

AS8202 Communications Processor Enables Low-Cost X-by-Wire Systems

Communication Processor Supporting the Time-Triggered Protocol TTP[®] Now Ready for Mass Production

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The newly developed AS8202™ communication processor is based on the Time-Triggered Protocol TTP[®]. It is the first building block that combines TTP with support for fault-tolerant bus systems in a single device. The AS8202 was designed and developed by TTTech Computertechnik AG, and was fabricated by austriamicrosystems AG. The release of the AS8202 emphasizes the leadership position of the two Austrian high-tech companies in the field of time-triggered communication protocols.

The new AS8202 communication controller – a joint development of TTTech Computertechnik AG and austriamicrosystems AG – offers an extraordinary degree of reliability. In addition, it supports data transfer rates of up to 25 Mbit/s for x-by-wire automotive applications and is ready for mass production.

After many years of research and development, time-triggered communication technology is now ready for a broad penetration of the automotive and aerospace industries. The research firm Allied Business Intelligence, Inc. of Oyster Bay, New York, predicts in a recently released study that the aggregate volume for automotive x-by-wire applications will be more than 7 billion US Dollars in 2005 and 27 billion US Dollars in 2010.



X-by-wire applications needing high availability, such as electromechanical braking and steering systems, impose stringent reliability and performance demands upon the underlying communication systems. Mechanical and hydraulic systems in automobiles will be replaced by fault-tolerant, time-triggered electronic and software systems that can recover from failures under certain conditions. The new AS8202 processor is the first time-triggered chip that fulfills the extreme demands that are required for such applications.

Classical event-driven communication systems, such as CAN-Bus, run asynchronously and are driven by events. In contrast, in TTP-based systems all connected nodes, for example brakes and steering, communicate on the basis of specified time intervals, while avoiding any data collision. Furthermore, they communicate over redundant data busses. The precision of the time intervals is in the microsecond range.

The architecture of TTP is such that it is able to achieve far higher service rates for simultaneous or near-simultaneous events than other communication protocols. This is especially important, for example, when a vehicle control system must handle both brakes and steering at the same time.

The concept and design of the new communication processor were developed by TTChip Entwicklungsgesellschaft mbH, a subsidiary of TTTech Computertechnik AG. Implemented using a 0.35 µm CMOS process; therefore the die area is only about 20 mm². The maximum data rate is 25 Mbit/s in synchronous mode and up to 5 Mbit/s in asynchronous mode.

The AS8202 communication processor contains a 16K x 16 flash memory, a 4K x 16 boot ROM and two 2K (or 4K) x 16 SRAMs. The control program is placed in the flash memory, the sequence needed for system startup is part of the boot ROM and the SRAMs are used to hold communication and other run-time data. Content of the flash may be changed according to the application requirements.

Hubertus Christ, general manager of the automotive drive! business unit at austriamicrosystems, is confident that TTP will quickly become the standard for high availability networks in automotive and aerospace applications. "Not only does the highly integrated nature and high density of the circuits simplify the development of even more reliable communication networks, but these attributes further reduce overall systems costs and substantially reduce time-to-market", says Mr. Christ.

TTTech managing director Georg Kopetz, who is also encouraged by the success of the new product, says, "A whole series of successful pilot projects, literally conducted around the world, indicates strongly that TTP satisfies the needs of automotive and aerospace applications in a cost effective way. Moreover, TTP supports easy configuration and fault tolerance in a truly optimal manner. With the introduction of the new TTP building blocks, TTTech and austriamicrosystems now have the opportunity to enhance further their leadership positions in the domain of fault-tolerant communication systems."

"We're very excited about the excellent outcome of our joint effort with austriamicrosystems," said Leonard Gagea, technical director of TTChip. "We can now support our customers with the most modern communication devices for time-triggered applications."

TTTech offers a complete set of development tools for users of the AS8202 and its forthcoming derivatives and associated processors. In addition, the Time-Triggered Protocol and the communication controller will be qualified for use in aerospace applications. The devices are produced in a new 8-inch wafer fab at austriamicrosystems in Unterpremstätten, as well as at the TSMC (Taiwan Semiconductor Manufacturing Company) foundry.

About TTTech Computertechnik AG

TTTech Computertechnik AG is the leading supplier of technology and software products in the field of time-triggered systems and TTP® (Time-Triggered Protocol). TTTech products enable developers of aerospace, automotive, and industrial control equipment to deliver reliable embedded systems quickly and efficiently. TTTech's products comprise a complete software development environment for TTP-based systems, including hardware as well as TTP chip models. In addition, TTTech provides a broad range of services, from training courses on TTP to worldwide product and project support. TTTech especially emphasizes by-wire and integrated vehicle control systems.

TTTech's subsidiaries – TTChip Entwicklungsgesellschaft mbH, TTControl S.r.l. and TTTech Germany GmbH – respectively focus on development of chip models, control systems for special vehicles, and advanced vehicle dynamics. TTTech North America Inc. and TTTech Japan provide on-site engineering and sales support in North America and Japan.

Further information on TTTech is available at www.tttech.com.

About austriamicrosystems AG

austriamicrosystems AG has its headquarter in Unterpremstätten, near Graz, in southeastern Austria. The mission of the company is to develop, qualify and manufacture specialized microelectronic devices based on customer's specifications. The company has 940 employees, located in 14 offices around the world. Revenues for the year 2001 increased by 20 percent over the previous year, to about 147.5 million Euros. The drive! automotive business unit grew an impressive 80 percent. In terms of growth, drive! was the strongest of the company's business units. Further information is available at the company's web site: www.austriamicrosystems.com.

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