Sanmina taking lead role in the automotive sector

Published in page 12 & 13 - http://content.yudu.com/web/69r/0A18qm2/CIEFeb2017/flash/resources/index.htm?refUrl=http%253A%252F%252Fwww.cieonline.co.uk%252Fcategory%252Ffeatures%252F

The automotive industry has been changing and developing rapidly over the last few years and will continue for many years to come. CIE editor, Amy Wallington talks to Bernd Enser, vice president, Global Automotive Business, Sanmina about how the company has taken a significant role in the industry to drive innovation in this area

Bernd Enser

Sanmina is a leading integrated manufacturing solutions company, providing custom design, manufacturing and global supply chain solutions to high technology Original Equipment Manufacturers (OEMs). Founded in 1980, Sanmina primarily serves OEMs in sectors such as medical devices, communications networks, defence and aerospace, industrial and semiconductor systems, multimedia, computing and storage, automotive and clean technology.

Bernd Enser is the vice president of Sanmina's Global Automotive Business and has been with the company for 26 years. He is also chairman of the technical community in ZVEI, an association for electronics manufacturers in Germany. "My team and I are primarily focused on technical standards and technical guidelines. Our goal is to make sure that the entire electronics industry has all the necessary information and processes available in order to launch and manufacture highly reliable and high quality products."

The automotive industry is one of the most innovative industries at the moment, with innovation every day that makes driving safer. Sanmina Corporation plays a significant role in this sector, with over 20 years of automotive electronic manufacturing experience. Sanmina also contributes to relevant industry bodies through chairmanship positions in trade organisations such as ZVEI and SAE.

With driving becoming more and more automated, the automotive industry is working hard to find the best solutions for intelligent vehicles. The complex technologies needed for advanced driver assistance systems (ADAS) and the driverless car include communications, sensors, multimedia and high-density electronics. In order to meet the stringent requirements of the automotive regulatory environment, these technologies and applications need strong engineering, validation, and complex manufacturing capabilities.

More and more vehicles today have semiconductors that were not specifically designed for automotive applications. Enser said that this trend is developing rapidly, and in the not to distant future these types of components will become embedded in almost everything that moves, and not just in premium vehicles. He said: "This trend represents an initiative to pull many of the functions you have come to depend on with your smartphone, into vehicles in order to make them safer, more comfortable and part of a normal lifestyle. This will not only support the current way we drive but will also support future initiatives like autonomous driving, car-to-car connect, car-to-x connect, and so on."

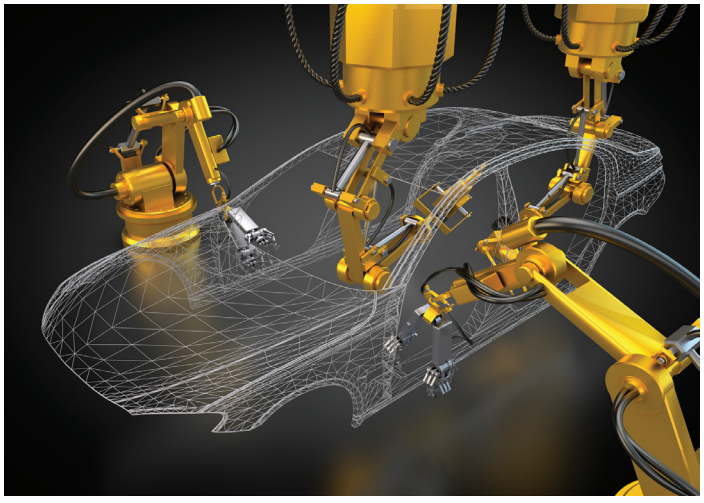
Initiatives such as car-to-x connect will be useful in many ways and can make driving safer. Manoeuvres such as overtaking a large vehicle when driving can be accomplished much more safely. Enser explained, "Just imagine you are driving behind a truck that is going 40mph. If you are not on a motorway, you cannot pass because you cannot see what is in front of the truck or oncoming traffic, posing a safety hazard. By having car-to-x connect you can connect to the car in front of the truck to see what is in front and if there is anything coming the other way. This then allows you to pass the truck safely, preventing accidents.

"It can also be used to see if there are any road obstructions anywhere in your path or if there are animals or children in the area. These capabilities will give a much more advanced view of the road, enabling greater safety."

However, these technologies are not ready yet, and Enser explains the challenge of integrating consumer components into automotive applications. "To get functions such as car-to-x connect embedded into vehicles, we need components that are actually designed to be used in places like smartphones. However, the challenge is that if you look at the mission profile of a vehicle, it is completely different than the profile for devices used in consumer products, where you have narrower temperature ranges, no vibration and no accelerated stress. We need to come together as an industry to see what needs to happen to make it possible to utilise consumer electronics in automobiles. It is not just a challenge for the component manufacturers, it's a challenge across the entire value chain that services this segment."

Sanmina works in eight different market segments including communications, defence and aerospace, industrial, medical amongst others. This means that Sanmina can look at components used in these segments to see if they are suitable for automotive applications. "We learn a lot about what components can do, what they can withstand and what they cannot do through the other market segments we are involved in," said Enser. "With that knowledge from a manufacturing point of view, we know how often we can solder them, which soldering profiles we have to use, what would damage them, how to treat them through the entire manufacturing process, how to store them, how to get them tested, and much more. This gives us valuable information for the automotive industry - since we know how these components behave in certain environments, we are able to advise on this."

Enser likens the component automotive manufacturing business to a triangle. "On one side, you have the components available to the market that are used in a specific application," he explained. "Another side of the triangle looks at the components from a reliability point of view. You need to have an understanding of the mission profile of the vehicle, and you need to be able to break it down to component level in order to predict what stress each component will see through its lifecycle and whether it can withstand it. And the third side of the triangle, and I would say the most 'invisible' side but one that is extremely important, is the legal aspect. There is a new standard on the market called ISO 26262 which describes functional safety and the different safety levels. It also puts everyone in the industry in a position of being liable if not compliant to that standard. So by assessing all three aspects - the component itself, the reliability aspect, and the legal aspect, you are able to



identify everything you need to do in order to make such components usable in the automotive industry."

Another task to make sure the systems are safe is to detect any potential failures that might occur through the products' lifetime. Sanmina's intelligent testing identifies algorithms that can produce a potential failure while running the initial circuit. "With these processes, we can cycle a component and apply certain signals. By measuring in real-time the responses of the component, including the embedded software, we can determine up to a certain grade how long such a component or a specific component function will last," explains Enser.

It's also important to have knowledge about the different failure modes of components and to understand their structure, because if anything does fail the supplier needs to run more tests to see what has happened. "The supplier provides you with feedback for example, on electrical over-stress," said Enser. "The important thing here is that we understand the particular failure phenomenon down in the event electrical over-stress occurs. So you need to know how it happened, and most semiconductor manufacturers have the ability to reproduce such failures. They can tell you the most probable signal or signals that were applied to drive that electrical over-stress, which pins have been loaded with voltage and current, and what time those signals were applied to the pins."

Considering all of these aspects, the automotive industry still has a long way to go before we see completely automated vehicles, but we can see developments in ADAS and how they can improve driving safety. Enser concluded: "2017 and 2018 will be a challenging time for the entire industry. But it is interesting that more and more companies are using EMS services, and we want to make sure that the automotive industry recognises the value of these services, and learns more about what the EMS industry can bring to this market."

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