

# Hybrid electronics

## Printed tracks and interconnects combined with SMD parts

Hybrid circuit consisting of printed tracks and SMD parts conductively glued to foil

Using printed tracks and SMD electronics opens up electronic circuits directly on the component or flexible foils. PCBs made of glass fibers and epoxy resin can be eliminated and not only packaging space is reduced, but also the environmental footprint improves significantly. Printing, gluing and Pick-and-Place processes can be fully automated. By using digital printing technologies product individualization in design and function are realizable down batch size of one.

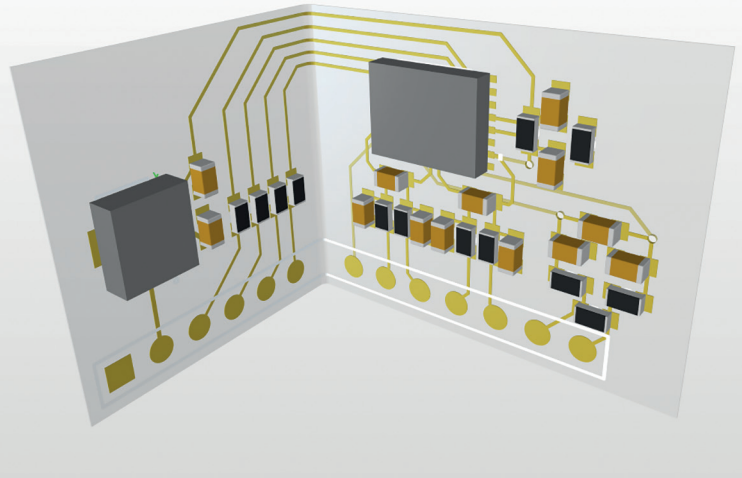
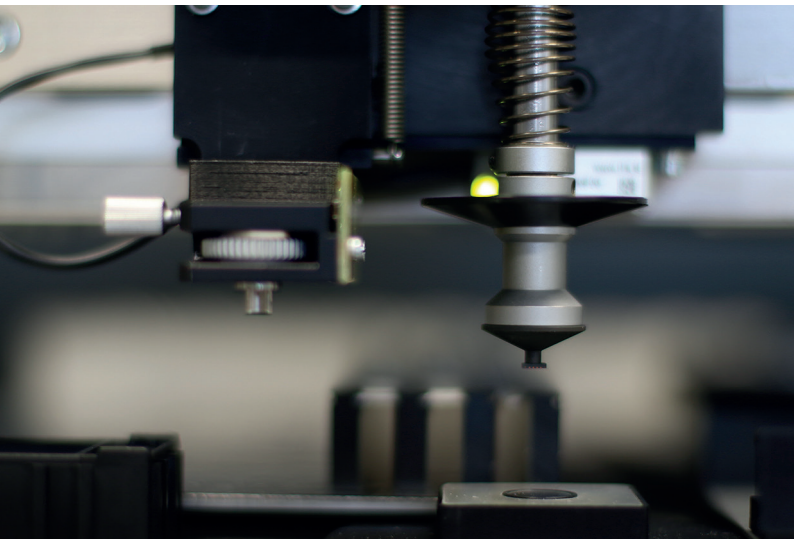
### Integrated circuit packaging

To enable the full potential of hybrid circuits materials and manufacturing processes need to match each other. A key role is played by the electrical conductive bonding of the SMD components to the printed pads. Conductive and non-conductive glue must perform together as well as a soldered connection.

Therefore, the right choice of materials and processes is essential. Furthermore, a carefully considered circuit design and coatings assist in getting a robust and reliable product. Digital printing as well as printing on 3D surfaces can raise new potentials and combined with a 3D Pick & Place process a more compact design is possible.

### Reducing the Footprint

Replacing the printed circuit board (PCB) made of glass fibers and resin by a minimal amount of printed tracks and glue can reduce the carbon footprint and the proportion of non-recyclable waste significantly. First recycling concepts for printed circuits show the possibility to separate the electronics and part material, so the conductive track material (mostly noble metal) and sometimes even the SMD components can be reused.



Left: Pick-and-Place machine for SMD part assembly on printed tracks

Right: Development of printed circuits on foil or 3D surfaces

## Multi-layer

In many cases multi-layer can be converted into single-layer designs to reduce production effort but also multi-layer circuits are feasible. This can be achieved by building bridges, using zero Ohm resistors or the printing of a full surface insulation coating.

## Our offer

Fraunhofer IFAM offers you the following R&D services in this field:

- Consulting on all aspects of hybrid electronics
- Feasibility studies for hybrid electronics, including:
  - Mechanical and electrical design
  - Material selection
  - Printing of prototypes
  - Testing of prototypes
- Process integration, profitability studies and know-how transfer

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