Easy diagnostics with an app

Andreas Schneider, Burkhard Schranz

Introduction

High complexity, high costs, low storage capacity - automotive supplier Getrag Ford Transmissions GmbH has been confronted with these data logging issues in the past while trying to acquire measured data on the condition of its dual-clutch gearbox during operation. Optimeas developed an intelligent and cost-effective data logging solution based on their smart platform for the gearbox specialist, which can save data of 120 days.

An English taxi company with several hundred Ford vehicles got the ball rolling: "The taxi business always challenges the gearbox extremely: The engine is constantly turned on and off, there are high temperatures and the vehicle is mostly used for short distances," explained Andreas Schneider, responsible for the measuring technology at Getrag Ford Transmissions GmbH (GFT), Cologne. "Therefore we are highly interested in conducting customer measurements at dual-clutch gearboxes of the power shift type series to gather information on the gearbox condition during permanent operation." Sensors connected to the gearbox control unit help to collect data on shifting travels, hydraulic pressure, rotational speed or torque values - including potential error codes.

However, data loggers available in the company were only able to store information of 20 hours. Then the vehicle had to be brought to the garage to retrieve the data - or a technician had to drive to the customer. Both

Figure 1: SmartCANLog

solutions didn't seem practical to Schneider. Therefore he started to search for a data logger with more storage volume, which was at the same time reasonably priced and easy to handle. "Data logger in the high-end sector are often very complex and require a high effort of programming and parameter setting, which always requires a technician. We wanted to avoid this, as far as possible - and hence provide our customers, i.e. the OEMs, with the possibility to just use the logger," explained Schneider.

The company found the suitable solution in Optimeas' smartCANLog. It is based on a highperformance ARM platform and is equipped with an isolated and ISO 11898-conform CAN connection. It currently supports log files such as RAW CAN and Multiplex CAN. The latter is used by the control unit of the gearbox. The device is equipped with a micro SD slot, which can be operated by the gearbox specialist in combination with 64 GiB memory cards.

Data of 120 days on one SD card

GFT records 140 channels in total using the multiplex procedure, which means that the data logger collects a maximum of 200 MiB per hour. They are compressed by a factor of 10, which results in 0,5 GiB per day. This allows the user to save the data of approximately 120 days on the smartCAN-Log. Schneider commented: "Compared to the previous solution, which only provided data storage for one day, this system offers an enormous advantage to us - in particular the easy ▷

Figure 2: Different housing options of the smartCANLog

Figure 3: Employment of the device in the car

parameter setting." Connecting the micro SD card to a computer or laptop enables the user to install two software files: a DBC database file and a configuration file. The DBC file contains information about data sent by the gearbox. The configuration file defines, among other things, the size of the data blocks and whether or not data should be compressed.

Hence, the function of the logger is determined by the software. In order to keep the usage as easy as possible, Optimeas develops software specifically according to the requirements of the individual customer as well as the application. This basically means that an app is running on the smartCANLog, which can be flexibly adjusted. It is also possible to initiate pre-evaluations of measurement results on the logger - or the connection of an ODB2 diagnostics interface in case a direct connection to the control unit is not possible. Even testing benches can be flexibly expanded. Furthermore, software updates can be implemented within minutes. Customers can install their own software on the data logger with the help of an app loader.

Insert and start without programming and parameterization

After the installation the user only needs to insert the card into the logger. The logger recognizes exchanged or new SD cards automatically, closes running data collections, configures the measurement based on the DBC file information and starts collecting data automatically. The logger reads the existing DBC file and with it decodes received CAN messages completely and channel by channel. All data is marked with a time stamp and mutually stored in a data file on the SD card. The resulting data format can be compared to a video recording, which means that all data up to the latest data point is readable even in case of an abrupt stop of the measurement.

„The big advantage for us lies in the dramatically reduced effort," said Schneider. "Whereas before we had to continuously send technicians to the customer, with the logger that is only necessary during the first start-up in order to do the wiring and to show local employees what they need to consider when installing the logger in another vehicle. Afterwards data measuring runs automatically and support is not required." Today, GFT monitors the proper recording of the device via an acoustic monitoring system. Optimeas will upgrade the next device generation of the smart-CANLog with a visual monitoring system.

Due to its high storage volume and low complexity, the logger is also a good solution for drive tests - no matter where in the world they are conducted. At the end of the drive test only the storage card is pulled out - and the measured data can be read. Climate conditions are irrelevant, because in case of fleet use the logger is installed in a splash-proof automotive housing. The device, which measures 13 cm x 7,5 cm x 3 cm, is usually installed in the vehicle's passenger compartment.

"The smartCANLog fulfills our requirements perfectly. And based on its functional range it is also very attractive in terms of price," said Schneider. "Traditional solutions usually provide extended functionalities, which we mostly don't require. And the more functions, the more complicate programming, parameter setting and fault tracing become." Therefore GFT decided in favor of the data logger of Optimeas. Not least because the functionality of the logger can be, despite its slim design, flexibly extended. Schneider mentioned measuring, for instance external data such as temperatures, voltage or currents. For that purpose Optimeas will extend its system by analog inputs. Alternatively it is also possible to wire CAN measurement modules with the CAN knot to be able to record this data with the logger: "With the CAN network you are able to set up, depending on the measuring task, an extensive measurement system based on the smartCANLog." ◄

Authors

*Burkhard Schranz
Optimeas Measurement
and Automation Systems
GmbH
Am Houiller Platz 4/B
DE-61381 Friedrichsdorf
Tel.: +49-6172-9977120
Fax: +49-6172-99771289
info@optimeas.de*

*Andreas Schneider
Getrag Ford
Transmissions GmbH
Scarletallee 2
DE-50735 Köln
Tel.: +49-221-58970
getrag.info.koeln@
getrag.com*

Links
www.optimeas.de

www.getrag.com

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