

# Microphone carrier for a hearing aid

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## Intended use and function

The MID microphone carrier (MIC module™) is used in behind-the-ear (BTE) hearing aids, type Acuris P, from Siemens Audiologische Technik GmbH. The BTE features a multi-channel and adaptive directional microphone system with up to three microphones. This reduces unwanted ambient noise, particularly in difficult situations, by reacting directly to noise sources and adjusting the microphone mode automatically.

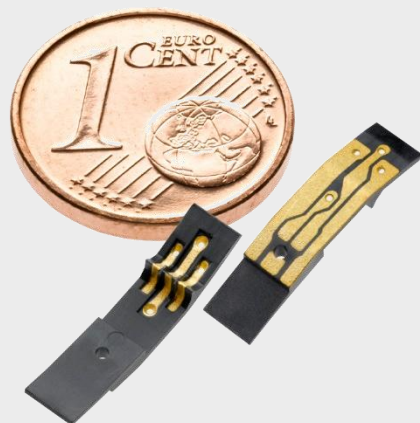


Figure 1: Behind-the-ear (BTE) hearing aid (left) and MID microphone carrier (MIC module™)(right)

## Advantages of the MID solution

- The advantage of MID technology is the three-dimensional, freely arrangeable focusing of the microphones. This makes it possible to eliminate a further carrier that would have to be connected to the board by wires.
- The implementation of the MID solution simplifies assembly by a significant measure.

<b>Application areas</b>	Medical technology
<b>User</b>	Siemens Audiologische Technik GmbH
<b>Product</b>	Behind-the-ear hearing aid
<b>Main function</b>	Three-dimensional arrangement of the microphones



Pushing Performance

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## Project implementation

The project to implement the microphone carrier in MID technology kicked off in 2003. The first samples were delivered at the end of 2003. Commercial viability was achieved in 2005 and production commenced in 2006.

### Functions of the MID component

- Electrical connection of the microphones to the main board.
- Positioning and assembly of a total of three microphones. The exact positioning of the microphones is crucial for the hearing aid's correct function, because this allows users to experience spatial hearing.

### Manufacturing aspects

- LPKF-LDS technology is employed to structure the injection molded component from the material LCP. Metallization is done without external current and consists of Cu-Ni-Au, which is a typical layer composition for MIDs.
- The component's curved shape requires the design of adapted holders for the laser process.
- The MID part impresses with extremely compact dimensions (length 16 mm, width 4 mm). Special precautions are needed during the production process in order to avoid damage.
- The MID component is structured and metallized on both sides. This is possible thanks to the integration of vias from the front to the back side.
- The vias are produced directly during the injection molding process.

Substrate material	LCP (Vectra E 820i LDS)
Structuring	LDS
Metallization	Chemical Cu-Ni-Au
Connection technology	Soldering (vapor phase)
Number of components	3
Start of production	2005
Production run	10,000 p.a.
Development period	2 years