

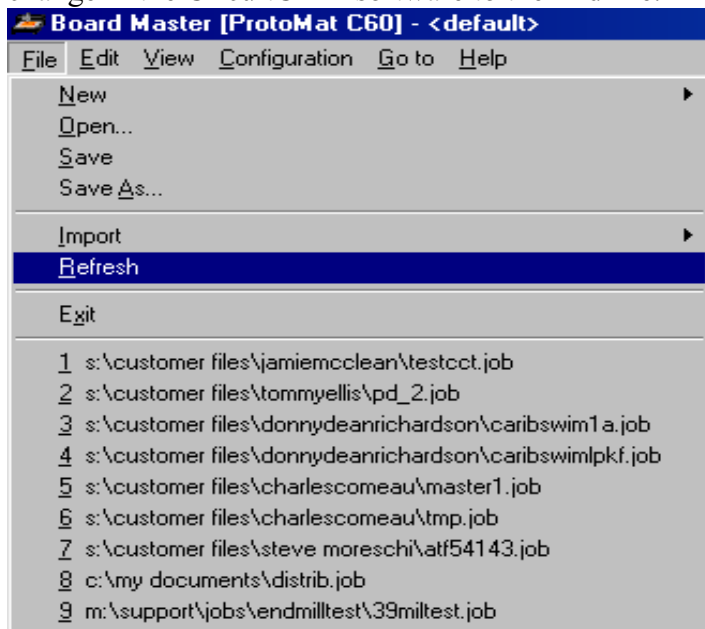
BoardMaster Advanced Features

In this section of the tutorial, we will cover the advanced features of the BoardMaster software, touching upon any area that is not necessary for a basic operation of the machine.

File Menu Commands

Refresh

The 'Refresh' command, is used to reload the lmd sequences into the project, after you have made a change in the CircuitCAM software to the lmd file.



This is a very useful command if you have ever experienced an error in the drawing that you would like to correct, if you are in the middle of milling out your board when you actually notice the error.

The way that the refresh command is utilized, works in the following manner:

Let's say that during milling, you notice that there is an area of traces, that have not been milled out in between. You look at the board drawing, and realize that you neglected to assign a tool small enough to fit in-between the traces, during your insulation process.

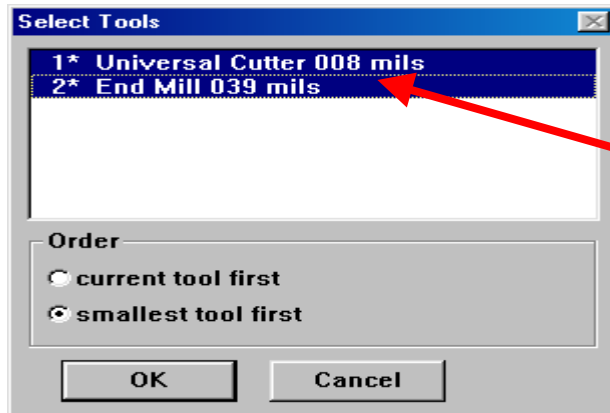
So, you go back to the CircuitCAM software, and reinsulated with a small tool now assigned as well as your other tools. You save, and export the lmd file. Back in BoardMaster, you receive a message asking you to input a new lmd name.

You cancel out of that, and instead, select the 'Refresh' command, and, the modified data from the LMD file is re-imported into the BoardMaster software, with the job file still being in exactly the same location as it was before you made the change in CircuitCAM. Only now, you see that the traces that were previously not milled out, are now ready to be milled out. Pretty impressive, hmmm?

How to manually rerun tools

If you find yourself needing to rerun a specific area, using a specific tool.

- Select the phase you want to rerun, and go to the edit/tool selection menu.
- Deselect all of the tools that you do not need to rerun, leaving only the desired tool selected, which will be indicated by a dark blue background highlighting the selected tool.



**Click on one of
these listed tools to
select and/or
deselect for usage.**

- Now, you can use the sequence selection icon in the interface screen, to select the particular area of your board, to be milled.
- Click on the plus button, and the software will only mill out that area with the selected tool only.

Adding an LMD to the project

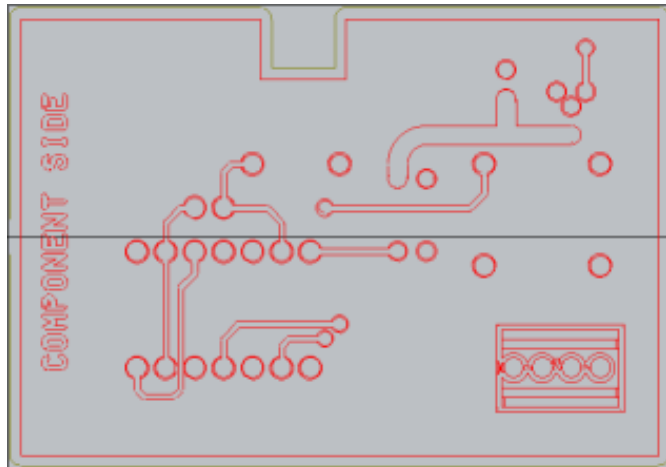
There are three different ways of adding an lmd into your project.

- The first and most obvious way, is to 'Import' an lmd into the project
- The second option, is to import the project into the pool of available lmd's, this is accessed by selecting the 'Edit/Tool Assignment' menu command. In this dialog, you are able to add in an lmd into the placement pool, however, the lmd will not be placed onto the job, unless you use the placement dialog to actually place the lmd into the job. This will open up the dialog box to let you choose lmd files to import.
- The third way to add the lmd, is to choose from the pool of imported lmd files, by the placement dialog box, which is accessed by the edit menu, and choosing the 'Placement' selection. You will need to click on the 'Add' button, to select an lmd from a pool of imported lmd files

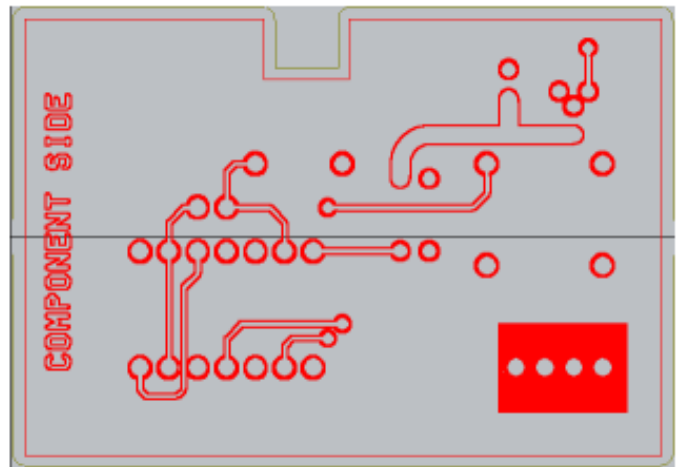
View Menu Commands

View – Real tools VS Outline view

Sometimes it is helpful to be able to view your board drawing as it would appear with actual path widths. This aids in inspecting and identifying the areas on the board that are being milled out, to assure quality and precision. To enable viewing with real tools, go to the 'View' menu, and click on the 'RealTools' choice. Here are example views of outline VS real tools views:



Outline View



Real Tools View

You can see in the outline view, that the tool paths are indicated by thin lines, representing the path that the tool will be taking, whereas, in the real tools view, it shows you what it will look like in the actual width of the tool itself, instead of just the path that the tool will take.

Removing an LMD from project

The removal of the lmd from this placement screen, will only remove the lmd from the current active processing. The lmd file will still be available in the project for replacement if you so desire.

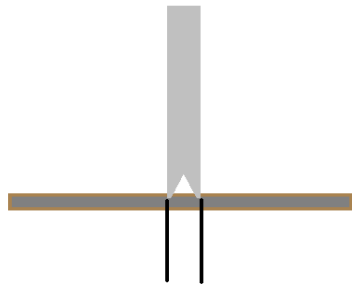
The second and most permanent place to remove the project is found in the edit menu, under 'Tool Assignment'. Any LMD removed from this point, will be removed from the project altogether. It will not be removed from the computer, only from the project, and will no longer be available.

Setting Tool height

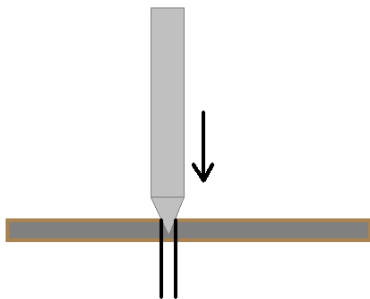
To properly set your tool heights, there are different methods for each type of tool that you have to use.



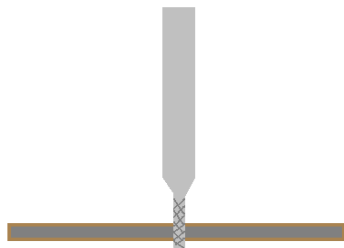
For setting up drill heights, the main concern is that the drill be extended far enough below the depth limiter to drill all the way thru your base material, but not thru the underlay beneath it.



End mills, are designed to remove just the copper coating on the base material. In doing a 'Scratch' test, you first adjust the depth limiter so that the end mill will not touch the base material. Now with the machine in manual mode, place the head in a position on your base material that is outside the bounds of your project. Next, turn on the spindle motor, bring the head down, and adjust the depth limiter until the end mill just barely touches the base material. At this point, adjust the depth limiter down 16 clicks, and the depth will be set appropriately for the end mill function.



The third type of tool, is the universal cutter, which achieves it's width of cut, based upon how deep the bit burrows into the base material. It will take four clicks of the knurl nut to widen the cut of the standard universal cutter by 1 mil, and 8 clicks of the knurl nut to widen the cut of the fine line cutter by one mil.

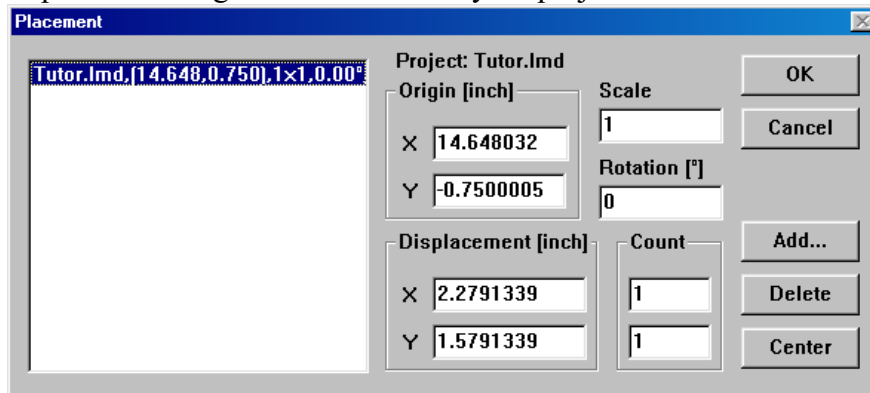


The last tool, is the contour router, which is adjusted the same as the drill bits. Just make sure, with both the contour router and the drill bits, that you do not go thru the underlay and damage the tabletop.

Edit Menu Commands

Panelization and Placement

Panelization is the process of duplicating an LMD project, in such a manner that a panel of lmd's are created. This is the preferred method of panelization, rather than duplicating the project in CircuitCAM or in the original CAD package. The method of panelizing requires you to have already imported the original LMD file into your project.



There are actually two ways that you can reach the dialog box where you panelize a project.

The first way is to use the edit menu, and select 'placement'. In this Placement dialog, you will see the name of the imported LMD in the left side box. In the right side, is all the information that is pertinent to the currently selected LMD. Whenever an lmd is selected on the left side, you can view and change the information about this lmd on the right hand side.

- The 'Origin' of the project, corresponds directly to the Zero point that was set in the CircuitCAM software. This origin, determines where the lmd resides on the project placement.
- The displacement, corresponds to how far apart the panelized boards will be from each other. Scale and rotation, determine the size of the lmd and the rotation of the lmd, as compared to the initially imported lmd.
- Now, the count, is where you will set up the number of duplicates of the lmd that you want to mill out, spaced apart by the amount entered in the displacement box.
- If you want to center the project in the programmed material, then you would click on the 'Center' button.
- The 'Delete' button, will remove the currently selected lmd on the left, from the project. Please note, that this will not delete the lmd, but it will merely remove the lmd from the current project.
- The 'Add' button, will add an lmd into the project, from a pool of already imported lmd's. If you have not imported any lmd's yet, then this dialog will be empty when you select this function..

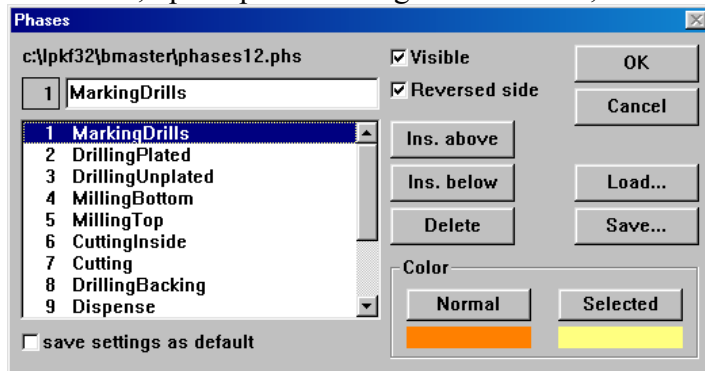
The second way to reach this dialog box, would be to right click on an lmd that was displayed on the BoardMaster interface screen. You would place your cursor over the graphic artwork onscreen, and right click your mouse button to bring up the placement dialog box. You can change the placement of your project thru this dialog box, or, you can select the 'Project Placement' icon, and then click and drag your lmd to any part of the tabletop that you desire. Just keep in mind, the extent of the milling head in comparison to where the edge of your material is.

Reload

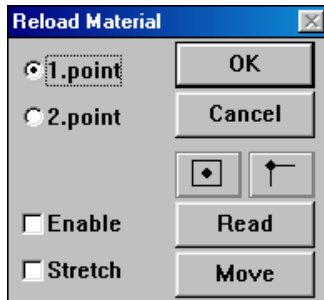
The reload dialog, enables you to realign an already milled circuitboard, and prepare it for reworking, even if the project has been off the machine and or cut out of the base material. The process for reloading the material works in the following manner:

- First, you will need to secure the board to the tabletop. If you are going to rework the bottom side of the board, you may proceed to the next section. If you are going to rework the topside, and you are placing your board on the table, topside up, then you will want to reverse the phase of your drill holes, to allow you to proceed with the next section.

To do this, open up the 'Configuration' menu, and select the 'Phases' choice.



In this dialog box, click on the layer that your drill holes are located on, and then, select the 'Reversed side' check box. This is because the drill holes are usually made from the bottom side of the project, whereas in milling the topside, you will want access to the drill holes from the top.



Then, you will need to open up the 'Edit/Reload' dialog box. What you will need to determine, before you proceed, is what side of the board that you will be needing to rework.

- The first step to realign the board material, is to click on the radio button labeled '1.point'. This will be the first point of origin for the reload function.
- Now, use the 'sequence select icon, to select a drill hole from one of the drill hole phases.
- Now, in the reload dialog box, click on the 'center point' button, this is the button with the dot in the middle of the box. The button next to it, would select a corner of a square pad, whereas, the 'center point' button, selects the center of the selected object. What this does, is tells the software that you would like to use the center of this drill hole as the first alignment point.
- Now, manually choose a drill bit of the same size as the drill hole, and insert the bit into the Colette when the machine prompts you to do so.

Now that you have your first reference point selected, and a drill bit of the same size as the drill hole in the Colette, manually move the drill head using the movement icons, until the drill fits precisely into the selected drill hole. Click on the button, in the reload dialog box, labeled 'Read'.

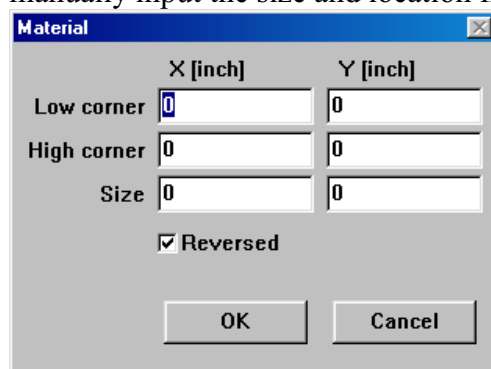
This will program in the exact PHYSICAL placement of that reference hole into the memory of the software. Now, we will need a second reference point preferably as far and diagonally away from the first reference point as you can get it. Repeat the procedure that you performed, for the second reference point, making sure to click on the '2.point' button before you repeat the procedure.

Now, the last two steps, are to click on the 'Enable' and the 'Stretch' check boxes. This will enable the realignment of the board in the software. You may change your layer selection to the appropriate layer you need to rework, select the segments using the 'sequence selection' icon buttons, and run the milling process

Configuration Menu Commands

Manual inputting material size

If you know the size of your material, and are correctly define the location of the material, you can manually input the size and location from the configuration/material menu.



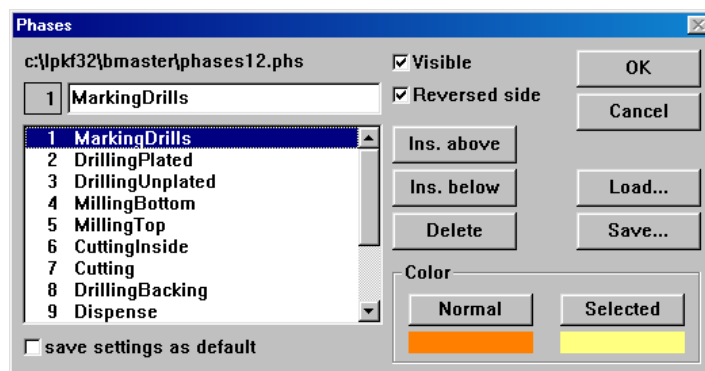
The 'Material' dialog box contains the following fields and controls:

	X [inch]	Y [inch]
Low corner	0	0
High corner	0	0
Size	0	0

Below the input fields is a checked checkbox labeled 'Reversed'. At the bottom are 'OK' and 'Cancel' buttons.

Simply open up the configuration/materials menu, and enter in the low corner x and y coordinates, and the high corner x and y coordinates, or input the size of the material in the boxes provided.

Reversing phases



The 'Phases' dialog box shows a list of phases on the left and configuration options on the right:

- File path: c:\pkf32\bmaster\phases12.phs
- Phase list:
 - 1 MarkingDrills
 - 2 DrillingPlated
 - 3 DrillingUnplated
 - 4 MillingBottom
 - 5 MillingTop
 - 6 CuttingInside
 - 7 Cutting
 - 8 DrillingBacking
 - 9 Dispense
- Options:
 - ☒ Visible
 - ☒ Reversed side
 - Buttons: Ins. above, Ins. below, Delete, Load..., Save...
 - Color selection: Normal (orange), Selected (yellow)
 - ☐ save settings as default

If you would like to reverse the side that a particular phase is performed on, such as a drilling phase, you can simply go to the configuration menu, and click on the phases submenu. Find the phase you wish to reverse, select it by clicking on it, and then, click on the box labeled 'Reversed side'. This will reverse the side that that phase is performed upon.

Single sided boards – reverse drills

If you are milling out a single sided board, and your milling is to occur on the topside only, you may want to reverse the phase of the marking drills and the drilling layers, to avoid having to turn the board over from the backside to the topside.