

Trends, pre-announcements, and rumors

The Embedded World is an early indicator for the CAN community about the year's business. CAN FD seems to be well-established in the automotive industry.

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The CANopen FD demonstrator on the CiA booth, in the background the CANopen product panels from different CiA members (Photo: CAN Newsletter)

The trade fair saw an increase in both display area and exhibitor numbers. In 2018, it once again welcomed more than 1000 companies from all over the world to showcase their products and services. CiA presented its CANopen FD demonstrator comprising protocol stack implementations by Emtas, Esacademy, ESD electronics, HMS, and Microcontrol. There were a lot of detailed discussions about the new features of CANopen FD, in particular the Universal SDO protocol. The first and second day, the CiA booth was very well visited said Reiner Zitzmann, CEO of CAN in Automation. A running CANopen FD network was also shown by Emtas on the ST Microelectronics booth. Microcontrol and Peak stated that they are working on implementing CANopen FD into their I/O modules. Perhaps, these products will be shown at SPS IPC Drives 2018 in November on the CiA booth communicating with other CANopen FD devices. ESD is also preparing its I/O product range to support CANopen FD. Port and SYS TEC have not yet migrated their CANopen protocol stack to CANopen FD, but are prepared to provide a solution when customers demand it.

There were several pre-announcements of hardware support for CAN FD. Bosch will provide by end of this year a new M_CAN core featuring a hardware implementation of CiA 603 (time-stamping). This time-stamping unit (TSU) supports the Autosar synchronization method. It provides up to sixteen 32-bit time-stamps. The time is captured at EOF of Sync frames received or transmitted by the M_CAN core. Additionally the updated core features a direct memory access unit. The M_CAN core is used by about 15 chipmakers including Intel. Bosch presented at its booth also an experimental CAN emulation using a Generic Time IP Module (GTM). The software implementation was running at 125 kbit/s. It could be used as an additional CAN port for lower speed networks.

Cypress, Infineon, and Renesas plan to release industrial small-sized micro-controllers with CAN FD on-chip, but no roadmap with deadlines were available at the fairground. ST Microelectronics and NXP seem to be a step ahead. But deadlines are not available publically. Rumors said that first chips are shipped this year. Microcontrol will use the STM32 chips supporting CAN FD series in its CANopen FD I/O products. Emtas provides already a CANopen FD tool-chain for the STM32 micro-controller series.

CAN FD interface modules

The automotive industry is ordering CAN FD interface modules. They are used increasingly in higher volumes for test systems. Several companies for example ESD Electronics, Janz Tec, and Peak-System reported about larger orders from test system providers, Tier1s, and OEMs. These products are often equipped with FPGAs implementing CAN FD cores. ESD and Peak use their own CAN FD cores, while Janz Tec has implemented the IP core by Kvaser. Peak is not selling its IP core, while ESD is negotiating this. Besides these early birds, also other providers of PCI-type interfaces and USB dongles are in development of CAN FD compatible products. One of them is EMS Dr. Wuensche. These companies are addressing mainly the non-automotive markets, which have not yet migrated from Classical CAN to CAN FD. This includes also the mobile machine markets. HMS and EMS Dr. Wuensche are considering developing repeater for CAN FD networks.

With the launches of CAN FD supporting micro-controllers the suppliers of evaluation boards and boards for embedded systems have by accident so-to-say CAN FD on their products. Typical examples include the modules by Phytec and its competitors. But the mother- or main-boards do not yet feature CAN transceiver chips qualified for bit-rates above 1 Mbit/s. So you can use CAN FD just for bit-rates up to 1 Mbit/s.

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Uwe Wilhelm, Peak-System, provided some details on the CAN FD products planned for this year (Photo: CiA)

CAN FD products to come soon

At the Embedded World 2018 Peak-System has presented some prototypes of CAN FD products to be released this year. This includes the PCAN-Router Pro FD with six CAN FD channels plus some discrete I/Os for trigger purposes. The channels can be individually programmed and configured with Windows software. The CAN termination is switchable separately for each port. Besides the routing, the user can calculate and compare values. Of course, tracing of CAN FD traffic to a memory card for analysis is possible, too. The product comes in an aluminum housing with flange and six 9-pin Dsub connectors for accessing the CAN ports. It features a temperature range from -40 °C to + 85 °C.

The company also pre-launched the PCAN-PCI/104-Express FD module featuring up to four CAN FD interfaces. They can be configured to support ISO CAN FD as well as non-ISO CAN FD. Software APIs (application programmer interfaces) and driver software for Linux and Windows are included. Another product in development is the PCAN-Micromod FD module providing eight analog inputs and eight digital inputs as well as eight digital outputs. The product is available as an evaluation board or as a ready-to-mount module for motherboards. Additionally, the company will offer a version in an aluminum housing. It is intended to support CANopen FD using the protocol stack from Esacademy.

The company presented a prototype of a compact diagnostic device for CAN FD. The battery-powered PCAN-Minidiag FD is in the size of a telephone handset and comes with a membrane keypad in housing suitable for harsh environments (IP42-rated). It detects bit-rates, shows the bus-load and CAN error frames, and measures the CAN termination. The product is intended for field usage and first diagnostic in case of network problems. The voltage measurements are done at the pins 6 and 9 or 2 and 7 of the 9-pin Dsub connector compliant with CiA 303-1.

Taiwan is advancing

The increasing number of Taiwanese manufacturers does not support CAN FD at all. In Nuremberg at Embedded World 2018, there were several Taiwanese companies such as Acute, Embedion, MSI, and Technexion offering board-level and system-level products featuring CAN connectivity. MSI has developed Industrial PCs, which can be equipped optionally with an PCIe module featuring CAN connectivity. Another example of Taiwanese products are the Smarc-compatible modules by Embedian coming with up to two CAN ports. For them you need on the main board CAN transceivers implemented. Smarc (smart mobility architecture) is a small form factor computer module specification by the nonprofit SGeT (Standardization Group for embedded technologies) association targeting applications that require low-power, low-costs, and high-performance. The modules will typically use ARM SOCs similar or the same as those used in many familiar devices such as tablet computers and smart phones. Alternative low-power SOCs and CPUs, such as tablet oriented X86 devices and other RISC CPUs may be used as well. The module power envelope is under 6 W.

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