

# FM3 Family of 32-bit MCUs with ARM Cortex-M3 Core

## High-Performance MB9BF500/400/300/100 and Basic MB9AF100 Series



### Description

The FM3 family of 32-bit general purpose microcontrollers, features the industry's leading-edge ARM Cortex-M3™ CPU, and integrates Fujitsu's highly reliable and high-speed secure embedded flash technology and a host of robust peripheral features, including motor control timers, ADCs and a wide range of communication interfaces. The FM3 family is optimized to address the 16-bit and 32-bit microcontroller market for a variety of industrial and consumer applications.

The initial offerings in the Fujitsu FM3 family are the High-Performance MB9BF500/400/300/100 and Basic MB9AF100 Series products.

### High-Performance MB9BF500/400/300/100 Series

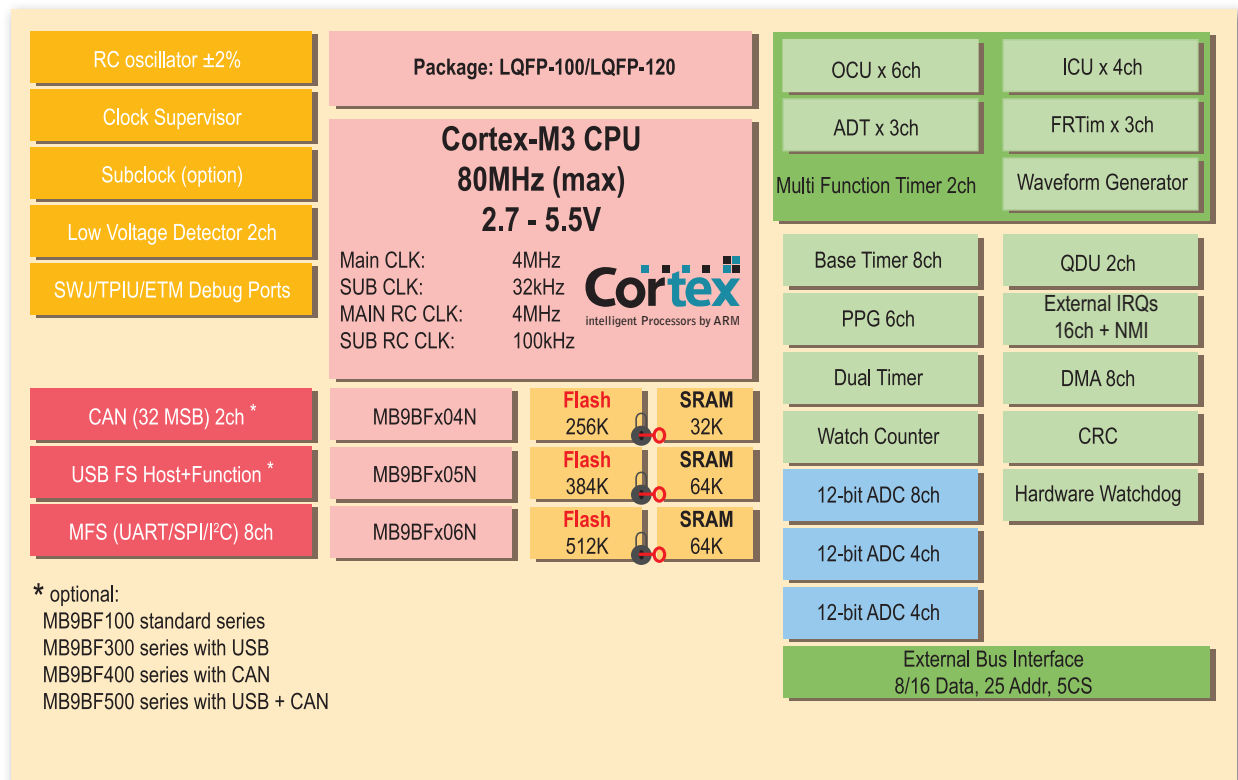
The High-Performance Series is designed to provide the full range of integrated advanced peripheral functions as well as the higher speed and greater memory density required by the 32-bit market.

Devices in the High-Performance series operate at 80MHz and support up to 512KB high-speed flash memory and up to a 64KB SRAM (with plans for speeds up to 144MHz, 1MB Flash/128KB SRAM). The MCUs in the series are available in configurations capable of supporting USB, CAN, UART, SIO, I<sup>2</sup>C, and LIN communications protocols, and will be available in LQFP120, LQFP100, and BGA112 packages.

### Basic MB9AF100 Series

The Basic Series features the lower cost, power-saving technology and compact design required by the 16-bit market. The Basic Series includes limited versions of the advanced peripheral functions of the High-Performance Series and are optimized for use primarily in major home appliances, digital consumer devices and office automation devices.

The Basic Series devices operate at 40MHz, support up to 256KB high-speed flash memory and up to 32KB SRAM, and are available in LQFP120, LQFP100, QFP100, and BGA112 packages.



**High-Performance MB9BF500/400/300/100 Series Block Diagram**

## Key Features of the FM3 Family

### ARM Cortex-M3 CPU Core

- Leading-edge architecture with the latest Cortex-M3 core from ARM
- Excellent real-time behavior
- Outstanding power efficiency
- MPU and ETM full real-time trace
- CPU operating speed up to 80MHz, with plans for up to 144MHz
- Easy development, fast time to market

### Flash technology unique to Fujitsu Semiconductor

- Highly reliable, high speed secure embedded flash memory technology
- High-speed flash zero-wait states at 60MHz
- Memory densities up to 1MBytes
- Embedded conventional and dual-operation flash memory technology
- Program cycles: Maximum 100,000 times
- Data retention period: Maximum 20 years
- Supports data-protection functionality
- Flash with ECC (Error Correction and Code)

### Peripheral Features

- High-speed, high-resolution ADCs
- Multiple timers – Software enabled switching of functions between the Reload, PPG, PWM, and PWC timers
- Products with LCD controller

### Multiple communication control macros

- Robust multiple CAN2.0A/B (active) with 32 message buffers
- USB 2.0 Full Speed communication macro (Host and Slave Function)
- Multifunction serial interfaces – LIN/SPI, I<sup>2</sup>C, UART
- Plan for Ethernet communication interfaces planned

### Wide range of products

- Wide voltage range
  - Single power supply 2.7V to 5.5V supporting 3V and 5V system designs
  - Future Low Power Line will support 1.8V to 5.5V
- Wide range of pin and package options ranging from 32- to 176-pin
- Product features to address industrial, white-goods and handheld consumer applications

## Applications

- Industrial applications
- Motor control
- Factory automation
- Consumer appliances / white goods
- Power tools
- Medical and healthcare
- Handheld devices

## FM3 Family Roadmap

The Fujitsu FM3 Family roadmap will offer a range of solutions extending from high-performance applications that require advanced control, such as factory automation systems, to basic applications, such as major home appliances (air conditioners, refrigerators, washing machines, etc.), digital consumer devices and office automation equipment.

Future offerings will include other High-Performance, Basic, Low-Power, and Low-Leak product lines. The FM3 Family will be available in configurations supporting 20MHz to 144MHz and in pin/package options ranging from 32-pin to 176-pin products. The Low-Power line will support voltage ranges of 1.8V to 5.5V.

## Development Tools

The Fujitsu FM3 family is supported by the two market-leading tool-chain suppliers: IAR Systems and Keil. These companies offer enhanced IDEs (integrated development environments) which integrate the compiler, debugger and GUI (graphical user interface). A GNU/Eclipse-based tool chain will be available.

Several third parties offer middleware tools such as CMSIS- compliant firmware, driver libraries, drivers, protocol stacks and RTOSs such as CANopen stacks, USB drivers and file systems.

Evaluation boards are available from IAR, Keil and Fujitsu, ranging from full-featured system boards to simple, low-cost products. Fujitsu also offers software modules, application notes and example software.

- Motor Control libraries
- Self test library (IEC 60730)
- USB drivers, mass storage class

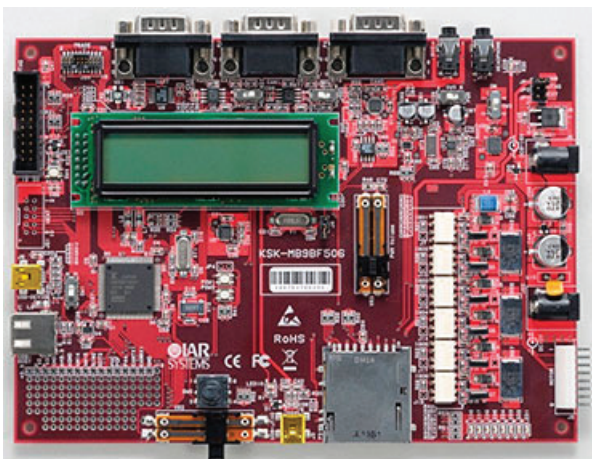
## Starter Kits

### IAR Starter Kit (MB9BF506-SK)



The IAR MDK starter kit "MB9BF506-SK" includes following support package:

- Full-featured evaluation board with MB9BF500 series, 100-pin microcontroller
- Standalone or embedded J-Link in-circuit debugger/ programmer (USB/JTAG)
- Embedded Workbench® for the ARM (EWARM) development environment
- IAR C/C++ compiler (output of code up to 32 Kbytes)
- Sample projects to evaluate a range of device peripherals



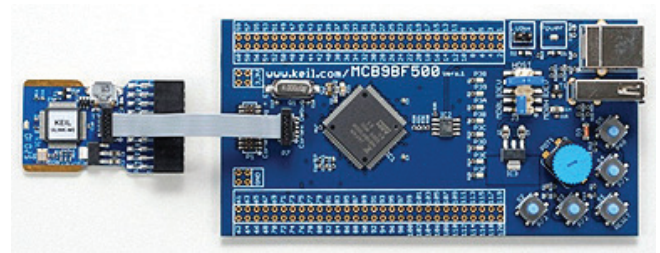
### Keil Evaluation Board with ULINK-ME (MCB9BF500)



Designed for low-cost, simplicity and ease of use, the Keil evaluation board will provide software engineers a quick and easy way to develop their applications.

The Keil starter kit packages include:

- Evaluation board with MB9BF506 100pin microcontroller
- ULINK-ME in-circuit debugger/programmer (USB/JTAG)
- µVision4™ development environment (output of code up to 32 Kbytes)
- Sample projects for a range of device peripherals



For the latest information on starter kits and other development resources for the FM3 family, visit:  
<http://www.fujitsu.com/us/services/edevice/microelectronics/microcontrollers/datalib/fr/indexarm.html>

# FM3 Family Product Lineup

| High-Performance and Basic Series – Product Lineup |       |         |          |         |                   |              |              |              |
|--|-------|---------|----------|---------|-------------------|--------------|--------------|--------------|
| Series   | MHz   | Package | Function |         | Flash/RAM Density |              |              |              |
|  |       |         | CAN      | USB 2.0 | 128KB/16KB        | 256KB/32KB   | 384KB/48KB   | 512KB/64KB   |
| High-Performance Series                            | 80MHz | LQFP120 | 2        | 1       |                   | MB9BF504RPMC | MB9BF505RPMC | MB9BF506RPMC |
|  |       |         | 2        | -       |                   | MB9BF404RPMC | MB9BF405RPMC | MB9BF406RPMC |
|  |       |         | -        | 1       |                   | MB9BF304RPMC | MB9BF305RPMC | MB9BF306RPMC |
|  |       |         | -        | -       |                   | MB9BF104RPMC | MB9BF105RPMC | MB9BF106RPMC |
|  |       | LQFP100 | 2        | 1       |                   | MB9BF504NPMC | MB9BF505NPMC | MB9BF506NPMC |
|  |       |         | 2        | -       |                   | MB9BF404NPMC | MB9BF405NPMC | MB9BF406NPMC |
|  |       |         | -        | 1       |                   | MB9BF304NPMC | MB9BF305NPMC | MB9BF306NPMC |
|  |       |         | -        | -       |                   | MB9BF104NPMC | MB9BF105NPMC | MB9BF106NPMC |
|  |       | BGA112  | 2        | 1       |                   | MB9BF504NBGL | MB9BF505NBGL | MB9BF506NBGL |
|  |       |         | 2        | -       |                   | MB9BF404NBGL | MB9BF405NBGL | MB9BF406NBGL |
|  |       |         | -        | 1       |                   | MB9BF304NBGL | MB9BF305NBGL | MB9BF306NBGL |
|  |       |         | -        | -       |                   | MB9BF104NBGL | MB9BF105NBGL | MB9BF106NBGL |
| Basic Series                                       | 40MHz | LQFP120 | -        | -       | MB9AF102RPMC      | MB9AF104RPMC |              |              |
|  |       | LQFP100 | -        | -       | MB9AF102NPMC      | MB9AF104NPMC |              |              |
|  |       | QFP100  | -        | -       | MB9AF102NPF       | MB9AF104NPF  |              |              |
|  |       | BGA112  | -        | -       | MB9AF102NBGL      | MB9AF104NBGL |              |              |

## FUJITSU SEMICONDUCTOR AMERICA, INC.

Corporate Headquarters  
 1250 E. Arques Avenue, M/S 333, Sunnyvale, CA 94085-5401  
 Tel: (800) 866-8608 Fax: (408) 737-5999  
 E-mail: [FSA\\_inquiry@us.fujitsu.com](mailto:FSA_inquiry@us.fujitsu.com) | Website: <http://us.fujitsu.com/semi>



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