

Available Process Profiles

Profiles 1 to 7 have been predefined by LPKF for use with 230 x 330 mm (9 x 12 in) circuit boards. Profiles 8 and 9 are available for customizing by the user.

Custom Size Circuit Board Current Calculation
 Current Setting = Exposed Board Area * 0.00014333

Profile	Application	Preparation	Bath 1 Degreasing (55C)	Preparation	Bath 2 Cleaning (18-25C)	Preparation	Bath 3 Activation (18-25C)	Preparation	Bath 4 Plating (18-25C)	Concluding	Current (A) Full Board Settings	Reverse Pulse Plating (RPP)
1	Standard Board	1. Fasten Board to holder w/out electrical connection 2. Thoroughly rinse circuit board 3. See Sample Requirements and Preparation	65	1. Thoroughly rinse circuit board	5	1. Thoroughly rinse circuit board w/ UPW. 2. Blow off excess water and ensure all via holes are clear of water.	15	1. Remove board from holder w/out electrical connection. 2. squeegee off surfaces of board. 3. Tap circuit board several times against wipe covered surface to clear via holes of excess activator. 4. Wipe surfaces of board. 5. Thoroughly dry circuit board with heat gun. 6. Fasten board to holder with electrical connection. Make sure contact points are clean and bright, use sand paper as necessary. 7. Plug electrical connection into the right side of plating unit.	90	1. Thoroughly rinse circuit board. 2. Blow off excess water. 3. Wipe dry. 4. Clean work area and shut down system.	12	off
2	Standard Board w/ RPP		65		5		15		90		12	on
3	Multi-layer Board		80		10		25		120		12	off
4	Multi-layer Board w/ RPP		80		10		25		120		12	on
5	Flexible Board		80		5		15		60		10	off
6	Flexible Board w/ RPP		80		10		25		60		10	on
7	Initialization - Do not modify (used when chemicals are replaced)		80?		N/A		N/A		300?		12?	??
8	User-defined	User Defined as needed										
9	User-defined	User Defined as needed										

When using circuit boards of dimensions other than 230 x 330 mm (standard full board), the plating current has to be recalculated and the profile has to be edited accordingly. Calculate the board area by multiplying Width x Length (**do not double this for two sided boards**). Enter the product into the calculator below in mm² units. Press the **Calculate Current** button and the required current setting is output in the **Required Current field**. Enter this value into the profile as described below.

Note: Operating the unit at too high current settings will degrade the surface of the circuit board and reduce the service life of the chemical bath.

Common Tasks and Processing Tips

Changing the plating profile

- Use the up/down arrows to highlight the "Profiles" menu option. Click the right arrow to enter the next menu level.
- Use the up/down arrows to highlight the "Selection" menu option. Click the right arrow to enter the next menu level.
- Use the up/down arrows to highlight the process profile to be used. Click the right arrow to enter the selection.

Starting the process or specific phase of the process

- Use the up/down arrows to highlight the "Phases" menu option. Click the right arrow to enter the next menu level.
- Use the up/down arrows to highlight the phase to start, typically phase 1. Click the right arrow to enter the next menu level.
- Use the up/down arrows to highlight the "Start" option. Click the right arrow to enter the selection, follow prompts.

Setting calculated current for custom size circuit boards

- Use the up/down arrows to highlight the "Profiles" menu option. Click the right arrow to enter the next menu level.
- Use the up/down arrows to highlight the "Change" menu option. Click the right arrow to enter the next menu level.
- Use the up/down arrows to highlight the "Current" menu option. Click the right arrow to enter the new value.
- Select the digit to change using the right arrow key.
- Change the digit by pressing the up or down arrow key.
- Press the right arrow key several times to move the cursor to the last entry position. Press the right arrow key one more time, the value shown is stored to memory.
- Press the left arrow key as many times as needed to reach the main menu.

Error Codes

If the unit has detected an error this is indicated by an error code on the display. On the lower left of the display an "E" for "error" and a corresponding code number is displayed. On the lower right of the display the error name is displayed. At the same time a beep is sounded.

Code	Display	Cause	Remedy
01	I < 1A	Current interrupted in tank 4	Re-insert the circuit board into tank 4. Select and confirm START on the controller.
			Check the electric contact of the circuit board and holder
			Remove the protective copper film
			Check the anode plug and cable see "Cleaning the anode rails" on page 54 of manual
02	Level	Fill level of tank 1 is too low	Fill up tank 1 with CLEANER 110 up to the triangular mark.
		Fill level sensor is defective	Switch off the unit. Report the error to customer service.
03	VDD	Voltage VDD faulty	
04	Temp	Overheated heat sink	
05	24V	24V voltage faulty	
06	3V	Plating voltage faulty	
08	TempSen	Temperature sensor is defective	
16	I Motor	Motor overload	see "Easing frame movement" on page 55 of manual
		Motor is defective	Switch off the unit. Report the error to customer service.



Danger of poisoning! Danger of Chemical Burns! Always wear protective gloves and goggles when handling the chemicals. Avoid any contact with the fluids used, in case of skin contact rinse immediately with plenty of water, in case of eye contact rinse immediately with plenty of water and consult an ophthalmologist!

Sample Requirements and Preparation

The circuit board should be drilled only with carbide drills that are suitable for the board material and are in mint condition. Comply with the drill parameters found in the drill's manual or the tool libraries of BoardMaster. Preferably use FR4 with a copper layer of 5 or 9 µm, as this material has a protective copper film and rinsing suffices to clean the drilled holes. When using base material without protective film, e.g. FR4 18/18 µm, you need to deburr the drilled board and brush or scrub the surface with a non-woven synthetic (**do not use steel wool**). Rinse the circuit board thoroughly, especially the holes. Before processing the circuit board select the profile suitable for your requirements. If you should use board material of dimensions other than 9 x 12 ", you will have to edit the profile according to the board dimensions employed.

Bath 1 must be heated to approximately 55 C prior to operation. (See digital thermometer readout)

Phase 1: Degreasing the circuit board (complete sample requirements and preparation step above before proceeding)

1. Insert the circuit board with several knocking movements into tank 1.
2. Select and start PHASE 1 on the controller.
When the time counter is down to 0, a beep sounds and the status display prompts you to rinse the board.
3. Acknowledge the end of PHASE 1 by selecting and confirming END on the controller.
4. Take the circuit board out of the tank and rinse it thoroughly water in an external basin or sink.

Note: It is necessary to rinse the circuit board immediately after taking it out of bath 1 to prevent the degreasing agent from hardening. To rinse the circuit board move it up and down in a jet of water for about 15 times or at least 30 seconds. Ensure that the circuit board fastenings are also rinsed in order to minimize carry-over.

Phase 2: Cleaning the circuit board

1. Insert the circuit board with several knocking movements into tank 2.
2. Select and start PHASE 2 on the controller.
When the time counter is down to 0, a beep sounds and the status display prompts you to rinse and subsequently dry the board.
3. Acknowledge the end of PHASE 2 by selecting and confirming END on the controller.
4. Take out the circuit board and rinse thoroughly with tap water in an external basin or sink.
5. Rinse the circuit board with distilled, de-ionised, or ultra pure water. Make sure that the via holes are also rinsed thoroughly in this step.

Note: Take special care rinsing the circuit board otherwise the ACTIVATOR chemical is ruined by trace elements of the tap water (chlorine, calcium carbonate etc.) and has to be replaced completely.

6. Blow off the circuit board with oil-free compressed air or nitrogen until the water is removed from the holes.
7. Dry both sides of the circuit board with a heat gun. Make sure that the holes are completely cleared for the next phase.

Note: The circuit board has to be completely dry, water will dilute the ACTIVATOR chemical!

8. Cover tanks 1 and 2 to minimize evaporation losses.

Phase 3: Activating the circuit board

1. Insert the circuit board with several knocking movements into tank 3.
2. Select and start PHASE 3 on the controller.
When the time counter is down to 0, a beep sounds and the status display prompts you to dry the board.
3. Acknowledge the end of PHASE 3 by selecting and confirming END on the controller.
4. Take the circuit board out of the tank and wipe off the ACTIVATOR on both sides letting the liquid drip back into tank 3 using a squeegee.
5. Tap the almost dry circuit board on a soft surface so that surplus ACTIVATOR is removed even from small via holes.
6. Unfasten the board from the circuit board holder.
7. Let the circuit board dry thoroughly (e.g. using a heat gun, max. temperature 95 °C, +/- 5 °C for 4 minutes +/- 1 minute) and remove surplus ACTIVATOR by tapping the board in turns on a soft surface.

Note: Drying the ACTIVATOR can also be achieved using a drying cabinet at 100 °C max. (95 °C, +/- 5 °C for 4 minutes +/- 1 minute). Ensure that the holes are not blocked by residues.

8. If you are using FR4 base material with copper film remove the film after drying.

Phase 4: Copper plating

1. Remove any oxide layers on the circuit board holder with electrical connector using sandpaper (copper gleam must be visible at the bolt and the flat surfaces).
2. Fasten the circuit board to the circuit board holder with electrical connector.
3. Ensure that the cathode connector is plugged in properly on the right side of the enclosure.
4. Insert the circuit board with several knocking movements into tank 4.
5. Select and start PHASE 4 on the controller.

Checking whether all via holes are plated with copper.

6. After approx. 15 to 20 minutes select and confirm PAUSE in order to interrupt the through-plating process. The countdown is halted.
7. Take the circuit board out of the tank.
8. Rinse the circuit board thoroughly in an external basin or sink.
9. Check the circuit board:

Check whether the circuit board edge is copper-plated already.

For multi-layer circuit boards the edges of which you have sealed with adhesive tape, use a magnifying glass to inspect the largest via hole whether it is copper-plated already.

If the circuit board edges (or holes) are already copper-plated the process works fine. Otherwise: Check the parameter settings (current, RPP).

10. Reinsert the circuit board with several knocking movements into tank 4.
11. Select and confirm START on the controller.
The countdown is resumed.

When half the time is over a beep is sounded and you are prompted to turn around the circuit board.

12. Take the circuit board holder with the circuit board out of the tank, turn it 180 °, and re-insert it with several knocking movements into the tank.
13. Select and confirm START on the controller.
When the time counter is down to 0, a beep sounds and the status display prompts you to rinse and subsequently dry the board.

14. Acknowledge the end of PHASE 4 by selecting and confirming END on the controller.

PHASE 4 can be repeated as often as needed by pressing the u key.

15. Take the circuit board out of bath 4 and let the chemical drip back into the bath.
16. Rinse the circuit board in an external basin or sink with running water for at least 30 seconds.
17. Blow off the circuit board with oil-free compressed air or nitrogen.
18. Dry the circuit board quickly, using warm air if possible (e.g. with a hair dryer or heat gun).

Note: This should be done as quickly as possible to prevent the copper from oxidizing.