Intel’s comeback in CAN business

In 1988, Intel had introduced the first CAN chip, the legendary 82526. But then the chipmaker focused on the PC business and stepped back from the CAN markets. Now Intel is back in CAN business: Recently, the company introduced the EG20T controller featuring an on-chip CAN module.

Intel is interested in the high-volume infotainment markets. However, this embedded market is highly fragmented. That is why the chipmaker has developed different versions of its Atom processor. Recently, the chipmaker introduced the Atom E600 series, developed specifically for embedded applications such as in-vehicle infotainment systems for cars, smart grid devices and IP media phones. The SoC (system on chip), also known by its codename “Tunnel Creek”, is positioned as one of several successors to the original Atom, the Z500, whose “Silverthorne” CPU was paired with a “Queens Bay”, that combines Atom E600 with an Altera FPGA.

I/O hubs from Intel and others

The E600 features an open interconnect for so-called I/O hubs (IOH) providing additional interfaces. Intel has introduced the EG20T controller (“Queens Bay”), which provides an on-chip CAN module. The chip measures 23 mm x 23 mm. According to the chipmaker, the E600 and EG20T platform has an overall package size that is 46 % smaller than Menlow. That is because instead of using a proprietary interconnect, Tunnel Creek communicates with the IOH via PCI Express bus. Besides CAN, Intel’s IOH provides interfaces such as SATA (Serial Advanced Technology Attachment), USB client, SD/MMC, and Gigabit-Ethernet, as well as general embedded interfaces such as IEEE 1588, SPI, I²C, UART, and GPIO. The EG20T is manufactured in FC-BGA package, and is priced at US-$ 9 in 1 000 quantities.

Intel anticipates third-party vendors to create their own IOH chips for the E600. OKI, Realtek, and STMicroelectronics (STM) already have announced those chips. STM’s Connext using the PCI Express (PCIe) interconnection will provide rich I/O connectivity, including CAN, Ethernet-AVB (Audio Video Bridging), and MOST (Media Oriented Systems Transport), as well as general purpose I/Os such as SATA and USB. The chip was designed by STM in consultation with Intel to ensure that the IOH would be optimally matched to the E600 series to expand its connectivity. “A key trend in the automotive industry is to offer drivers and passengers access to the same level of information and entertainment in the car as they enjoy at home,” said STM’s Fabio Marchio. “In-car networking technologies that handle the distribution of multimedia, data and control information are now well-established and the next step is to offer a cost-effective platform that allows the same architecture to be used across a range of car models and generations.” First samples are scheduled for May 2011 and the expected high-volume price is approximately US-$ 7.50.

The Qseven consortium (initiated 2008 by Congatec) has specified a single-board computer that integrates all the core components of a common PC and is mounted onto an application-specific carrier board. Qseven modules have a standardized form factor of 70 mm x 70 mm and have specified pin-outs based on the high-speed MXM system connector. This connector is a well-known and a proven interface connector that is commonly used for PCI Express graphics cards in notebooks. In the Qseven version 1.20 specification pins for CAN connectivity (TX output and RX input of the CAN controller) have been added. Unfortunately, no CAN bit-timing is standardized, and the CAN transceiver chip needs to be implemented on the carrierboard. Congatec has already announced the Conga-QA6 board featuring the E600 processor and the EG20T.
A mobile dialogue: Robust and simple to operate

One of 7844 products we developed for you with passion: Dialogue module PDM360 NG for mobile vehicles. The powerful process and dialogue unit of the latest generation has a scratch-resistant high-resolution 7" TFT colour display. 9 backlit function keys with tactile feedback guarantee intuitive operation in the field. Its robust diecast housing with protection rating IP 67 ensures the highest reliability for mounting inside or outside the cabin. It is easy to program and allows immediate fast and flexible use.
controller hub. The Qseven compliant module operates from -40 °C to +85 °C. Typical power consumption is claimed to be under 5 W and provision for battery and ACPI 3.0 power management is included through Dialog Semiconductor’s DA6011 clock and power controller. The board is one of the first Qseven modules to support the E600, joining Advantech’s SOM-3564. The interface list includes: 6 x USB 2.0, 2 x Sata, 1 x SDIO, 3 x PCIe, LPC bus, iPC bus, Gigabit-Ethernet, SPI and CAN. The CAN and SPI interfaces are new additions to the Qseven standard and utilize previously unused pins. WLAN, Bluetooth, and RFID can be supported through the SDIO interface. Congatec supports all eight versions of the E600, including the 0.6-GHz, 1.0-GHz, 1.3-GHz, and 1.6-GHz models. Equipped with 2 GiB of onboard DDR memory, the module is offered with an optional 32-GiB flash-drive via one of the two Sata interfaces. Three PCI Express expansion interfaces and an SDIO interface are also offered for additional peripheral and storage expansion.

Hetronic, the Swedish specialist in embedded PC development and manufacturing, has launched the H6055 Qseven module providing a CAN interface. Equipped with E600 (600 MHz, 1 GHz, or 1.3 GHz) and EG20T chips, the board targets embedded applications such as in-vehicle infotainment systems, battery-powered handheld devices and industrial automation devices. “This platform from Intel is the perfect fit for the Qseven form factor, bringing advantages such as higher integration and a richer feature set with maintained computing performance, to cost-sensitive applications. We will be able to offer semi-custom solutions based on the H6055 COM module, which incorporates all the components of a PC mounted on an application-specific carrier board using the cost-efficient MXM connector close to the cost of single board computer solutions,” says Patrik Björklund from Hetronic. The H6055 module comes with up to 1 GiB RAM and is specified for -40 °C to +85 °C. Samples will be available to selected OEM customers beginning of 2011. American-based Portwell Technology has introduced both the PQ7-M105IT Qseven board and its companion PQ7-C100XL 3.5-inch carrier board for a temperature range of -40 °C to +85 °C. The Qseven module features the E620T/E640T/E660T SoC and the EG20T chip. Of course, it provides one CAN interface. The developer carrier board is based on Portwell’s 3.5-inch ESB form factor. It is suitable for outdoor embedded systems, industrial control, COTS (Commercial Off-The-Shelf) military and in-vehicle infotainment systems. The boards require less than 5-W power for fanless applications.

The Taiwanese DFI has also released a Qseven module equipped with an E600 processor and an EG20T hub controller. The QB700-B board providing 512 MiB of DDR2 memory features CAN connectivity, but is not available in extended temperature range. Other Qseven vendors such as MSC Gleichmann will also introduce products with the E600 processor dedicated for industrial applications. Embedded-logic has presented its Q7-Atom-E6 board featuring a clock rate up to 1.6 GHz. It requires less than 5 W and is specified for temperatures from -40 °C to +85 °C. The module with CAN interface is available soon.

Other board-level products

There are also other board-level products, which use the E600 and the EG20T chips by Intel.

Eurotech has released the Catalyst TC module. The 67 mm x 100 mm module is designed for industrial automation, medical, automotive and in-vehicle infotainment, gaming, and military markets. It provides Sata, Gigabit-Ethernet, and CAN interfaces, allowing for smaller carrier board designs as more capability is built into the module. The board supports both industrial and commercial temperature options. It supports several operating systems such as Windows 7, Windows Embedded Standard, Windows CE and Wind River Linux. Also supported is Everyware Software Framework by Eurotech, a Java-based IDE environment.

**Dedicated for embedded computing**

Intel offers the EP80579 System-on-Chip (SoC) integrating several peripherals such as two CAN modules, three Ethernet-MACs, and two USB ports. The CAN modules support CAN base and extended frame formats. Several software houses provide BIOS (AMI, Insyde, and Phoenix) and operating systems (Windows XP Embedded, Linux, VxWorks, FreeBSD, CentOS, and Redhat) for this Pentium-M based SoC. The processor is compatible with the 86-family.
offers CAN and CANopen training for development engineers and system integrators. Topics include application fields, physical layer, protocol, communication services, standardization, and certification.

Seminars

CAN training
2010-12-07 Nuremberg (DE)
2011-01-18 Nuremberg (DE)

CANopen training
2010-12-01 Parma (IT)
2010-12-08 Nuremberg (DE)
2010-12-09 Zurich (CH)
2011-01-19 Nuremberg (DE)
2011-02-01 Egerkingen (CH)
2011-02-09 Lyon (FR)
2011-02-11 Dresden (DE)
2011-02-15 Madrid (ES)
2011-02-23 Nuremberg (DE)

Special CANopen training
Subsea 2011-02-24 Oslo (NO)
Safety 2011-03-16 Nuremberg (DE)
Subsea 2011-05-12 Edinburgh (GB)

Roadshow CANopen Lift 2011
2011-03-28 Überlingen (DE)
2011-03-30 Berlin (DE)
2011-04-01 Düsseldorf (DE)

In-house seminars
In-house seminars are offered for companies, which have dedicated training requirements.

For more details please contact the CiA office at headquarters@can-cia.org

Safe Single and Multiturn
Absolute Position Measurement
with CANopen Safety Interface

Compliant with New Machine Directive
EN2006/42/EC

Highest Safety Standards
with SIL 3 EN/IEC 62061, Cat.4
and PL e EN ISO 13849-1

Certified by TÜV Rheinland®

Redundant High Resolution
Optical Design up to 30 Bit

Customer Advantage:
No PLC Plausibility Check for
Position Value Needed

www.posital.eu
The board-level products are available and orders being accepted now.

Habey USA, a US manufacturer of embedded computers and server storage products, has launched the BIS-6622 fan-less embedded PC platform. At 5-inch x 5-inch x 1.75-inch in size, this tiny Atom computer is packed with Intel’s EG20T I/O hub and GMA 600 graphic controller. Windows and Linux operating systems are available. Also in Taiwan, the E600 has the first design- ins: Avalue Technology has developed a 3.5-inch single-board computer with the EG20T hub controller. Of course, the ECM-QB supports CAN connectivity.

In Germany, Lippert Embedded Computer has introduced the CoreExpress-ECO2 module featuring the E600 processor. The board is especially suitable for portable, battery-powered devices and can be easily integrated into industrial networks using the built-in CAN interface. Compared to the CoreExpress products based on the Z500 Atom processors, graph- ics performance has been significantly increased. According to the company, a built-in hardware-accelerated video encoder within the E600 processor opens up entirely new applications.

**Openmatics platform**


**V850ES/Jx3 MCU series expanded**

Renesas released additional 78 micro-controllers based on the V850ES 32-bit core originally developed by NEC. After the merger of NEC and Renesas, the chips are available from Renesas. Some members of the introduced MCU series provide on-chip CAN modules. The V850ES/Jx3-H modules are designed for general-purpose applications featuring CAN and USB interfaces; the E models provide an additional Ethernet port. The F series are dedicated for automotive and industrial applications where up to five CAN channels are needed. They come with up to 1-MiB flash memory. Price-optimized MCUs (Fx3-L) with less performance and peripherals are available, too. (hz) www.renesas.com

**ARM7 with two CAN ports**

The LPC2378 micro-controllers by NXP are based on an ARM7 core. The chip features two CAN modules as well as Ethernet, USB, and four UARTs. The microcontroller also supports several other serial interfaces including SPI and I²C. This blend of serial interfaces combined with an on-chip 4-MHz internal oscillator, a 32-KiB SRAM, an additional 16-KiB SRAM for Ethernet, and an 8-KiB SRAM for USB and general purpose use, together with a 2-KiB battery-powered SRAM make this micro-control- ler suited for gateways and converters. The use in industrial control and medical devices is also possible. (hz) www.nxp.com

**Partial networking and selective wake-up**

Some chipmakers (Elmos, Freescale, Infineon, NXP, and STM) and carmakers (Audi, BMW, Daimler, PSA, Porsche, and VW) have formed the Switch (Selective, wake-up, interoperable, transceiver for CAN high-speed) group. Under the chairmanship of the C&S, the group has pre-developed a specification of CAN high-speed transceiver with selective wake-up functionality. The specification will be submitted as new work item proposal for international standardization. The partial networking function is intended to make it possible for a CAN node or a sub-network to be in low-power mode, while CAN communication is ongoing and to be woken individually by means of dedicated wake-up messages. For selective wake-up of individual nodes, wake-up messages have to be received and decoded by a CAN decoder in the trans-ceiver chip particularly to enable it to decide whether its own bus node has to be woken up or not. During the low-power mode, the low-power mode, the transceiver monitors the CAN_H and CAN_L bus lines for wake- up patterns (WUP). A WUP is signaled by two consecutive dominant bus-levels, each separated by a recessive bus-level. A bus wake-up is performed, if partial networking is disabled and a WUP has been received. If partial networking is supported, the wake-up is performed, if a valid wake-up CAN data frame (WUF) is received. This means, the transceiver may implement these WUFs. The transceiver may ignore up to four CAN data frames that are received after switching on the bias. A received CAN data frame is a valid WUF if the following conditions are fulfilled:

- The CAN-ID (11-bit or 29-bit) of the received frame matches the configured CAN-ID by means of an ID mask.
- The DLC matches exactly the configured DLC.
- The data field has at least one bit set in a bit position, where also in the configured data mask the bit is set.
- No error has been detected with the exception that the ACK slot bit and EOF bits are regarded as “don’t cares”.

In order to allow undisturbed CAN communication, when a couple of CAN nodes intentionally are not pow- ered (e.g. ignition-key controlled ECUs) while other nodes continue to commu- nicate normally, it is important that these non-powered nodes do affect the bus-levels as less as possible. This requires that transceiv- ers, which are temporarily not powered, show a lowest possible leakage current.

(hz) www.can.cia.org
**PCAN-Router Pro**
Configurable four channel CAN router with data logger incl. configuration software.

**PCAN-USB Pro**
High-speed USB 2.0 interface with galvanic isolation for connecting up to 2 CAN and 2 LIN busses.

**PCAN-PDI/104-Express**
CAN interface for PCI/104-Express systems. Available as 1-channel, 2-channel, and opto-isolated version.

**PCAN-GPRS Link**
Development platform with CAN, GPS, and GPRS. Interpretation of OBD-2., FMS-, DTCO-, & CiA® 477.

**PCAN-Explorer 5**
The universal tool for developing and monitoring CAN networks.
- Extensive user interface improvements: File management via projects, configuration of all elements with the property editor, and window arrangement using tabs
- Simultaneous connections with multiple networks/CAN interfaces of the same hardware type
- Configurable symbolic message representation
- Data logging with tracers and the 4-channel Line Writer
- VBScript interface for the creation of macros
- Functionality upgrades with add-ins (e.g. J1939 Add-in)
- User interface language in English or German

**PCAN-Diag**
PCAN-Diag is a handheld CAN bus diagnostics unit with a wide range of functions:
- CAN traffic is clearly represented in lists. Configurable symbolic representation of received messages
- Transmitting individual CAN frames or CAN frame lists
- Detection of the CAN transfer rate, bus load measurement, and termination measurement
- The built-in 2-channel oscilloscope allows a detailed analysis of the differential CAN signal
- PCAN-Diag is normally shipped with a High-speed CAN transceiver, other transceiver types are also available

**PCAN-ExpressCard**
CAN interface for ExpressCard slots. Available as 1-channel, 2-channel, and opto-isolated version.

**PCAN-PDI Express**
CAN interface for PCI Express slots. Available as 1-channel, 2-channel, and opto-isolated version.

**PCAN-cPCI**
CAN interface for cPCI slots. Available as 2-channel and 4-channel opto-isolated versions.

---

*www.peak-system.com*

Otto-Roehm-Str. 69 – 64293 Darmstadt / Germany
Phone: + 49 6151 8173-20 – Fax: + 49 6151 8173-29 – E-mail: info@peak-system.com