

MID TECHNOLOGY

Customized Solutions. Continued Innovation.

www.te.com/antennas

MID Technology

TE Connectivity (TE) is a global leader in MID (Molded Interconnect Devices) technology. As a focused and agile company, we have many years of experience in designing and manufacturing custom solutions - making everyday products better. Our technology and products deliver superior performance needed to operate diverse applications in various industries around the world.

FLEXIBILITY

MID offers state-of-the-art custom designs for consumer electronics, telecommunications, automotive, medical and industrial applications. Several industries have geared their focus towards minimizing space usage and replacing complex sub-assemblies with a single component which may reduce capital expense, assembly, weight, package size and overall cost while improving functionality and reliability. Below are two custom case studies to illustrate MID technology:



Joystick Switchmount

This component utilized multi-pair MID circuit geometry to overcome the problem of needing to mount and interconnect eight switches and eight diodes over four planes. The solution provided electrical pathways and mounting pads over multiple planes, eliminating 16 separate wires and four circuit boards, as well as providing a significant reduction in labor. The component was manufactured in high volume products with the volume exceeding millions of parts.



High Mounted Brake Lamp

By utilizing MID technology, we were able to replace the traditional 14-piece insert molded "pigtail" assembly shown on the left with a single component shown on the right, fulfilling the design's highest priority - component reduction. This helped eliminate labor costs from assembly while at the same time increasing part quality and reducing the potential points of failure.

MID TECHNOLOGY

In its most basic form, MID technology is defined as the process that results in selectively plated plastic parts. This technology is most often used in three basic ways:

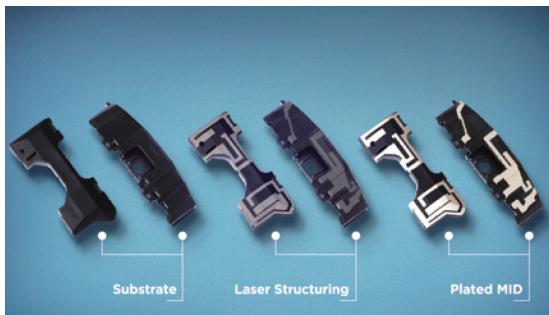
1. Electro-mechanical (signal or current carrying traces)
2. RF technology (antennas)
3. Shielding applications

MIDs can integrate electrical and mechanical elements into almost any shape of interconnect device allowing entirely new functions to be created while facilitating the miniaturization of products.

TE utilizes two different technologies to manufacture antennas: Laser Direct Structuring (LDS) and two shot molding.

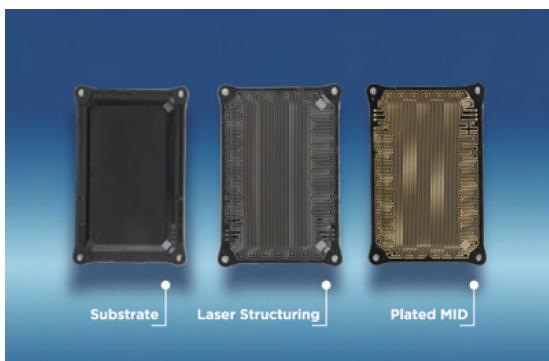
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LASER DIRECT STRUCTURING MID TECHNOLOGY



TE's use of laser direct structuring (LDS) antenna and product technology can save valuable space in your application by integrating high frequency, mechanical and electrical functionality into one component. Laser structuring enables 3-dimensional (3D) design/routing capability, versus the limiting 2-dimensional (2D) capability on a printed circuit board (PCB). LDS technology also allows for improved antenna performance because antennas can be placed in the design where they have more room for better bandwidth and efficiency. LDS is a three-step process. First, the antenna is molded in a standard single shot mold using one of the LDS resins. Second, the desired pattern is directly structured onto the antenna by the 3D laser system. Finally, the pattern is plated using industry-standard methods where the plating adheres to the plastic only where the plastic has been activated by the laser, thus creating a conductive pattern. Key benefits of LDS include:

- 3D design capability
- Improved performance
- Improved time to market
- Cost savings



TWO SHOT MID TECHNOLOGY

Two shot molding is a mature and well developed process that remains viable for cost effective and repeatable production of MIDs. The basic process has only two steps - injection molding of two distinct thermoplastic polymers and the electroless plating process, resulting in a selectively plated component. In order to achieve the selectivity during plating, a catalyst doped "plateable" resin is molded in conjunction with a standard non-plateable resin to define the desired area to be plated. This area is metalized initially with copper, followed by nickel and, optionally,

gold plating. The following are just a few of the many advantages that MID two shot technology delivers compared to alternative technologies:



- Design flexibility for complex 3D geometries
- Ability to integrate multiple functions into one component
- Tightest tolerance for pattern registration to carrier
- Fewest manufacturing steps and processes
- Higher yields
- Improved scalability

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