

PCBA PANEL GUIDE LINE FOR IN-LINE & SEMI-AUTO ROUTER MACHINE

The Following are recommendations and not actual demands for PCB design, but make the process of depaneling more efficient.

1. Keep cutting paths as short as possible by introducing (joining) tabs and cut-outs in between modules (boards) and to the side breakaway tabs, instead of a full joint. This can be requested easily from PCB (raw card) supplier. In this way the machine need not rout entire separation. This will reduce cycle time and increase router bit life. This will also allow the use of slower cutting speeds to reduce board stresses without compromising cycle time since the non cutting speed of the machine is very high.

2. Keep the number of tabs to a minimum, enough to achieve PCB rigidity and minimize warpages. The lesser the number of tabs the faster the cycle time.

3. To reduce cycle time, the separation between modules (boards) should be the same as the tool diameter. Therefore, a single pass of the router bit is possible. Suggested separation is 2.05mm-2.1mm (to use dia.2.0 router bit) or 2.25-2.3mm (to use dia.2.2 router bit). This will leave a 0.05mm protrusion on each side. If 0.05mm overcut is allowed than preferably separation is the same as the router bit diameter i.e. 2.0 or 2.2mm, tolerance is -0mm +0.025mm. (RBM & GSR)

4. Any routing that requires router bit diameter below 1.0mm presents a problem in lower cutting feed rate and reduced tool bit life. Recommendation is 1.5 - 2.2mm router bit diameter.

5. Minimum of 3 locating holes per module if possible. This ought to give the best holding protection of the module.

6. Hole to hole pitching accuracy of +/- 0.05mm (2 mills). This will make fixture fabrication easier and reduce the stress on the board during loading and unloading since all holes will conform much better to the pin location. (RBM & GSR)

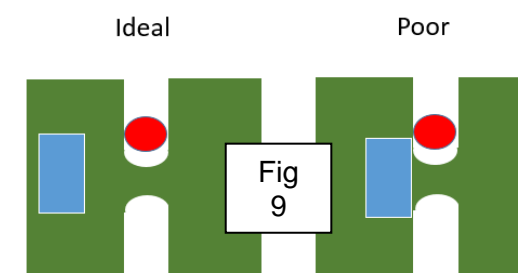
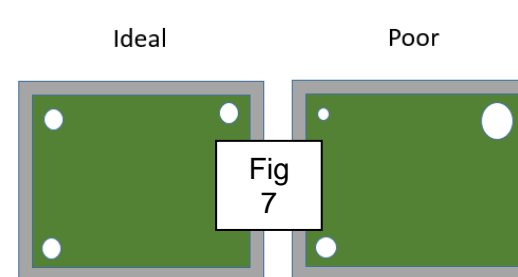
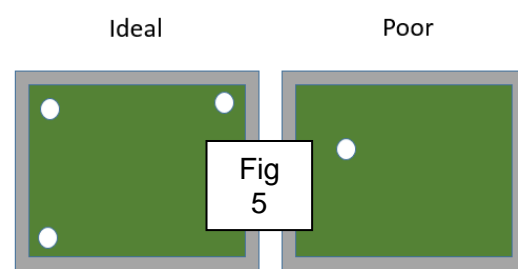
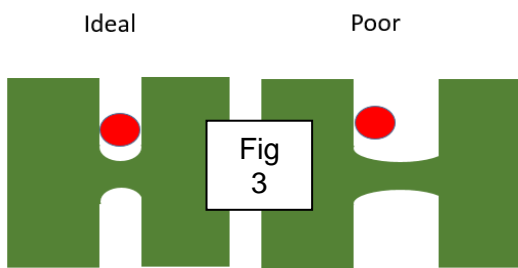
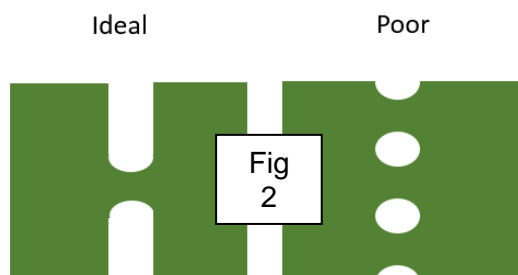
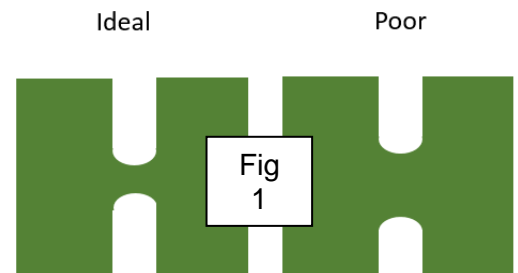
7. All module hole diameters to be standardized across models (now and for future models). This will simplify design, stock maintenance and keep cost down.

8. Control diameter of module holes and other locating holes to within +/-1mill (0.025mm). (RBM & GSR)

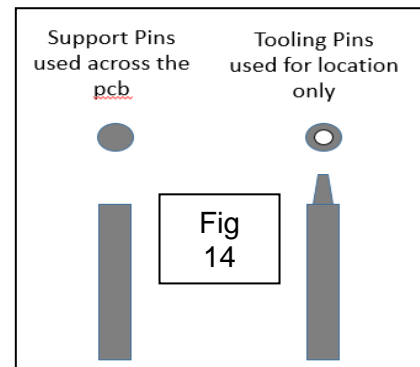
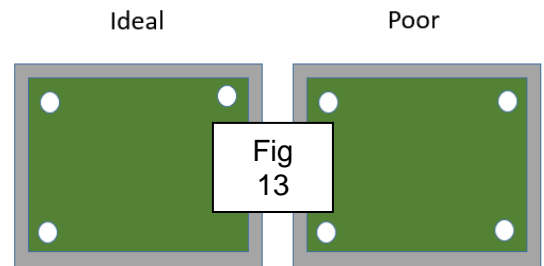
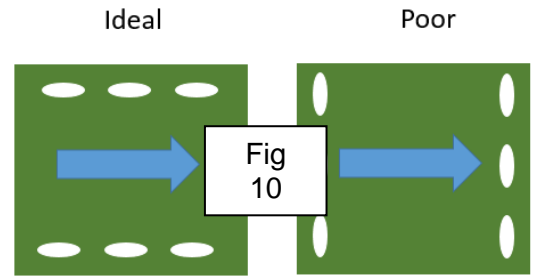
9. Keep all tall components (like big capacitors and inductors) away from cutting paths. This will reduce the possibility of problems during cutting. (RBM & GSR)

10. For in-line system, the breakaway tabs are preferred along the edge where the panel sits on the conveyor i.e. on both parallel edge of the conveyor. There should not be a tab across PCB.

11. Location of module holes to be as near to the cutting path as possible, (while still keeping point 13 in mind) this will allow the



12. support to be as effective as possible and reduce the need for other clear areas on the PCB for support.
13. Provide orientation proof locating holes on the panel either on the module or on the waste tab area. e.g. non symmetrical arrangement of holes on the 4 corners of the panel. (GSR)
14. Clear area around module holes of 1.5 to 2mm (as perimeter). This will allow us to use the locating pins as support pins as well by putting a shoulder on the locating pins. This clear area should be ALL on the module and not include the break away tab or it will interfere with the cutting path. (GSR)
15. Release drawings early to vendor for fabrication of fixtures. For obvious reasons. Please include details such as component height etc. A picture (digital camera prices are coming down) of a populated board (both sides) would be very useful. (RBM & GSR)



Remarks: The above are only suggestions and not limitations of the machine.

Some of the above suggestions applies only either to in-line router machine (RBM) or semi-automatic (GSR) (manual load/unload) routing system.

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