Employing ARM™ Cortex-M3™ as the CPU core of general-purpose microcontrollers!

Fujitsu Semiconductor has employed ARM Cortex-M3™ as the CPU core for general-purpose microcontrollers. Cortex-M3™ is one of the Cortex family series. It is a new-generation ARM CPU core specialized for the embedded microcontroller market. Fujitsu Electronic Device Business Group, the predecessor of Fujitsu Semiconductor, started employing ARM CPU cores (ARM7, ARM9, ARM11) for ASSP products and SoC products in 1998. We have accumulated experience in employing ARM CPU cores. Fujitsu Semiconductor is currently developing 32-bit general-purpose microcontrollers aiming at consumer and business applications that meet market needs by combining this accumulated experience with Cortex-M3™ core.

What is ARM™ Cortex family?
Cortex is the name of the next-generation family of CPU cores following on from the existing ARM7, ARM9, and ARM11 CPU cores made by ARM. The family lineup consists of the three series: Cortex-M series, R series, and A series. Each has the capabilities optimized to suit the applications and required specifications of the target markets. From among these, Cortex-M3™ cores are embedded processors specialized for microcontrollers covering the performance range of conventional 16 and 32-bit microcontrollers. Cortex-M3™ core is enhanced particularly for memory saving and power saving capabilities.

Features of Fujitsu Semiconductor Cortex-M3™ Microcontrollers

- **High performance**
  Operating speed: 80 MHz
  Support wide range of power supply voltages: 2.7 V to 5.5 V
  High reliability flash memory:
  Writing = 100,000 times*, retention characteristic = 10 years*
- **High security**
  Flash security technology:
  Protect intellectual property rights by preventing external readings
- **Built-in high performance analog macros**
  CR oscillator circuit
  High-speed 12-bit A/D converter
  Dual voltage monitoring (interrupt and reset) by Low Voltage Detector (LVD)
- **Wide variety of communication controls**
  CAN communication macro
  USB communication macro (Host and Function)
  Note: Ethernet communication macro is under development
  Multifunction serial (UART, SIO, SPI, and I²C)
  Multifunction timer (for motor control)
  Base timer (PWM, PWC, PPG, and reload timer)
- **Easy to use peripheral macros**

Development Tools

- **Various kinds of development tools for ARM based microcontrollers**
  Various development tools such as an integrated development environment, debugging environment, middleware, are available thanks to our collaboration with third party providers who have great experience in ARM core microcontroller development. Furthermore, our technical support center offers total support for inquiries regarding both microcontrollers and development tools. Our technical support service that does not require you to draw a distinction between microcontroller and support tool when a problem does occur, provides complete support for your microcontroller development.

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### CPU Core Roadmap and Product Lineup

#### CPU core roadmap
Cortex-M3™ core features capabilities that cover the performance range of conventional 16 and 32-bit microcontrollers. This enables Cortex-M3™ being added to the existing FR core (original 30-pin core) and FR-16LX core (original 16-bit core) lines.

#### Product lineup of Fujitsu Semiconductor Cortex-M3™ cores
Our product lineup offers the High-performance line “MB9BFxxx series” of products positioned as an extension of our existing 32-bit microcontrollers and the Low-power line “MB9BFxxx series” of products corresponding to our existing 16-bit microcontrollers. The High-performance line provides more processing ability than ever before with more advancements over the existing 32-bit microcontrollers with a higher performance IP macro and faster operating frequencies. In the Low-power line, the IP macro, operating frequency, and operating modes have been optimized and that enables the 32-bit microcontrollers to offer power consumption in line with 16-bit microcontrollers.

#### Provision of Sample Product
Sample product has been available since April 2010 ahead of Cortex-M3™ product release. This sample product is the microcontroller positioned in the High-performance line equipped with USB and CAN communication functionality as well as motor control timer and various serial communication functions that will allow you to check “What kind of product is Fujitsu Semiconductor’s Cortex-M3™?”. In addition to providing standalone microcontroller sample, a starter kit with this sample mounted will also be available (scheduled for release: from August 2010). This starter kit is a circuit board pre-mounted with the sample product that also includes an easy-to-use integrated development environment (with restrictions on some functionality) that can be used for a wide variety of purposes including training material for new recruits, an evaluation environment during actual work, or a test board during actual development.

#### First Product Release <Simultaneous Development of 32 Models>
For the first release of Cortex-M3™ microcontrollers, 32-models of High-performance line have been developed simultaneously. They are a combination of 4 different memory capacities, and 2 different pin counts.

- **Motor controller group**
  Equipped with a wide variety of motor control timers
- **USB group**
  Equipped with a motor control timer and USB
- **CAN group**
  Equipped with a motor control timer and CAN
- **USB+CAN group**
  Equipped with a motor control timer, USB, and CAN

**Schedule**
ES: Released in sequence from October 2010
Mass production: All released in January 2011

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*1 In the production version this is upgraded to “12-bit ADC”.
*2 In the production version this is upgraded to “100/120 pins”.
*3 In the production version this is upgraded to “16-bit PPG”.
*4 In the production version this is upgraded to “5MB/4MB”.

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<thead>
<tr>
<th>ROM (flash)/RAM</th>
<th>Motor Controller Group</th>
<th>USB Group</th>
<th>CAN Group</th>
<th>USB+CAN Group</th>
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<tbody>
<tr>
<td>512KB/44KB</td>
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<td>384KB/44KB</td>
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<tr>
<th>Package</th>
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<td>LCD controller</td>
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<tr>
<td>USB</td>
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<td>CAN</td>
<td>CAN controller</td>
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<td>I²C</td>
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<td>WDT</td>
<td>Watchdog Timer</td>
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<td>CR oscillator circuit</td>
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