

# Fieldbus and multi-protocol controller chips

The idea of a generic fieldbus controller chip is an old one. Back in the nineties of the last century, the company Delta t (Hamburg, Germany) developed the IX field processor implementing different networks including the Controller Area Network (CAN). First prototypes were available end of 1992. However, the chip was not economically successful. The price was not competitive when compared to commercial off-the-shelf (COTS) controller chips for dedicated bus systems. And in those days, most of the vendors supported only one or two bus systems. This changed in the course of time: At the end of the last decade, many industrial control device suppliers supported many and some of them all market-relevant bus systems and networks. So it would have been nice, if a single hardware platform supported several industrial communication technologies. At the beginning of this millennium, Synergetic Microsystems developed the EmbeddedComm EC-1 chip. This was a System-on-a-chip (SoC) that



featured multiple network support including Ethernet, dual CAN channels, Profibus DP, SPI and dual serial channels. The chip was based on an 80186 compatible microprocessor. In the meantime, the chip has been redesigned by the predecessor GridConnect ([www.gridconnect.com](http://www.gridconnect.com)) and several versions are available: The LX-001 provides CAN, Ethernet and serial ports; the LX-002 features additionally a Profibus-DP interface; and the LX-180 BP is packed in a 180-pin BGA housing measuring 12 mm x 12 mm. The company offers CAN and CANopen driver source codes for these chips. In Germany, Profichip ([www.profichip.com](http://www.profichip.com)), Beck IPC ([www.beck-ipc.com](http://www.beck-ipc.com)), and Hilscher ([www.hilscher.com](http://www.hilscher.com)) have introduced multi-protocol

chips that support several communication technologies. The ARM-based PLC 7100 is a PLC-on-chip featuring CAN, Ethernet, and Profibus interfaces. The chip will be available by the end of this year. It provides 16 send/receive buffers for the two CAN interfaces. CANopen as well as DeviceNet will be supported.

Another PLC-on-chip, the IPC@Chip SC123/143 from Beck IPC, is based on the 96-MHz SC186 microcontroller. It is equipped with two CAN channels, one Ethernet port and four TTL serial interfaces as well as USB, I<sup>2</sup>C and SPI. The manufacturer, a member of the Festo Group, provides optionally the CANopen protocol stack from Port ([www.port.de](http://www.port.de)).

The netX is an ARM-based 32-bit microcontroller offered by Hilscher ([www.hilscher.com](http://www.hilscher.com)). The chip is available in different versions providing Ethernet, Profibus, AS-i and CAN interfaces. CANopen and DeviceNet protocol stacks are available. USB, UART, I<sup>2</sup>C, and several other functions including A/D converter and encoder channels are implemented on the 345-pin chip. These dedicated fieldbus controller chips are in competition to some recent-

ly introduced COTS microcontrollers supporting CAN as well as Ethernet connectivity. The DCIC9907 by Dualcore Semiconductor ([www.dualcore.com](http://www.dualcore.com)) is a Twin ARM 946E chip with two Ethernet and two CAN channels. This dual microcontroller is designed for gateway applications and comes in a 109-pin housing. One of the ARM processors can be used for real-time applications running under the EUROS real-time operating system, while the other ARM processor runs the system infrastructure such as human-machine interface and the communication interfaces. Hyperstone ([www.hyperstone.com](http://www.hyperstone.com)) has launched the hyNet 32XS network processor featuring two Ethernet ports and one CAN channel. The CAN interface is compatible to the stand-alone CAN controller from Philips Semiconductors (SJA 1000). The 32-bit processor provides USB, UART, I<sup>2</sup>C, and general-purpose I/O ports. The 256-pin component (17 mm x 17mm) is dedicated for gateway and other network applications including wireless communications.

Using the same hardware to support different networks and bus systems is one advantage of those multi-protocol controllers. Another is the possibility to design compact gateways and bridges. In particular, I/O devices with CAN-to-Ethernet gateway functionality may benefit of these microcontrollers supporting several communication protocols. (hz)

## Voltage regulator system IC

EM Microelectronic ([www.emmicroelectronic.com](http://www.emmicroelectronic.com)) introduced the EM6152 integrated intelligent system power IC that incorporates multi-mode windowed watchdog timer, reset logic, and 5-V automotive voltage regulator. Supporting operation up to 40 V, it comes in 8-pin SO8 package with

regulator current output up to 100 mA or PSOP-16 power package rated to 400 mA. IC operates over -40 °C to +125 °C range and comes in two versions with 33% (V50) or 67% (V53) open watchdog window size and one version with CAN sleep mode detector (V55).

(mm)