

Recording in-vehicle data and maneuvers

Company
G.i.N. mbH
Raiffeisenstr. 15
64347 Griesheim
(Germany)

Wolfgang Bassenauer and Andreas Schoenberg, the CEOs of G.i.N. were founding members of the CAN in Automation (CiA) users' and manufacturers' group. In the meantime, the company has grown from two persons to 34 employees. Besides the headquarters in Griesheim, there is a subsidiary in Wolfsburg (Germany) close to Volkswagen, one of the main customers. Vector owns 48% of the company's shares.

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1994 at Hanover Fair: W. Bassenauer (right) and A. Schoenberg (center) in discussion with H. Zeltwanger (left)

In 1991, Wolfgang Bassenauer and Andreas Schoenberg have established G.i.N. In the beginning, they produced the CanPC interface boards, the NetCheck hand-held tester, the *cmod* and the Tiny CAN module families. About *cmod* modules were installed in the Transrapid systems. Other customers are still using them.

available from Vector. "The close cooperation with Vector avoided to establish own sales channels," said Wolfgang Bassenauer.

"Data-logger is our business – from simple to most sophisticated ones."

Wolfgang Bassenauer

"However, last year we have given the last *cmod* production documentation to our customer," explained the CEOs," so that they can manufacture the modules by themselves." One other of the first developments was the CANscope hardware and base software. This CAN physical layer tool, an oscilloscope with CAN protocol knowledge, has been enhanced several times and is still

In modern cars and vehicles, the development engineers need to record data, in order to prove the correct function of the communication and the application. "It is not sufficient just to log the in-vehicle network data," said Andreas Schoenberg. "The data streams from the up to 8 CAN networks, up to 8 LIN networks, the two Flexray networks and the Most network need to be directed and combined with application parameters requested via the communication links," added Wolfgang Bassenauer. The data-logger provides up to 36 independent gateway functions, which can be programmed in order to combine data from different networks.

The company has found a niche in the automotive industry. The company develops leading-edge data-loggers with challenging requirements: Short boot-up times, in order to wake-up the multi-processor tool in less than 30 ms; and programmability of more than 100 trigger conditions for several recording scenarios including remotely demanded internal ECU data (diagnos- ▸

The GL3000/4000 data-loggers

The fundamental properties of these data-logger families include two ARM-9 processors: The real-time tasks (logger CPU) and the administrative tasks (Linux-CPU) are running parallel without interrupting each other. The time-critical CPU runs with no operating system overhead. This logger CPU is active immediately after wake-up regardless of the Linux start time. The ARM-7 processor cluster operates the communication interfaces. One micro-controller is able to manage up to four CAN networks and some additional interfaces (e.g. one LIN port and one K-line interface as well as an EIA 232 port or some LEDs). Besides the in-vehicle network data, the



tools can capture several digital and analog signals in real-time. The data-logger supports several input and output formats including CANalyzer log file (LOG, BLF), ASCII trace (ASC) and MDF. The tools supports even 2D classification tasks with up to 25000 classes.

tics, CCP, XCP). The products are programmable on the system level, meaning that for example the brake data is recorded and pre-analyzed in dependence of engine temperature and speed. Some users define more than 250 recording tasks (classifications). The high-end multi-processor data-loggers, such as the the GL3000 and GL4000 series, are equipped with two ARM-9 processors and an ARM-7 micro-controller clusters. From the user's script C-programs are generated and downloaded into the micro-controllers' flash memories. The MultiLog series features one CPU.

In total, the company has sold more than 12000 data-loggers. These products are used for network analyzes, automated fleet operation, vehicle monitoring, and quality assurance, not only in the automotive industry. "Our products provide more than just data recording," explained Andreas Schoenberg. "For example, there is the voice-input capability as well as the camera, GPS, and tachograph inputs." The test driver can record also verbal information, which will be related to the automatically logged data.

"A short start-time and efficient programmability are the key-features."

Andreas Schoenberg

The company has already started to develop the next generation of sophisticated data-loggers. "We believe and know that the future cars will implement more CAN networks as today and of course Ethernet will play in the entertainment a more important role," said Wolfgang Basenauer. "We are just in pre-development phase evaluating the demands of our customers." The data-loggers are like ECGs for highly networked embedded control systems. ◀

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