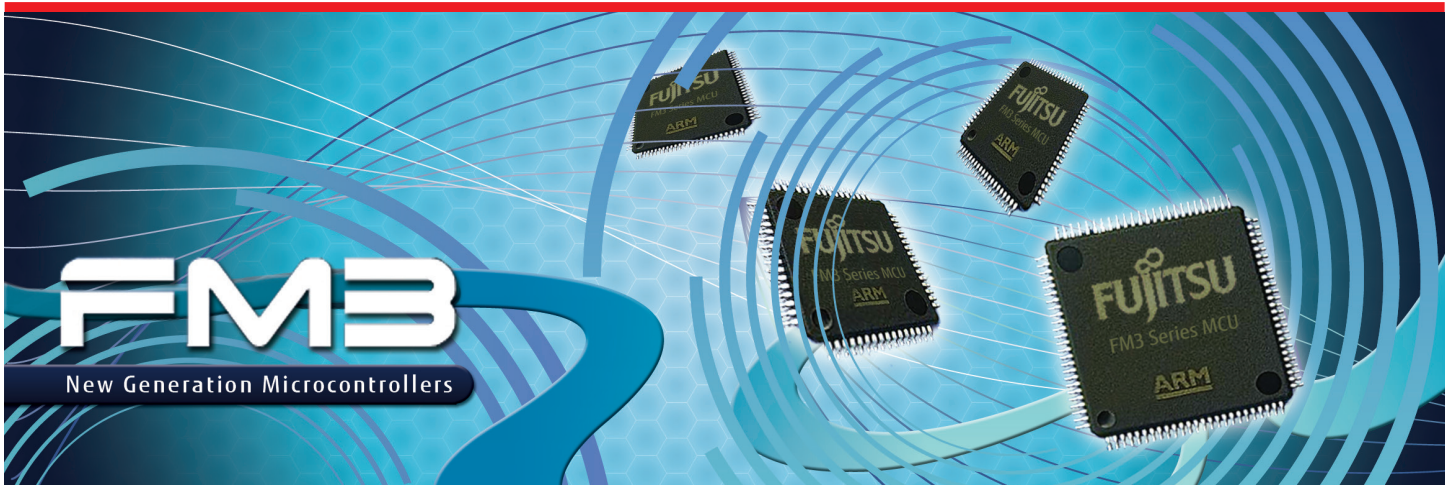


FM3 Family Microcontrollers

32-Bit ARM®-based MCUs for Industrial and Consumer Applications



Overview

The Fujitsu FM3 family of 32-bit general-purpose microcontrollers features the industry-standard ARM® Cortex™-M3 CPU. The FM3 family provides a scalable platform for industrial and consumer applications ranging from motor control, factory automation, white goods and power tools to medical devices, major home appliances, digital consumer devices and office automation equipment.

The MCUs include a host of robust peripheral features, including multiple motor control timers, high-speed ADCs and a wide range of communication interfaces. The MCUs are based on Fujitsu's highly reliable, high-speed embedded Flash process. Customers can select the best device from a wide range of products, with available packages ranging from 48pin to 176pin and Flash memory densities ranging from 32KB to 1MB.

Applications

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

FM3 Family Features

Wide range of highly scalable products

- Low-, mid- and high-performance applications
- Wide voltage range: 1.65V to 5.5V
- Several package options with 48pin to 176pin-pin compatibility throughout all four product groups
- Extended temperature support: -40 to +80°C and -40 to +105°C

ARM Cortex-M3 CPU core

- Excellent architecture for real-time applications
- Outstanding power efficiency
- MPU and ETM full real-time trace
- CPU operating speed up to 144MHz
- Easy development, fast time to market

Highly reliable embedded Flash memory

- 100,000 erase cycles, up to 20 years of data retention
- Densities up to 1MB Flash, 128kB RAM
- High speed: up to 10ns CPU access speed
- Zero wait, single cycle up to 72MHz
- Flash security function
- Built-in Error Correction Code (ECC)
- Embedded conventional and dual-operation Flash memory technology

Integrated MPU and ETM features of Cortex-M3 core

- Serial Wire JTAG Debug Port (SWJ-DP)
- ETM for comprehensive debug and trace facilities 1.8V to 5.5V
- Trace Port Interface Unit (TPIU) for bridging to a Trace Port Analyzer

Advanced peripheral features

- High-speed ADC: 1M samples/sec
- High-resolution ADC: 12 bit +/-2LSB
- ADC with built-in FIFO and fast conversion time (e.g., 1µs@5V, 40MHz)
- On-chip RC oscillator +/-2% over the temperature range with trimming
- Up to three separate ADC units
- DAC option for some product groups

Integrated motor control safety features to meet IEC 70730 requirements

- Integrated Quadrature Position/Revolution Counter (QPRC)
- Low-voltage detection
- Clock supervisor
- Hardware watchdog timer with independent clock
- RTC – option with battery backup for some products
- DTIF (motor emergency stop) interrupt and dead time function
- Cyclic Redundancy Check (CRC) accelerator to verify data transmission or storage integrity

Wide range of communication peripherals

- Robust multiple CAN2.0A/B (active) with 32 message buffers
- Multiple LIN I/Fs
- USB 2.0 full-speed host and function: 12Mbps
- 10/100B-T x 2-ch Ethernet MAC
- IEC 61508 (SIL2) STL and plan for SIL3 function safety
- Multifunction serial macro with buffer, up to 12 channels each configurable as UART–4.5Mbps, SIO/SPI: 10Mbps, I2C–400KHz
- Multiple timers, software-enabled switching of functions between the Reload, PPG, PWM and PW timers

Long-term supply guarantee

- Long-term track record
- Product availability for a minimum of 10 years after product launch
- Fujitsu's own fab, which helps meet delivery demands of customers

Product Lineup

The FM3 MCU family consists of four groups: **High-Performance**, **Basic**, **Low-Power** and **Ultra-Low-Leak**. The groups differ in CPU operating frequency and supply voltage, but are based on the same architecture (software compatible), use the same peripherals and are pin-compatible in most cases.

High-Performance Group

The High-Performance Group is designed to provide the full range of advanced, integrated peripheral functions as well as the higher speed and greater memory density required by 32-bit embedded applications. With multiple communication interfaces, large memory and high performance, these devices are ideal for applications that require high-speed processing, such as industrial equipment, factory automation systems, motor control, office automation equipment, servo control and inverter control systems.

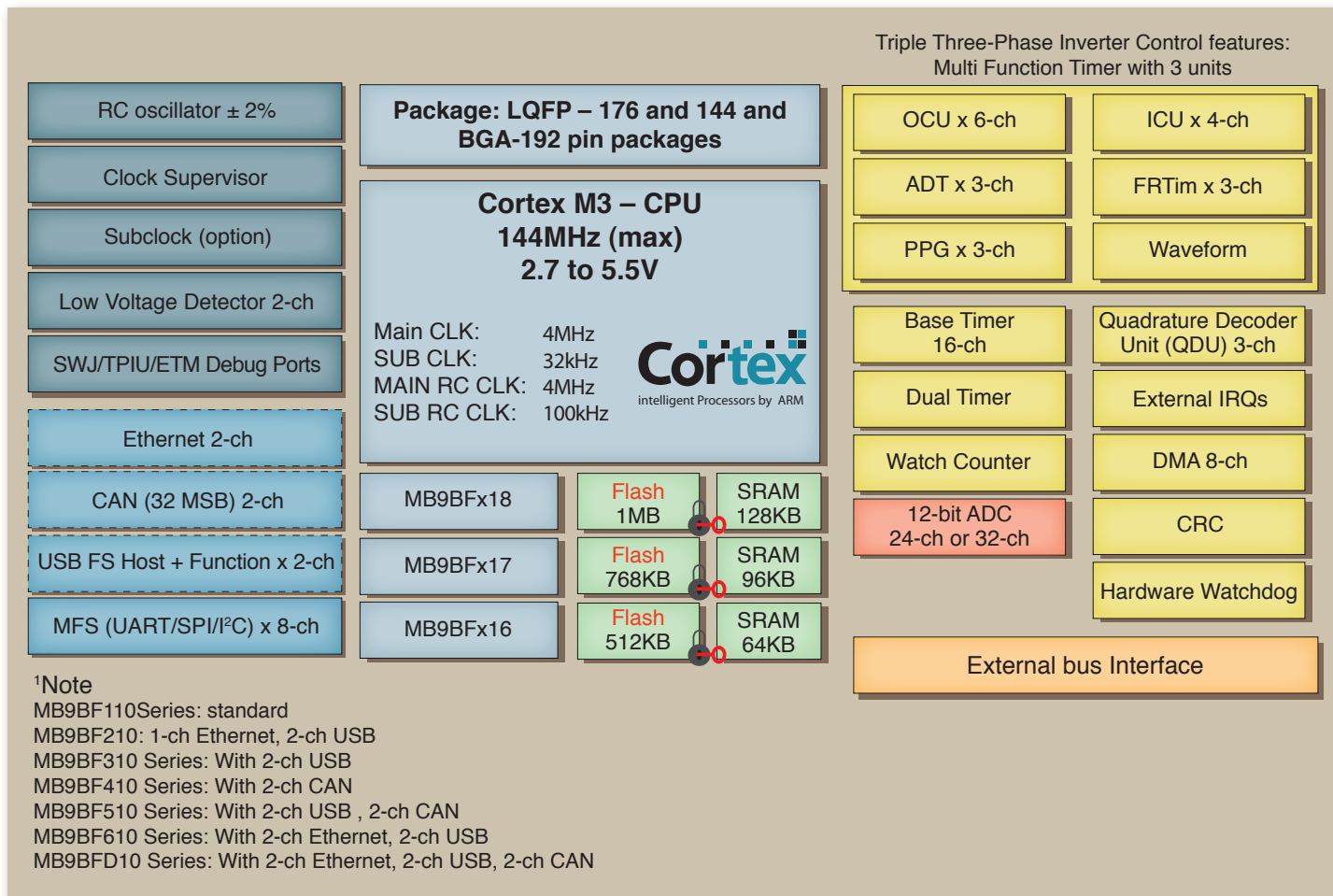
The newest member of the group features a high-performance, low-power 144MHz CPU; a full array of peripherals; multiple communications interfaces (including Ethernet, USB 2.0, and CAN); and a real-time clock. The integrated multiple inverter control enables highly precise, high-speed control of up to three motors. Safety features include those that meet the IEEE1588 requirements for time-synched communication in an automated factory setting.

Products are available with integrated Flash memory of up to 1MB, up to 128KB RAM, a wide operating voltage range (2.7V to 5.5V), and package options ranging from 100pin to 176pin.

Basic Group

Devices in this group offer a balance between performance and cost, while still retaining the rich array of peripheral functions featured in the High-Performance Group. The Basic Group is optimized to provide cost-effective, single-motor inverter control. The devices are suitable for a variety of applications including factory automation systems, energy-efficient home appliances (such as air conditioners and refrigerators requiring power conservation), sensor control, lighting control, HMI and generic control applications.

The devices, which support a wide 2.7V to 5.5V operating voltage, are available in packages ranging from 48pin to 120pin.



Block Diagram of MB98610/310/110 Series

Low-Power Group

The Low-Power Group meets the demand for energy-efficient consumer products. The group's low-voltage operation (1.65V to 3.6V) helps extend battery life and reduce power consumption during operation. (Power consumption in active mode is about 250µA/MHz.) This group supports memory options up to 288KB Flash / 32KB RAM having dual-operation Flash; integrated USB, RTC, LCD controllers; and an HDMI-CEC receiver. Package options range from 64pin to 100pin.

The Low-Power Group is optimal for a wide range of applications, including home appliances with digital displays, AV applications that require AV equipment connections, battery-powered mobile products, and healthcare equipment that uses liquid crystal displays.

Ultra-Low-Leak Group

The Ultra-Low-Leak Group, which is based on an optimized low-leakage process technology, offers an excellent design option for medical equipment, small appliances, home electronics products, utility meters, sensor networks and digital entertainment systems.

Controllers in this group can operate up to 20MHz core clock. When using RTC mode under date and time management, the controller draws an extremely low 1.6 microAmps of power. In deep-standby RTC mode, where power to the Flash memory is shut off, the MCU draws just 1.2 microAmps. This low standby mode current and a wide voltage range (1.8V to 5.5V) make these products well-suited for low-cost and battery-powered applications.

The Ultra-Low-Leak Group devices also feature inverter motor control, an LCD controller and a real-time clock. The MCUs are available in 48pin to 100pin packages with 128KB to 64KB of Flash memory and up to 8KB RAM. The series roadmap plans for support of LCDC-integrated devices with large direct-drive-segment LCD displays.

Series	Pins	Packages (planned)	Flash	2nd Flash	RAM	CPU [MHz]	Debug ETM	MPU	sub clock	Flash Security	External Bus	12-bit ADC (units) ch
High-Performance Group												
MB9B500N	100	LQFP,QFP,BGA	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B400N	100	LQFP,QFP,BGA	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B300N	100	LQFP,QFP,BGA	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B100N	100	LQFP,QFP,BGA	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B500R	120	LQFP	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B400R	120	LQFP	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B300R	120	LQFP	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9B100R	120	LQFP	512K/384K/256K	-	64K/48K/32K	80	✓	✓	✓	✓	✓	(3) 16
MB9BD10S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9B610S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9B210S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9B510S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9B410S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9B310S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9B110S	144	LQFP	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 24
MB9BD10T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B610T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B210T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B510T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B410T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B310T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B110T	176	LQFP, BGA	1024K/768K/512K	-	128K/96K/64K	144	✓	✓	✓	✓	✓	(3) 32
MB9B510N	100	LQFP,QFP,BGA	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B410N	100	LQFP,QFP,BGA	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B310N	100	LQFP,QFP,BGA	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B110N	100	LQFP,QFP,BGA	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B510R	120	LQFP	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B410R	120	LQFP	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B310R	120	LQFP	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
MB9B110R	120	LQFP	512K/384K/256K/128K	32K	64K/48K/32K	144	✓	✓	✓	✓	✓	(3) 16
Basic Group												
MB9A310K	48	LQFP (QFN)	128K/64K	32K	16K/16K	40	-	-	✓	✓	-	(2) 8
MB9A110K	48	LQFP (QFN)	128K/64K	32K	16K/16K	40	-	-	✓	✓	-	(2) 8
MB9A310L	64	LQFP (QFN)	256K/128K/64K	-	32K/16K/16K	40	-	-	✓	✓	-	(2) 9
MB9A110L	64	LQFP (QFN)	256K/128K/64K	-	32K/16K/16K	40	-	-	✓	✓	-	(2) 9
MB9A310M	80	LQFP	512KB/384K/256K/128K/64K	-	32K/32K/32K/16K/16K	40	-	-	✓	✓	✓	(3) 12
MB9A110M	80	LQFP	512KB/384K/256K/128K/64K	-	32K/32K/32K/16K/16K	40	-	-	✓	✓	✓	(3) 12
MB9A310N	100	LQFP,QFP,BGA	512KB/384K/256K/128K/64K	-	32K/32K/32K/16K/16K	40	✓	-	✓	✓	✓	(3) 16
MB9A110N	100	LQFP,QFP,BGA	512KB/384K/256K/128K/64K	-	32K/32K/32K/16K/16K	40	✓	-	✓	✓	✓	(3) 16
Low-Power Group												
MB9AB40L	64	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	-	(2) 12
MB9AA40L	64	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	-	(2) 12
MB9A340L	64	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	-	(2) 12
MB9A140L	64	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	-	(2) 12
MB9AB40M	80	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	✓	(2) 17
MB9AA40M	80	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	✓	(2) 17
MB9A340M	80	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	✓	(2) 17
MB9A140M	80	LQFP	256K/128K/64K	32K	32K/16K/16K	40	-	-	✓	✓	✓	(2) 17
MB9AB40N	100	LQFP	256K/128K/64K	32K	32K/16K/16K	40	✓	-	✓	✓	✓	(2) 24
MB9AA40N	100	LQFP	256K/128K/64K	32K	32K/16K/16K	40	✓	-	✓	✓	✓	(2) 24
MB9A340N	100	LQFP	256K/128K/64K	32K	32K/16K/16K	40	✓	-	✓	✓	✓	(2) 24
MB9A140N	100	LQFP	256K/128K/64K	32K	32K/16K/16K	40	✓	-	✓	✓	✓	(2) 24
Ultra-Low-Leak Group												
MB9A130K	48	LQFP (QFN)	128K/64K	-	8K/8K	20	-	-	✓	✓	-	(1) 6
MB9A130L	64	LQFP (QFN)	128K/64K	-	8K/8K	20	-	-	✓	✓	-	(1) 8
MB9AA30M	80	LQFP	128K/64K	-	16K/12K	20	-	-	✓	✓	-	(1) 12
MB9A130M	80	LQFP	128K/64K	-	16K/12K	20	-	-	✓	✓	✓	(1) 12
MB9AA30N	100	LQFP, BGA	128K/64K	-	16K/12K	20	✓	-	✓	✓	-	(1) 16
MB9A130N	100	LQFP, BGA	128K/64K	-	16K/12K	20	✓	-	✓	✓	✓	(1) 16

WDG Watchdog
 RTC Real Time Clock
 BT Base Timer (Reload, PPG, PWM, PWC)

MFT Multi Function Timer (e.g. for motor control)
 QDU Quadrature Decoder Unit
 MFS Multi Function Serial (USART, I2C, SPI)

10-bit DAC	MFT + QDU	BT	WDG	RTC	MFS (USART, SPI, I2C)	USB Host+Funct. Full Speed	CAN	Ethernet MAC	CRC	LCD	max I/O's	supply voltage	temperature range	Special Features
-	2	8	✓	-	8	1	2	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	-	2	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	1	-	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	-	-	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	1	2	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	-	2	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	1	-	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	-	-	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	2	2	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	-	2	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	-	1	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	2	-	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	-	2	-	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	-	-	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	-	-	-	✓	-	122	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	2	2	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	-	2	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	-	1	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	2	-	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	-	2	-	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	2	-	-	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	16	✓	-	8	-	-	-	✓	-	154	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	1	2	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	-	2	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	1	-	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	-	-	-	✓	-	80	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	1	2	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	-	2	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	1	-	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	3	8	✓	✓	8	-	-	-	✓	-	100	2.7 to 5.5V	-40°C to +85°C	RC osc. +/-2%, NAND Flash I/F
-	1	8	✓	✓	4	1	-	-	✓	-	36	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%
-	1	8	✓	✓	4	-	-	-	✓	-	36	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%
-	2	8	✓	-	8	1	-	-	✓	-	51	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%
-	2	8	✓	-	8	-	-	-	✓	-	51	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%
-	2	8	✓	-	8	1	-	-	✓	-	66	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	-	-	-	✓	-	66	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	1	-	-	✓	-	83	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%, NAND Flash I/F
-	2	8	✓	-	8	-	-	-	✓	-	83	2.7 to 5.5V	-40°C to +105°C	RC osc. +/-2%, NAND Flash I/F
-	-	8	✓	✓	8	1	-	-	✓	20x8	51	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	-	-	-	✓	20x8	51	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	1	-	-	✓	-	51	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	-	-	-	✓	-	51	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	1	-	-	✓	33x8	66	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	-	-	-	✓	33x8	66	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	1	-	-	✓	-	66	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	-	-	-	✓	-	66	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	1	-	-	✓	40x8	83	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	-	-	-	✓	40x8	83	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	1	-	-	✓	-	83	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	-	8	✓	✓	8	-	-	-	✓	-	83	1.65 to 3.6V	-40°C to +105°C	RC osc. +/-2%
-	1	8	✓	✓	4	-	-	-	-	-	37	1.8 to 5.5V	-40°C to +85°C	RC osc. +/-2%
-	1	8	✓	✓	8	-	-	-	-	-	52	1.8 to 5.5V	-40°C to +85°C	RC osc. +/-2%
2	-	8	✓	✓	8	-	-	-	-	28x8	66	1.8 to 5.5V	-40°C to +105°C	RC osc. +/-2%
2	1	8	✓	✓	8	-	-	-	-	-	66	1.8 to 5.5V	-40°C to +105°C	RC osc. +/-2%
2	-	8	✓	✓	8	-	-	-	-	40x8	83	1.8 to 5.5V	-40°C to +105°C	RC osc. +/-2%
2	1	8	✓	✓	8	-	-	-	-	-	83	1.8 to 5.5V	-40°C to +105°C	RC osc. +/-2%

ADC Analog Digital Converter
DAC Digital Analog Converter
MPU Memory Protection Unit

ETM Embedded Trace Macrocell – Debug Interface
CRC Cyclic Redundancy Check

Software Development Support

The FM3 MCU family is an ideal choice for system designers who want to streamline development and reduce time to market. Fujitsu offers a common set of programming libraries and tools, a full line of starter and development kits, and application support to aid system design.

IDE, Compiler, Debuggers

The Fujitsu FM3 family is supported by market-leading tool-chain suppliers like IAR Systems, Keil, and Mentor Embedded. These companies offer enhanced IDEs (integrated development environments) with a compiler, assembler, linker and debugger usable within a common GUI. A free OpenSource GNU/Eclipse-based tool chain is available as well.

Popular JTAG emulators like Segger J-Link or Keil ULINK and many low-cost FTDI-based adapters can be utilized with FM3 microcontrollers. FM3 devices with an implemented Embedded Trace Macrocell (ETM) feature a Trace Port Interface Unit (TPIU) beside the standard Serial Wire JTAG Debug Port. The TPIU allows the connection of JTAG adapters with trace functionality.

- IAR embedded workbench
- Keil MDK
- Sourcery CodeBench
- Atollic TrueSTUDIO
- Rowley CrossWorks
- Altium TASKING
- OpenSource GNU Tool-chain



Evaluation Boards

Developers can select the right-sized solution from a wide range of MCU evaluation boards offered by Fujitsu and partners. Beside the basic MCU motherboards, application specific adapter boards are offered. The specific boards come with example software and libraries. Some boards are available as bundles with a JTAG adapter.

SK-FM3-100PMC-JLINK

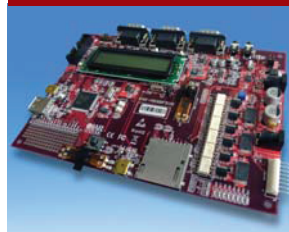


Starter Kit with MB9BF506N MCU (100pin MCU)

Segger J-Link JTAG adapter

- Same as SK-FM3-100PMC plus Segger J-Link JTAG adapter

KSK-MB9BF506

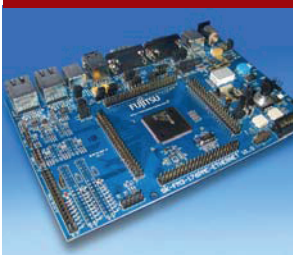


Starter Kit with MB9BF506R MCU (120pin MCU)

J-Link lite (on board)

- Many peripherals
- LCD
- SD-card slot
- CAN, USB, RS232
- Motor control power stage

SK-FM3-176PMC-ETHERNET



Starter Kit with MB9BFD18T MCU (176pin MCU)

- JTAG/USB adapter on board
- All MCU pins accessible
- Dual EtherMAC I/F
- USB Host+Func, RS232
- CAN
- 2 x 7seg LEDs, buttons, rotary encoder, poti
- 3V and 5V operation

MCB9BF500UME



Starter Kit with MB9BF506R MCU (120pin MCU)

ULINK-ME JTAG adapter

- Limited set of peripherals
- USB Host + Function
- Buttons
- All MCU pins accessible

Middleware

Fujitsu and third parties offer diverse middleware components. In many cases the user can choose between commercial and free solutions. The offerings include CMSIS-compliant firmware, low-level peripheral and driver libraries, drivers, protocol stacks and real-time operating systems such as CANopen stacks, USB drivers and file systems.



Operating Systems

- freeRTOS
- Micrium uC/OS-II and uC/OS-III
- Keil RTX
- Segger embOS
- Avix/RT

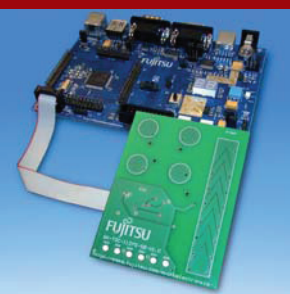
Fujitsu Middleware Components

- Peripheral library
- USB library
- Functional safety self-test libraries (IEC60730 – class B, IEC61508 SIL2)
- EEPROM emulation library
- Motor control platform
- Capacitive touch library

Partner Middleware Components

- USB library
- Ethernet TCP/IP stacks and application layers
- CANopen protocol stacks

SK-TSC-1127-SB



Capacitive Touch Sensor Board with FMA1127DC-30S

- Can be connected to SK-FM3-100PMC or SK-FM3-64PMC1 (neither included)
- Software package

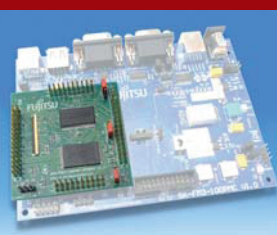
ADA-FM3-100PMC-WLAN-RP



WiFi Module for FM3

- Extension board for SK-FM3-100PMC (not included)
- Based on Redpine's RS9110-N-11-22, UART/SPI wireless device server module
- Power supply by starter kit: 3V or 5V
- Software package

ADA-FM3-100PMC-MEMORY



External 4 MByte FLASH and 512 KByte SRAM Memory

- Extension board for SK-FM3-100PMC (not included)
- Supports TFT display control via GPIO (connector on PCB)

ADA-FM3-100PMC-RFID-TAG



UHF RFID Module with 4KByte FRAM

- Extension board for SK-FM3-100PMC (not included)
- Based on dual interface UHF RFID chip MB97R804B with SPI interface and 4KByte FRAM
- The memory can be accessed from the MCU via an SPI interface and via RFID reader/writer devices

SK-POWER-3P-LV2-MC



3-phase MOSFET Power Stage 24V, 8A max.

- Allows the connection of BLDC or PMSM motors (not included)
- Current and voltage measurements
- Temperature sensor and overvoltage/ current detection with indicator LEDs
- Fits to ADA-FM3-100PMC-MC (not included)

ADA-FM3-100PMC-RFID-RW



UHF RFID Reader/Writer Module

- Extension board for SK-FM3-100PMC (not included)
- Based on AMS reader/writer chip
- Wireless access to UHF RFID tags like ADA-FM3-100PMC-RFID-TAG

2.7V to 5.5V	144MHz	High-Performance Group 1. Large on-chip memory: up to 1MB Flash/128KB RAM & ext. bus I/F; work Flash option for EEPROM emulation 2. Peripherals: Up to 3ch motor control, 2ch Ethernet-MAC, 2ch CAN, 2ch USB, many timers/serial I/Fs, integrated safety functions for UL or IEC60730 3. Package: 100 to 176pin – QFP, LQFP, BGA 4. Applications: factory and office automation, gateway and system control, motor inverter control
	80MHz	
1.65V to 3.6V	40MHz	Basic Group 1. On-chip memory: up to 512KB Flash/ 64KB RAM, work Flash option for EEPROM emulation 2. Peripherals: 1ch motor control, USB, many timers/serial I/F, integrated safety functions for UL or IEC60730 (DAC and CAN integrated under development) 3. Package: 48 to 120pin – QFP, LQFP, QFN and BGA 4. Applications: white goods, sensor control, HMI and any compact handheld and generic control
		Low-Power Group 1. Low active run mode current: 200µA/MHz 2. On-chip memory: up to 288KB Flash / 32KB RAM, dual operation Flash memory option 3. Peripherals: LCDC 40 Segx8 Com, USB, RTC, ADC, DAC, 2c HDMI-CEC receivers and many serial I/Fs 4. Package: 64 to 100pin – QFP, LQFP, QFN and BGA 5. Applications: battery powered, consumer electronics – digital A/V, home appliances, handheld medical
1.8V to 5.5V	20MHz	Ultra-Low-Leak Group 1. Ultra low-leak-current in standby mode 2. On-chip memory: up to 128KB Flash / 16KB RAM 3. Peripherals: LCDC 40 Segx8 Com, RTC, DAC, 1ch motor control, integrated safety functions for UL or IEC60730, multiple timers/serial I/Fs 4. Package: 48 to 100pin – QFP, LQFP, QFN and BGA 5. Applications: battery-powered handhelds, home appliances, utility meters, sensor networks

