

Factors	Description	⇒ GCT's recommendation
Tool	Normally, spiral and diamond patterned routers are used upon processing inner and outer contours.	Spiral patterned routers offer enormous advantages in relation to dimensional accuracy. ⇒ GCT recommends spiral patterned routers type 1 100 (diamond coated router). Diamond coated routers have hardly any measurable diameter wear. Routers with reduced diameter tolerances can be supplied on request.
Handling	The tool handling has a high influence on the accuracy. The risk of damaging the cutting edges is very high. Therefore, the tools have to be put directly from the manufacturer's packaging box into the tool cassette.	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p style="color: red; font-weight: bold;">wrong</p>  </div> <div style="text-align: center;"> <p style="color: green; font-weight: bold;">correct</p>  </div> </div> <p>⇒ GCT recommends ordering routers with set rings from your supplier, if required.</p>
Machine / Spindle	The routing machine in operation must fulfill the quality demands.	⇒ GCT recommends using one spindle only, max 2 spindles even on multiple spindle routing machines.
Pressure foot	The PCB is fixed on the machine table by a pressure foot.	The pressure foot and brush insert have to be controlled and changed regularly.
Collet / Maintenance	It is important to maintain the collet regularly and properly in order that process capability as well as routing quality can be guaranteed. The maintenance should be carried out according to manufacturer's specification.	The correct maintenance increases the dimensional accuracy. The run-out should be checked regularly. ⇒ GCT recommends $\leq 20 \mu\text{m}$ run-out and to clean the collets once per shift.
Extraction	The efficiency of the extraction has a wide influence on the accuracy.	⇒ GCT recommends at least 75 mbar at the pressure foot.
Parameter	The chip load influences the cutting forces and consequently the accuracy.	⇒ GCT provides individual parameter recommendations on request.
Pre-drilling	Pre-drilling at the beginning and at the end of the routing distance increases the accuracy.	⇒ GCT recommends pre-drilling with a drill of the same diameter.
Routing direction	The accuracy is influenced by the routing direction.	⇒ GCT recommends to rout outer contours anticlockwise and inner contours clockwise.
Routing depth / Stack height	The routing depth / stack height influences the accuracy.	⇒ GCT recommends reducing the stack height by one panel.
Router run-out / Deflection	There are always dimensional deviations between the top and bottom panel. They depend on the router diameter.	Upon routing outer contours the router will be pulled into the material, i.e. the bottom panel will become smaller compared to the top panel. When routing inner contours it will be the opposite way around.
Tool life	The tool life influences the router wear and consequently the accuracy.	⇒ GCT recommends reducing the tool life by 25%.
PCB fixture	The PCB is fixed with pins on the tooling plate.	⇒ GCT recommends internal pinning of the panel.
Backup / Tooling plate	The use of stable tooling plates and a firm fixture on the machine table are very important.	⇒ GCT recommends pre-routing the backup to reduce the cutting forces.