Blog

Is Foxconn Ready for Cars?

Junko Yoshida, Chief International Correspondent
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What makes Taiwan's foray into cars interesting is if and when Foxconn gets involved. We spotted several key technologies at AutoTronics show last week.

Never underestimate the power of an industrializing nation with the will to succeed. We've seen it happen in Japan, followed by Korea, and we've also observed Taiwan as it pioneered the semiconductor foundry business and mastered PC and mobile ecosystems.

It's still an open question, though, whether Taiwan can replicate in the auto market the feats it performed with its own Taiwan Semiconductor Manufacturing Co., HTC or Asus.

Asked about Taiwan's foray into cars, Robert Hollingsworth, a veteran chip company executive formerly with SMSC, told me, "It depends. If industry standards prevail, I think they will do well. If everything divides into brand implementations, the growth will be very slow and without volume, will become less interesting for Taiwan's developers and manufacturers."

He, however, added: "Foxconn's involvement makes this very interesting."

Hon Hai Precision Industry Co. Ltd., trading as Foxconn Technology Group, is a Taiwanese multinational electronics contract manufacturing company headquartered in New Taipei City, Taiwan. The company is best known as the builder of Apple's iPhones and iPads.

(Source: EMS-CHEMIE AG)

Last week at AutoTronics Taipei, Taiwan sought to showcase some of the R&D achievements of local vendors and Taiwan Automotive Research Consortium (TARC). Demonstrations ranged from heads-up display and vision-based object detection systems to driver simulators and light-weight modular vehicle frames.

To be clear, though, Taiwan has only one car OEM – Haitec – and few globally recognized tier ones. Local industry needs to pull together to make Taiwan succeed in automotive.

Setting a target and making strategic investments to help an industry grow is "something the U.S. government hardly does," said Aart de Geus, founder, chairman and CEO of Synopsys Inc., in an interview in Taipei. "But they should."

Top-down government policy isn't an approach that sits well with most Americans. But when the market is already well-seed by R&D, it doesn't hurt to water the new shoots.

Nicky Lu, chairman, CEO and founder of Etron Technology Inc., told me last week in Taipei that just two months ago, Taiwan Semiconductor Industry Association (TSIA) teamed with the Taiwan External Trade Development Council (TAITRA) to establish a consortium of companies called "V-Team."

Lu, who served as chairman of TSIA until earlier this year, is currently executive board director of the organization.

So, what does V stand for? Lu said, "V as in vehicle, V as in victory."

Nicky Lu, Etron CEO

Connect with EMS
Citing a total of 25 V-Team companies, Lu said, "The goal is to link software and hardware, connect manufacturers and EMS," by fostering the development of tier ones who serve the global automotive industry. Lu added, automotive electronics is "one of the four key pillars"

of TSMC's business identified by Morris Chang. The other three are mobility, high-performance computing (i.e. AI), and IoT, he explained.

Taiwan's automotive ambition precedes the formation of V-Team, however.

To promote Taiwan's auto industry development, the Department of Industrial Technology (DoIT) of the Ministry of Economic Affairs in Taiwan urged four research institutes to establish the Taiwan Automotive Research Consortium (TARC) in mid-2005.

Currently, six members of the consortium are the Automotive Research and Testing Center (ARTC), the Mechanical and System Research Laboratories (MSL) of the Industrial Technology Research Institute (ITRI), the Material and Chemical Research Laboratories (MCL) of ITRI, the Metal Industries Research & Development Centre (MIRDC), the National Chung-Shan Institute of Science and Technology (NCSIST), and Hua-chuang Automobile Information Technical Center Co. Ltd. (HAITEC).

In addition to a host of automotive parts and components, this year's AutoTronics Taipei also highlighted R&D advancements made by local vendors and local research institutes, making Taiwan ready for the coming era of highly automated vehicles.

Foxconn wasn't present at AutoTronics. But Taiwan is getting ready to design and manufacture key subsystems for highly automated vehicles if Foxconn wants to pick up and run.

In following pages are examples we spotted on the show floor.

Next page: E-Lead goes big on HUD

E-Lead goes big on HUD

E-Lead is all in with HUDS (photo: EE Times)

E-Lead has been serving the automotive industry over the last 20 years, supplying everything from dash cams and rear-seat multimedia entertainment systems to Tier Ones and car OEMs.

The company's latest additions include a host of heads-up display (HUD) units tailored for a wide range of OEMs' needs. Dennis Chen, a manager at E-Lead (shown above), pointed out that the product lineup includes an aftermarket augmented reality HUD E-Lead developed with Baidu, China's Internet giant. This is the only HUD approved by Baidu for compatibility with their Internet of Vehicles spec, branded by Baidu as "CarLife," he explained.

Windshield-Type HUD. It's made visible for drivers with sunglasses on. (photo: EE Times)

E-Lead also showed off a new windshield type HUD that features special optical design. "You can view all the info on the HUD, even with your sunglasses on," said Chen. This is an

advancement E-Lead's competitors have yet to match.

Haitec offers hardware-independent AEB

(Photo: EE Times)

Haitec, Taiwan's only car OEM, doesn't export complete cars. But by leveraging its software prowess, Haitec has developed a hardware-independent Autonomous Emergency Braking (AEB) System targeted at Tier Ones and car OEMs abroad.

To meet the 2018 E-NCAP/C-NCAP requirement, AEB has become almost a compulsory function for every vehicle.

AEB requires a combination of one or more different kind of sensors with different levels of AEB. Haitec's system integrates signals from sensors to track objects with its own fusion system. After calculation by a vehicle dynamic model, "we could trigger brake system and the most accurate timing for AEB," the company explained. "By doing so, false positive rate could be enormously reduced. Additionally, by expending suitable sensors and with proper software changes, this system could upgrade to fulfill other ADAS functions."

The point of Haitec's AEB solution, however, is, "It's a highly generic system," explained Chihhan Chang (shown in the picture above), manager of image processing department at Haitec's Advanced Engineering Div. "We designed it to work with various sensors or brake systems in different car OEMs' models with a simple calibration process."

Vehicle simulator

(Photo: EE Times)

In testing highly automated vehicles, nothing is more important than vehicle simulators, noted Vector Yeh (shown above), deputy manager, mechatronics and system integration technology group, R&D Division at Automotive Research & Testing Center (ARTC).

The driving simulator integrates virtual environment, sensor models, vehicle dynamic models, driver interfaces, and real-time simulation with a variety of I/O interfaces to establish a real-time co-simulation platform. In accordance with requirements, road scenarios, sensing models and simulated signals can be arranged, and the developed ADAS algorithms or ECU can be verified and validated in the platform.

According to ATRAC, the driving simulator can perform different level simulations such as Hardware-in-the-Loop to support algorithm verifications, functional tests, and fault-injection tests before on-vehicle tests. Interactions between drivers and the systems can also be evaluated by driver-in-the-loop level simulation.

ITRI shows off Long distance floating multi-screen HUD

(Photo: ITRI)

ITRI (Industrial Technology Research Institute) showed off its long distance floating multi-screen HUD. It allows the driver to handle all the traffic information in a safe condition and reduces the risk of eye fatigue and distraction, explained Ming-Chieh Chou, senior engineer working at smart microsystems technology center at ITRI.

ITRI's wide-view HUD uses laser projector technology. The HUD module combines micro scanning optical engine with optical mirror. Through a long distance floating light path design, the image screen can be projected at a 2-meter distance in front of the car windshield, with a size up to 26 inches, according to ITRI.

The research institute explained that its unique beam splitter technology can produce three individual displays by using a single projector. The team also developed high-speed image distortion compensation technology, allowing an individual correction to be made for each display.

Next page: Vision-based forward object detection system

Vision-Based Forward Object Detection System

(Source: ARTC)

Putting bounding boxes around objects that need to be detected is something everyone is doing these days to advance their ADAS systems.

ARTC demonstrated its vision-based system to which the team apply only a camera. "We use deep learning method like CNN with embedded system to detect pedestrian and bicycle by a pin-hole camera. Real-time forward collision warning system is applied in advanced driver assistance systems," explained Han-Wen Huang, who works for applied sensor technology group at ARTC.

Motorcyclists in Taipei getting ready to zip through traffic as soon as the light changes (Photo: EE Times)

Of course, CNN, deep learning...

But isn't that what everyone else in the ADAS space already doing?

Noting Taipei road traffic so crowded with motorcycles, Huang said, "We've collected far more data about bicycles and motorcycles weaving through our streets. Our system is significantly effective to detect motorbikes."

— Junko Yoshida, Chief International Correspondent, EE Times 🔲

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