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SPRING **06**

Fujitsu UPDATE

SHOW ISSUE

The Latest News on. . . Semiconductor Technologies and Products from Fujitsu Microelectronics Europe

Visitors attending Embedded World – the event attracted a record number of exhibitors last year.

Why we exhibit at Embedded World

embeddedworld2006
Exhibition&Conference
Nürnberg

Jim Bryant, FME's Director of Marketing Communications, outlines the appeal of the show and explains why it is an ideal platform to promote Fujitsu's products and solutions.

Why do companies attend exhibitions? A somewhat cynical response might be: because all our competitors are going to be there, so we can't afford to be absent. What would people think?

That may have an element of truth but it has never been a cast-iron good reason for attending a show, and it has never been FME's view.

We go to shows because we believe there is real purpose to the event, and that we can benefit from attending in a clear-cut, tangible and even measurable way.

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FME's stand at Embedded World 2006.

And what is the benefit we look for most? Without doubt, it is to be able to communicate with our customers and potential customers in a way that is just not possible using any other approach.

Over the years, technology has offered us many new communication media, such as email, video conferencing and the Web. But, as every one knows, there is simply no substitute for face to face communication.

That, in a nutshell, is why we will attend Embedded World 2006. There are relatively few exhibitions that really excite us, and we are not alone in this: there seems to be a growing feeling of lethargy towards many of them.

Embedded World is genuinely different. It does excite us! Its combination of technology focus, accessibility, and the right audience makes it an ideal forum for us to communicate with our customers, display our products, and demonstrate effective, value-added technological solutions.

One obvious reason for the attraction of the event is the ever-growing importance of the embedded market. As our own involvement in the world of embedded systems has increased, so has the Embedded World event grown in stature.

Today Fujitsu boasts a portfolio of products that **need** to be experienced and seen working. We need engineer to talk to engineer, and Embedded World delivers that environment.

I N F I N I T E

Take our range of Graphic Display Controllers (GDCs). Yes, of course you can read all about them, study the data sheets, and so on. But obviously such an application is inherently visual and it needs to be seen working! The same applies to many of our products, for instance MPEG controllers, WiMAX communications, and our range of microcontrollers. Seeing demonstrations working 'live' has an impact that no written description can match.

First staged in 1994, the 'Embedded Systems Show' was an instant success and quickly outgrew its original facilities and so moved to Nürnberg. New organisers have increased the show's popularity still further and turned it into one of the best events in the industry.

The 2005 show continued the growth trend, with 730 exhibitors from 23 countries. A new hall was added, making three in total, and it is now the biggest embedded event in the world.

The conference accompanying the exhibition is another strong feature, attracting speakers from all over the world. The final factor in its success is the location. Nürnberg is at the centre of Germany's automotive manufacturing base, which ensures a ready supply of visitors with a strong interest in the embedded marketplace.

FME has supported the show from the start and this year we will again be showing and demonstrating our main product and solution focus.

I N F I N I T E

Major new products on display will include the Carmine high-end GDC, the first to be fabricated in 90nm technology. Others are the WiMAX and ETHOS communications chips, a family of high performance16-bit MCUs, plus MCUs designed specifically for the automotive industry and a Starter Kit for easy implementation of FME's FlexRay controllers.

From **February 14 to 16th 2006**, the Exhibition Centre in Nürnberg will once again be a meeting place for the international embedded community. Judging from previous years, FME will make new contacts, secure valuable enquiries, and cement existing relationships – more than enough reasons to carry on exhibiting at Embedded World.

We hope to see you there!

embedded world 2006
Exhibition & Conference
Nürnberg

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The Carmine GDC is the first device of its kind to be fabricated in 90nm technology.

Automotive Graphic Display Controller is first to be made using 90nm technology

FME has launched a new Graphic Display Controller (GDC) designed for the embedded automotive market, the first device of its kind to be fabricated in 90nm technology.

The 90nm GDC, the Carmine MB86297, is one of two new GDCs being introduced; the second one being the MB86276 Lime. Both GDCs have been developed in response to customer requests for FME to enhance its extensive GDC roadmap at both the higher and lower ends of the market.

The Carmine MB86297 is Fujitsu's third generation of high-end graphics products, and incorporates a brand new design that provides more than 10 times the performance of FME's previous highest end GDC, the Coral. The Carmine is fabricated in Fujitsu's foundry at Mie, Japan, and is a critical component for FME, enabling it to deliver an industry-leading solution for demanding automotive functions, such as high-end graphics and multimedia applications.

Carmine offers excellent 3D performance - up to 10Mpolygons/s - together with the highest rendering performance available in the embedded market, and fully supports the OpenGL ES 1.1 Standard for Embedded Accelerated Graphics. The GDC can display resolutions of up to 1280 x 1024, and has a fully independent dual display output. Carmine also features excellent expansion options, including a DDR-SDRAM interface for the addition of up to 128MB of graphic memory and a PCI66 host interface.

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The Lime controller is manufactured specifically for price optimisation.

The second GDC, the MB86276 Lime, is manufactured specifically for price optimisation, providing a low-end extension to FME's GDC roadmap. The 0.18µm Lime device is an ideal solution for lower-end automotive applications that do not require 3D functions.

Although Lime is aimed at the lower end of the market, the device still offers advanced features, such as accelerated 2D functions. Dual RGB digital output is supported and Lime displays resolutions of up to 1280 x 768. A range of connection options is available, including a 32/16-bit embedded host interface, GPIOs, an I²C interface, and an external SDRAM interface for the addition of up to 64MB of memory.

Both Carmine and Lime are fully binary compatible, and offer universal connectivity to all MCUs and other CPUs, with a wide variety of operating system drivers available, as well as several unique features, including video inputs.

FME's extensive roadmap and the excellent scalability of all devices in the series mean that products are interchangeable, allowing customers to move to higher- or lower-end devices without having to make major software changes. Although Carmine and Lime have been developed for the automotive industry, they are also suitable for a range of other markets such as the avionics, marine, medical, industrial, PoS, surveillance and console-gaming sectors.

Both Carmine and Lime are housed in BGA packages. They are available for sampling now and will be in full, 100k-a-month production by the middle of 2006.

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Full engineering support for European customers is available from FME's GDC application team based in Frankfurt.

FME continues to invest heavily in R&D to further expand its range of GDCs to offer customers the widest choice of solutions. The company is already working on derivations of these two products to offer more functionality, including a Lime-based GDC featuring a CPU and a Carmine-based GDC with additional media functions.

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FlexRay, gyro and 32-bit microcontroller demonstration, combine to provide electronic stability control.

FlexRay, gyro and 32-bit microcontrollers combine to provide electronic stability control

A wide ranging series of products and demonstrations featuring devices targeted for the automotive and industrial control markets is one of the highlights of Fujitsu's stand at the Embedded World 2006 show.

One of the displays centres on the use of Fujitsu 32-bit microcontrollers (MCUs) and other devices working together with the FlexRay™ bus to perform electronic stability control, seen as an increasingly important function in the automotive world.

The demonstration features a model car whose wheels are monitored by a video camera. The rotation speeds of the wheels are varied, as happens when a car loses its grip with the road surface, and as a result the car starts to slide around. This movement of the car is sensed by the Fujitsu gyro-sensor, the S1BG Series, which exploits the piezoelectric properties of the material lithium niobate.

The data from the gyro is fed via the FlexRay bus to a FlexRay node, each wheel having its own node, which consists of a new 32-bit MCU, the MB91F467DA, working with Fujitsu's FlexRay stand-alone communication controller, the MB88121. A central FlexRay node then gathers all the data relating to wheel speeds and calculates the necessary adjustments to rectify the situation.
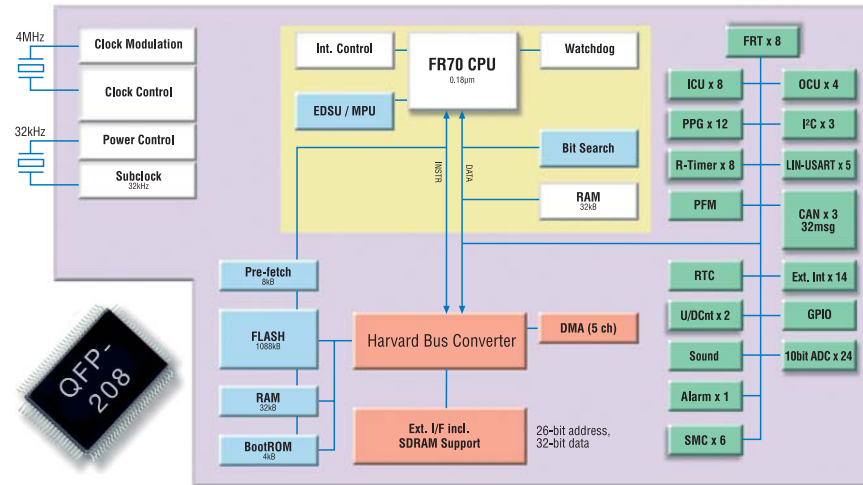
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The MB91F467DA is the first member of a new series of 32-bit MCUs, developed for the automotive industry.

The MB91F467DA is the first member of a new series of 32-bit MCUs, which have been developed in Europe for the automotive industry, and is based on the new technology of 0.18μm embedded flash. The devices in the series, which can embed up to 4MBytes of flash, are suitable for many automotive functions, such as dashboard, body control, infotainment, and FlexRay applications, as well as potential industrial control areas.

The MB91F467DA features 1MByte of flash, 64kRAM and has three CAN interfaces. Other features include six stepping motors, 5 LIN user interfaces, support for external bus and DRAM, and it comes in a 208-pin package. More members of the family will be introduced soon, including 100- and 144-pin devices for body control.

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The MB90F330 USB controller.

The MB90350, now with dual-operation flash.

The other central component in the electronic stability control demonstration, the MB88121 communication controller, is an ASSP that provides the protocol engine to service the FlexRay bus. By adding FlexRay connectivity to 16- and 32-bit controllers that lack embedded FlexRay protocol engines, the 64-pin device acts as an ideal companion chip to a large number of embedded MCUs used in automotive applications.

Several 16-bit MCU families have been introduced by FME. One is the MB90F330 and 335 series of USB controllers, targeted at applications such as measurement, automation and control in the industrial market. The USB controllers come with a driver package consisting of the Fujitsu USB Firmware API and the Fujitsu USB Minihost API, available to customers free of charge, which make programming for new USB interfaces extremely easy and quick. Both USB 1.1 and the high-speed USB 2 standards are supported.

Another new 16-bit MCU is the MB90350, which now features dual- operation flash. This is useful because it allows emulation of E^{2}PROM, and also makes it easier and faster to carry out programming within the application.

Two new 32-bit MCUs are the MB91F272, which in the PFV package is pin compatible with the 16-bit MB90340 family, thus providing a straightforward migration path, and the MB91F267, which has the ability to control a three-phase motor. It also features a micro DSP, a CAN controller, and a new Phase3-Kit design-in board is available.

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The MB91F267, offers three-phase motor control.

A low-cost evaluation kit is available for the 8FX series.

A new memory development concerns Fujitsu's well-established non-volatile FRAM, which is now available in the form of stand-alone memory components. There are four devices: the MB85RS256, a 256k bit unit with SPI interface in an 8-pin package; and three parallel units, offering capacities of 256k and 1Mbit in various packaging formats.

A major benefit of the FRAM memories is their endurance. They are capable of more than 10^{10} read/write cycles, and will retain data for at least 10 years, exceptional for non volatile memory. This makes them ideally suited to applications where constant, long-term use is required, for example metering, data logging, or automotive black boxes. They can also replace battery-backed SRAM, eliminating maintenance and providing a greener solution, and also E^2PROM and flash, both of which have far shorter lifetimes. High-end RFID products like the newly-announced MB89R119 RFID tag IC open up further potential application areas.

Finally, the F^2MC-8FX series has been updated, and is now available in six sub-families, in formats ranging from 28- to 100-pin packages. Devices with or without LCD embedded control are available, and other features include a LIN user interface on all devices, dual- operation flash starting at the 48-pin level, and a single emulation and development tool for the entire 8FX family.

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Fujitsu devises at the heart of the IP networking revolution

In the last decade the Internet has changed the world. Now the communications technique it is based on - the Internet Protocol (IP) - is in the process of revolutionising the networking industry.

IP provides a series of benefits for many different kinds of networking, including low cost, powerful management capabilities, interoperability, security and performance. The most obvious application of IP to networking to date is the huge growth in Voice over IP (VoIP) and video on demand, which is having a major impact on telecommunications across the globe. Now, the same thing is set to happen with many other networks, where IP will both replace traditional technologies, and provide the infrastructure for entirely new networking applications.

To meet the requirements of the IP revolution, Fujitsu has developed a range of networking and communication ASSPs that cater for the critical functions, provide some of the highest performing devices available, and fully meet worldwide standards to ensure interoperability and convergence.

The new markets that IP will support include broadband communications, already a rapidly growing market delivering services such as local area TV and video on demand, digital library access, video conferencing, entertainment, and high-speed wireless Internet access, with more in the pipeline.

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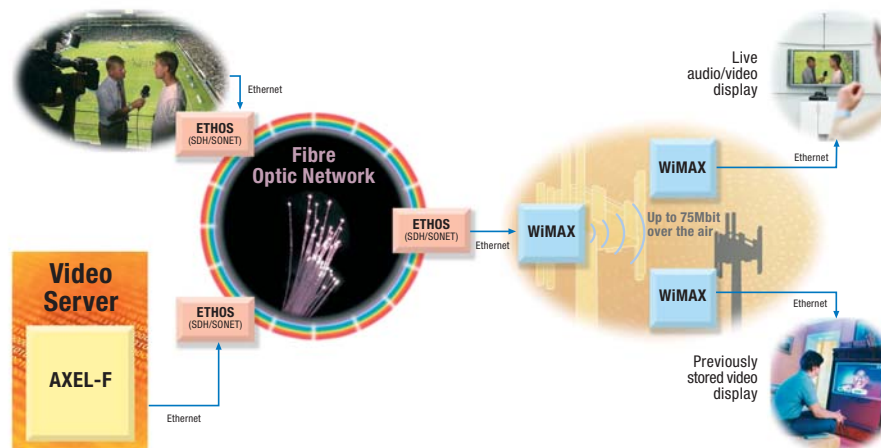
An example of an emerging, interoperable IP-based service is a high resolution video-on-demand application, together with live video streams.

IP will also be used for traditional services like telephone and TV. Whereas VoIP is already a well established technology, an application such as high quality video streaming over partially wireless IP networks is still an emerging market. Cost savings achieved by using the high integration and flexibility of Fujitsu's communication ASSPs allows the design of new products, enabling FME customers to take full advantage of the expanding IP-based networking and communication market.

One example of an emerging, interoperable IP-based service is a high resolution video on demand application, together with live video streams, as shown above. Three powerful components are at the heart of this system, which will be demonstrated at the upcoming Embedded World 2006 Exhibition, taking place in Nürnberg in February.

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The three components at the heart of the system to be demonstrated at the Embedded World 2006 Exhibition from the top: AXEL-F, ETHOS, and WiMAX SoC.

These are the AXEL-F Ethernet Switch, for high-speed Ethernet over copper, ETHOS, for Ethernet over optical fibre, and a WiMAX System-on-Chip (SoC), capable of handling megabits per second over the air.

At the service provider, a large number of streams are generated and combined for transmission across the network, responding to customers' requests for simultaneous access to thousands of video channels. In the video server, Fujitsu's leading edge 10Gbps Ethernet switching technology, based on the AXEL-F device, allows the rapid extraction and provision of the requested content from high capacity disk storage arrays.

AXEL-F is one of the most powerful devices of its kind currently available, offering 12-port 10Gbps operation, giving an aggregate throughput of 240Gbps. Such a system could support more than 150,000 high definition video channels, while offering the best price/performance ratio in today's market.

The data streams are then routed across an optical fibre-based, highly reliable Metropolitan Area Network (MAN). This is done using Fujitsu's ETHOS (Ethernet-over-SDH/SONET) device, designed for hybrid SDH/SONET and data applications, the most highly integrated and cost-effective product of its kind available.

From the fibre-based MAN, a further ETHOS device drops the data stream to the Fujitsu WiMAX SoC for transmission to the subscriber across a broadband wireless interface. The WiMAX SoC is fully compliant with the WiMAX 802.16-2004 wireless

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standard - not necessarily the case with many other devices on the market. It provides high performance OFDM (256 FFT, 64 QAM) based transmission, as well as data encryption in hardware and LMAC provided as firmware. Reference designs are now available and volume production will start soon.

The WiMAX SoC can be used for base station and customer premises applications. Its wireless transmission capabilities bring low cost broadband access to the customer, enabling wider subscriber coverage independent of existing or proprietary infrastructure.

This demonstration is one example of how the Fujitsu ASSPs could be used, but there are many other possibilities. Crucially, because the devices are fully compliant with standard specifications such as IEEE interfaces, configuring them in different ways is made very straightforward, with no initial preparatory work needed.

Another key requirement for networks now and increasingly in the future is security. One issue in particular relating to modern broadband communications is a two-fold performance issue: communication performance and computational performance. Using the well-established technique of classical public key cryptography as an example, it is easy to exchange a key, but it is still challenging to use secure symmetric encryption technologies like DES in software for applications like real-time video conferencing. Therefore, the WiMax SoC contains a hardware DES/AES unit to provide the required security without compromising performance, and retaining cost effectiveness.

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The devices described above are just three taken from FME's ASSP networking portfolio. Details on several others are available at www.fujitsu.com/emea/services/microelectronics/networking, and additional devices are set to be introduced throughout 2006.

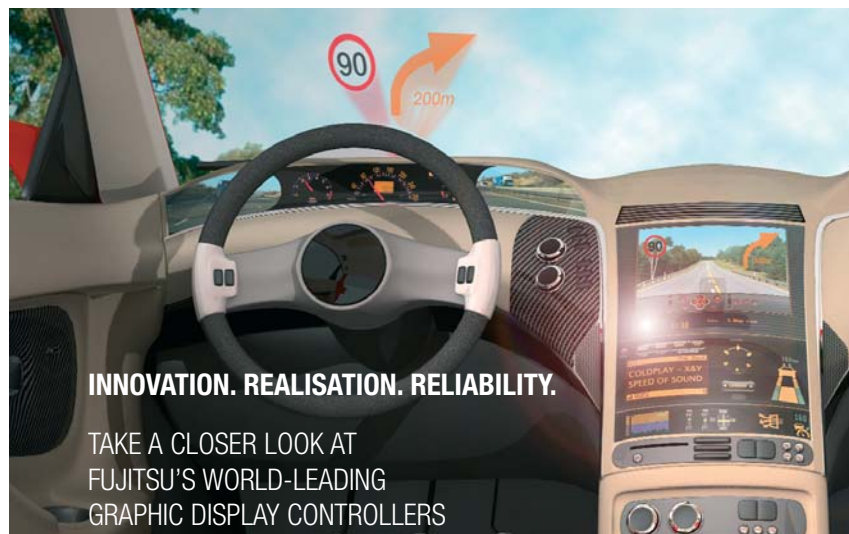**Back** ◀   ▶ **Forward**

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Carmine evaluation board enables designers to build up specific embedded applications.

Carmine GDC is the first 90nm device of its kind.

INNOVATION. REALISATION. RELIABILITY.

TAKE A CLOSER LOOK AT
FUJITSU'S WORLD-LEADING
GRAPHIC DISPLAY CONTROLLERS

Fujitsu's Graphic Display Controllers for in-car multimedia, navigation and head-up displays meet the stringent quality standards of the automotive industry. And they're supported by applications and systems engineers throughout Europe.

Our commitment to this market is underlined by 90nm product as well as a stable road-map of innovative devices in the pipeline.

Take a closer look at our Microcontrollers too, with next generation by-wire applications for in-car networks. We are also world leaders in GPS/AGPS and WiMAX solutions, while our MPEG devices deliver innovation for Digital TV and multimedia products.

Local Design Centres, systems know-how, strategic partnerships, consortium memberships and software & hardware development tools further enhance Fujitsu's solutions capabilities.

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