Safety caps for payment terminals

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Intended use and function

Systems that process data in electronic payment transactions must fulfill strict security requirements. This is why no critical information is stored in these systems when they are not operating. The critical phase in which data theft with subsequent fraud would be possible is reduced to the period during which credit card data are read in and sent directly during the payment procedure.

For example, it is necessary to prevent an illegitimate sensor from copying data during the reading and passing it on to third parties during the payment procedure. This is accomplished by using MID safety caps that protect the electronics. The bottom side of the safety caps has two long conductor paths and is metallized. If these conductor paths are interrupted, e.g., by a bore hole, the electronics will no longer function. This effectively prevents reading and consequently copying procedures. According to today's security standards, this protection must function reliably for a hole diameter of as minute as 200 µm.

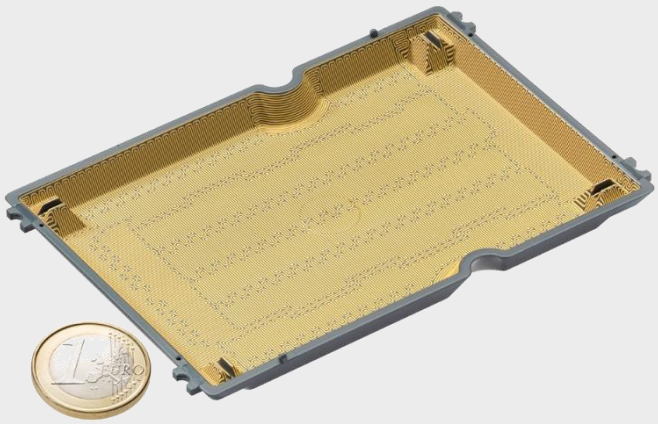

Figure 1: Safety cap for electronic payment systems

Advantages of the MID solution

- MID safety caps feature assembly that is simpler than that for conventional solutions (glued flex-print foils).
- High level of security functionality for protected data in payment systems.

Application areas	Medical technology
User	Kavo Dental GmbH
Product	DIAGNOdent – caries diagnosis
Main function	Scanner

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Project implementation

The safety cap development kicked off in April 2004. The autumn of 2005 marked the start of production for the first product generation, while further solutions were implemented during the following eight months.

Functions of the MID component

- Covering with integrated conductor path structure: the detection of a bore hole with a diameter of 200 µm necessitates a closely meshed conductor path network with a pitch of 300 µm (conductor path width 150 µm and conductor path spacing of 150 µm).
- This avoids quality problems in the field that can occur when the adhesive used in the conventional method fails.

Manufacturing aspects

- The injection molded component is structured by means of LPKF-LDS technology. Metalization is performed without external current and consists of Cu-Ni-Au, which is a typical layer composition for MIDs.
- Due to the relatively minor requirements with regard to the thermal load on the safety caps, the material PBT is used. Conductive rubber is used for contacting and there is no need for soldering.
- The large production runs allow economical manufacturing of the product as rack goods.
- During the metallization, precise monitoring of the process parameters is needed because the conductor paths must lie within a narrowly defined resistance range.
- The application requires further development or optimization of the cleaning procedures in the safety cap manufacturing process.

Substrate material	LCP (Vectra E 840i LDS)
Structuring	LDS
Metallization	Chemical Cu-Ni-Au
Start of production	2005
Production run	350,000 p.a.
Development period	1 year

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