

CAN FD PLUGFEST

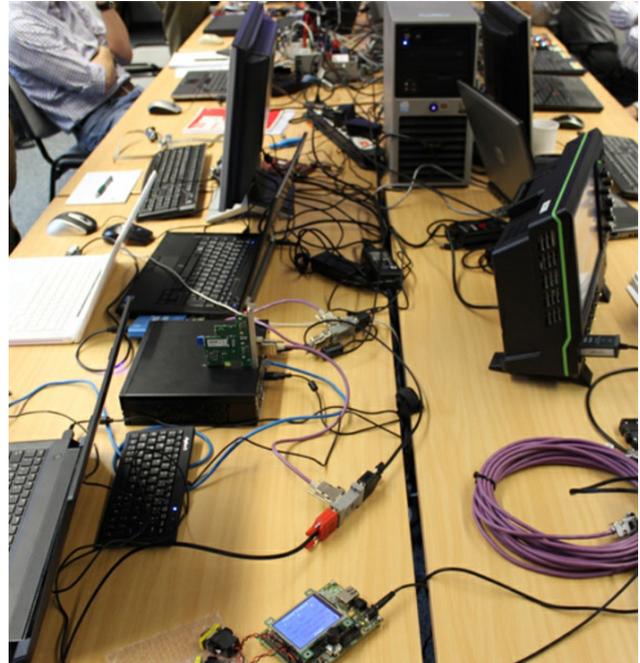
## Fourteen nodes and no error frames

The plugfest showed that multiple devices of different manufacturers can successfully work together in a CAN FD network. For many devices, this was the first endurance test they had to pass.

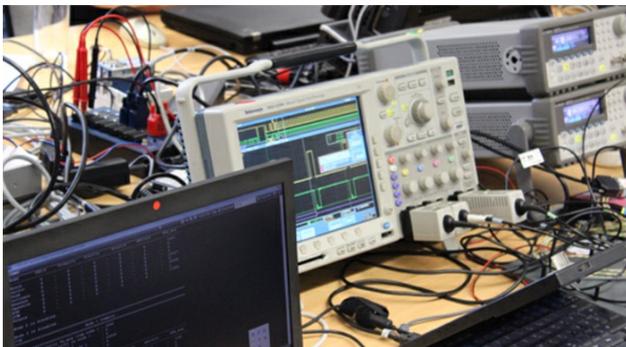
THE NETWORK, WHICH WAS ASSEMBLED FOR THE PLUGFEST, comprised evaluation boards from Bosch, Infineon, Renesas, Spansion, and ST Microelectronics. Additionally, interface devices from ESD, Ixxat/HMS, Kvaser, National Instruments, Peak, and Vector were connected. The micro-controllers used the M-CAN core by Bosch, while others used their own FPGA-based CAN FD implementations. Physical layer experts from Daimler, General Motors, and Volkswagen looked in detail at the quality of the signal level of the transmitted CAN FD frames. No interoperability issue was detected during the plugfest. Emtas tested its CAN FD low-level driver software. LeCroy observed the CAN FD communication with its tools as well as Vector and Ixxat. CiA had organized the one-day event.

At first, a line topology was set up using cables as available. The overall network length was about 15 m. Some connections also used non-terminated stubs. The arbitration bit-rate was set in all tests to 500 kbit/s.

The data-phase bit-rate was increased from 1 Mbit/s to 10 Mbit/s. No error frames were detected up to bit-rates of 5 Mbit/s. Several hundred thousands of CAN FD frames were exchanged starting with a low busload and going up to 100 percent. Considering the fact that the transceivers were made for classic CAN, this was quite a success.



The network length amounted to 15 m (Photo: CiA)



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The stress tests matched the theoretical assumptions for the lower bit-rates. Because the cabling wasn't optimized, some error frames occurred at higher bit-rates. "Using professional cabling and very short stubs, this should not happen," assumed the physical layer experts. Stress tests included changing the oscillator frequency in one node. In addition, the recessive bits were shortened and lengthened.

Separately, Vector and Volkswagen tested the ISO transport protocol as specified in ISO 15765-2 using CAN FD frames. The two implementations running under Windows respectively Linux exchanged data packages without errors.

The maximum data-phase bit-rate was 5 Mbit/s, and the package length was up to 2,8 MiB. All participants seemed quite pleased with the achievements of the plugfest. It gave everyone the

chance to see how their devices worked in a CAN FD network that was not restricted to company-intern devices. It also showed who still has some work to do on their devices.