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FUJITSU

MICROCONTROLLER SUPPORT TOOL

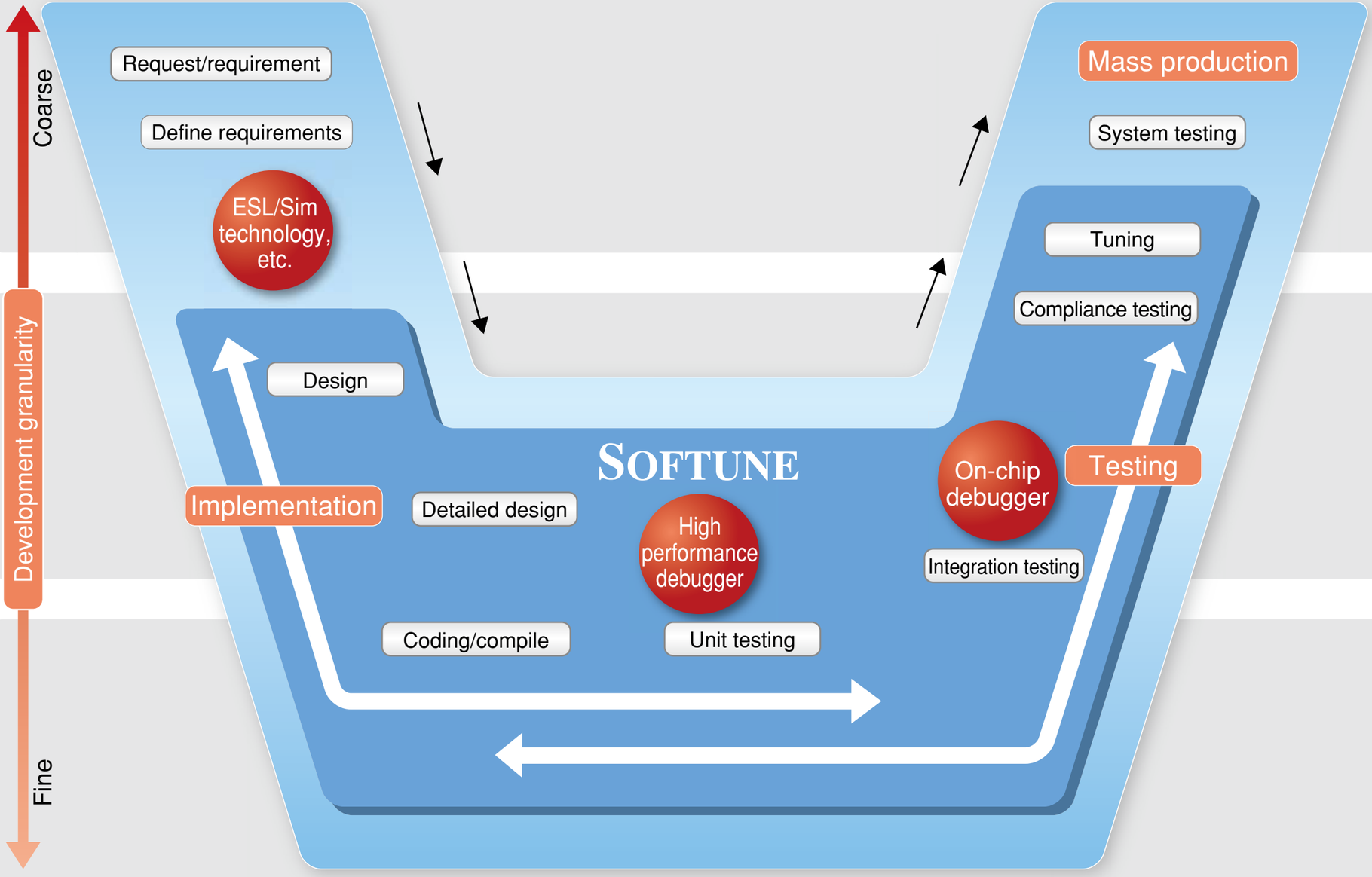
2011.1

FUJITSU SEMICONDUCTOR

shaping tomorrow with you

Fujitsu Semiconductor Microcontroller Development Environments

Flow of Development “V-model”



CONTENTS

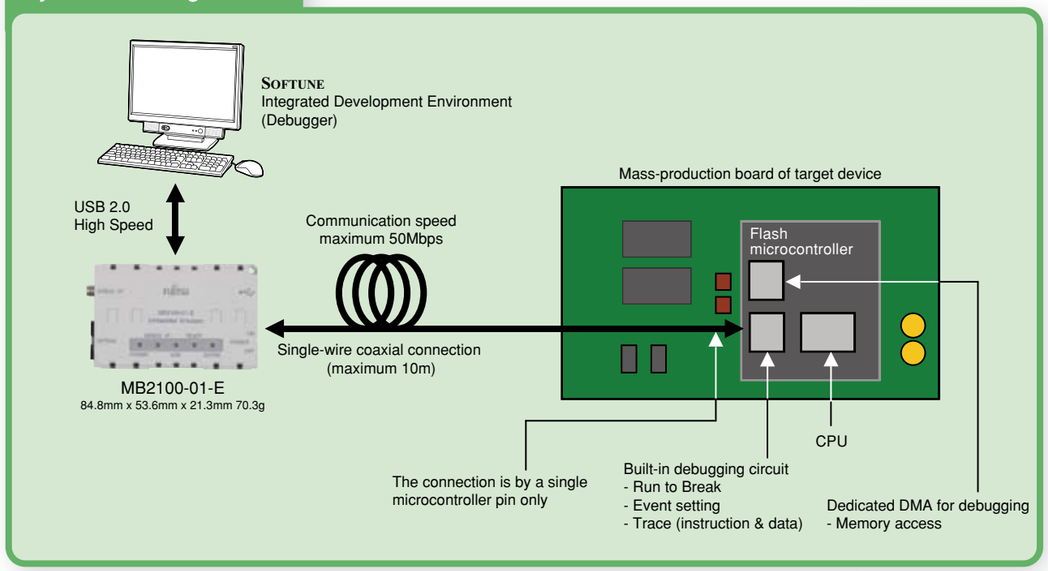
Development System (hardware tools)

Fujitsu Semiconductor provides development tools such as emulators and adapters for developing software for the FR family and F^{2}MC family.

FR Family 32-bit Microcontroller On-chip Debugger

- Features of the MB2100-01-E emulator
  - Debug using a flash microcontroller on a mass-production board
  - Connect to the flash microcontroller using a single wire coaxial cable
  - Read from and write to memory without stopping the CPU
  - Connect to a flash microcontroller at up to 10 m
  - Configure traces and multiple events
  - Security function with password
  - Compact size and light weight 84.8mm x 53.6mm x 21.3mm, 70.3g
  - Connect using USB 2.0 High Speed
  - The power supply is USB bus-powered
  - Power supply isolation
  - Supports all flash microcontrollers that includes the single-wire coaxial cable debugging interface

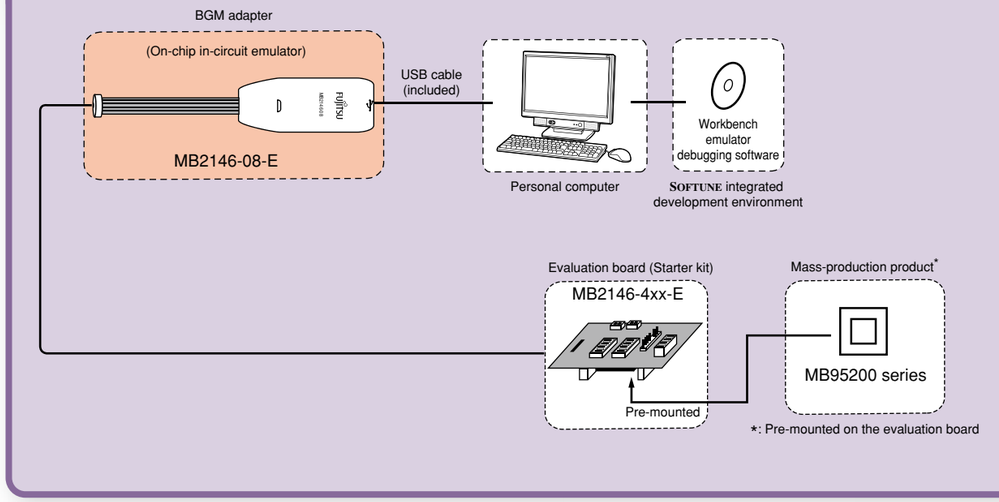
System Configuration



New 8FX Family 8-bit Microcontroller MB95200 Series

- Features of the MB2146-08-E (BGM adapter)
  - Supports microcontroller operating voltages of +2.9 to +5.5V
    (The upper and lower limits on the microcontroller operating voltage and operating frequency vary between each of the devices. For the operating voltage and operating frequency of each MCU, see the documentation related to that device (data sheet, hardware manual, etc.))
  - Compact development environment, with small lightweight BGM adapter
  - Debugging possible over single-wire serial
  - Because the monitor program executes in a dedicated memory space, it does not consume any of the user memory space
  - Built-in continuous execution, step execution, and forced break functions
  - Software breakpoints: 256 points
  - Host interface: Able to connect using USB1.1

System Configuration

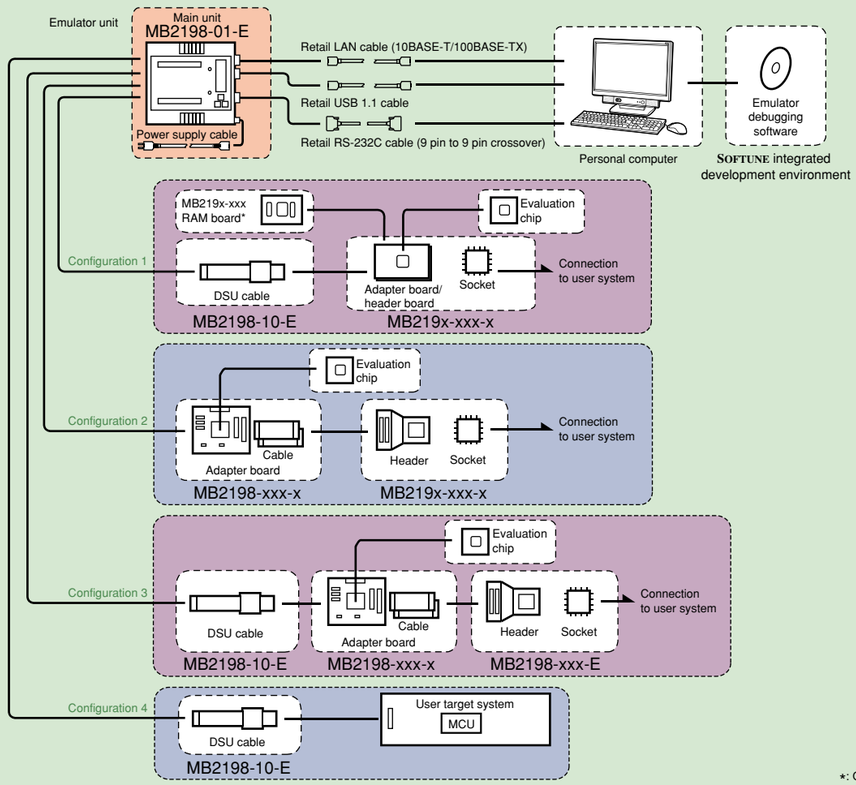


Development System (hardware tools)

FR Family 32-bit Microcontroller

- Features of the MB2198-01-E emulator
  - Supported DSU: DSU3, DSU4
  - Power supply voltage: Supports linear +2.7V to +5.5V
    (The upper and lower limits on the microcontroller operating voltage and operating frequency vary between each of the MCU. For the operating voltage and operating frequency of each MCU, see the documentation related to that device (data sheet, hardware manual, etc.))
  - Capable of source-level debugging (assembler, C, mixed display)
  - Simple GUI operation using pull-down menu buttons
  - Real-time trace function
  - Multiple window display, including source code, variables, registers, memory, trace, etc.
  - Hardware break x 5, Software break x 4096, Code event x 2, Data event x 2
  - Execution cycle measurement function
  - Host interface: Equipped standard with RS-232C (max. 115kbps), LAN (10BASE-T, 100BASE-TX), and USB1.1

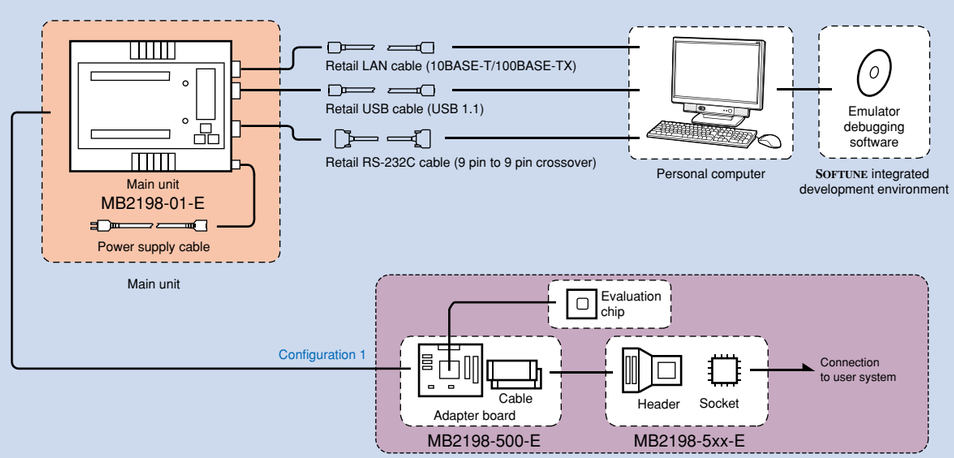
System Configuration



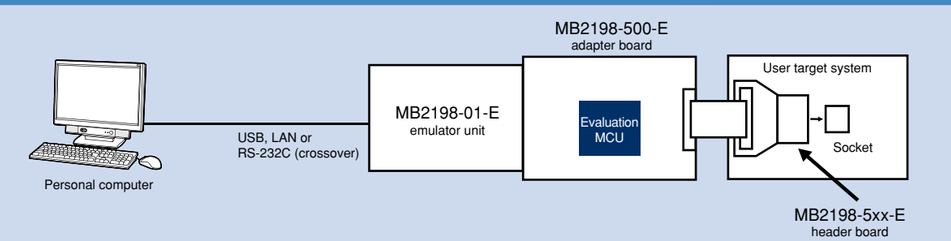
F²MC-16FX Family 16-bit Microcontroller

- Features of the MB2198-01-E emulator
  - Supported DSU: DSU4
  - Power supply voltage: Supports linear +2.7V to +5.5V
    (The upper and lower limits on the microcontroller operating voltage and operating frequency vary between each of the MCU. For the operating voltage and operating frequency of each MCU, see the documentation related to that device (data sheet, hardware manual, etc.))
  - Capable of source-level debugging (assembler, C, mixed display)
  - Simple GUI operation using pull-down menu buttons
  - Real-time trace function
  - Multiple window display, including source code, variables, registers, memory, trace, etc.
  - Hardware break x 4, Software break x 2048, Data break x 4
  - Execution cycle measurement function
  - Host interface: Equipped standard with RS-232C (max. 115kbps), LAN (10BASE-T, 100BASE-TX), and USB1.1

System Configuration



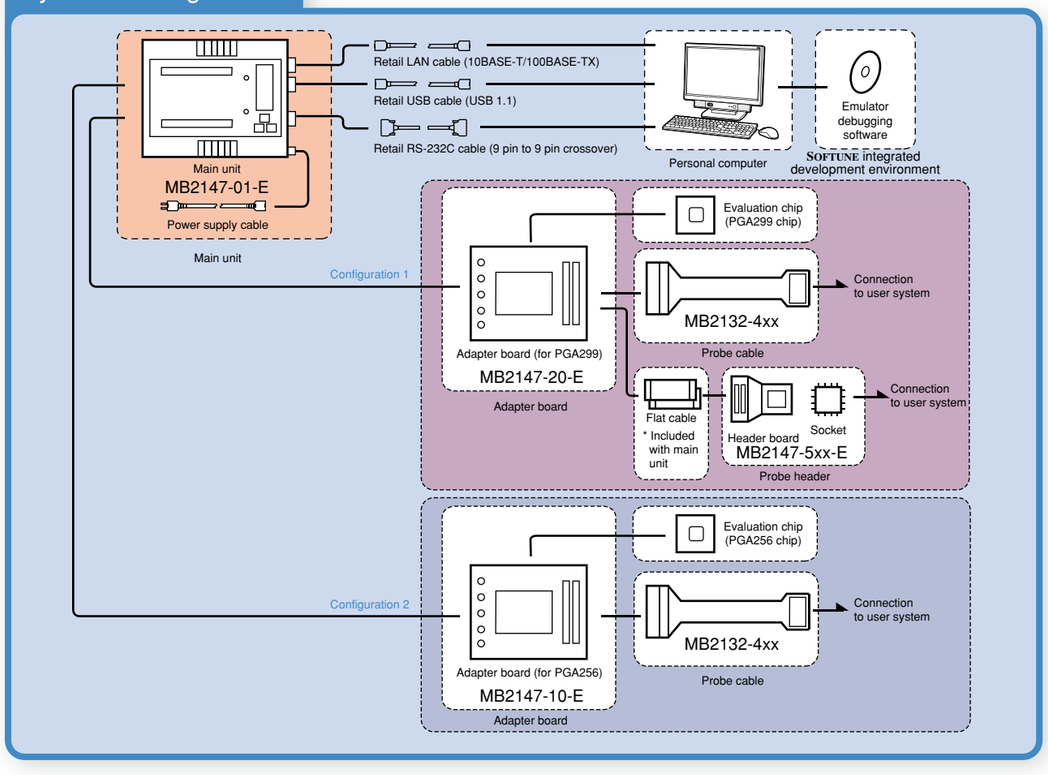
Example System Configuration for the MB96300 Series



F²MC-16LX Family 16-bit Microcontroller

- Features of the MB2147-01-E (version that supports high speeds)
- Supports a maximum microcontroller operating frequency of 33MHz
- Supports microcontroller operating voltages of +2.7V to +5.5V (The upper and lower limits on the microcontroller operating voltage and operating frequency vary between each of the devices. For the operating voltage and operating frequency of each MCU, see the documentation related to that device (data sheet, hardware manual, etc.))
- Emulator memory (1M x 4 areas)
- Capable of source-level debugging (assembler, C, mixed display)
- Simple GUI operation using pull-down menu buttons
- On-the-fly function (execute commands during microcontroller execution)
- Powerful real-time trace function
- Multiple window display, including source code, variables, registers, memory, trace, etc.
- Event triggers that allow a wide variety of conditions to be specified (code x 8, data x 8)
- Sequential control by sequencer (4 conditionals, 3 levels)
- Performance measurement function (function to measure the execution time between 2 points, measure elapsed cycles)
- C0 coverage measurement function (measures program execution coverage)
- Host interface: Equipped standard with RS-232C (max. 115kbps), LAN (10BASE-T, 100BASE-TX), and USB1.1

System Configuration



Memo

Development Tool

Fujitsu Semiconductor provides ICE, evaluation boards, monitor debuggers, ROM writers, etc.
for developing software for the FR family and F²MC family.

FR Family Development Tool Lineup

System configuration*1	Series	ICE					Evaluation board		Flash memory writer				SOFTUNE V6 Professional Pack	SOFTUNE REALOS	Remarks
									Parallel writers*3		Serial writers*4				
		Main unit*2	DSU cable	Adapter board	Header board	Evaluation chip	Main board	Daughter board	Made by Flash Support Group Supported writers	Made by Minato Electronics Supported writers	Made by Fujitsu Semiconductor	Made by YDC			
Configuration 1	MB91301	MB2198-01-E	MB2198-10-E	MB2198-100-E	MB2198-101-E	MB91V301ACR-ES	MB91906EB	MB91914EB	-	-	Yes	Under planning	SOFTUNE V6 Professional Pack	SOFTUNE REALOS	RAM board: MB2198-90 ROM replacement unit:MB2197-90
	MB91307	MB2198-01-E	MB2198-10-E	MB2197-170A	MB2197-172	MB91V307RCR-ES	MB91906EB	MB91915EB	-	-	Yes	-			RAM board: MB2197-91 ROM replacement unit:MB2197-90
Configuration 2	MB91210	MB2198-01-E	-	MB2198-150-E	MB2198-141-E (For LQFP144) MB2198-142-E (For LQFP100)	MB91V210PB-ESE1	-	-	AF9709C/AF9723B	-	Yes	-			
	MB91220	MB2198-01-E	-	MB2198-130-E	MB2198-132-E	MB91V220CR-ES	-	-	AF9709C/AF9723B	-	Yes	-			
	MB91230	MB2198-01-E	-	MB2198-130-E	MB2198-121-E	MB91V230CR-ES	MB91920EB	-	AF9709C/AF9723B	MODEL 1890A/ 1930/1931/1893 MODEL 1940	Yes	Yes			
	MB91245	MB2198-01-E	-	MB2198-130-E	MB2198-123	MB91V245ACR-ES	-	-	AF9709C/AF9723B	-	Yes	-			
	MB91260B	MB2198-01-E	-	MB2198-130-E	MB2198-122 -E (For QFP100) MB2198-126 -E (For LQFP100)	MB91V260BCR-ES	MB91921EB	-	AF9709C/AF9723B	MODEL 1890A/ 1930/1931/1893 MODEL 1940	Yes	Yes			
	MB91265A	MB2198-01-E	-	MB2198-130-E	MB2198-128-E	MB91V265ACR-ES	-	-	AF9709C/AF9723B	MODEL 1890A/ 1930/1931/1893 MODEL 1940	Yes	Under planning			
	MB91270	MB2198-01-E	-	MB2198-130-E	MB2198-129-E	MB91V280CR-ES	-	-	AF9709C/AF9723B	-	Yes	Yes			
	MB91350A	MB2198-01-E	-	MB2198-110-E	MB2198-111-E (For MB91354A, MB91355A, MB91F355A LQFP176) MB2198-112-E (For MB91352A, MB91353A, MB91F353A LQFP120)	MB91V350APB-ES	MB91906EB	MB91916EB (Daughter board for MB91F355A) MB91922EB (Daughter board for MB91F353A)	AF9709C/AF9723B	MODEL 1890A/ 1930/1931/1893 MODEL 1940	Yes	Yes			
	MB91625	MB2198-01-E	-	MB2198-700-E	MB2198-704-E	MB91V650 PB-ESE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR100SQF2-NB (Made by Sunhayato)	-	-	Yes	-			
	MB91635A	MB2198-01-E	-	MB2198-700-E	MB2198-702-E	MB91V650 PB-ESE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR144SQF-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes			
	MB91640A/ MB91645A	MB2198-01-E	-	MB2198-700-E	MB2198-703-E (For MB91640A, single power supply) Under planning (For MB91645A, dual power supply)	MB91V650 PB-ESE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR176SQF-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	-			
	MB91660	MB2198-01-E	-	MB2198-700-E	MB2198-701-E	MB91V650 PB-ESE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR120SUS-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes			
	MB91665	MB2198-01-E	-	MB2198-700-E	MB2198-705-E (For LQFP48), MB2198-706-E (For LQFP64)	MB91V650 PB-ESE1	-	-	-	-	Yes	-			
Configuration 3	MB91F463N	MB2198-01-E	MB2198-10-E	MB2198-600A7	MB2198-621-E (For LQFP64)	MB91FV460B, (Pre-mounted on adapter board)	MB2198-621SK-E	-	-	-	Yes	-			NQPACK064SB and HQPACK064SB140 must be obtained separately
	MB91F464A	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-606 (No level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-606SK	-	-	-	Yes	-			NQPACK100SD-ND and HQPACK100SD must be obtained separately
	MB91F465B/ MB91F467B/ MB91F466H	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-664 MB2198-604B (No level shifter) MB2198-634B (Has level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-604SK	-	-	-	Yes	-			NQPACK144SD-ND and HQPACK144SD must be obtained separately
	MB91F465K	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-609 (No level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-609SK	-	-	-	Yes	-			NQPACK120SD and HQPACK120SD must be obtained separately

SP365030118QAC (1 license)
SP365030118QBC (3 licenses)
SP365030118QCC (5 licenses)
SP365030118QDC (10 licenses)

- SOFTUNE µT-REALOS/FR (µT-Kernel)
  - -SP3650P1218RCC (integration license)
  - -SP3650P1218EVC (evaluation license)
- SOFTUNE REALOS/FR Spec.4 (µITRON4.0)
  - -SP365001518RCC (integration license)
  - -P365001518EVC (evaluation license)
- SOFTUNE REALOS/FR (µITRON3.0)
  - -SP365000218RCC (integration license)
  - -SP365000218EVC (evaluation license)

*1 : See P5 for details on the system configuration.
*2 : Requires either an RS-232C cable, USB cable, or LAN cable.
*3 : See the following website for information on parallel writers: http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/pararell.html
When using a parallel writer, you may require adapters or other equipment in addition to the writer itself. Contact the individual writer manufacturers for details.
*4 : See the following website for information on serial writers: http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/serial.html

Development Tool

FR Family Development Tool Lineup

System configuration*1	Series	ICE					Evaluation board		Flash memory writer				SOFTUNE V6 Professional Pack	SOFTUNE REALOS	Remarks
									Parallel writers*3		Serial writers*4				
		Main unit*2	DSU cable	Adapter board	Header board	Evaluation chip	Main board	Daughter board	Made by Flash Support Group Supported writers	Made by Minato Electronics Supported writers	Made by Fujitsu Semiconductor	Made by YDC			
Configuration 3	MB91F465P	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-646-E (For LQFP176)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	-	-	-	-	Yes	-	SP365030118QAC (1 license) SP365030118QBC (3 licenses) SP365030118QCC (5 licenses) SP365030118QDC (10 licenses)	- SOFTUNE μT-REALOS/FR (μT-Kernel) -SP3650P1218RCC (integration license) -SP3650P1218EVC (evaluation license) - SOFTUNE REALOS/FR Spec.4 (μITRON4.0) -SP365001518RCC (integration license) -P365001518EVC (evaluation license) - SOFTUNE REALOS/FR (μITRON3.0) -SP365000218RCC (integration license) -SP365000218EVC (evaluation license)	NQPACK176SD and HQPACK176SD must be obtained separately
	MB91F465X	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-612-E (For LQFP100)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-603-E (FlexRay Evaluationboard), MB2198-602SK-E	-	-	-	Yes	-			NQPACK100SD and HQPACK100SD must be obtained separately
	MB91F467C/ MB91F463C/ MB91F465C	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-607-E (No level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-607SK-E	-	-	-	Yes	-			NQPACK144SD-ND and HQPACK144SD must be obtained separately
	MB91F465D/ MB91F467D	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-605-E (No level shifter), MB2198-635-E (No level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-605SK-E	-	-	-	Yes	-			NQPACK208SD and HQPACK208SD must be obtained separately
	MB91F467S	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-619-E (For LQFP176)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-619SK-E	-	-	-	Yes	-			NQPACK176SD and HQPACK176SD must be obtained separately
	MB91F467T	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-620-E (No level shifter) MB2198-650-E (Has level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-620SK-E	-	-	-	Yes	-			
	MB91F467R (Single power supply device)	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-601 (No level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-601SK-E	-	-	-	Yes	Yes			NQPACK176SD and HQPACK176SD must be obtained separately
	MB91F467R (Dual power supply device)	MB2198-01-E	MB2198-10-E	MB2198-300A	MB2198-305-E (Has level shifter)	MB91V460RB-ES	MB2198-601SK-E	-	-	-	Yes	Yes			
	MB91F469G	MB2198-01-E	MB2198-10-E	MB2198-600A7-E, MB2198-600A4 (Supports GHS)	MB2198-608 (No level shifter) MB2198-638 (Has level shifter)	MB91FV460B, MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-608SK-E	-	-	-	Yes	-			CSPACK256Y2027FJ02 must be obtained separately
	MB91F469Q	MB2198-01-E	MB2198-10-E	MB2198-600A6-E, MB2198-600A4 (Supports GHS)	MB2198-617-E	MB91V460RB-ES (Pre-mounted on adapter board)	MB2198-608SK-E	-	-	-	Yes	-			CSPACK256Y2027FJ02 must be obtained separately
	MB91470/ MB91480	MB2198-01-E	MB2198-10-E	MB2198-160-E	MB2198-161-E (For LQFP144), MB2198-162-E (For LQFP100) MB2198-165-E (For QFP100)	MB91FV470BGL-ESE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR144TQF-NB (For MB91470), BBF2004-FR100SQF-NB (For MB91480)	-	-	Yes	Yes			Power-on debugging adapter board: MB2198-169
	MB91490	MB2198-01-E	MB2198-10-E	MB2198-160A-E	MB2198-163-E (LQFP64,0.65mm), MB2198-164-E (KQFP64, 0.6mm)	MB91FV470BGL-ESE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR64SQF-NB (LQFP-64, 0.5mm,10×10mm)	-	-	Yes	Yes			Power-on debugging adapter board: MB2198-169
	MB91605A	MB2198-01-E	MB2198-10-E	MB2198-81-E (MB91605A adapter)	-	MB91605APMC-GE1	-	-	-	-	Yes	-			
Configuration 4	MB91305	MB2198-01-E	MB2198-10-E	-	-	MB91305PMC-G-BNDE1	MB91925EB	-	-	-	Yes	-			
	MB91310	MB2198-01-E	MB2198-10-E	-	-	MB91FV310APFV-ESE1	MB91918EB	-	-	MODEL 1890A/ 1930/1931/1893 MODEL 1940	Yes	Yes			
	MB91313A	MB2198-01-E	MB2198-10-E	-	-	MB91F313APMC-GE1	BBF2004-MB (Made by Sunhayato)	BBF2004-FR120SQF-CB	AF9709C/AF9723B	-	Yes	-			
	MB91314A	MB2198-01-E	MB2198-10-E	-	-	MB91F314APMC-GE1	-	-	AF9709C/AF9723B	-	Yes	-			
	MB91319	MB2198-01-E	MB2198-10-E	-	-	MB91FV319APMT-ESE1	-	-	-	MODEL 1890A/ 1930/1931/1893 MODEL 1940	Yes	Yes			
	MB91345	MB2198-01-E	MB2198-10-E	-	-	MB91F345BPFT-GE1, MB91F346BPFT-GE1	-	-	-	-	Yes	-			
	MB91F467M	MB2198-01-E	MB2198-10-E	-	-	MB91F467MAPMC-GSE2, MB91F467MAPMC-GSE1	-	-	-	-	Yes	-			
	MB91610	MB2198-01-E	MB2198-10-E	-	-	MB91F610PMC	MB91934EB	-	AF9709C/AF9723B	-	Yes	-			
On-chip debugger	MB91570	MB2100-01-E	-	-	-	-	BBF2004-MB	BBF2004-FR144TCL-CB	-	-	-	-		-	
	MB91590	MB2100-01-E	-	-	-	-	MB2198-751-E	-							

*1 : See P5 for details on the system configuration.
*2 : Requires either an RS-232C cable, USB cable, or LAN cable.

*3 : See the following website for information on parallel writers: http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/pararell.html
When using a parallel writer, you may require adapters or other equipment in addition to the writer itself. Contact the individual writer manufacturers for details.
*4 : See the following website for information on serial writers: http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/serial.html

Development Tool

F²MC-16LX Family Development Tool Lineup

System configuration *1	Series	Package	ICE				Evaluation board		Flash memory writer				SOFTUNE V3 Professional Pack	SOFTUNE REALOS/907
			Main unit*2	Adapter board	Probe cable	Evaluation chip	Main board	Daughter board	Parallel writers*3 Made by Flash Support Group Supported writers	Parallel writers*3 Made by Minato Electronics Supported writers	Serial writers*3 Made by Fujitsu Semiconductor	Serial writers*3 Made by YDC		
Configuration 1	MB90330A	LQFP-120P (0.4mm,14×14mm) FPT-120P-M24	MB2147-01-E	MB2147-20-E	MB2132-491 (Includes one set: NQPACK120SE, HQPACK120SE)	MB90V330ACR-ES (PGA-299C)	MB2031-01	MB2031-20	AF9709C/AF9723B	-	Yes	Yes	SP3607Z008-P01 (1 license) SP3607Z008-P03 (3 licenses) SP3607Z008-P05 (5 licenses) SP3607Z008-P10 (10 licenses)	SP3607M008BA (integration license) SP3607M008EV (evaluation license)
		LQFP-120P (0.5mm,16×16mm) FPT-120P-M21			MB2132-492 (Includes one set: NQPACK120SD, HQPACK120SD)			-						
	MB90335	LQFP-64P (0.65mm,12×12mm) FPT-64P-M23	MB2147-01-E	MB2147-20-E	MB2132-493 (Includes one set: NQPACK064SB, HQPACK064SB140)	MB90V330ACR-ES (PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90340E	LQFP-100P (0.5mm,14×14mm) FPT-100P-M20	MB2147-01-E	MB2147-20-E	MB2147-581-E (Includes one set: NQPACK100SD-ND, HQPACK100SD)	MB90V340E-101CR-ES (Single clock, PGA-299C) or MB90V340E-102CR-ES (Dual clock, PGA-299C)	BBF2004-MB (Made by Sunhayato)	BBF2004-100SCL-NB (Made by Sunhayato) BBF2001-100CL2-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes		
		QFP-100P (0.65mm,14×20mm) FPT-100P-M06			MB2147-582-E (Includes one set: NQPACK100RB179-A, HQPACK100RB179)									
	MB90350E	LQFP-64P (0.65mm,12×12mm) FPT-64P-M23	MB2147-01-E	MB2147-20-E	MB2147-540-E (Includes one set: NQPACK064SB, HQPACK064SB140)	MB90V340E-101CR-ES (Single clock, PA-299C) : For MB90351/352 or MB90V340E-102CR-ES (Dual clock, PA-299C) : For MB90351/352 or MB90V340E-103CR-ES (Single clock, PA-299C) : For MB90356/357 or MB90V340E-104CR-ES (Dual clock, PA-299C) : For MB90356/357	BBF2004-MB (Made by Sunhayato)	BBF2004-64CL-NB (Made by Sunhayato) BBF2004-64SCL-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes		
		LQFP-64P (0.5mm,10×10mm) FPT-64P-M24			MB2147-542-E (Includes one set: NQPACK064SD-ND, HQPACK064SD)									
	MB90360E	LQFP-48P (0.5mm,7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-20-E	MB2147-521-E (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V340E-101CR-ES (Single clock, PA-299C) : For MB90362 or MB90V340E-102CR-ES (Dual clock, PA-299C) : For MB90362 or MB90V340E-103CR-ES (Single clock, PA-299C) : For MB90367 or MB90V340E-104CR-ES (Dual clock, PA-299C) : For MB90367	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90390	LQFP-120P (0.5mm,16×16mm) FPT-120P-M21	MB2147-01-E	MB2147-20-E	MB2132-469 (Includes one set: NQPACK120SD, HQPACK120SD)	MB90V390HBCR-ES (PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90800	QFP-100P (0.65mm,14×20mm) FPT-100P-M06	MB2147-01-E	MB2147-20-E	MB2147-582 (Includes one set: NQPACK100RB179-A, HQPACK100RB179)	MB90V800-101CR-ES (Single clock, PGA-299C)or MB90V800-201CR-ES (Dual clock, PGA-299C)	BBF2004-MB (Made by Sunhayato)	BBF2001-100CL2-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes		
	MB90820B	QFP-80P (0.8mm,14×20mm) FPT-80P-M06	MB2147-01-E	MB2147-20-E	MB2147-560 (Includes one set: NQPACK080RA, HQPACK080RA)	MB90V820CR-ES (PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	-		
		LQFP-80P (0.5mm,12×12mm) FPT-80P-M21			MB2147-561 (Includes one set: NQPACK080SD, HQPACK080SD)									
		LQFP-80P (0.65mm,14×14mm) FPT-80P-M22			MB2147-562 (Includes one set: NQPACK080SB, HQPACK080SB160)									
	MB90860E	LQFP-100P (0.5mm,14×14mm) FPT-100P-M20	MB2147-01-E	MB2147-20-E	MB2147-581 (Includes one set: NQPACK100SD-ND, HQPACK100SD)	MB90V340E-101CR-ES (Single clock, PGA-299C) or MB90V340E-102CR-ES (Dual clock, PGA-299C)	BBF2004-MB (Made by Sunhayato)	BBF2004-100SCL-NB (Made by Sunhayato) BBF2001-100CL2-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes		
		QFP-100P (0.65mm,14×20mm) FPT-100P-M06			MB2147-582 (Includes one set: NQPACK100RB179-A, HQPACK100RB179)									
	MB90880	LQFP-100P (0.5mm,14×14mm) FPT-100P-M20	MB2147-01-E	MB2147-20-E	MB2147-581 (Includes one set: NQPACK100SD-ND, HQPACK100SD)	MB90V880A-101CR-ES (Single clock system device, No sub clock) or MB90V880A-102CR-ES (Dual clock system device, Has sub clock)	BBF2004-MB (Made by Sunhayato)	BBF2004-100SCL-NB (Made by Sunhayato) BBF2001-100CL2-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes		
		QFP-100P (0.65mm,14×20mm) FPT-100P-M06			MB2147-582 (Includes one set: NQPACK100RB179-A, HQPACK100RB179)									

*1 : See P7 for details on the system configuration.
*2 : Requires either an RS-232C cable, USB cable, or LAN cable.

*3 : See the following website for information on the parallel and serial writers. http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/
When using a parallel writer, you may require adapters or other equipment in addition to the writer itself. Contact the individual writer manufacturers for details.

Development Tool

F²MC-16LX Family Development Tool Lineup

System configuration*1	Series	Package	ICE				Evaluation board		Flash memory writer				SOFTUNE V3 Professional Pack	SOFTUNE REALOS/907
			Main unit*2	Adapter board	Probe cable	Evaluation chip	Main board	Daughter board	Parallel writers*3		Serial writers*3			
									Made by Flash Support Group	Made by Minato Electronics	Made by Fujitsu Semiconductor	Made by YDC		
									Supported writers	Supported writers				
Configuration 1	MB90910	LQFP-48P (0.5mm,7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-20-E	MB2147-521 (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V950MAS (Single clock, PGA-299C)	-	-	Scheduled for support	-	Yes	Yes	SP3607Z008-P01 (1 license) SP3607Z008-P03 (3 licenses) SP3607Z008-P05 (5 licenses) SP3607Z008-P10 (10 licenses)	SP3607M008BA (integration license) SP3607M008EV (evaluation license)
	MB90920	LQFP-120P (0.5mm,16×16mm) FPT-120P-M21	MB2147-01-E	MB2147-20-E	MB2132-469 (Includes one set: NQPACK120SD, HQPACK120SD)	MB90V920-101CR-ES (Single clock, PGA-299C) or MB90V920-102CR-ES (Dual clock, PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90930	LQFP-120P (0.5mm,16×16mm) FPT-120P-M21	MB2147-01-E	MB2147-20-E	MB2147-469 (Includes one set: NQPACK120SD, HQPACK120SD)	MB90V930-101CR-ES (Single clock, PGA-299C) or MB90V930-102CR-ES (Dual clock, PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90950	LQFP-100P (0.5mm,14×14mm) FPT-100P-M20	MB2147-01-E	MB2147-20-E	MB2147-581 (Includes one set: NQPACK100SD-ND, HQPACK100SD)	MB90V950JACR-ES (Single clock, PGA-299C, with clock supervisor) or MB90V950JASCR-ES (Dual clock, PGA-299C, with clock supervisor) or MB90V950MACR-ES (Single clock, PGA-299C) or MB90V950MASCR-ES (Dual clock, PGA-299C)	BBF2004-MB (Made by Sunhayato)	BBF2004-100SCL-NB (Made by Sunhayato)	AF9709C/AF9723B	-	Yes	Yes		
		QFP-100P (0.65mm,14×20mm) FPT-100P-M06			MB2147-582 (Includes one set: NQPACK100RB179-A, HQPACK100RB179)			BBF2001-100CL2-NB (Made by Sunhayato)						
	MB90960	LQFP-48P(0.5mm,7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-20-E	MB2147-521 (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V340E-101CR-ES (Single clock, PGA-299C) or MB90V340E-102CR-ES (Dual clock, PGA-299C) or MB90V340E-103CR-ES (Single clock, PGA-299C) or MB90V340E-104CR-ES (Dual clock, PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90980	LQFP-64P (0.5mm,10×10mm) FPT-64P-M24	MB2147-01-E	MB2147-20-E	MB2147-541 (Includes one set: NQPACK064SD-ND, HQPACK064SD)	MB90V485BCR-ES (PGA-299C)	-	-	AF9709C/AF9723B	-	Yes	-		
	MB90990	LQFP-48P (0.5mm,7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-20-E	MB2147-521 (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V340F-101CR-ES (Single clock, PGA-299C) or MB90V340F-102CR-ES (Dual clock, PGA-299C) or MB90V340F-103CR-ES (Single clock, PGA-299C, with clock supervisor) or MB90V340F-104CR-ES (Dual clock, PGA-299C, with clock supervisor)	-	-	AF9709C/AF9723B	-	Yes	Yes		
Configuration 2	MB90385	LQFP-48P (0.5mm,7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-10-E	MB2132-466 (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V495GCR-ES (PGA-256C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90455	LQFP-48P (0.5mm, 7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-10-E	MB2132-466 (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V495GCR-ES (PGA-256C)	-	-	AF9709C/AF9723B	-	Yes	Yes		
	MB90460	SH-DIP-64P DIP-64P-M01	MB2147-01-E	MB2147-10-E	MB2132-434	MB90V460CR-ES (PGA-256C)	-	-	AF9709C/AF9723B	MODEL 1890A/1930/ 1931/1893	Yes	Yes		
		QFP-64P (1.0mm,14×20mm) FPT-64P-M06			MB2132-434 + 64SD-64QF-8L									
		LQFP-64P (0.65mm,12×12mm) FPT-64P-M23			MB2132-461 (Includes one set: NQPACK064SB, HQPACK064SB140)									
	MB90895	LQFP-48P (0.5 mm, 7×7mm) FPT-48P-M26	MB2147-01-E	MB2147-10-E	MB2132-466 (Includes one set: NQPACK048SD, HQPACK048SD)	MB90V495GCR-ES (PGA-256C)	-	-	AF9709C/AF9723B	-	Yes	Yes		

*1 : See P7 for details on the system configuration.
*2 : Requires either an RS-232C cable, USB cable, or LAN cable.

*3 : See the following website for information on the parallel and serial writers. http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/
When using a parallel writer, you may require adapters or other equipment in addition to the writer itself. Contact the individual writer manufacturers for details.

Development Tool

F²MC-16FX Family Development Tool Lineup

Series	Package	ICE				Evaluation board		Flash memory writer			SOFTUNE V3 Professional Pack
		Main unit *1	Adapter board	Header board	Evaluation chip	Main board	Daughter board	Parallel writers*2 Made by Flash Support Group Supported writers	Serial writers*2 Made by Fujitsu Semiconductor	Serial writers*2 Made by YDC	
MB96310	FPT-48P-M26 for the LQFP-48 (0.5mm, 7x7mm)	MB2198-01-E	MB2198-500-E	MB2198-509-E	MB96V300CRB-ES	BBF2004-MB (Made by Sunhayato)	BBF2004-48SCL-NB (Made by Sunhayato)	-	-	-	SP3607Z008-P01 (1 license) SP3607Z008-P03 (3 licenses) SP3607Z008-P05 (5 licenses) SP3607Z008-P10 (10 licenses)
MB96320	FPT-80P-M21 for the LQFP-80 (0.5mm, 12x12mm)	MB2198-01-E	MB2198-500-E	MB2198-505-E	MB96V300CRB-ES	MB2198-555-E	MB2198-590-E (Extension trace board)	-	Yes	-	
MB96330	FPT-144P-M08 for the LQFP-144 (0.5mm, 20x20mm)	MB2198-01-E	MB2198-500-E	MB2198-506-E	MB96V300CRB-ES	MB2198-556-E	MB2198-590-E (Extension trace board)	AF9709C,AF9723B	Yes	-	
MB96340	FPT-100P-M22 for the QFP-100 (0.65mm, 14x20mm)	MB2198-01-E	MB2198-500-E	MB2198-501-E	MB96V300CRB-ES	BBF2004-MB (Made by Sunhayato)	BBF2001-100CL2-NB (Made by Sunhayato)	AF9709C,AF9723B	Yes	Yes	
	FPT-100P-M20 for the LQFP-100 (0.5mm, 14x14mm)			MB2198-502			BBF2004-100SCL-NB (Made by Sunhayato)				
MB96350	FPT-64P-M24 for the LQFP-64 (0.5mm, 10x10mm)	MB2198-01-E	MB2198-500-E	MB2198-503-E	MB96V300CRB-ES	BBF2004-MB (Made by Sunhayato)	BBF2004-64SCL-NB (Made by Sunhayato)	-	Yes	Yes	
	FPT-64P-M23 for the LQFP-64 (0.65mm, 12x12mm)			MB2198-504			BBF2004-64CL-NB (Made by Sunhayato)	-			
MB96370	FPT-144P-M08 for the LQFP-144 (0.5mm, 20x20mm)	MB2198-01-E	MB2198-500-E	MB2198-507-E	MB96V300CRB-ES	MB2198-557-E	MB2198-590-E (Extension trace board)	-	Yes	-	
	FPT-144P-M12 for the LQFP-144 (0.4mm, 16x16mm)			MB2198-508-E							
MB96380	FPT-120P-M21 for the LQFP-120 (0.5mm, 16x16mm)	MB2198-01-E	MB2198-500-E	MB2198-16FX-120P-M21	MB96V300CRB-ES	MB2198-560-E	MB2198-590-E (Extension trace board)	AF9709C,AF9723B	Yes	Yes	
MB96390	FPT-100P-M20 for the LQFP-100 (0.5mm, 14x14mm)	MB2198-01-E	MB2198-500-E	MB2198-510-E	MB96V300CRB-ES	MB2198-558-E	MB2198-590-E	-	Yes	-	

*1 : Requires either an RS-232C cable, USB cable, or LAN cable.
*2 : See the following website for information on the parallel and serial writers. http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/
When using a parallel writer, you may require adapters or other equipment in addition to the writer itself. Contact the individual writer manufacturers for details.

Development Tool

New 8FX Family Development Tool Lineup

Series	Part Number	Package	ICE				Evaluation board	Flash memory writer				SOFTUNE V3 Professional Pack	Remarks
			BGM adapter	MCU board	Header board	Evaluation chip		Parallel writers*1			Serial writers*1		
								Made by Flash Support Group Supported writers	Made by Hi-Lo Systems	Made by Data I/O	Made by Fujitsu Semiconductor		
MB95260H	MB95F262H MB95F262K MB95F263H MB95F263K MB95F264H MB95F264K	QFN-32 SDIP-24 SOP-20 TSSOP-20	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-420A-E	- AF9845 + TRF039-95F202KP-SH AF9845 + TRF039-95F202K AF9845 + TRF039-95F264KPFT	ALL-100 + ADP-MB95F264-QN32 ALL-100 + ADP-MB95F204-SD ALL-100 + ADP-MB95F204-S ALL-100 + ADP-MB95F264-SS20	FlashPAK II + FP-PAK-L975 Optima Sprint + SP-S5416 FlashPAK II + FP-PAK-S830 FlashPAK II + FP-PAK-S957	Yes		
MB95270H	MB95F272H MB95F272K MB95F273H MB95F273K MB95F274H MB95F274K	SOP-8	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-420A-E	AF9845 + TRF039-95F212KPF	ALL-100 + ADP-MB95F223-S	FlashPAK II + FP-PAK-S941	Yes		
MB95280H	MB95F282H MB95F282K MB95F283H MB95F283K MB95F284H MB95F284K	SOP-16	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-420A-E	AF9845 + TRF039-95F223K	ALL-100 + ADP-MB95F223-S	-	Yes		
MB95310L	MB95F314E MB95F314L MB95F316E MB95F316L MB95F318E MB95F318L	LQFP-80	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-450-E	AF9845 + TRF059-95F318EPMC	ALL-100 + ADP-MB95F318-TQ	-	Yes		
MB95330H	MB95F332H MB95F332K MB95F333H MB95F333K MB95F334H MB95F334K	LQFP-32 SDIP-32 QFN-32	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-440-E	Under developing - -	ALL-100 + ADP-MB95F334-Q - -	- - -	Yes	SP3603Z008-P01 (1 license) SP3603Z008-P03 (3 licenses) SP3603Z008-P05 (5 licenses) SP3603Z008-P10 (10 licenses)	
MB95350L	MB95F352E MB95F352L MB95F353E MB95F353L MB95F354E MB95F354L	SOP-24 TSSOP-24 QFN-32	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-460-E	Under developing Under developing Under developing	ALL-100 + ADP-MB95F354-S ALL-100 + ADP-MB95F354-SS -	Under developing - -	Yes		
MB95370L	MB95F374E MB95F374L MB95F376E MB95F376L MB95F378E MB95F378L	LQFP-64	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-450-E	-	-	-	Yes		
MB95390H	MB95F394H MB95F394K MB95F396H MB95F396K MB95F398H MB95F398K	LQFP-48 QFN-48	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-440-E MB2146-441-E	Under developing -	- -	- -	Yes		
MB95R200	MB95R203A *2	SDIP-24 SOP-20	MB2146-08-E (Includes USB cable)	-	-	- (built-in on-chip debugger)	MB2146-430A-E	- -	- -	- -	Yes		Starter kit Part number: MB2146-430A-01-E

*1 : See the following website for information on the parallel and serial writers. http://jp.fujitsu.com/microelectronics/products/micom/tools/hard/writer/
When using a parallel writer, you may require adapters or other equipment in addition to the writer itself. Contact the individual writer manufacturers for details.
*2 : Under developing

Starter kit (Equipped with an MB95F264K (5V version))
Part number:
MB2146-420A-01-E

Evaluation Board

Fujitsu Semiconductor provides evaluation boards for developing embedded systems equipped with the FR family and F²MC family.

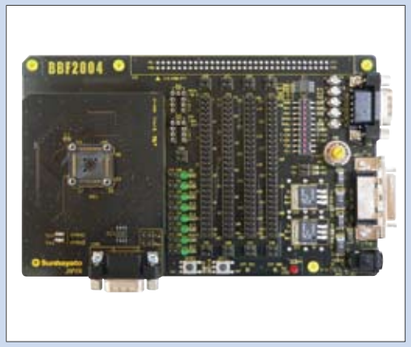
Evaluation Board for FR Family MB91590 (MB2198-751-E)

■Features
This is an evaluation board supporting the Fujitsu Semiconductor FR family MB91590 series.
Equipped with RF and D-sub video inputs, D-sub video output, CAN/LIN/UART I/O, LEDs, and switches (detachable).
This board contributes to improving the development efficiency because it can perform a simplified evaluation of operations before a mounting attempt in a customer's system.

Evaluation Board for the FR Family and F²MC-16LX/FX (BBF2004)

■Features
This is an evaluation board manufactured by Sunhayato that supports the F²MC-16LX/FX and FR family. This makes it possible to perform simple operational testing of the MCU before embedding it into your system, contributing to increased development efficiency. This board is made up of a main board and a daughter board. By changing the daughter board, this evaluation board can be used to perform debugging using tools that incorporate an emulator debugger (ICE), to evaluate microcontrollers with built-in flash memory, and as a serial writer. The main board is common to all models, and can support different models by changing the daughter board.

Sunhayato Corporation
Sales department: TEL : +81-3-3984-7791 FAX : +81-3-3971-0535



Microcontroller Starter Kit (Jouet Bleu)

The Jouet Bleu (Blue Toy) is a microcontroller starter kit for people learning about microcontrollers and embedded systems. It can be used as a effective tool for educating students and new recruits about developing embedded software.

■Features
- Microcontroller board equipped with a high-performance 16-bit microcontroller
- Software development environment
- Enables learning about microcontrollers from the basics to applications
- Notebook PCs can be used for software development

Sunhayato Corporation
Sales department: TEL : +81-3-3984-7791 FAX : +81-3-3971-0535

New 8FX MB95200 Series Starter Kit

This is a starter kit for the New 8FX MB95200 series of Fujitsu low pin count 8-bit microcontrollers. The MB95200 series starter kit includes a BGM adapter and evaluation board, and is optimal for evaluating performance and functionality and testing operation before embedding an MCU into users' system. The SOFTUNE V3 integrated development environment (evaluation version), various sample software, application notes, etc. are available on the Fujitsu Semiconductor website and can be downloaded free of charge.
The following two starter kits are available.
- Starter kit with FRAM microcontroller: MB2146-430A-01-E
- Starter kit with Flash microcontroller: MB2146-420A-01-E

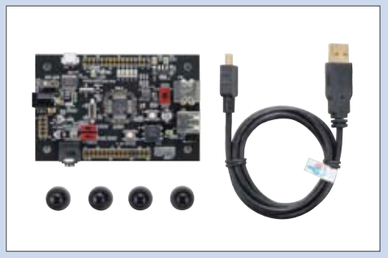
■FRAM microcontroller evaluation board
This evaluation board is equipped with an FRAM microcontroller as the target MCU together with a variety of peripheral resources. The target MCU can be evaluated easily by connecting using a BGM adapter. This board is included in the FRAM Microcontroller Starter Kit (MB2146-430A-01-E).
- Equipped with an MB95R203A (8 KByte FRAM, 496 Byte RAM)
- Board functions
  Buzzer, temperature sensor, LED, serial (RS-232C), interrupt button, LIN/UART pins, I²C, BGM adapter pins

■Flash microcontroller evaluation board
This evaluation board is equipped with a Flash microcontroller as the target MCU together with a variety of peripheral resources. The target MCU can be evaluated easily by connecting using a BGM adapter. This board is included in the Flash Microcontroller Starter Kit (MB2146-420A-01-E).
- Equipped with an MB95F264K (20 KByte Flash, 496 Byte RAM)
- Board functions
  Buzzer, temperature sensor, LED, interrupt button, serial (RS-232C), LIN/UART pins, BGM adapter pins

FR80 MB91665 Series USB Evaluation Kit (MB91972EVB-1/MB91972EVB-2)

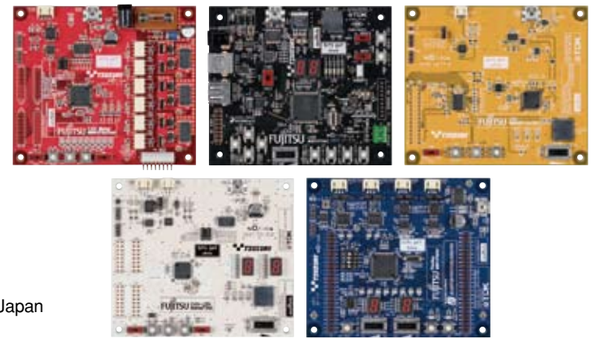
■Features
This is a USB evaluation kit supporting Fujitsu Semiconductor 32-bit FR80 family MB91665 series microcontrollers.
This kit can run USB host and USB function application software using Fujitsu Semiconductor original USB microcontroller middleware.

The evaluation kit includes the following:
- USB middleware (sample)
- Application software (sample)
- Evaluation board
- Integrated development environment



Evaluation Board

Bits pot* is a series of microcontroller boards that allows you to easily get to know, evaluate, and study microcontrollers. There is a series of five-color boards equipped with the microcontroller providing how to learn in-vehicle network technology, CAN, LIN, FlexRay and USB I/F using each of the 8-, 16-, and 32-bit New 8FX/16FX/FR microcontrollers.
A combination of the kits can easily construct in-vehicle networks, control USB devices in a standalone configuration, etc. Furthermore, the development environment, text books, and sample software required for developing software can all be downloaded from the website, creating a starter kit that allows you to study in-vehicle networks and USB from the basics to applications.

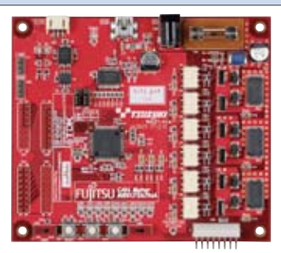


*:"bits pot" means putting a lot of things (functions) in a small jar (board).

Developer: TSUZUKI DENSAN Co., Ltd.
2-5-3, Nishi-shinbashi, Minato-ku, Tokyo, 105-8420, Japan
E-mail : pd-bitspot@tsuzuki-densan.co.jp
URL : http://www.tsuzuki-densan.co.jp/bitspot/

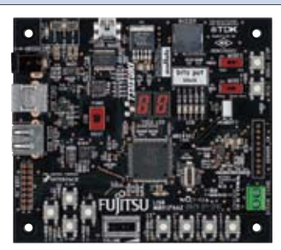
Kit for Learning CAN communication and brushless DC motor control (bits pot red)

CAN-MOTOR [CAN-100]
■Microcontroller: 32bit-FR60Lite MB91F267N
- Brushless DC motor control using MOTOR driver circuit
- Motor control using temperature sensor
- Connecting with bits pot white, it controls the motor by the CAN communication.



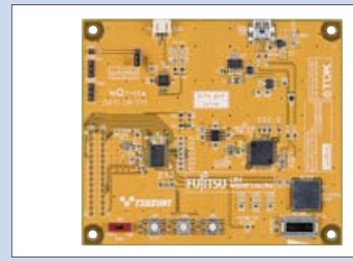
Kit for Learning USB (bits pot black)

USB [USB-100]
■Microcontroller: 32bit-FR80 MB91F662
- Learn mouse function using HID class driver
- Fabricate a humidity gauge using a humidity sensor
- Learn about FRAM (ferroelectric memory)



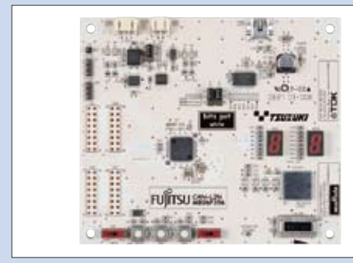
Kit for Learning LIN communication (bits pot yellow)

LIN [LIN-100]
■Microcontroller: 8bit-F²MC-8FX MB95F136J
- Buzzer output control using slide volume
- LED control using temperature sensor
- Connecting with bits pot white, it communicates by LIN using LIN slave sample software (supports LIN 2.0*1)
  *1: Does not support config, diag, etc.



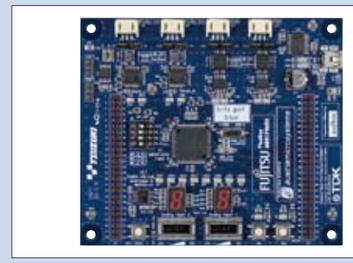
Kit for Learning CAN-LIN communication (bits pot white)

CAN-LIN [CAL-100]
■Microcontroller: 16bit-F²MC-16FX MB96F356
- Basic function of board by SW operation (LED, 7seg, temperature sensor, and buzzer)
- Control motor and receive motor RPM and temperature sensor information using CAN communication with a bits pot red
- Connecting with bits pot yellow, it communicates by LIN using LIN master sample software (supports LIN2.0*2)
  *2: Does not support config, diag, etc.

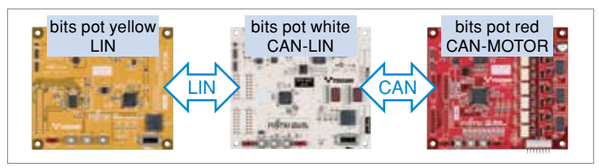


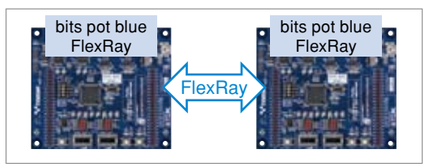
Kit for Learning FlexRay communication (bits pot blue)

FlexRay [FLR-100] Note: One set consists of two boards.
■Microcontroller: 32bit-FR60 MB91F465X
- Basic function operation of FR60 MB91460 series
- Understand the FlexRay communication specifications by connecting two bits pot blue
- The bus evaluation is also possible with the FlexRay transceiver (austriamicrosystems company's AS8221C).
- Connecting with bits pot red or blue, it communicates by CAN.



Learning CAN/LIN communication with a particular aim is also possible by combining with a bits pot white (CAN-LIN), bits pot red (CAN-Motor), or bits pot yellow (LIN), and sample programs are also available depending on the combination.
The bits pot blue (FlexRay) has two board per set, allowing you to quickly learn FlexRay, which is the next generation in-vehicle network technology.



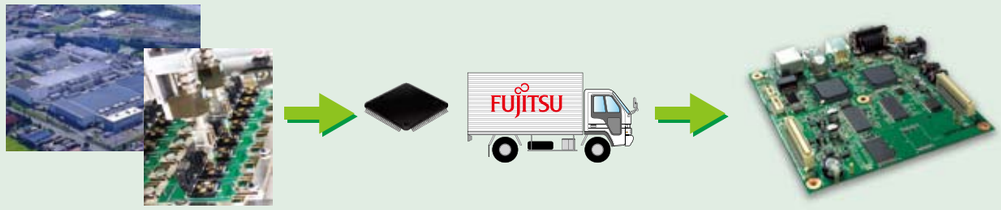


Program Writing Support

Fujitsu Semiconductor provides a support environment for writing programs that is tailored to the needs of our customers from development through to mass production and shipping. The most efficient mass production method for you can be chosen based on delivery schedules and production volumes.

The case of delivery of products that have been programmed by Fujitsu Semiconductor or an authorized agent

[Request for pre-programmed products]



Fujitsu Semiconductor factory
Fujitsu Electronics
Programming house

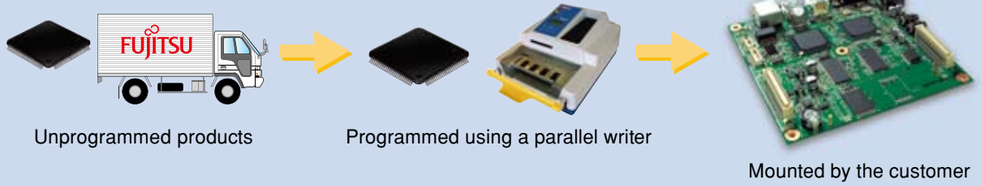
Pre-programmed products

Mounted by the customer

Advantage: Large lots

The case of products programmed by the customer

[Request for programming prior to mounting]



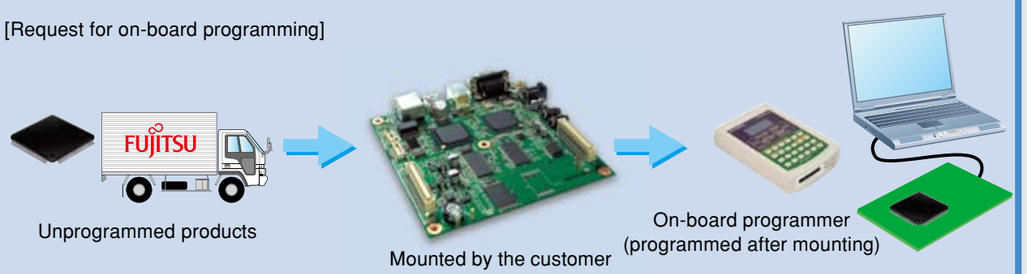
Unprogrammed products

Programmed using a parallel writer

Mounted by the customer

Advantage: Short delivery time

[Request for on-board programming]



Unprogrammed products

Mounted by the customer

On-board programmer
(programmed after mounting)

Advantages: Short delivery times, high maintainability

■Pre-programmed device support

- Programmed externally: Can be handled by a programming house
  - Can also handle small programming volumes
  - Provides pre-programmed products with short delivery times
- Pre-programmed products: Can be programmed when shipped from the factory
  - Same shipping format as mask ROM products
  - Can handle short delivery times similar to mask ROM products

■Programming before mounting support

- Parallel writers for microcontrollers with built-in Flash

○ : Supported, △ : Under developing, - : Not supported

Parallel writer		New 8FX (MB95200 ～)	F²MC-16LX	F²MC-16FX	FR	FM3
Flash Support Group, Inc.						
Single unit programmers	AF9709C	-	○	○	○	△
	AF9710	-	○	-	-	-
Gang programmers	AF9723B	○	○	○	○	△
Minato Electronics Inc.						
Single unit programmers	MODEL1881XP	-	○	-	○	-
	MODEL1995/2	-	○	-	○	-
Gang programmers	MODEL1893	-	○	-	○	-
	MODEL1931	-	○	-	○	-
	MODEL1930+SU3000LX	-	○	-	○	-
	MODEL1940	-	○	-	○	-
	MODEL1895	-	○	-	○	-
	MODEL1896	-	○	-	○	-
Data I/O Corporation (USA) (Represented in Japan by Toyo Corporation)						
Gang programmers	FlashPAK II	○	○	-	○	△
Hi-Lo Systems Co., Ltd.						
Single unit programmers	ALL-100	○	-	-	-	△

■Onboard programming support

- Serial on-board writers

○ : Supported, △ : Under planning, - : Not supported

Serial on-board writers		New 8FX (MB95200 ～)	F²MC-16LX	F²MC-16FX	FR	FM3
Fujitsu Semiconductor Limited	Flash USB Programmer (BGM adapter: MB2146-09B-E must be acquired separately)	-	○	-	○	△
	Flash USB Programmer (BGM adapter: MB2146-08-E must be acquired separately)	○	-	-	-	-
	Flash MCU Programmer	-	○	○	○	○
	Flash USB Direct Programmer	-	-	-	○	○
Yokogawa Digital Computer Corporation	AF420/AF320 AF620/AF520	-	○	○	○	△
Flash Support Group, Inc.	AF9101/03	-	○	-	○	△
Kyoei	I.S.P-300	-	○	-	○	-

Fujitsu AUTOSAR Development Environment

Fujitsu Semiconductor provides an AUTOSAR compliant development environment.

About AUTOSAR

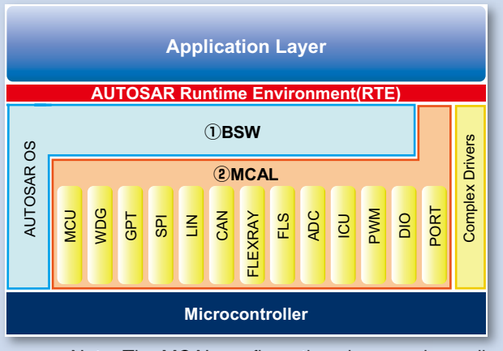
AUTOSAR (Automotive Open System Architecture) is a standardization organization established in July 2003 mainly by Daimler-Chrysler, BMW AG, Robert Bosch GmbH in order to modularize and commonize automotive software.
The AUTOSAR software platform was prepared as a solution for the demands for in-vehicle system software and is being investigated by various OEM and ECU manufacturers for its application to in-vehicle software.

- Standardizing software frameworks
- Standardizing design processes
- Commonizing and modularizing application software by introducing a common runtime environment (RTE)
- Providing a microcontroller abstraction layer (MCAL) that absorbs the hardware differences and commonizes upper layer software

Scalable AUTOSAR compliant with HIS recommended specifications

The Herstellerinitiative Software (HIS) software initiative was established by five German automobile manufacturers Audi, BMW, Daimler, Porsche, and Volkswagen in order to assist with ECU related standardized software and modules, process maturity, software testing, software tools, and programming.
Scalable AUTOSAR compliant with HIS recommended specifications provides guidelines for implementing BSW functions optimized for small code size without violating the AUTOSAR specifications and contributes to cost reductions.

System configuration example

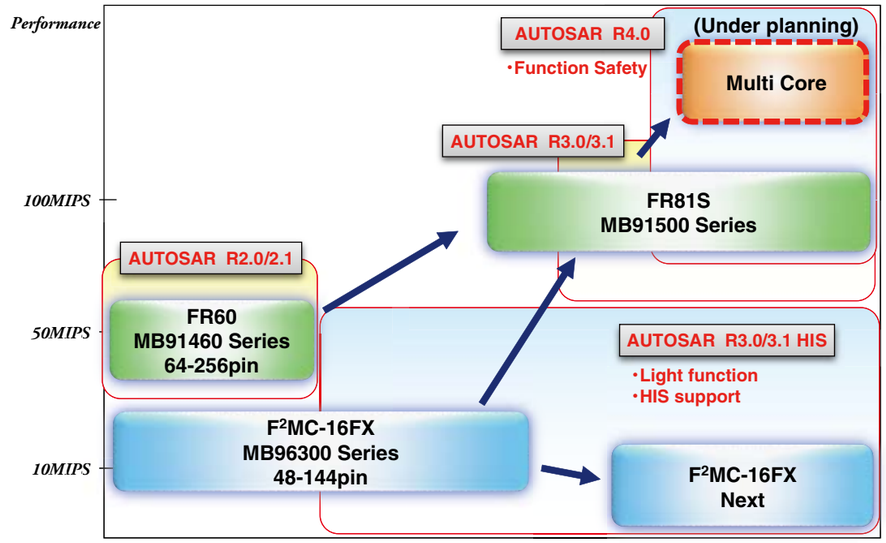


Note: The MCAL configuration changes depending on target microcontrollers.

Product lineup

PARTS		Version	Provided by	Support MCU
①	OS/BSW	R2.0/2.1 R3.0/3.1 R3.1 HIS recommended version	Elektrobit, Vector, KPIT, etc.	MB91460 series (32-bit), MB96300 series (16-bit), etc.
②	MCAL	R2.0/2.1	Elektrobit and Fujitsu Semiconductor	MB91460 series (32-bit)
		R3.0/3.1/3.1 HIS recommended version	Fujitsu Semiconductor	MB96300 series (16-bit)

AUTOSAR product roadmap



Types of AUTOSAR MCAL

Examples in AUTOSAR MCAL R3.0 for F²MC-16FX

Category	Product name "AUTOSAR MCAL R3.0 for F²MC-16FX"	Model	Description	Usage period	Storage period	Area	Remarks
Licenses	Evaluation license	SP360802418EVC	Can only be used by customers for evaluations.	3 months	None	Limited countries	No source code
	Development license	SP360802418QAC	Can only be used for customer's test integration. Can be used for all 16FX models. Includes basic support.	Unlimited	12 months	World wide	No source code
	Development license with source	SP360802518QAC					Source code available
	Production license with source	SP360802618QAC -MB96Fxxx	Can only be used for customer's mass-production integration. Can only be used in one product. Includes basic support.	Unlimited	12 months	World wide	Source code available
Services	Basic Support Service	-	- Bug support - Version upgrade and manual support - Phone and email support: 50 hr - Response time: 72 hr (during business hours)	6 months	6 months	Limited countries	Included as standard with Development/Production license
	Basic Upgrade Support Service	SP360802710MAC-BAS	- Extends the period of basic support (6 months)	6 months	6 months	Limited countries	Extends the basic support by 6 months to have the support for 12 months. Can only be purchased once.
	Extended Support Service	SP360802710MAC-EXT	- Bug support - Version upgrade and manual support - Phone and email support: 100 hr - Response time: 48 hr (during business hours) - On-site support: 1 day - Standard installation training: 1 to 2 days	12 months	12 months	Limited countries	
	Premium Support Service	SP360802710MAC-PRE	- Bug support - Version upgrade and manual support - Phone and email support: 200 hr - Response time: 24 hr (during business hours) - On-site support: 2 days - Custom installation training: 1 to 2 days	24 months	24 months	Limited countries	

SOFTUNE™ REALOS™ series

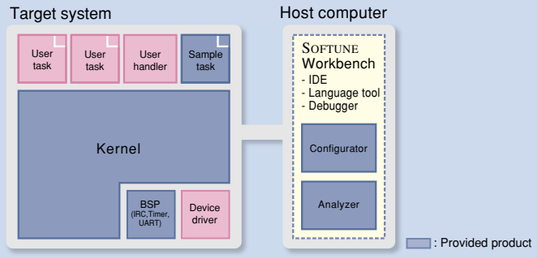
Fujitsu Semiconductor provides a real-time OS for developing software for Fujitsu microcontrollers (FM3 family, FR family and F²MC-16 family).

Features of the REALOS Series

- µT-Kernel specifications and µITRON specifications
- High-speed, lightweight kernel optimized for Fujitsu microcontrollers (kernel code size: from 0.8 KB, kernel data size (TCB): from 21 Bytes)
- Highly responsive interrupts
- Supports custom power-saving functions
- Includes kernel source code, royalty payments not required

System configuration

- Kernel conforms to µT-Kernel specifications and µITRON specifications
- REALOS configurator
- REALOS-aware debugging tool
- Sample programs
- ITRON Extension (Including only µT-Kernel compliant products) *Under developing



SOFTUNE REALOS/FR configuration diagram

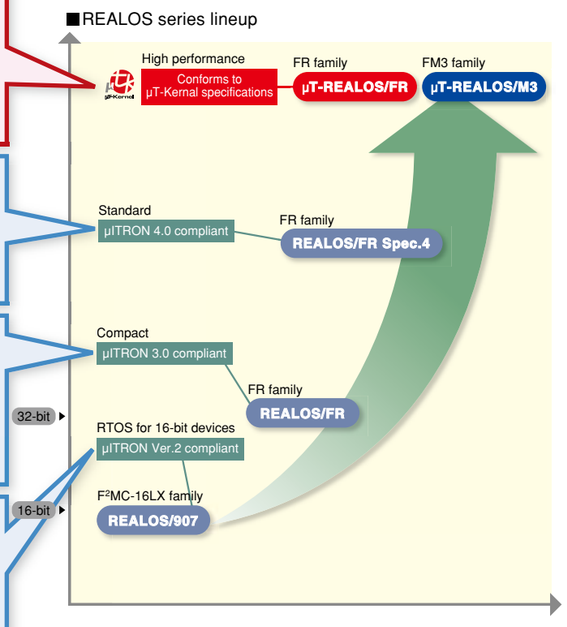
Series Lineup

●µT-Kernel compliant OS
This OS conforms to the µT-Kernel specifications that are the successor to the µITRON specifications.
µT-REALOS/FR has excellent migratability, many functions, and power-saving functionality. The kernel overhead is extremely small. This is the most advanced RTOS to conform to the µT-Kernel specifications.

●µITRON 4.0 compliant OS
This OS conforms to the industry standard µITRON specifications.
REALOS/FR Spec. 4 has many functions and simple power-saving functions. This RTOS can be used in large-scale systems that conform to µITRON 4.0.

●µITRON 3.0 compliant OS
This OS conforms to the industry standard µITRON specifications.
REALOS/FR is a compact RTOS that can be used in devices with tight resource limitations. Use this to develop products that demand tight memory size limitations and large production volumes.

●µITRON 2.0 compliant OS
This OS conforms to the industry standard µITRON specifications.
REALOS/907 is an extremely small RTOS that can be used in 16-bit devices. Use this to develop products that demand large production volumes.



µT-REALOS/M3

"µT-REALOS/M3" is a real-time OS that conforms to the µT-Kernel specifications.
This is the optimal kernel for FM3 to support various development environments.

Features

●µT-Kernel compliant kernel
The µT-Kernel specifications offer excellent migratability and reusability of software among µT-Kernel specifications by strong standardization. Furthermore, the µT-Kernel specifications are compatible with the T-Kernel specifications aimed at large-scale embedded system development, allowing migration with virtually no modifications.

●High-speed, lightweight kernel
The kernel overhead is extremely small compared to earlier REALOS products.
Furthermore, the memory size can be kept to a minimum depending on the functions to be used according to its unique kernel structure.

●Energy-saving function support
Customizable energy-saving functions are supported as original functions.
This allows for extremely detailed energy-saving designs.

●Development environment support
The following development environments supporting FM3 are available:

[Development Environment]
RealView Development Suite v4.0 or later
RealView MDK (MDK-ARM)
IAR EWARM

[JTAG Emulator]
RealView ICE
ULINK
J-LINK
EjSCATT *Under planning

●OS-aware tool support *Under planning
We will provide a tool equivalent to the OS-aware debugging tool that has been acquiring a favorable reputation in the earlier REALOS series.

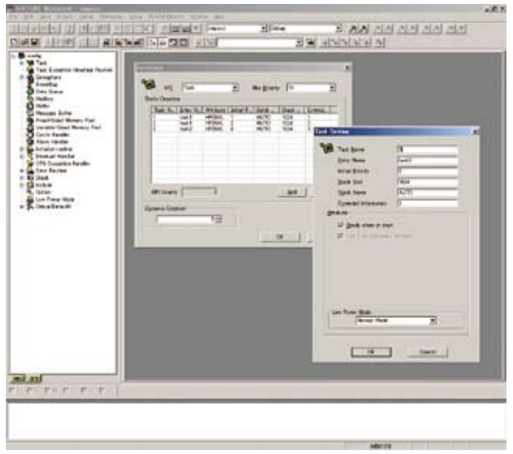
SOFTUNE™ /REALOS series
(Integrated Development Environment & Real-time OS)

REALOS Development Support Functions

Support tools are available for increasing the efficiency of the "REALOS" kernel, a real-time OS which conforms to the µT-Kernel specifications and µITRON specifications, and for increasing the efficiency of developing application programs that use the REALOS kernel.

●REALOS configurator

The REALOS configurator provides a configurator that assists in configuring conditionals when creating the REALOS kernel. The kernel can be easily reconfigured by the necessary item settings according to the configurator screens.

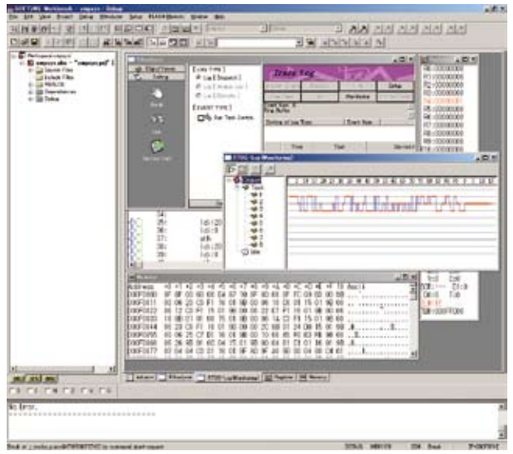


●REALOS-aware debugging tools

■REALOS analyzer (for FR and F²MC-16)

The REALOS analyzer graphically analyzes and displays the performance and task state transitions of systems that incorporate REALOS. This allows the operation of the system to be grasped visually.

- Object display
- OS breaks
  (execution break, access break, dispatch break, service call/system call break)
- Service call/system call issued
- Task transition diagram
- Stack information
- Task context watch



■OS-aware tool for FM3

*Under planning

List of products

Product name	Version	Family	Part number	Component products
SOFTUNE Professional Pack	V6	FR	SP365030118QAC (1 license) SP365030118QBC (3 licenses) SP365030118QCC (5 licenses) SP365030118QDC (10 licenses)	Workbench C/C++ compiler Assembler pack C/C++ analyzer C/C++ checker
	V3	F²MC-16	SP3607Z008-P01 (1 license) SP3607Z008-P03 (3 licenses) SP3607Z008-P05 (5 licenses) SP3607Z008-P10 (10 licenses)	Workbench C compiler Assembler pack C analyzer C checker
		F²MC-8FX	SP3603Z008-P01 (1 license) SP3603Z008-P03 (3 licenses) SP3603Z008-P05 (5 licenses) SP3603Z008-P10 (10 licenses)	

Product name	Compliant specification	Family	Part number	Component products
µT-REALOS/M3 for RVDS	µT-Kernel	FM3	SP3680P1218RCC (development/integration license)	Kernel configurator Kernel source (integration license only)
			SP3680P1218EVC (evaluation license)	
µT-REALOS/M3 for MDK			Under developing (development/integration license)	
			Under developing (evaluation license)	
µT-REALOS/M3 for EWARM			Under developing (development/integration license)	
			Under developing (evaluation license)	
SOFTUNE µT-REALOS/FR		FR	SP3650P1218RCC (integration license)	Kernel configurator Kernel source (integration license only)
			SP3650P1218EVC (evaluation license)	
SOFTUNE REALOS/FR Spec.4	µITRON4.0		SP365001518RCC (integration license)	
			SP365001518EVC (evaluation license)	
REALOS/FR Spec.4 for MULTI			SP365001618RCC (integration license)	
			SP365001618EVC (evaluation license)	
SOFTUNE REALOS/FR	µITRON3.0		SP365000218RCC(integration license)	
			SP365000218EVC (evaluation license)	
REALOS/FR for MULTI			SP365001018RCC (integration license)	
			SP365001018EVC (evaluation license)	
SOFTUNE REALOS/907	µITRON Ver.2.01	F²MC-16	SP3607M008BA (integration license)	
			SP3607M008EV (evaluation license)	

System requirements

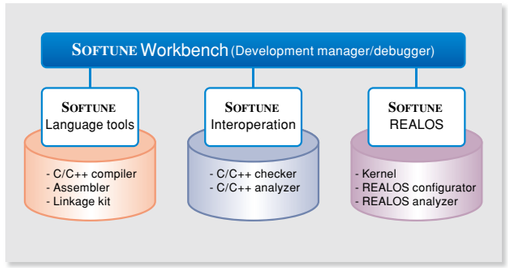
Item	Specification
Type	IBM PC/AT or compatible
OS	Windows 7, Windows Vista, Windows XP
Memory	256 MByte or more (512 MByte or more recommended)
Hard disk	300 MByte or more (1 GByte or more recommended)

SOFTUNE™ series
(Integrated Development Environment)

SOFTUNE is an integrated development environment that was designed to respond to the various demands of program developers and pursues ease of use.

Structure of SOFTUNE

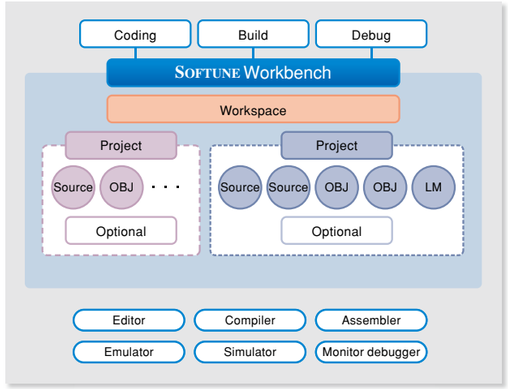
- Unification of manager section and debugger section.
  Errors that are found can be fixed on the spot, and the result can be debugged immediately.
- Assists in development using the C/C++ languages.
- Equipped with tools for improving quality.
  Projects integrated with "C/C++ Checker" for verifying coding and "C/C++ Analyzer" for structural analysis.
- Equipped with tools for simplifying the use of the µITRON compliant "REALOS". (Configurator and analyzer)

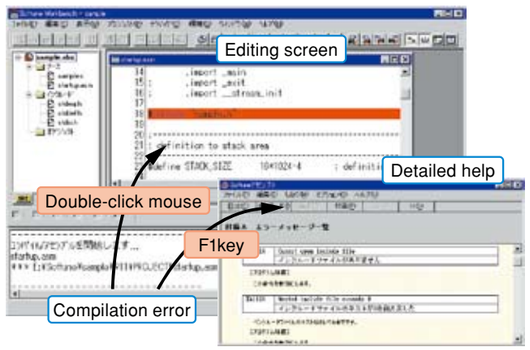


Manager functions

Work progresses based on a "project file" that contains all of the necessary information for developing a program.

- Utilizing projects
  The development environment can be easily constructed both for the case of a single person performing multiple jobs in parallel or for a group working on a single development by using project files.
- Delivering excellent usability
  - Editor provided as standard
    An editor is built-in as standard, offering a plethora of functions such as keyword highlighting and auto-indenting.
  - Error jump and online help
    Errors that occur during a build are displayed in the output window at the bottom of the screen. Jumping to the tag or displaying error details from the errors shown in this window are easily possible.
  - Able to interoperate with third-party editors
    In response to the demand for using familiar editors, integration with third-party editors is also possible.
- Customizable usage environment
  The development environment can be customized to suit every individual such as by interoperating with source control tools when sharing files or calling file conversion tools.

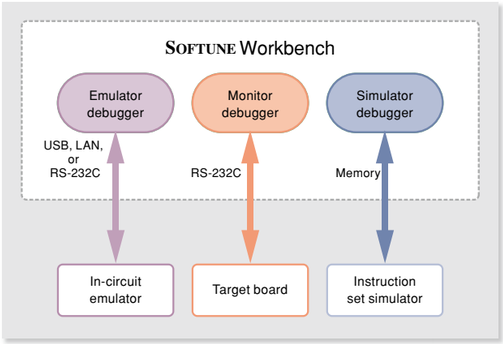


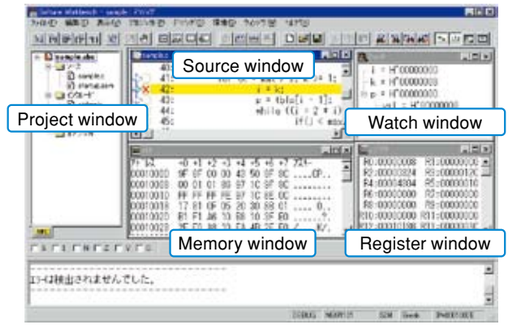


Debugger Functions

Three types of debugger functions are supported that need to be used at various different stages of the development cycle. Select the optimal debugging environment to match your circumstances.

- Easy to read screen information
  The screen layout can be arranged freely by selecting and positioning the required windows. Furthermore, selecting the information to display or viewing only the necessary information are also possible.
- Simple environment settings
  - Debugging environment provides a setup wizard
    The setup wizard supports settings such as selecting the emulator and board communication lines and the states of windows. The required settings can be made simply by following the on-screen directions.
  - MCU operating environment
    A "CPU information file" that describes device-specific information for all models of supported MCUs is provided as standard. This allows all of the necessary information such as I/O port locations, ROM/RAM capacities, and starting addresses to be configured automatically.
  - Saving and restoring the debugging environment
    The previous debugging environment settings can be saved and the same settings would be restored the next time.
    (Window layout, breakpoint settings, memory map information, etc.)
- On-chip debugging (F^2MC-8FX family)
  Debugging is supported by the on-chip in-circuit emulator (BGM adapter). Debugging can be performed using a single serial line.
  - Equipped with continuous execution, stepped execution, and forced break functions
  - Software breakpoints: 256 points
  - Host interface: Connectable via USB





Development Supporting Tool
(Development Environment / OS / Middleware / tools)

This section introduces the development supporting tools for developing embedded systems for the FM3 family, FR family, and F²MC family.

Tools supporting FM3 Family (ARM Cortex-M3 core)

Vendor	Debugger	Overview	Compiler support	Emulator
Computex	CSIDE	This inherits the PARMiCE idea and actualizes comfortable operations through its ease of use such as compatibility and connections without any dedicated power. In addition, this supports multicore, Serial Wire Debug (SWD) and Serial Wire Viewer (SWV) by ARM CoreSight™ technology, and Embedded Trace Macrocell (ETM).	IAR, KEIL, GNU	PALMiCE3, J-Stick
IAR Systems	EWARM	Embedded WorkBench for ARM is a development environment with integrated C/C++ compiler, assembler, linker, editor, and C-SPY® debugger that allows a user to perform the full sequence of operations from creating a project to editing files, compiling, assembling, linking, and debugging applications.	IAR's ISO C/C++and Extended Embedded C++	AnbyICE, ARM RealView ICE, J-Link, Macraigor Wiggler, and RDI-based JTAG interface
KEIL	uVISION4 (MDK-ARM)	This is an integrated software development environment for microcontrollers based on Cortex-M, Cortex-R, ARM 7, and ARM 9 that also supports the use of full-spec real-time OS and libraries for networking, file systems, and peripherals.	ARM, GNU &EABI-compliant	ULINK2, ULINKpro, Seggger Jlink
Yokogawa Digital Computer Corporation	microVIEW PLUS	- High-performance JTAG tool - High-speed JTAG communication Improved download speeds Advanced JTAG clock setting is available. - Hot-plug support Capable of connecting to a target without dropping the target's power supply - SWV/SWD support - Multicore support Completely implements multicore debugging (ARM environments and SMP environments) *Supports up to 8 cores - OS/platform support Original OS also supported - Debugger: microVIEW-PLUS Original debugger that completely controls leading edge advice product functions. Sophisticated GUI improves the debugging efficiency. User-friendly interface and variety of functions significantly improve the complex debugging operations. - Simple operation - Effective monitoring - Customizable GUI Your preferred debug window can be defined over a TCL link library.	RVDS, IAR, KEIL, GNU	adviceLUNA
Sophia Systems	WATCHPOINT	- Supports Cortex®M0, M1, M3, and M4 products - Supports ARM multi ICE interface (JTAG, SWD, SWV, ETM*) - Supports ARM® Thumb® Thumb2® state debugging - Hardware breakpoints - Software breakpoints on RAM and Flash memory (no upper limit on the number of settings) - Flash memory programming - Optimized for on-site debugging - USB bus-power support (AC power not required) - Compact 86 x 101 x 23 mm - Executes user macro scripts using JTAG pod button - Connects to PC using USB 2.0 H/S - Includes WATCHPOINT® for Windows® * The ETM interface is supported by "EjSCATT for ETM."	IAR, KEIL, GNU	EjSCATT, EjSCATT for ETM

Tool supporting FR Family and F²MC Family (Fujitsu original core)

Integrated Development Environments

Product name	Overview	Inquiries
SOFTUNE	An integrated development environment that is user friendly and highly-efficient. - Integrates language tools and debugger tools that increase the efficiency of the work cycle of coding, compiling, and debugging. - Frees users from the hassles of configuring settings when developing a program. - Interoperates with a variety of tools, supporting seamless development with SOFTUNE.	Fujitsu Semiconductor Limited http://jp.fujitsu.com/fsl/en/
MULTI5.0	MULTI 5.0 is an integrated development environment that supports each of the phases in the process of system development. It consists of a compiler, builder, editor, debugger, etc. and is GUI-based, focusing on ease of use. This provides a total solution that increases the reliability, safety, and performance of developed products and contributes to shortening development times and reducing development costs through various functions and new technologies such as the DoubleCheck static source code analysis tool and TimeMachine dynamic analysis tool.	Advanced Data Controls Corp. TEL : +81-3-3576-5351 http://www.adac.co.jp/

Development Supporting Tool
(Development Environment / OS / Middleware / tools)

Real-Time Operating System

Product name	Overview	Inquiries
SOFTUNE REALOS	- A µITRON compliant real-time OS for the Fujitsu F²MC-16LX/FR family microcontrollers. - Can be used for a broad range of development, from products with tight resource limitations to large-scale systems. - An analyzer is included as a debugging support tool.	Fujitsu Semiconductor Limited http://jp.fujitsu.com/fsl/en/
SOFTUNE uT-REALOS	- A µT-Kernel compliant real-time OS for the Fujitsu FR family of microcontrollers. - The kernel overhead is extremely small, making it optimal for products that demand power-saving functionality and real-time performance. - An analyzer is included as a debugging support tool.	Fujitsu Semiconductor Limited http://jp.fujitsu.com/fsl/en/
EB tresos	EB, which is a full member of JASPAR that is working to standardize electronic control unit (ECU) software evaluation work and vehicle-mounted LAN interface ratings, provides the EB tresos ECU development tool for AUTOSAR compliant vehicle-mounted products. EB tresos AutoCore/AUTOSAR compliant middleware (BSW and RTE) Graphical user interface for EB tresos Studio and embedded software configuration Real-time OS for AUTOSAR compliant real-time OS	Elektrobit Nippon KK TEL : +81-3-5775-6160 http://www.elektrobit.com/
osCAN	osCAN is a pre-emptive, real-time, multitasking operating system that has the optimal functions for operating on a microcontroller. Features: - Seamless integration with CANbedded from Vector - Wide range of supported processors - Static OS that is compact and fast - All OS objects can be specified using a graphical configuration tool before compilation - Conforms to OSEK/VDX2.2, providing long-term usability and stability	Vector Japan Co., Ltd. TEL : +81-3-5769-6972 (Embedded software department) http://www.vector-japan.co.jp/
MICROSAR product group (AUTOSAR embedded software product)	Configuration: - MICROSAR RTE: AUTOSAR RTE - MICROSAR BSW: AUTOSAR Basic Software - MICROSAR Configuration Suite/MICROSAR EAD: AUTOSAR BSW configurator set Features: - Strong experience and track record with previous CANbedded and osCAN products - Full BSW supporting AUTOSAR specification release 3.0 - Covers applications from development to ECU implementation in concert with the DaVinci Tool Suite (from prototypes and evaluation units to mass production products) - Can be configured in combination with MCAL from other manufacturers or EAD - Full featured technical service and training, assistance migrating to AUTOSAR, etc.	Vector Japan Co., Ltd. TEL : +81-3-5769-6972 (Embedded software department) http://www.vector-japan.co.jp/
KPIT AUTOSAR BSW Package	This software package consists of BSW (basic software) for the hardware-independent layer optimized for "F²MC-16FX family" and the ECU Spectrum integrated tool for generating ECU configuration and RTE (AUTOSAR Runtime Environment). Features of this software package include the code size optimization for 16-bit microcontrollers with small ROM sizes, and it allows AUTOSAR to be introduced even on ECU with small configurations regardless of ROM sizes.	KPIT Cummins Infosystems Limited TEL : +81-3-6913-8501 http://www.kpitcummins.com/japanese/index.html

Middleware

Product name	Overview	Inquiries
RELC	- This is a data compression and decompression library. It can be incorporated into devices using microcontrollers. - Useful for reducing data transfer time and packet communication time. - Useful for efficient usage of flash memory and write time reduction. - Employs a Fujitsu Laboratories' lossless data compression method that is secure in terms of compression patents. - The decompression function is also available as a hardware macro.	Fujitsu Electronics Inc. http://jp.fujitsu.com/fei/en/
Multi Device File Access Library(MDF) for FR V03	- Used for handling PC-compatible data on a target embedded device. - Because the embedded device and PC data are managed in the same files and directories, it is easy to pass data between PCs and embedded devices. - Supports exFAT, which is employed in the "SDXC" the large capacity SD card standards.	Fujitsu Semiconductor Limited http://jp.fujitsu.com/fsl/en/
Cryptography and security library	Library for encryption (AES ECB/CBC, AES CTR, DES, 3DES, RSA, RSA-OAEP), hash functions (SHA-1, SHA-2, MD5), message authentication (HMAC SHA-1, HMAC MD5, AES OMAC1), digital signatures (DSA, ECDSA, RSA-PSS, PKCS#1v1.5), pseudo random number generation (FIPS186-2 Appendix 3.1), key exchange (DH, ECDH), and modular exponentiation arithmetic.	Fujitsu Semiconductor Limited http://jp.fujitsu.com/fsl/en/
JPEG library	- This is middleware that performs compression and decompression (non-reversible) of image data in compliance with the DCT method baseline and process from the JPEG standards.	Fujitsu Semiconductor Limited http://jp.fujitsu.com/fsl/en/
KASAGO (TCP/IP stack)	- This is a TCP/IP protocol stack (supports IPv4/IPv6 dual stacks) specialized for embedded systems. Focuses on compactness and fast responsiveness to deliver efficient communication.	Zuken Elmic, Inc. TEL : +81-45-664-5171 http://www.elwsc.co.jp/
CANdriver	- Provides a hardware independent interface to the upper level software layer, making it possible to use and reuse components without regard to the hardware platform - Parameters for initializing the hardware can be configured in advance using a settings/generation tool	Vector Japan Co., Ltd. TEL : +81-3-5769-6972 (Embedded software department) http://www.vector-japan.co.jp/
LINdriver	- Satisfies all requirements of the current LIN specifications (supports LIN 1.2/1.3 and LIN 2.0) - Enables simple implementation of a CAN-LIN gateway when combined with the Vector CANbedded component	Vector Japan Co., Ltd. TEL : +81-3-5769-6972 (Embedded software department) http://www.vector-japan.co.jp/

Development Supporting Tool
(Development Environment / OS / Middleware / tools)

Analysis Tools

Product name	Overview	Inquiries
PGRelief	This is a static analysis tool for identifying bugs in C/C++ source code. - Identifies bug locations from data structures and processing flows. - Checks conformance with SEC coding standards and MISRA-C guidelines. - Analysis is perform by integration with SOFTUNE make/build, allowing checking and correction of bugs by simple operations.	Fujitsu Software Technologies Limited TEL : +81-45-475-5600 http://jp.fujitsu.com/fst/services/pgr/
QAC/MCM	QAC is a static analysis tool for C source code that is used to improve the quality of software. MCM is an optional product for QAC that can evaluate conformance with MISRA C coding standards. QAC/MCM integrate with SOFTUNE make/build to check violations of standards, etc.	Toyo Corporation Software Solutions TEL : +81-3-3245-1248 http://www.toyo.co.jp/ss/

CASE Tools

Product name	Overview	Inquiries
IBM Rational Rose® Technical Developer	Supports the most powerful model-driven development, such as executing models and generating completely executable code. This allows developers of specialist systems and embedded systems to also realize a high level of productivity.	IBM Corporation http://www-01.ibm.com/software/awdtools/developer/technical/
IBM Rational Test RealTime™	This is a cross-platform solution for component testing and runtime analysis. In particular, this is for developers writing code for embedded, real-time, and other types of cross-platform software products.	IBM Corporation http://www-01.ibm.com/software/awdtools/test/realtime/index.html
Telelogic Statemate	Statemate is a graphical modeling toolset for system engineers. This offers powerful support for the upper development processes by functions for graphically modeling request specifications, detailed specifications, and function specifications.	Itochu Techno-Solutions Corporation TEL : +81-3-6417-5434 http://www.ctc-g.co.jp/solutions/embedded/index.html
visual STATE	- This is a tool for designing using state charts, generating code, testing, and creating documents for embedded applications. - Enables simply design under the concept of drawing a sketch, and reduces design man-hours - Errors detected in design upper phase using powerful formal verification tool - Improved quality by automated tests and coverage analysis - Price half that of equivalent products	IAR Systems TEL : +81-3-5298-4800 http://www.iarsys.co.jp/

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CASE Tools

Product name	Overview	Inquiries
MATLAB®/ Simulink®	MATLAB provides functions and analysis environment for efficiently developing scientific calculation programs. Simulink is a simulation environment for efficiently designing and verifying real-time systems that runs in MATLAB. Algorithms designed based on models using Simulink can be automatically converted into C code for embedded systems using Real-Time Workshop Embedded Coder. MATLAB/Simulink can perform advance evaluation of C code for embedded systems using PIL simulation by interoperating with the SOFTUNE debugger.	MathWorks Japan TEL : +81-3-6367-6700 http://www.mathworks.co.jp/
ZIPC	- This is a CASE tool that uses extended hierarchical state transition chart design methods. - C source is automatically generated from the state transition chart. - Supports REALOS system calls. - Offers debugging using state transition charts integrated with SOFTUNE.	CATS Co. Ltd. TEL : +81-45-473-2816 http://www.zipc.com/
SystemDesk	- Designs AUTOSAR compliant software components and graphically models hardware independent software architectures. - Automatically generates the AUTOSAR definition file, and interoperates with the TargetLink automatic code generation tool to create RUNNABLE. - Configuring the network between ECU and assigning functions to multiple ECU can be easily performed using this tool, and the AUTOSAR runtime environment is automatically generated for each ECU. - Interoperates with BSW tools such as Tresos (EB) to create production SW packages.	dSPACE Japan TEL : +81-3-5798-5460 http://www.dspace.jp/
TargetLink	- Directly generates C code for mass production from MATLAB/Simulink/Stateflow - Generates ANSI C code efficiently that is suitable for the code developed by an actual programmer - Embedded simulation and test environment that uses an actual processor - Further optimized for the processor - Can generate AUTOSAR compliant code	dSPACE Japan TEL : +81-3-5798-5460 http://www.dspace.jp/

Development Supporting Tool
(Development Environment / OS / Middleware / tools)

Verification Tools

Product name	Overview	Inquiries
CANoe	CANoe is an all-round tool for developing, testing, and analyzing networks and ECU, and supports users throughout the entire development process. - Capable of network-wide simulation and analysis using simulation nodes created using CAPL/.NET or models created using MATLAB/Simulink Features: - Able to simplify the operation by user control panel - The test function covers from ECU testing to automatic report creation - Supports CAN, LIN, MOST, and FlexRay	Vector Japan Co., Ltd. TEL : +81-3-5769-6971 (Development tool department) http://www.vector-japan.co.jp/
CANalyzer	CANalyzer is a general-purpose analysis tool for distributed network systems that make it possible to easily monitor, analyze, and send messages on a network. Features: - Simplifies testing using the user display panel - Capable of performing various tests of bus data, and displaying in a Window or recording in a log file - Capable of evaluation by offline playback using log files - Sending and evaluation of messages using the programming function using CAPL - Supports CAN, LIN, MOST, and FlexRay	Vector Japan Co., Ltd. TEL : +81-3-5769-6971 (Development tool department) http://www.vector-japan.co.jp/
CANape	CANape is software that provides a complete development environment for measurement, compliance, and diagnosis. Features: - Capable not only of measurement, compliance, and diagnosis of the memory built into an ECU, but is also able to measure and output vehicle-mounted networks such as CAN, LIN, and FlexRay as well as measure analog, GPS, audio, and video, and therefore supports various hardware - Capable of evaluating and printing measurement data after measurement, and managing compliance data after compliance	Vector Japan Co., Ltd. TEL : +81-3-5769-6984 (Compliance tool department) http://www.vector-japan.co.jp/
RAMScope	RAMScope is a unit for extracting in real-time the data from built-in RAM using debugging interfaces such as NBD, AUD, RTD, NEXUS that are incorporated in vehicle-mounted MCUs. Because the extracted RAM data is saved directly into PC memory, a large amount of data can be accumulated, making it easy to analyze the operation of a control application. Features: - Capable of monitoring RAM without stopping operation right from the microcontroller start-up - Communication program to monitor RAM not needed => Almost no effect on microcontroller operation - Capable of monitoring RAM synchronized to the microcontroller control cycle (scanstart function) - Capable of tuning (overwriting) RAM - 10μs/1ch high frequency monitor (differs between microcontrollers) => Maximum 128ch/1ms sampling performance (can support 1024ch by special order) => When used with CAN: 100ch/1ms + CAN: 64Bytes/1ms - Saves logs with CAN and RAM on the same time axis (GT110) - The target and RAMScope main unit are electrically isolated - Synchronization of RAM values and external data by additional A/D and D/A units	Yokogawa Digital Computer Corporation TEL : +81-422-52-5698 (Instrument business vehicle instrument center) http://www.yokogawa-digital.com/

Memo