

HOWTO Setting up user-gcode.h in pcb-gcode.

The `pcb-gcode ULP` allows you to customize the g-code created for your boards to a great degree. If you don't see an option in the `setup1` program that suits your needs, you can add your code to the `user-gcode.h` file. The best way to set up `user-gcode.h` is to set `Use user-gcode...` on under Other options on the **GCode Options** tab in the setup program. Generate a set of NC files for a board. Let's say, for example, that after you change the tool when you're drilling from the bottom of the board, you want the tool to move to X5 Y5 Z5, turn the spindle off, then turn it back on. Since this has to do with drilling the bottom of the board, we should look at the `bd(bottom drill)` file. Here's an excerpt from a `bd(bottom drill)` file:

```
G90
(Tool Change Begin)
(Bottom Tool Change Begin)
@M05@
G00 X0.0000 Y0.0000 Z2.0000
M06 T01 ; 0.0236
(Bottom Tool changed)
(Tool changed)
G00 Z0.0200
M03
G04 P3.000000
(Bottom Tool Change End)
(Tool Change End)
G82 X-1.6200 Y1.2900 Z-0.1000 F9.80 R0.0200 P0.250000
G82 X-1.8800 Y0.5900
G82 X-1.9500 Y1.4900
G82 X-1.9500 Y1.8100
```

We want to add our commands *after* the tool is changed when drilling the *bottom* of the board. Looking at the sample above, you will find this line:

```
(Bottom Tool Change End)
```

That's where we want our code to go. Now you can open `user-gcode.h` in your favorite editor, and use the Search or Find feature to find the line with `Bottom Tool Change End`. Here's an excerpt from the `user-gcode.h` file:

```
TOOL_ZERO_BEGIN[BOTTOM] = "(Bottom Tool zero begin)\n";
TOOL_ZERO_END[BOTTOM]   = "(Bottom Tool zero end)\n";
TOOL_CHANGE_END[BOTTOM] = "(Bottom Tool Change End)\n";

TOOL_CHANGE_BEGIN[TOP]  = "(Top Tool Change Begin)\n";
```

The middle line is the one we're interested in:

```
TOOL_CHANGE_END[BOTTOM] = "(Bottom Tool Change End)\n";
```

Change the line so that it looks like this:

```
TOOL_CHANGE_END[BOTTOM] = "(Bottom Tool Change End)\n"
"G00 X5 Y5 Z5\n"
"M05 (spindle off)\n"
```

```
"G04 P3.000000 (wait 3 seconds)\n"
"M03 (spindle on)\n";
"G04 P3.000000 (wait 3 more seconds)\n";
```

Notice that all the lines have a `\n` before the last " and that the last line is the only one that ends with a semi-colon ;.

Generate the files again. Open the *bd* file in the editor and have a look. Here's how the sample looks now:

```
G90
(Tool Change Begin)
(Bottom Tool Change Begin)
M05
G00 X0.0000 Y0.0000 Z2.0000
M06 T01 ; 0.0236
(Bottom Tool changed)
(Tool changed)
G00 Z0.0200
M03
G04 P3.000000
(Bottom Tool Change End)
G00 X5 Y5 Z5
M05 (spindle off)
G04 P3.000000 (wait 3 seconds)
M03 (spindle on)
(Tool Change End)
G82 X-1.6200 Y1.2900 Z-0.1000 F9.80 R0.0200 P0.250000
G82 X-1.8800 Y0.5900
G82 X-1.9500 Y1.4900
G82 X-1.9500 Y1.8100
```

See the lines after (Bottom Tool Change End) ?

```
G00 X5 Y5 Z5
M05 (spindle off)
G04 P3.000000 (wait 3 seconds)
M03 (spindle on)
G04 P3.000000 (wait 3 more seconds)
```

Those are the lines that we added in `user-gcode.h`! Since we put our code in the `TOOL_CHANGE_END[BOTTOM]` definition, it will only be put in files for the bottom side of the board. So the code will be in the *bd* and *bot* files. If we only wanted our code in files for the top side, we would have put the code in `TOOL_CHANGE_END[TOP]`. You can probably guess that if we wanted the code in both the top and bottom files, we would have put the code in `TOOL_CHANGE_END[TOOL_CHANGE_END[ALL]]`.

To conclude, the steps to follow are:

1. Generate a set of files.
2. Find the file that you want the code to be put in (*bd*, *top*, etc.).
3. Find the location in the file that you want the code.
4. Find the comment near that location.
5. Find the comment in the `user-gcode.h` file.
6. Insert your code after the comment.

7. Generate the files again and check to be sure it is correct.

See Also

The Yahoo! [pcb-gcode](#) group.

The pcb-gcode [How it works](#) document.

Footnotes

¹ run `pcb-gcode --setup` from the EAGLE command line.