

Milling Circuit Boards with CircuitPro and S63 LPKF Machine

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Machine Setup

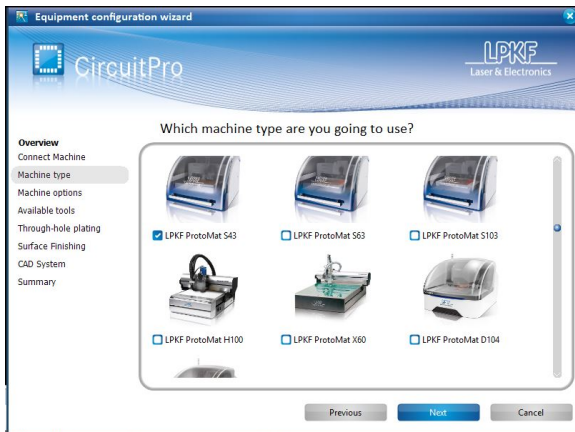


Figure: Hardware configuration

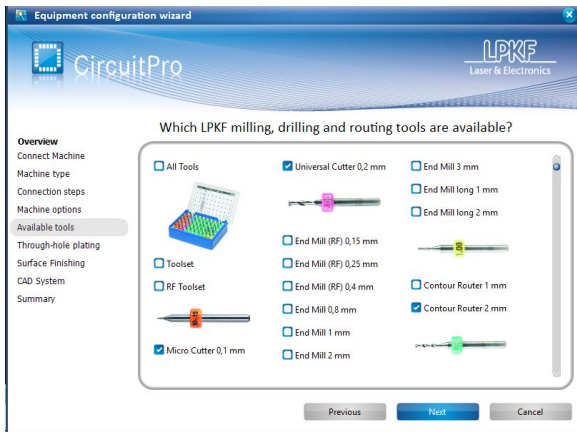
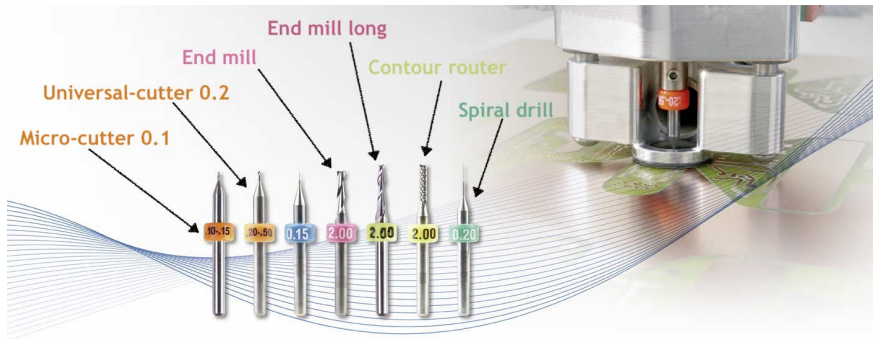


Figure: Tool selection window

Milling and Drilling Tools







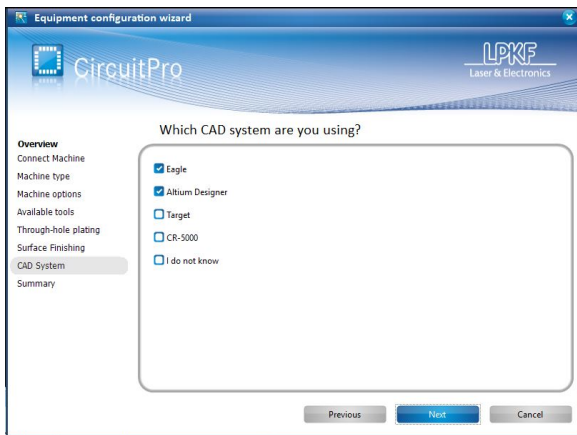


Figure: CAD Software Selection

GUI

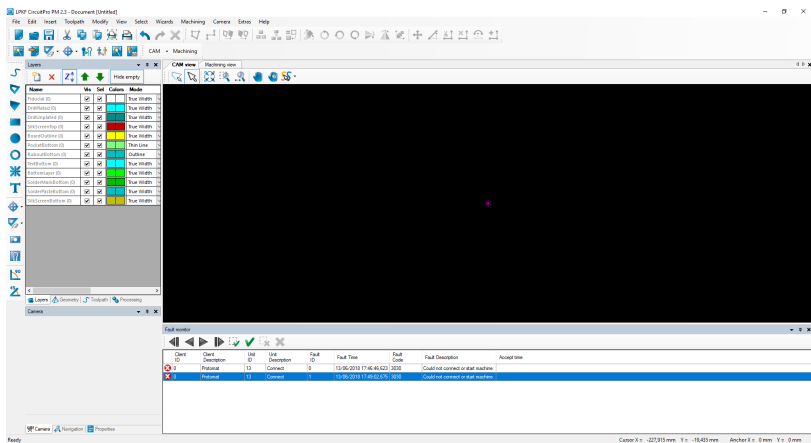


Figure: The CircuitPro Graphic User Interface

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

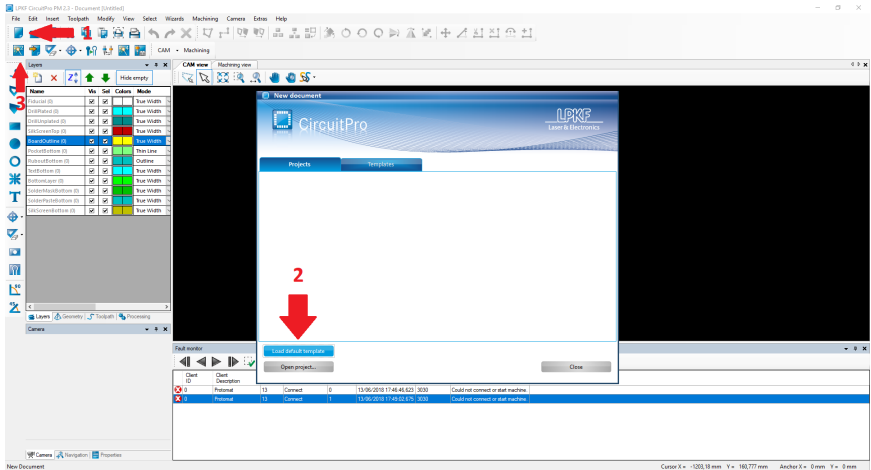


Figure: Cargar plantilla predeterminada

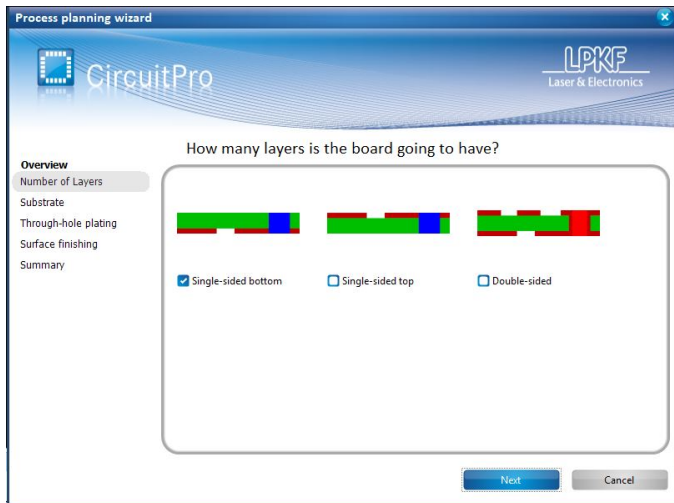


Figure: Selección de tipo de PCB

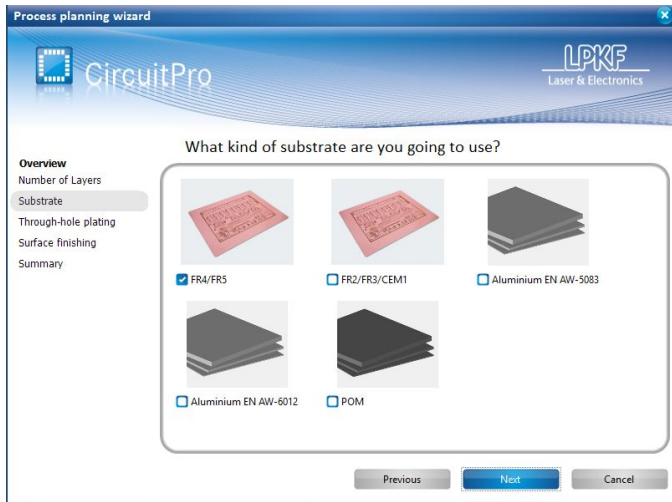


Figure: Selección de material

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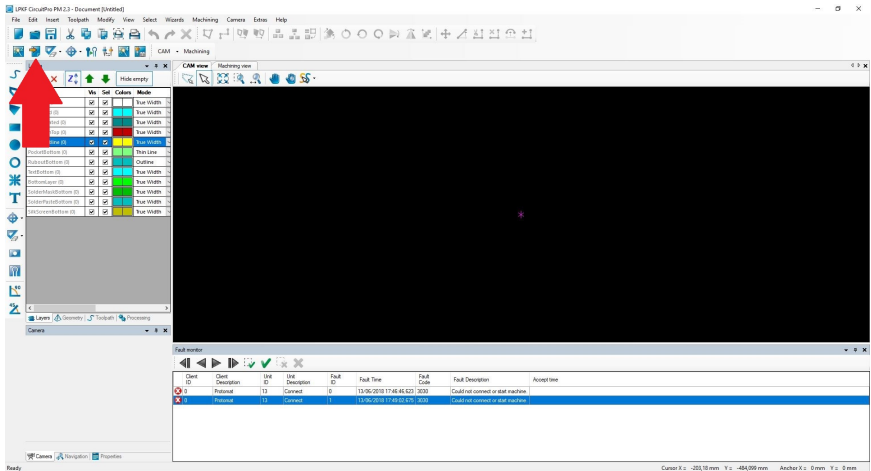


Figure: Layer files importing

Allowed files

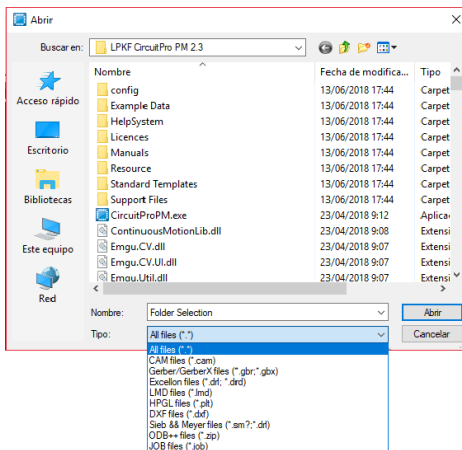


Figure: Archivos admitidos

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

Bottom layer

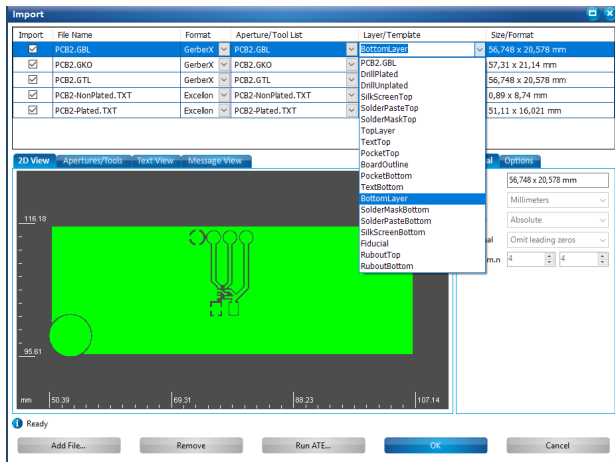


Figure: Bottom layer file

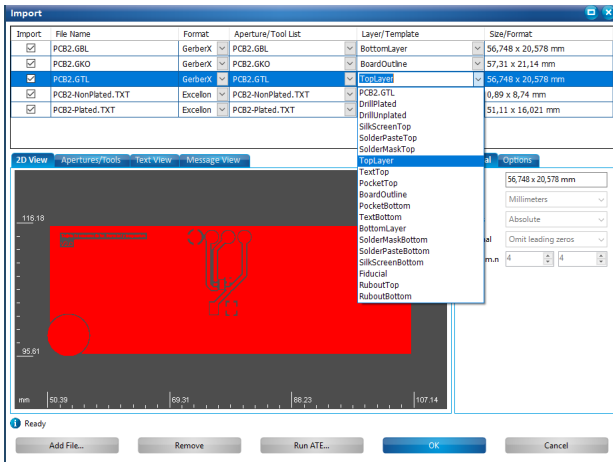


Figure: Top layer file

The Drill Layers

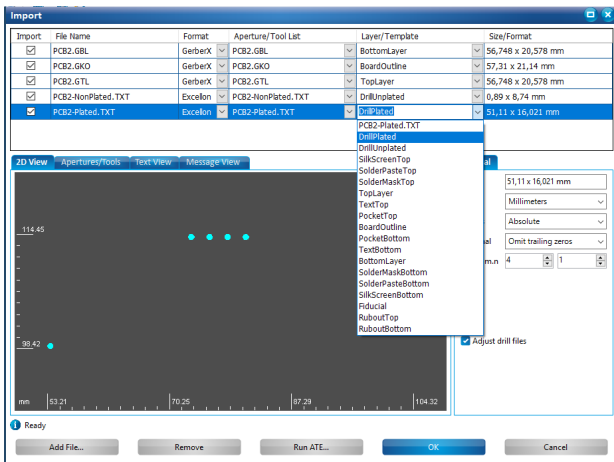
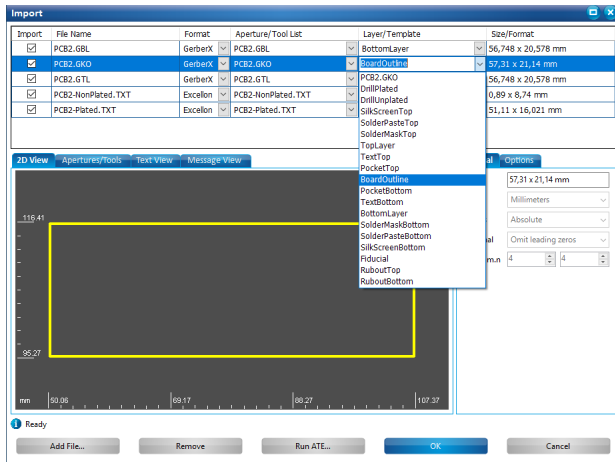


Figure: Drill layer importing

Capas de corte



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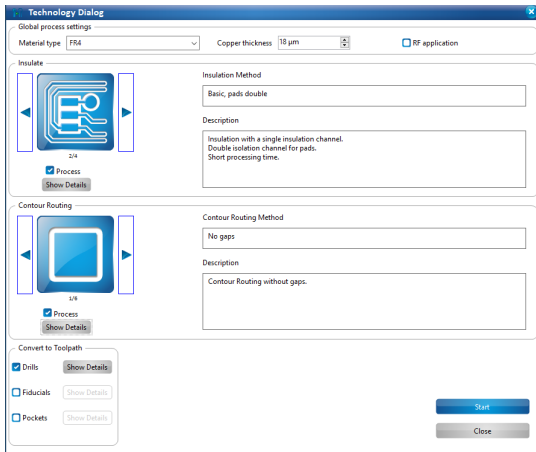
The screenshot displays the CircuitPRO CAM software interface. The main workspace shows a PCB layout on a red background. The layout includes a central component footprint with several traces extending to the left, where four circular pads are visible. A yellow rectangular boundary encloses the main layout area. At the bottom of the layout, the text "CircuitPRO" is displayed in a stylized font. The interface includes a menu bar (File, Edit, Insert, Toolpath, Modify, View, Select, Wizards, Machining, Extras, Help), a toolbar, and a Layers panel on the left. The Layers panel lists various layers with columns for Name, Vis, Sel, Colors, and Made. Below the Layers panel is a Navigation panel. At the bottom of the interface, there is a Fault monitor table and a status bar.

| Name | Vis | Sel | Colors | Made |
|-------------------------|-------------------------------------|-------------------------------------|--------|------------|
| Fabricated (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| DrillPlated (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| DrillUnplated (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubCopperTop (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubDielectricTop (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubLayer (H) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubTop (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubCopperBot (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubDielectricBot (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubLayer (H) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubBottom (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubCopperBottom (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubDielectricBottom (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubCopperBottom (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |
| SubDielectricBottom (S) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | True Width |

| Client ID | Client Description | Unit ID | Unit Description | Fault ID | Fault Time | Fault Code | Fault Description | Accept time |
|-----------|--------------------|---------|------------------|----------|------------|------------|-------------------|-------------|
|-----------|--------------------|---------|------------------|----------|------------|------------|-------------------|-------------|

Cursor X = 71,462 mm Y = 100,507 mm Anchor X = 0 mm Y = 0 mm

Global Process Settings



The screenshot shows a 'Computation Results' dialog box with a blue title bar and a close button. The main content area is titled 'Warnings' and contains a 'Drilling' section. This section lists four warnings, each with a specific diameter and the number of ignored objects. Each warning includes an 'Assign these toolpaths to...' dropdown menu. The first dropdown is set to 'Spiral Drill 0,7 mm', while the others are set to '<Please select tool... >'. To the right of the list are three buttons: 'Calculate', 'Save...', and 'Print...'. At the bottom of the dialog is a 'Show more' button.

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... >

Calculate

Save...

Print...

Show more

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.

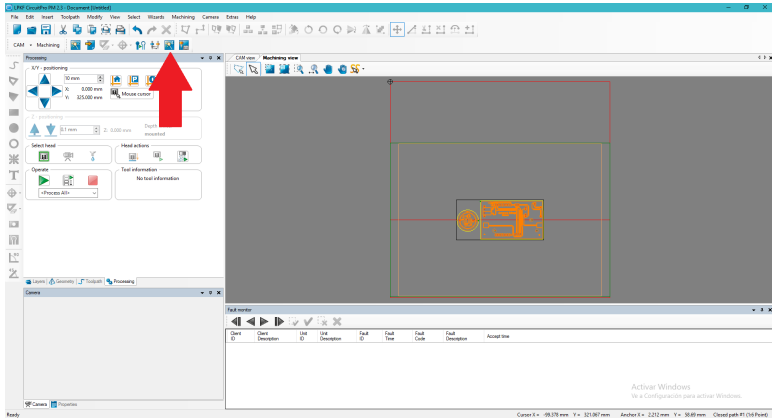


Figure: Board Production Wizard