

## LPKF Milling Machine Usage

The following document explains the procedure to follow for all students who want to create printed circuit boards using the LPKF milling machine.

### Background.

At times a student will be asked or will need to create one of three types of finished circuit boards with the LPKF Circuit Board Milling Machine (ProtoMat C30s): a simple single-sided board, a double-sided board, or a single-sided board with labels engraved on the component side.

This process will require the use of TraxMaker, CircuitCAM, and BoardMaster software. Slight familiarity with TraxMaker, and general familiarity with Windows-based computers, is required.

TraxMaker is installed in room 202 on bench 17 in the Austin Building. Only the lab assistant in charge has access to the software. (to get access to the software contact the lab assistant)

Due to misuse of the milling machine in the past, the new policy for its use will be as follows:

- All Students will be required to submit their layout for inspection.
  - o This is to make sure that the design meets all the specifications required by CircuitCam 4.0 and BoardMaster 4.0
- Once the layout has been submitted the lab assistant will work on finalizing the layout and creating the PCB
- A student will be allowed to use the Milling machine only when the lab assistant is present and he is following every step of the process. If the lab assistant is not present the PCB will be done as explained before in the second point
- Senior Student who have completed their internship will be allowed to use the Milling machine without supervision after successfully completing the training

The following is a schedule when the lab assistant will work on every submitted PCB layout

	Monday	Tuesday	Wednesday	Thursday	Friday
2:00 PM	Milling Machine		Milling Machine		Milling Machine
3:00 PM	Milling Machine		Milling Machine		Milling Machine
4:00 PM	Milling Machine		Milling Machine		Milling Machine
5:00 PM	Milling Machine		Milling Machine		Milling Machine

Plan ahead, at the end of the semester every student will want to have their PCB done in time. As soon as a student submits his layout the lab assistant will work as fast as possible to get everyone's work done in time

To submit your layout email your .PCB file to Marco Salas [sal06010@byui.edu](mailto:sal06010@byui.edu).

**NOTE:** Other PCB layout software than TraxMaker may be used, if the software generates standard Gerber X and NC-Drill output files, but some adjustments to these instructions may be necessary. Below is a link for tutorials on how to use Allegro PCB.

<https://byui.box.com/s/nfetnrq823rohcl4pvu9>

If a student is given permission to use the milling machine he needs to know that the LPKF ProtoMat C30s is a well-designed machine, and has very few safety considerations. However, it is necessary to observe the following precautions:

- Never reach into the machine while it is running.
- Be sure the motor has come to a complete stop before changing the tooling bits.
- Do not operate the machine without a tooling bit properly inserted.
- Do not use the control computer for other tasks, while the machine is running.
- Take care when handling the tooling bits, as there is a risk of cutting yourself.
- Keep the cover closed when the machine is operating, whenever possible. If it is necessary to operate the machine with the cover open, wear hearing protection and eye protection.