PCB Design Rules for Milling

General work-flow

1. Set up the design rules (Design → Rules), as per the requirements below.
2. Place your coordinate origin (Edit → Origin → Set, then click). The origin should be the bottom left corner of your board.
3. Draw the outline of your board on the Keepout layer. In Altium, choose the Keepout layer from the tabs at the bottom, choose a coarse grid (e.g. press "g" then choose 1.0 mm), then Place → Keepout → Track, and draw the board outline. If coordinates are shown in units of mils, you might want to switch to mm by pressing "q".
4. Place mounting holes in each corner of the board with a drill size of 3mm. These are vias connected to no net. Again, a coarse grid with metric units will help position the mounting holes correctly.
5. Switch the measurement system to mils (press "q"), choose a finer grid ("g"), then arrange your components as required.
6. Route all nets except GND. Use minimum 0.5 mm tracks
7. Draw a polygon on each of the top and bottom layers with the net set to GND. These should cover the entire board. You might find it convenient to return to a metric grid spacing when drawing the polygon edges.
8. Manually confirm the electrical connectivity of all nets. The electrical rule check will assume through-hole-plating technology. If your board is to be manufactured in-house then it will not have through-hole-plating. Visually check the connectivity.

Design Rules for the JCU Milling Machine

- Track width minimum 0.5mm.
- 0.5mm clearance.
- 0.5mm isolation on polygon.
- Polygon attached to a net (usually GND).
- Drill bits we use: 0.6mm, 0.7mm, 0.8mm, 0.9mm, 1mm, 1.1mm, 1.2mm, 1.5mm 2mm, 3mm.
- Typically use 0.7mm holes for vias.
- There should be 3mm mounting holes (usually in each corner of the board).
- Label the board with your name or initials. Note that the silkscreen layer is ignored so you must place text on the top or bottom layers for it to appear on the board.
- Generally, solder on bottom.

Current carrying capability

The main board used is FR4 1oz copper on a fiberglass substrate

For reference, approximate current capability of 1oz (28.35 gram) copper tracks are:

Current (amps)	Track width (mm)	Track with (inches)
1.0	0.4	0.156
1.5	0.5	0.02
2.0	0.8	0.0312
2.5	1.6	0.0625
3.5	2.5	0.1
4.5	3.2	0.125
5.0	4.0	0.156
5.5	5.0	.2
6.0	6.4	.25