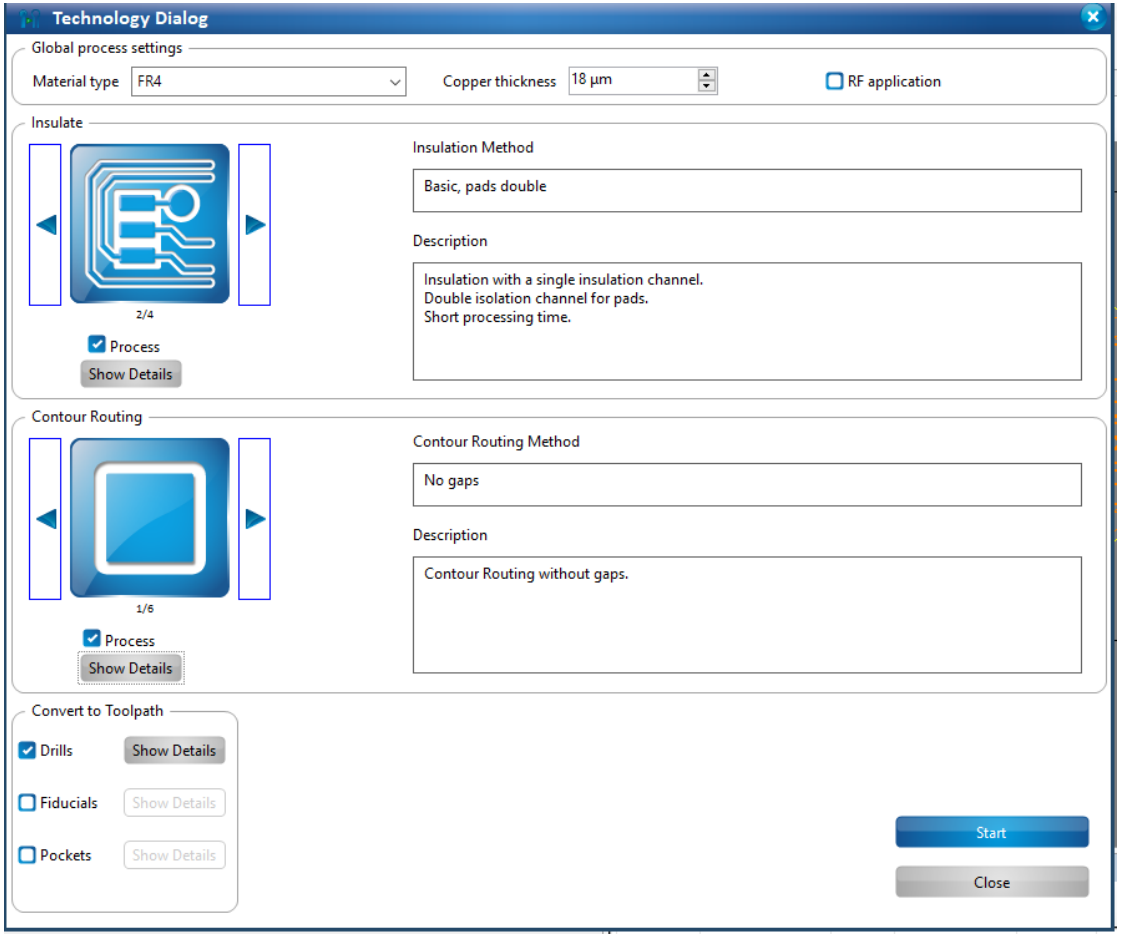
Figure: Drill layer importing

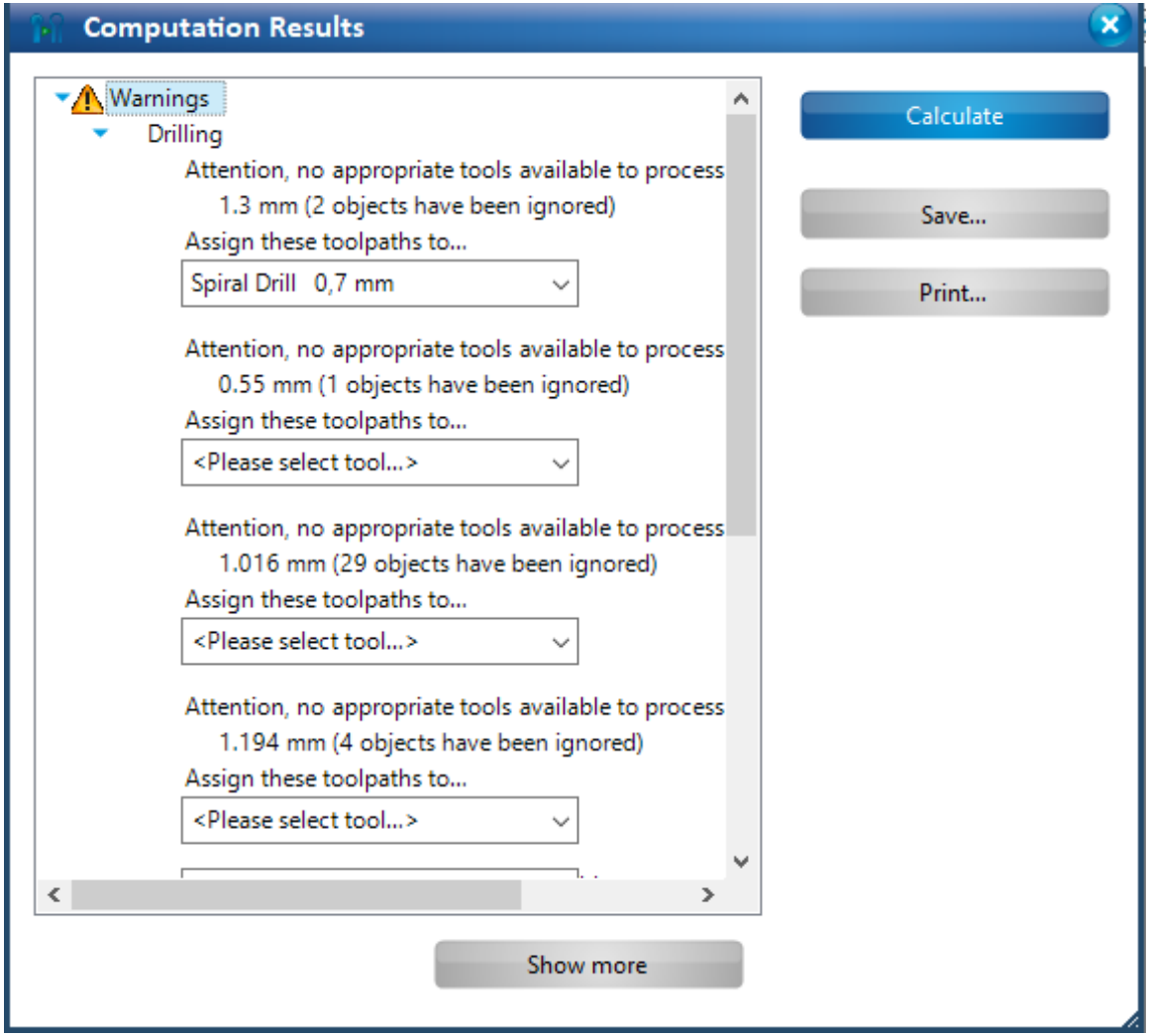
Capas de corte




LPKF CircuitPro PM 2.3 - Document [Untitled]
File Edit Insert Toolpath Modify View Select Wizards Machining Extras Help
CAM Machining
Layers
Hide empty
Name Vis Sel Colors Mode
Fiducial (0) True Width
DrillPlated (6) True Width
DrillUnplated (0) True Width
SilkScreenTop (0) True Width
SolderPasteTop (0) True Width
SolderMaskTop (0) True Width
TopLayer (41) True Width
TextTop (0) True Width
RuboutTop (0) Outline
PocketTop (0) Thin Line
BoardOutline (4) True Width
PocketBottom (0) Thin Line
RuboutBottom (0) Outline
TextBottom (0) True Width
BottomLayer (66) True Width
SolderMaskBottom (0) True Width
SolderPasteBottom (0) True Width
SilkScreenBottom (0) True Width
Layers Geometry Toolpath Processing
Navigation
Navigation Properties
CAM view Machining view
Fault monitor
Client ID Client Description Unit ID Unit Description Fault ID Fault Time Fault Code Fault Description Accept time
Ready
Cursor X = 71,462 mm Y = 100,597 mm Anchor X = 0 mm Y = 0 mm

Global Process Settings




Computation Results
Warnings
Drilling
Attention, no appropriate tools available to process
1.3 mm (2 objects have been ignored)
Assign these toolpaths to...
Spiral Drill 0,7 mm
Attention, no appropriate tools available to process
0.55 mm (1 objects have been ignored)
Assign these toolpaths to...
<Please select tool...>
Attention, no appropriate tools available to process
1.016 mm (29 objects have been ignored)
Assign these toolpaths to...
<Please select tool...>
Attention, no appropriate tools available to process
1.194 mm (4 objects have been ignored)
Assign these toolpaths to...
<Please select tool...>
Show more
Calculate
Save...
Print...

Until this point, every parameter on the PCB design was configured. Thus, the next step is to prepare the board production with the board production wizard from CircuitPro. This will guide through the production process and its necessary steps.

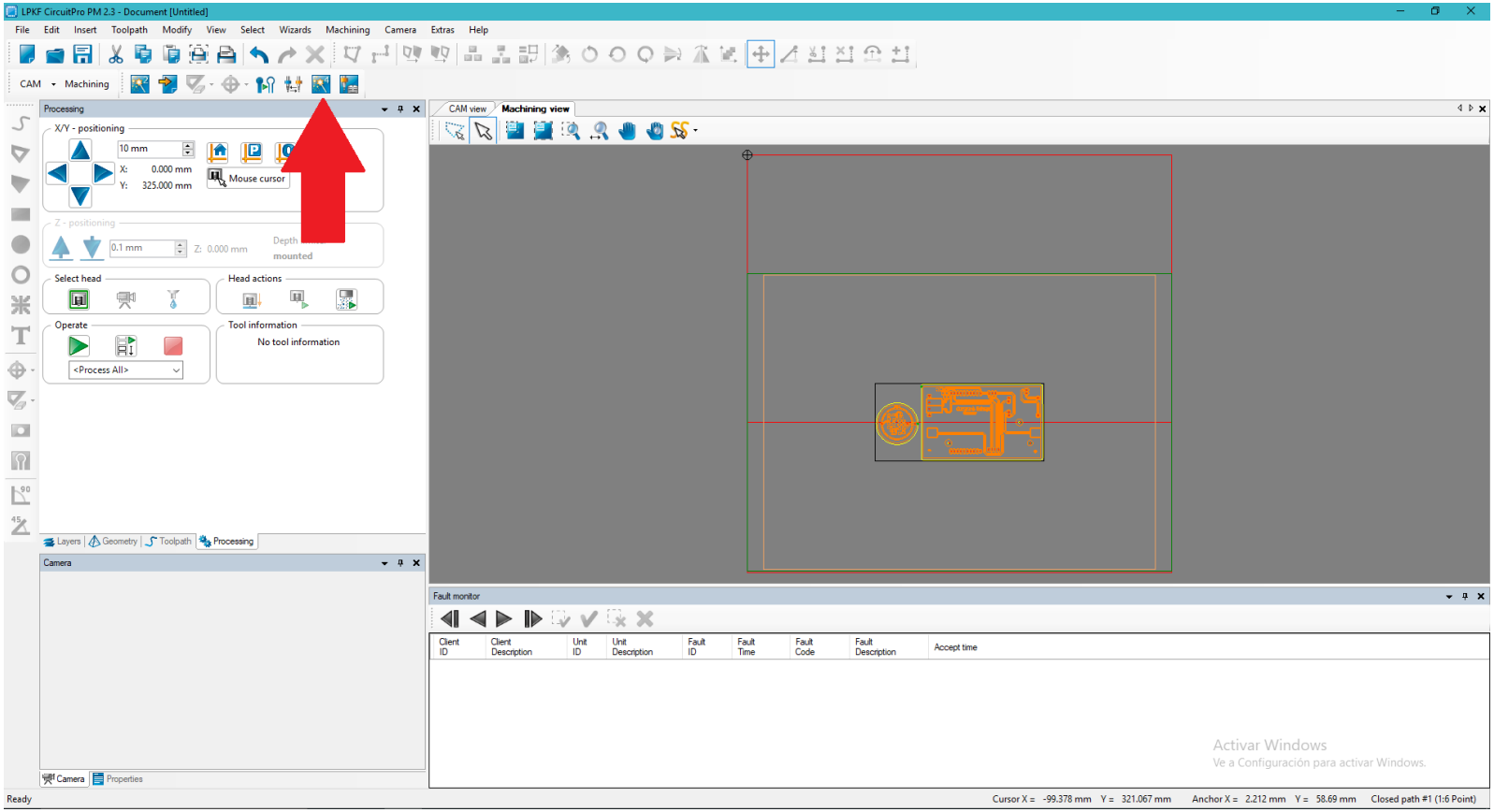


Figure: Board Production Wizard