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## 32-bit ARM™ Cortex™-M3 based Microcontroller

# FM3 MB9B500B Series

## MB9BF504NB/RB, F505NB/RB, F506NB/RB

### ■ DESCRIPTION

The MB9B500B Series are a highly integrated 32-bit microcontroller that target for high-performance and cost-sensitive embedded control applications.

The MB9B500B Series are based on the ARM Cortex-M3 Processor and on-chip Flash memory and SRAM, and peripheral functions, including Motor Control Timers, ADCs and Communication Interfaces (USB, CAN, UART, CSIO, I<sup>2</sup>C, LIN).

The products which are described in this data sheet are placed into TYPE0 product categories in "FM3 FAMILY MB9Axxx/MB9Bxxx SERIES PERIPHERAL MANUAL".

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**ARM™**

## ■ FEATURES

### ● 32-bit ARM Cortex-M3 Core

- Processor version: r2p0
- Up to 80MHz Frequency Operation
- Memory Protection Unit (MPU): improve the reliability of an embedded system
- Integrated Nested Vectored Interrupt Controller (NVIC): 1 NMI (non-maskable interrupt) and 48 peripheral interrupts and 16 priority levels
- 24-bit System timer (Sys Tick): System timer for OS task management

### ● On-chip Memories

#### [Flash memory]

- Up to 512 Kbyte
- Read cycle: 0wait-cycle@up to 60MHz, 2wait-cycle\* above
  - \*: Instruction pre-fetch buffer is included. So when CPU access continuously, it becomes 0wait-cycle
- Security function for code protection

#### [SRAM]

This series contain a total of up to 64Kbyte on-chip SRAM memories. This is composed of two independent SRAM(SRAM0, SRAM1). SRAM0 is connected to I-code bus or D-code bus of Cortex-M3 core. SRAM1 is connected to System bus.

- SRAM0: Up to 32 Kbyte
- SRAM1: Up to 32 Kbyte

### ● External Bus Interface

- Supports SRAM, NOR& NAND Flash device
- Up to 8 chip selects
- 8/16-bit Data width
- Up to 25-bit Address bit

### ● USB Interface

USB interface is composed of Function and Host.

#### [USB function]

- USB2.0 Full-Speed supported
- Max. 6 EndPoint supported
  - EndPoint 0 is control transfer
  - EndPoint 1 – 5 can be selected bulk-transfer or interrupt-transfer
- EndPoint1-5 is comprised Double Buffer

#### [USB host]

- USB2.0 Full/Low speed supported
- Bulk-transfer and interrupt-transfer and Isochronous-transfer support
- USB Device connected/dis-connected automatically detect
- IN/OUT token handshake packet automatically
- Max.256-byte packet-length supported
- Wake-up function supported

### ● CAN Interface (Max. 2channels)

- Compatible with CAN Specification 2.0A/B
- Maximum transfer rate: 1 Mbps
- Built-in 32 message buffer

## ● Multi-function Serial Interface (Max. 8channels)

- 4 channels with 16-byte FIFO (ch.4-ch.7), 4 channels without FIFO (ch.0-ch.3)
- Operation mode is selectable from the followings for each channel.
  - UART
  - CSIO
  - LIN
  - I<sup>2</sup>C

### [UART]

- Full-duplex double buffer
- Selection with or without parity supported
- Built-in dedicated baud rate generator
- External clock available as a serial clock
- Hardware Flow control : Automatically control the transmission by CTS/RTS (only ch.4)
- Various error detect functions available (parity errors, framing errors, and overrun errors)

### [CSIO]

- Full-duplex double buffer
- Built-in dedicated baud rate generator
- Overrun error detect function available

### [LIN]

- LIN protocol Rev.2.1 supported
- Full-duplex double buffer
- Master/Slave mode supported
- LIN break field generate (can be changed 13-16bit length)
- LIN break delimiter generate (can be changed 1-4bit length)
- Various error detect functions available (parity errors, framing errors, and overrun errors)

### [I<sup>2</sup>C]

- Standard mode (Max.100kbps) / High-speed mode (Max.400Kbps) supported

## ● DMA Controller (8channels)

DMA Controller has an independent bus for CPU, so CPU and DMA Controller can process simultaneously.

- 8 independently configured and operated channels
- Transfer can be started by software or request from the built-in peripherals
- Transfer address area: 32bit(4Gbyte)
- Transfer mode: Block transfer/Burst transfer/Demand transfer
- Transfer data type: byte/half-word/word
- Transfer block count: 1 to 16
- Number of transfers: 1 to 65536

## ● A/D Converter (Max. 16channels)

### [12-bit A/D Converter]

- Successive Approximation Register type
- Built-in 3unit
- Conversion time: 1.0μs@5V
- Priority conversion available (priority at 2levels)
- Scanning conversion mode
- Built-in FIFO for conversion data storage (for SCAN conversion: 16steps, for Priority conversion: 4steps)

## ● Base Timer (Max. 8channels)

Operation mode is selectable from the followings for each channel.

- 16-bit PWM timer
- 16-bit PPG timer
- 16/32-bit reload timer
- 16/32-bit PWC timer

## ● General Purpose I/O Port

This series can use its pins as I/O ports when they are not used for external bus or peripherals. Moreover, the port relocate function is built in. It can set which I/O port the peripheral function can be allocated.

- Capable of pull-up control per pin
- Capable of reading pin level directly
- Built-in the port relocate function
- Up to 100 fast I/O Ports@120pin Package

## ● Multi-function Timer (Max. 2unit)

The Multi-function timer is composed of the following blocks.

- 16-bit free-run timer × 3ch/unit
- Input capture × 4ch/unit
- Output compare × 6ch/unit
- A/D activating compare × 3ch/unit
- Waveform generator × 3ch/unit
- 16-bit PPG timer × 3ch/unit

The following function can be used to achieve the motor control.

- PWM signal output function
- DC chopper waveform output function
- Dead time function
- Input capture function
- A/D convertor activate function
- DTIF (Motor emergency stop) interrupt function

## ● Quadrature Position/Revolution Counter (QPRC) (Max. 2unit)

The Quadrature Position/Revolution Counter (QPRC) is used to measure the position of the position encoder. Moreover, it is possible to use up/down counter.

- The detection edge of the three external event input pins AIN, BIN and ZIN is configurable.
- 16-bit position counter
- 16-bit revolution counter
- Two 16-bit compare registers

## ● Dual Timer (Two 32/16bit Down Counter)

The Dual Timer consists of two programmable 32/16-bit down counters. Operation mode is selectable from the followings for each channel.

- Free-running
- Periodic (=Reload)
- One-shot

## ● Watch Counter

The Watch counter is used for wake up from power saving mode.

- Interval timer: up to 64s(Max.)@ Sub Clock : 32.768kHz

## ● External Interrupt Controller Unit

- Up to 16 external vectors
- Include one non-maskable interrupt(NMI)

## ● Watch dog Timer (2channels)

A watchdog timer can generate interrupts or a reset when a time-out value is reached.

This series consists of two different watchdogs, a "Hardware" watchdog and a "Software" watchdog.

"Hardware" watchdog timer is clocked by low speed CR oscillator. Therefore, "Hardware" watchdog is active in any power saving mode except STOP.

## ● CRC (Cyclic Redundancy Check) Accelerator

The CRC accelerator helps a verify data transmission or storage integrity.

CCITT CRC16 and IEEE-802.3 CRC32 are supported.

- CCITT CRC16 Generator Polynomial: 0x1021
- IEEE-802.3 CRC32 Generator Polynomial: 0x04C11DB7

## ● Clock and Reset

### [Clocks]

Five clock sources (2 ext. osc, 2 CR osc, and Main PLL) that are dynamically selectable.

- Main Clock : 4MHz to 48MHz
- Sub Clock : 32.768kHz
- High-speed CR Clock : 4MHz
- Low-speed CR Clock : 100kHz
- Main PLL Clock

### [Resets]

Reset requests from INITX pins, Power on reset, Software reset, watchdog timers reset, low voltage detector reset and clock supervisor reset.

## ● Clock Super Visor (CSV)

Clocks generated by CR oscillators are used to supervise abnormality of the external clocks.

- External OSC clock failure (clock stop) is detected, reset is asserted.
- External OSC frequency anomaly is detected, interrupt or reset is asserted.

## ● Low Voltage Detector (LVD)

This series include 2-stage monitoring of voltage on the VCC. When the voltage falls below the voltage has been set, Low Voltage Detector generates an interrupt or reset.

- LVD1: error reporting via interrupt
- LVD2: auto-reset operation

## ● Low Power Mode

Three power saving modes supported.

- SLEEP
- TIMER
- STOP

## ● Debug

- Serial Wire JTAG Debug Port (SWJ-DP)
- Embedded Trace Macrocells (ETM) provide comprehensive debug and trace facilities.

## ● Power Supply

Two Power Supplies

- VCC = 2.7V to 5.5V: Correspond to the wide range voltage.
- USBVCC = 3.0V to 3.6V: for USB I/O voltage, when USB is used.  
= 2.7V to 5.5V: when GPIO is used.\*

# MB9B500B Series

## ■ PRODUCT LINEUP

### ● Memory size

Product device	MB9BF504NB/RB	MB9BF505NB/RB	MB9BF506NB/RB
On-chip Flash	256Kbyte	384Kbyte	512Kbyte
On-chip SRAM	32Kbyte	48Kbyte	64Kbyte

### ● Function

Product device		MB9BF504NB MB9BF505NB MB9BF506NB	MB9BF504RB MB9BF505RB MB9BF506RB
Pin count		100	120
CPU		Cortex-M3	
Freq.		80MHz	
Power supply voltage range		2.7V to 5.5V	
USB2.0FS (Function/Host)		1ch	
CAN Interface		2ch(Max)	
DMAC		8ch	
External Bus Interface		Addr:25bit (Max.) Data:8/16 bit CS:5(Max.) Support: SRAM, NOR Flash	Addr:25bit (Max.) Data:8/16 bit CS:8(Max.) Support: SRAM, NOR & NAND Flash
MF Serial Interface (UART/CSIO/LIN/I <sup>2</sup> C)		8ch (Max.)	
Base Timer (PWC/ Reload timer/PWM/PPG)		8ch (Max.)	
MF-Timer	A/D activation compare	2 units (Max.)	2 units (Max.)
	Input capture	4ch	
	Free-run timer	3ch	
	Output compare	6ch	
	Waveform generator	3ch	
	PPG	3ch	
QPRC		2ch (Max.)	
Dual Timer		1 unit	
Watch Counter		1 unit	
CRC Accelerator		Yes	
Watchdog timer		1ch(SW) + 1ch(HW)	
External Interrupts		16pins (Max.)+ NMI × 1	
I/O ports		80pins (Max.)	100pins (Max.)
12 bit A/D converter		16ch (3 units)	
CSV (Clock Super Visor)		Yes	
LVD (Low Voltage Detector)		2ch	
Internal OSC	High-speed	4MHz (± 2%)	
	Low-speed	100kHz (Typ)	
Debug Function		SWJ-DP/ETM	

Note: All signals of the peripheral function in each product cannot be allocated by limiting the pins of package.  
It is necessary to use the port relocate function of the General I/O port according to your function use.



# MB9B500B Series

## ■ PACKAGES

Product name Package	MB9BF504NB MB9BF505NB MB9BF506NB	MB9BF504RB MB9BF505RB MB9BF506RB
LQFP: FPT-100P-M20*/M23	○	-
LQFP: FPT-120P-M21/M37	-	○
BGA: BGA-112P-M04	○	-

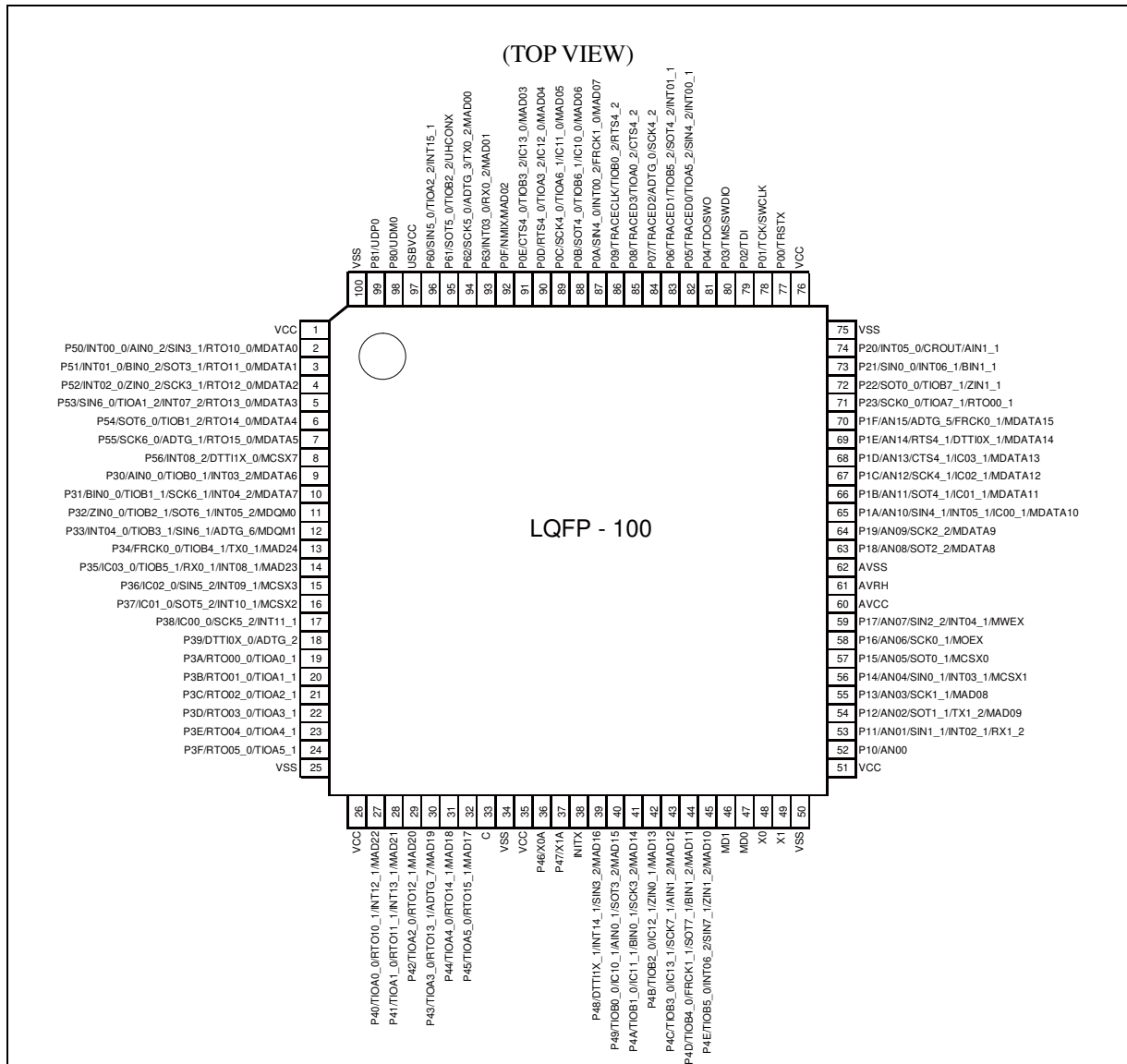
○ : Supported

\* : ES product only

Note : Refer to "■PACKAGE DIMENSIONS" for detailed information on each package.

## ■ PIN ASSIGNMENT

### ● FPT-100P-M20/M23

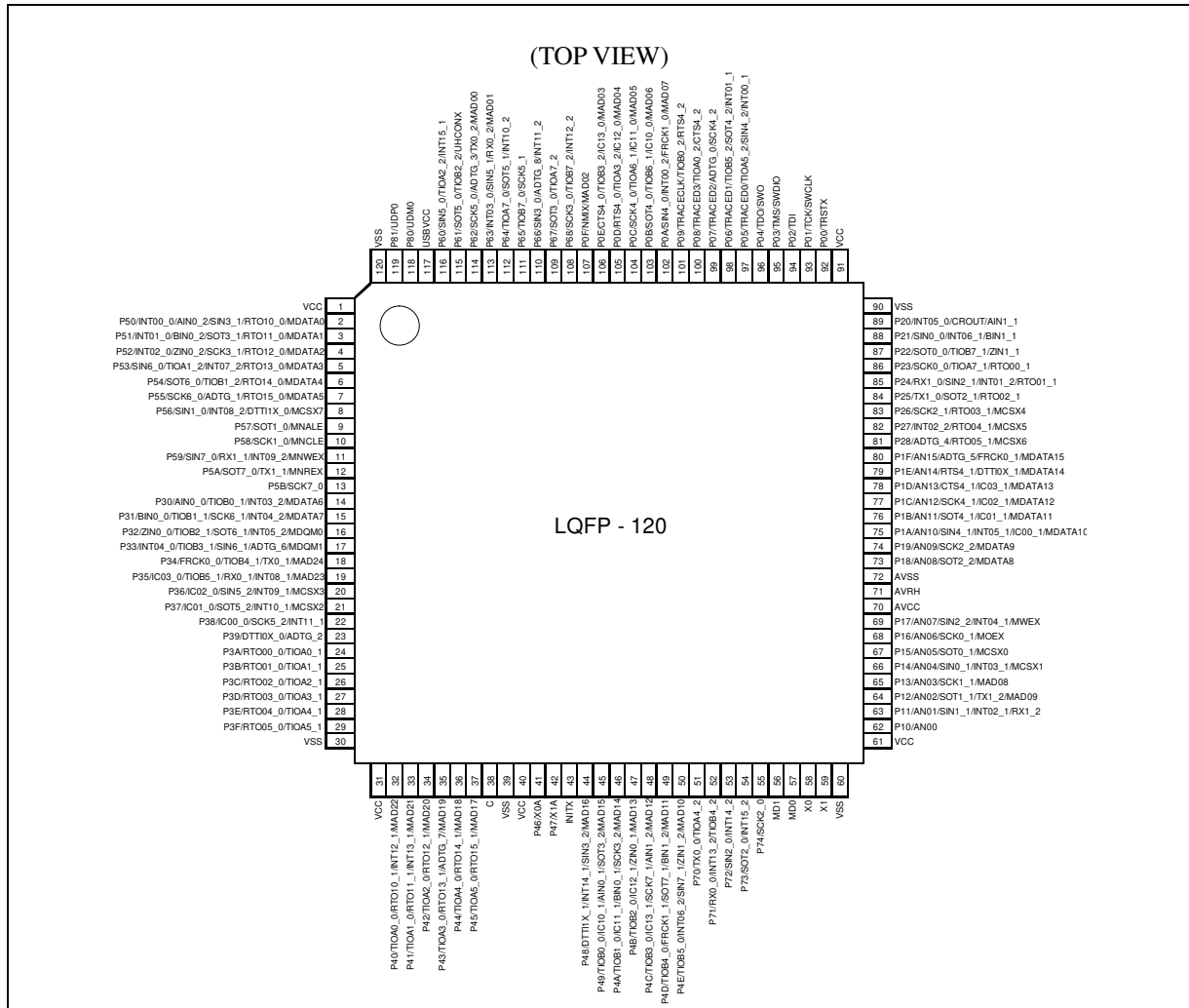


### <Notes>

- The number after the underscore ("\_") in pin names such as XXX\_1 and XXX\_2 indicates the relocated port number. For these pins, there are multiple pins that provide the same function for the same channel. Use the extended port function register (EPFR) to select the pin.

# MB9B500B Series

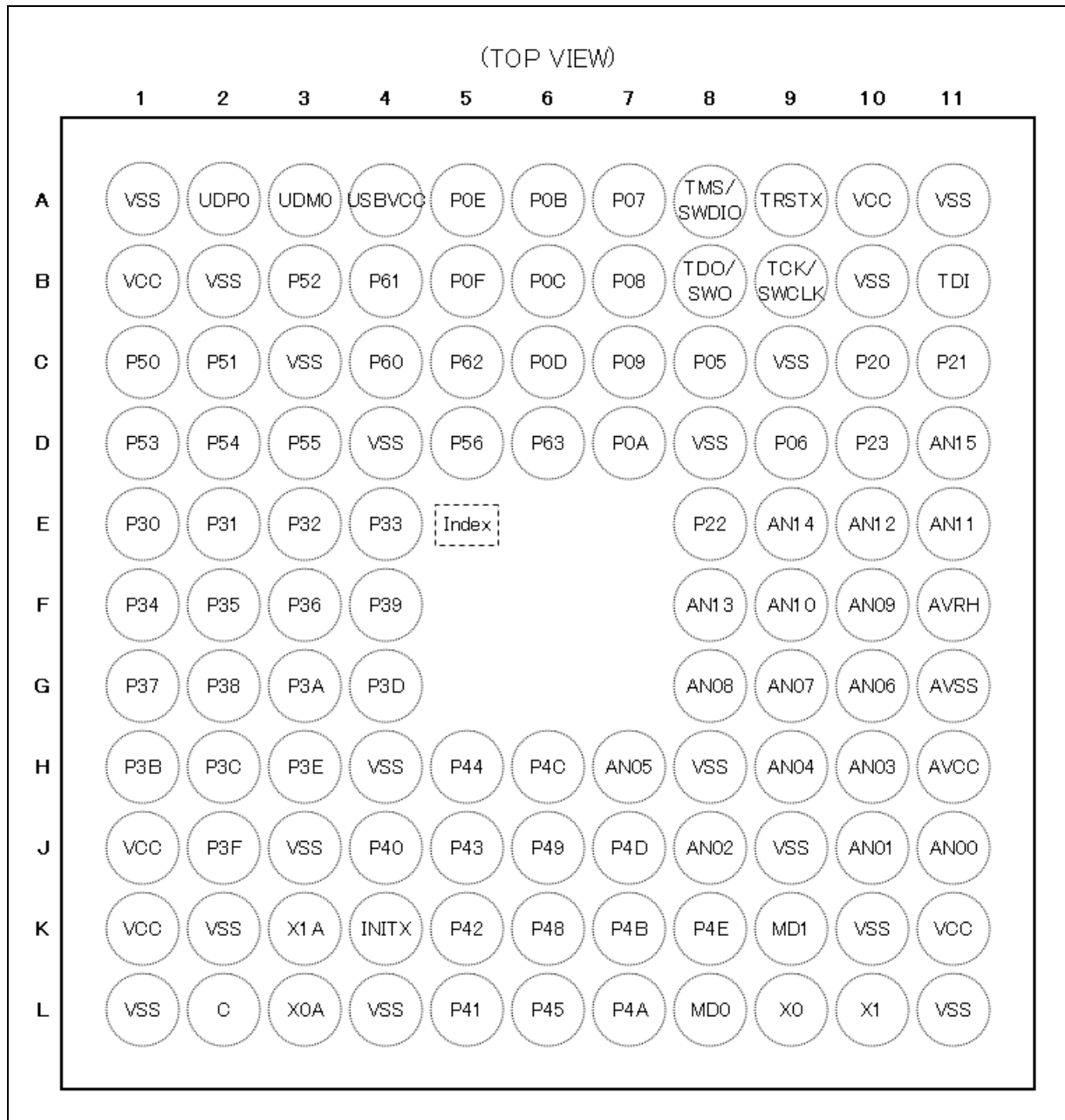
## ● FPT-120P-M21/M37



### <Notes>

- The number after the underscore ("\_") in pin names such as XXX\_1 and XXX\_2 indicates the relocated port number. For these pins, there are multiple pins that provide the same function for the same channel. Use the extended port function register (EPFR) to select the pin.

## ● BGA-112P-M04



### <Notes>

- The number after the underscore ("\_") in pin names such as XXX\_1 and XXX\_2 indicates the relocated port number. For these pins, there are multiple pins that provide the same function for the same channel. Use the extended port function register (EPFR) to select the pin.

# MB9B500B Series

## ■ PIN DESCRIPTION

The number after the underscore ("\_") in pin names such as XXX\_1 and XXX\_2 indicates the relocated port number. For these pins, there are multiple pins that provide the same function for the same channel. Use the extended port function register (EPFR) to select the pin.

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
1	B1	1	VCC	-	
2	C1	2	P50	E	H
			INT00_0		
			AIN0_2		
			SIN3_1		
			RTO10_0 (PPG10_0)		
			MDATA0		
3	C2	3	P51	E	H
			INT01_0		
			BIN0_2		
			SOT3_1 (SDA3_1)		
			RTO11_0 (PPG10_0)		
			MDATA1		
4	B3	4	P52	E	H
			INT02_0		
			ZIN0_2		
			SCK3_1 (SCL3_1)		
			RTO12_0 (PPG12_0)		
			MDATA2		
5	D1	5	P53	E	H
			SIN6_0		
			TIOA1_2		
			INT07_2		
			RTO13_0 (PPG12_0)		
			MDATA3		
6	D2	6	P54	E	I
			SOT6_0 (SDA6_0)		
			TIOB1_2		
			RTO14_0 (PPG14_0)		
			MDATA4		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
7	D3	7	P55	E	I
			SCK6_0 (SCL6_0)		
			ADTG_1		
			RTO15_0 (PPG14_0)		
			MDATA5		
8	D5	8	P56	E	H
			SIN1_0 (120pin only)		
			INT08_2		
			DTTI1X_0		
			MCSX7		
-	-	9	P57	E	I
			SOT1_0 (SDA1_0)		
			MNALE		
-	-	10	P58	E	I
			SCK1_0 (SCL1_0)		
			MNCLE		
-	-	11	P59	E	H
			SIN7_0		
			RX1_1		
			INT09_2		
			MNWEX		
-	-	12	P5A	E	I
			SOT7_0 (SDA7_0)		
			TX1_1		
			MNREX		
-	-	13	P5B	E	I
			SCK7_0 (SCL7_0)		
9	E1	14	P30	E	H
			AIN0_0		
			TIOB0_1		
			INT03_2		
			MDATA6		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
10	E2	15	P31	E	H
			BIN0_0		
			TIOB1_1		
			SCK6_1 (SCL6_1)		
			INT04_2		
			MDATA7		
11	E3	16	P32	E	H
			ZIN0_0		
			TIOB2_1		
			SOT6_1 (SDA6_1)		
			INT05_2		
			MDQM0		
12	E4	17	P33	E	H
			INT04_0		
			TIOB3_1		
			SIN6_1		
			ADTG_6		
			MDQM1		
13	F1	18	P34	E	I
			FRCK0_0		
			TIOB4_1		
			TX0_1		
			MAD24		
14	F2	19	P35	E	H
			IC03_0		
			TIOB5_1		
			RX0_1		
			INT08_1		
			MAD23		
15	F3	20	P36	E	H
			IC02_0		
			SIN5_2		
			INT09_1		
			MCSX3		
16	G1	21	P37	E	H
			IC01_0		
			SOT5_2 (SDA5_2)		
			INT10_1		
			MCSX2		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
17	G2	22	P38	E	H
			IC00_0		
			SCK5_2 (SCL5_2)		
			INT11_1		
18	F4	23	P39	E	I
			DTTIOX_0		
			ADTG_2		
19	G3	24	P3A	G	I
			RTO00_0 (PPG00_0)		
			TIOA0_1		
-	B2	-	VSS	-	-
20	H1	25	P3B	G	I
			RTO01_0 (PPG00_0)		
			TIOA1_1		
21	H2	26	P3C	G	I
			RTO02_0 (PPG02_0)		
			TIOA2_1		
22	G4	27	P3D	G	I
			RTO03_0 (PPG02_0)		
			TIOA3_1		
23	H3	28	P3E	G	I
			RTO04_0 (PPG04_0)		
			TIOA4_1		
24	J2	29	P3F	G	I
			RTO05_0 (PPG04_0)		
			TIOA5_1		
25	L1	30	VSS	-	-
26	J1	31	VCC	-	-
27	J4	32	P40	G	H
			TIOA0_0		
			RTO10_1 (PPG10_1)		
			INT12_1		
			MAD22		



# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
28	L5	33	P41	G	H
			TIOA1_0		
			RTO11_1 (PPG10_1)		
			INT13_1		
			MAD21		
29	K5	34	P42	G	I
			TIOA2_0		
			RTO12_1 (PPG12_1)		
			MAD20		
30	J5	35	P43	G	I
			TIOA3_0		
			RTO13_1 (PPG12_1)		
			ADTG_7		
			MAD19		
-	K2	-	VSS	-	-
-	J3	-	VSS	-	-
-	H4	-	VSS	-	-
31	H5	36	P44	G	I
			TIOA4_0		
			RTO14_1 (PPG14_1)		
			MAD18		
32	L6	37	P45	G	I
			TIOA5_0		
			RTO15_1 (PPG14_1)		
			MAD17		
33	L2	38	C	-	-
34	L4	39	VSS	-	-
35	K1	40	VCC	-	-
36	L3	41	P46	D	M
			X0A		
37	K3	42	P47	D	N
			X1A		
38	K4	43	INITX	B	C
39	K6	44	P48	E	H
			DTTI1X_1		
			INT14_1		
			SIN3_2		
			MAD16		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
40	J6	45	P49	E	I
			TIOB0_0		
			IC10_1		
			AIN0_1		
			SOT3_2 (SDA3_2)		
			MAD15		
41	L7	46	P4A	E	I
			TIOB1_0		
			IC11_1		
			BIN0_1		
			SCK3_2 (SCL3_2)		
			MAD14		
42	K7	47	P4B	E	I
			TIOB2_0		
			IC12_1		
			ZIN0_1		
			MAD13		
43	H6	48	P4C	E	I
			TIOB3_0		
			IC13_1		
			SCK7_1 (SCL7_1)		
			AIN1_2		
			MAD12		
44	J7	49	P4D	E	I
			TIOB4_0		
			FRCK1_1		
			SOT7_1 (SDA7_1)		
			BIN1_2		
			MAD11		
45	K8	50	P4E	E	I
			TIOB5_0		
			INT06_2		
			SIN7_1		
			ZIN1_2		
			MAD10		
-	-	51	P70	E	I
			TX0_0		
			TIOA4_2		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
-	-	52	P71	E	H
			RX0_0		
			INT13_2		
			TIOB4_2		
-	-	53	P72	E	H
			SIN2_0		
			INT14_2		
-	-	54	P73	E	H
			SOT2_0 (SDA2_0)		
			INT15_2		
-	-	55	P74	E	I
			SCK2_0 (SCL2_0)		
46	K9	56	MD1	C	D
47	L8	57	MD0	C	D
48	L9	58	X0	A	A
49	L10	59	X1	A	B
50	L11	60	VSS	-	
51	K11	61	VCC	-	
52	J11	62	P10	F	K
			AN00		
53	J10	63	P11	F	L
			AN01		
			SIN1_1		
			INT02_1		
			RX1_2		
-	K10	-	VSS	-	
-	J9	-	VSS	-	
54	J8	64	P12	F	K
			AN02		
			SOT1_1 (SDA1_1)		
			TX1_2		
			MAD09		
55	H10	65	P13	F	K
			AN03		
			SCK1_1 (SCL1_1)		
			MAD08		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
56	H9	66	P14	F	L
			AN04		
			SIN0_1		
			INT03_1		
			MCSX1		
57	H7	67	P15	F	K
			AN05		
			SOT0_1 (SDA0_1)		
			MCSX0		
58	G10	68	P16	F	K
			AN06		
			SCK0_1 (SCL0_1)		
			MOEX		
59	G9	69	P17	F	L
			AN07		
			SIN2_2		
			INT04_1		
			MWEX		
60	H11	70	AVCC	-	
61	F11	71	AVRH	-	
62	G11	72	AVSS	-	
63	G8	73	P18	F	K
			AN08		
			SOT2_2 (SDA2_2)		
			MDATA8		
64	F10	74	P19	F	K
			AN09		
			SCK2_2 (SCL2_2)		
			MDATA9		
65	F9	75	P1A	F	L
			AN10		
			SIN4_1		
			INT05_1		
			IC00_1		
			MDATA10		
-	H8	-	VSS	-	

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
66	E11	76	P1B	F	K
			AN11		
			SOT4_1 (SDA4_1)		
			IC01_1		
			MDATA11		
67	E10	77	P1C	F	K
			AN12		
			SCK4_1 (SCL4_1)		
			IC02_1		
			MDATA12		
68	F8	78	P1D	F	K
			AN13		
			CTS4_1		
			IC03_1		
			MDATA13		
69	E9	79	P1E	F	K
			AN14		
			RTS4_1		
			DTTIOX_1		
			MDATA14		
70	D11	80	P1F	F	K
			AN15		
			ADTG_5		
			FRCK0_1		
			MDATA15		
-	-	81	P28	E	I
			ADTG_4		
			RTO05_1 (PPG04_1)		
			MCSX6		
-	-	82	P27	E	H
			INT02_2		
			RTO04_1 (PPG04_1)		
			MCSX5		
-	-	83	P26	E	I
			SCK2_1 (SCL2_1)		
			RTO03_1 (PPG02_1)		
			MCSX4		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
-	-	84	P25	E	I
			TX1_0		
			SOT2_1 (SDA2_1)		
			RTO02_1 (PPG02_1)		
-	B10	-	VSS	-	-
-	C9	-	VSS	-	-
-	-	85	P24	E	H
			RX1_0		
			SIN2_1		
			INT01_2		
			RTO01_1 (PPG00_1)		
71	D10	86	P23	E	I
			SCK0_0 (SCL0_0)		
			TIOA7_1		
			RTO00_1 (PPG00_1)		
72	E8	87	P22	E	I
			SOT0_0 (SDA0_0)		
			TIOB7_1		
			ZIN1_1		
73	C11	88	P21	E	H
			SIN0_0		
			INT06_1		
			BIN1_1		
74	C10	89	P20	E	H
			INT05_0		
			CROUT		
			AIN1_1		
75	A11	90	VSS	-	-
76	A10	91	VCC	-	-
77	A9	92	P00	E	E
			TRSTX		
78	B9	93	P01	E	E
			TCK		
			SWCLK		
79	B11	94	P02	E	E
			TDI		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
80	A8	95	P03	E	E
			TMS		
			SWDIO		
81	B8	96	P04	E	E
			TDO		
			SWO		
82	C8	97	P05	E	F
			TRACED0		
			TIOA5_2		
			SIN4_2		
-	D8	-	VSS	-	-
83	D9	98	P06	E	F
			TRACED1		
			TIOB5_2		
			SOT4_2 (SDA4_2)		
			INT01_1		
84	A7	99	P07	E	G
			TRACED2		
			ADTG_0		
			SCK4_2 (SCL4_2)		
85	B7	100	P08	E	G
			TRACED3		
			TIOA0_2		
			CTS4_2		
86	C7	101	P09	E	G
			TRACECLK		
			TIOB0_2		
			RTS4_2		
87	D7	102	P0A	E	H
			SIN4_0		
			INT00_2		
			FRCK1_0		
			MAD07		
88	A6	103	P0B	E	I
			SOT4_0 (SDA4_0)		
			TIOB6_1		
			IC10_0		
			MAD06		

# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
89	B6	104	P0C	E	I
			SCK4_0 (SCL4_0)		
			TIOA6_1		
			IC11_0		
			MAD05		
90	C6	105	P0D	E	I
			RTS4_0		
			TIOA3_2		
			IC12_0		
			MAD04		
91	A5	106	P0E	E	I
			CTS4_0		
			TIOB3_2		
			IC13_0		
			MAD03		
-	D4	-	VSS	-	-
-	C3	-	VSS	-	-
92	B5	107	P0F	E	J
			NMIX		
			MAD02		
-	-	108	P68	E	H
			SCK3_0 (SCL3_0)		
			TIOB7_2		
			INT12_2		
-	-	109	P67	E	I
			SOT3_0 (SDA3_0)		
			TIOA7_2		
-	-	110	P66	E	H
			SIN3_0		
			ADTG_8		
			INT11_2		
-	-	111	P65	E	I
			TIOB7_0		
			SCK5_1 (SCL5_1)		
-	-	112	P64	E	H
			TIOA7_0		
			SOT5_1 (SDA5_1)		
			INT10_2		



# MB9B500B Series

Pin no.			Pin name	I/O circuit type	Pin state type
LQFP-100	BGA-112	LQFP-120			
93	D6	113	P63	E	H
			INT03_0		
			RX0_2		
			MAD01		
-	-		SIN5_1		
94	C5	114	P62	E	I
			SCK5_0 (SCL5_0)		
			ADTG_3		
			TX0_2		
			MAD00		
95	B4	115	P61	E	I
			SOT5_0 (SDA5_0)		
			TIOB2_2		
			UHCONX		
96	C4	116	P60	E	H
			SIN5_0		
			TIOA2_2		
			INT15_1		
97	A4	117	USBVCC	-	
98	A3	118	P80	H	O
			UDM0		
99	A2	119	P81	H	O
			UDP0		
100	A1	120	VSS	-	

## ■ SIGNAL DESCRIPTION

The number after the underscore ("\_") in pin names such as XXX\_1 and XXX\_2 indicates the relocated port number. For these pins, there are multiple pins that provide the same function for the same channel. Use the extended port function register (EPFR) to select the pin.

Module	Pin name	Function	Pin No.		
			LQFP-100	BGA-112	LQFP-120
ADC	ADTG_0	A/D converter external trigger input pin.	84	A7	99
	ADTG_1		7	D3	7
	ADTG_2		18	F4	23
	ADTG_3		94	C5	114
	ADTG_4		-	-	81
	ADTG_5		70	D11	80
	ADTG_6		12	E4	17
	ADTG_7		30	J5	35
	ADTG_8		-	-	110
	AN00	A/D converter analog input pin. ANxx describes ADC ch.xx.	52	J11	62
	AN01		53	J10	63
	AN02		54	J8	64
	AN03		55	H10	65
	AN04		56	H9	66
	AN05		57	H7	67
	AN06		58	G10	68
	AN07		59	G9	69
	AN08		63	G8	73
	AN09		64	F10	74
	AN10		65	F9	75
	AN11		66	E11	76
	AN12		67	E10	77
	AN13		68	F8	78
	AN14		69	E9	79
	AN15		70	D11	80
	Base Timer 0	TIOA0_0	Base timer ch.0 TIOA pin.	27	J4
TIOA0_1		19		G3	24
TIOA0_2		85		B7	100
TIOB0_0		Base timer ch.0 TIOB pin.	40	J6	45
TIOB0_1			9	E1	14
TIOB0_2			86	C7	101
Base Timer 1	TIOA1_0	Base timer ch.1 TIOA pin.	28	L5	33
	TIOA1_1		20	H1	25
	TIOA1_2		5	D1	5
	TIOB1_0	Base timer ch.1 TIOB pin.	41	L7	46
	TIOB1_1		10	E2	15
	TIOB1_2		6	D2	6
Base Timer 2	TIOA2_0	Base timer ch.2 TIOA pin.	29	K5	34
	TIOA2_1		21	H2	26
	TIOA2_2		96	C4	116
	TIOB2_0	Base timer ch.2 TIOB pin.	42	K7	47
	TIOB2_1		11	E3	16
	TIOB2_2		95	B4	115