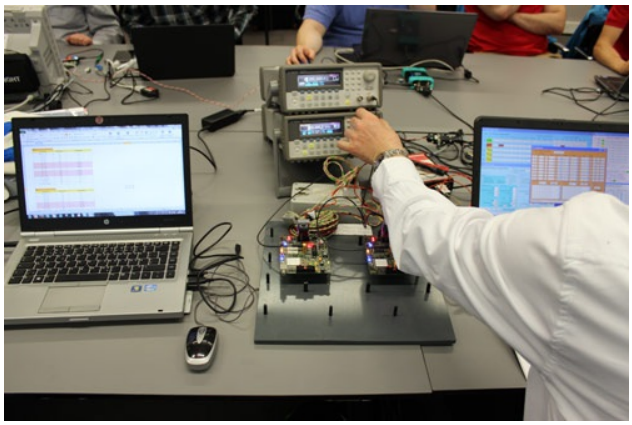
CAN Newsletter Online

CAN FD PLUGFEST

CAN FD withstands extreme testing

In the most recent CAN FD plugfest, CAN FD implementations successfully passed tests under extreme conditions. The tests showed that CAN FD implementations of several manufacturers are interoperable.



The bus with a linear topology reached a length of 24 m (Photo: CiA)

CiA plugfests are organized to improve the interoperability of CANopen devices and help system designers to optimize device software. The CAN FD plugfest, which took place June 2 and 3, 2016 at the CiA headquarters in Nuremberg, verified the interoperability and robustness of CAN FD implementations as well as the properties of the employed network topologies. About 20 CAN FD nodes, each of them representing a different company and two oscilloscopes were part of the network. International semiconductor manufacturers attended the plugfest.

The first day of the plugfest was used to test CAN FD data link layer implementations. CAN FD communication was successfully tested. All nodes correctly transmitted and received Classical CAN frames with 500 kbit/s, as well as CAN FD frames with an arbitration phase bit-rate of 500 kbit/s and a data phase bit-rate of 2 Mbit/s. To minimize the side effects of the physical layer, a linear topology with short stubs was used with a length of 24 m. About CAN FD 20 nodes were connected to the bus, provided by Atmel, Bosch, Cypress, Daimler, Dspace, Etas, Fraunhofer IPMS, Infineon, Intrepid, Kvaser, K2L, Microchip, National Instruments, NXP, Peak, Renesas, STM, Texas Instruments, and Vector. Rohde & Schwarz and Teledyne LeCroy provided oscilloscopes.

VW demonstrated a real CAN FD network (Photo: CiA)

In the second part of the day, the ability to receive special CAN FD frames was tested. Two Arbitrary Frame Generators (Bosch/Vector and Daimler) sent preconfigured CAN frames, while the nodes only acknowledged the correct reception. The reception of valid CAN frames and the robustness of CAN FD were tested. All nodes passed the corner case tests, which included modified bits with shifted edges, bit glitches, and flipped bits. To test the robustness, frames are disturbed in several ways. While the tests were successful, it was discovered that some nodes need to optimize their oscillators.

Tests during the second day focused on the impact of the CAN physical layer. A wiring harness from VW and several transceivers were used. Additionally, ringing suppression technology, CAN/CAN FD selecting transceivers, as well as sleep mode capable transceivers were tested successfully. It was also established that nodes with a CAN FD shield transceiver (NXP) can receive Classical CAN frames and reject CAN FD frames.

In a final test, all available nodes were plugged to the bus to see if that has an impact on the achievable bit-rate. In total, 33 nodes from 19 companies were connected to a linear bus topology. The achieved bit-rate was still 500 kbit/s in the arbitration and 2 Mbit/s in the data phase. Apparently, the increase of nodes from 20 on the first day to 33 did not affect the maximal bit-rate.

> News with @FraunhoferIPMS: CAN FD Controller IP Core Excels Through Third Plug Fest Testing https://t.co/RkU86wynto #semIP #canFD
>
> — CAST, Inc. (@castcores) 16. Juni 2016

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