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What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "<u>Embedded -</u> <u>Microcontrollers</u>"

Details

Product Status	Active
Core Processor	ARM® Cortex®-M3
Core Size	32-Bit Single-Core
Speed	20MHz
Connectivity	CSIO, I ² C, SPI, UART/USART
Peripherals	LVD, POR, PWM, WDT
Number of I/O	52
Program Memory Size	128KB (128K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	16K x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 5.5V
Data Converters	A/D 9x12b; D/A 2x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	64-LQFP
Supplier Device Package	64-LQFP (12x12)
Purchase URL	https://www.e-xfl.com/product-detail/rochester-electronics/mb9af1a2lpmc-g-sne2

Email: info@E-XFL.COM

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1. Product Lineup

Memory size

Product n	ame	MB9AF1A1L/M/N	MB9AF1A2L/M/N			
On-chip Flash mem	iory	64 Kbytes	128 Kbytes			
On-chip SRAM SRAM1		12 Kbytes	16 Kbytes			

Function

	Product nar	ne	MB9AF1A1L MB9AF1A2L	MB9AF1A1M MB9AF1A2M	MB9AF1A1N MB9AF1A2N							
Pin cou	Int		64	80	100							
СПЦ				Cortex-M3								
CFU	Freq.			20 MHz								
Power	supply voltage	range	1.8 V to 5.5 V									
Multi-fu (UART/	Inction Serial Ir /CSIO/I ² C)	nterface	8ch. (Max)									
Base T	imer			8ch (Max)								
(PWC/ Reload timer/PWM/PPG)												
	A/D activatio compare	n 1ch.										
MF- Timer	Input capture	e 4ch.										
	Free-run tim	er 3ch.										
MF- Timer	Output compare	6ch.		1 unit (Max)								
	Waveform generator	3ch.										
	PPG (IGBT mode) 3ch.										
HDMI-0 Receive	CEC/ Remote (er	Control		2ch. (Max)								
Real-tir	ne clock (RTC))		1 unit								
Watchc	log timer			1ch. (SW) + 1ch. (HW)								
Externa	al Interrupts		8 pins (Max)+ NMI × 1	11 pins (Max)+ NMI × 1	16 pins (Max)+ NMI × 1							
Genera	al-purpose I/O j	ports	52 pins (Max)	67 pins (Max)	84 pins (Max)							
12-bit A	VD converter		9ch. (1 unit)	12ch. (1 unit)	16ch. (1 unit)							
10-bit E	D/A converter			2ch. (Max)								
CSV (C	Clock Super Vis	sor)		Yes								
LVD (L	ow-Voltage De	tector)	2ch.									
Built-in	CR High	n-speed		4 MHz								
Bailt III	Low	-speed		100 kHz								
Debug	Function		SWJ-DP									

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 I/O port according to your function use.
 See Electrical Characteristics 12.4 AC Characteristics 12.4.3 Built-in CR Oscillation Characteristics for accuracy of built-in CR.



LQH080/LQJ080



Note:

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		Bin name I/O circuit Pin s			
LQFP-64	LQFP-80	LQFP-100	QFP-100		type	type	
				P12	_		
				AN02			
36	44	54	32	SOT1_1	F	J	
				(SDA1_1)	-		
				IC00_2			
				P13			
				AN03			
				SCK1_1			
37	45	55	33	(SCL1_1)	F	J	
				IC01_2	_		
				RTCCO_1			
				SUBOUT_1			
				P14			
20		56	34	AN04		К	
38	46			IC02_2	F		
				INT03_1	-		
-	-			SIN0_1			
				P15			
39				AN05			
	47	57	35	IC03_2	F	J	
	-			SOT0_1			
-				(SDA0_1)			
		59	36	P16		J	
	48			AN06	F		
	40	00		SCK0_1			
				(SCL0_1)			
				P17	_		
40	10	50	37	AN07	F	ĸ	
40	49	59	57	SIN2_2	Г	ĸ	
				INT04_1			
41	50	60	38	AVCC	-		
42	51	61	39	AVRH	-		
43	52	62	40	AVSS	-		
				P18			
14	53	63	11	AN08			
44	55	03	41	SOT2_2		J	
				(SDA2_2)			
				P19		J	
45	54	64	40	AN09	F		
	J 4		74	SCK2_2			
				(SCL2_2)			





Pin	Pin name	Function description	Pin No						
function	1 in name		n LQFP-64 LQFP-80 LQFF		LQFP-100	QFP-100			
Multi-	SIN5_0	Multi-function serial interface ch.5 input	60	76	96	74			
Serial	SIN5_2	pin	-	-	15	93			
5	SOT5_0 (SDA5_0)	Multi-function serial interface ch.5 output pin. This pin operates as SOT5 when it is	59	75	95	73			
	SOT5_2 (SDA5_2)	used in a UART/CSIO (operation modes 0 to 2) and as SDA5 when it is used in an I ² C (operation mode 4).	-	-	16	94			
	SCK5_0 (SCL5_0)	Multi-function serial interface ch.5 clock I/O pin. This pin operates as SCK5 when it is	58	74	94	72			
	SCK5_2 (SCL5_2)	used in a UART/CSIO (operation modes 0 to 2) and as SCL5 when it is used in an I^2C (operation mode 4).	-	-	17	95			
Multi-	SIN6_0	Multi-function serial interface ch.6 input	-	5	5	83			
function Serial 6	SIN6_1	pin	8	12	12	90			
	SOT6_0 (SDA6_0)	Multi-function serial interface ch.6 output pin. This pin operates as SOT6 when it is	-	6	6	84			
	SOT6_1 (SDA6_1)	used in a UART/CSIO (operation modes 0 to 2) and as SDA6 when it is used in an I^2C (operation mode 4).	7	11	11	89			
	SCK6_0 (SCL6_0)	Multi-function serial interface ch.6 clock I/O pin. This pin operates as SCK6 when it is	-	7	7	85			
	SCK6_1 (SCL6_1)	used in a UART/CSIO (operation modes 0 to 2) and as SCL6 when it is used in an I^2C (operation mode 4).	6	10	10	88			
Multi-	SIN7_1	Multi-function serial interface ch.7 input	27	35	45	23			
function	SIN7_2	pin	61	77	97	75			
7	SOT7_1 (SDA7_1)	Multi-function serial interface ch.7 output pin. This pin operates as SOT7 when it is	26	34	44	22			
	SOT7_2 (SDA7_2)	used in a UART/CSIO (operation modes 0 to 2) and as SDA7 when it is used in an I^2C (operation mode 4).	62	78	98	76			
	SCK7_1 (SCL7_1)	Multi-function serial interface ch.7 clock I/O pin. This pin operates as SCK7 when it is	25	33	43	21			
	SCK7_2 (SCL7_2)	used in a UART/CSIO (operation modes 0 to 2) and as SCL7 when it is used in an I^2C (operation mode 4).	63	79	99	77			







Static Electricity

Because semiconductor devices are particularly susceptible to damage by static electricity, you must take the following precautions:

- 1. Maintain relative humidity in the working environment between 40% and 70%. Use of an apparatus for ion generation may be needed to remove electricity.
- 2. Electrically ground all conveyors, solder vessels, soldering irons and peripheral equipment.
- 3. Eliminate static body electricity by the use of rings or bracelets connected to ground through high resistance (on the level of 1 $M\Omega$).

Wearing of conductive clothing and shoes, use of conductive floor mats and other measures to minimize shock loads is recommended.

- 4. Ground all fixtures and instruments, or protect with anti-static measures.
- 5. Avoid the use of styrofoam or other highly static-prone materials for storage of completed board assemblies.

6.3 Precautions for Use Environment

Reliability of semiconductor devices depends on ambient temperature and other conditions as described above.

For reliable performance, do the following:

1. Humidity

Prolonged use in high humidity can lead to leakage in devices as well as printed circuit boards. If high humidity levels are anticipated, consider anti-humidity processing.

2. Discharge of Static Electricity

When high-voltage charges exist close to semiconductor devices, discharges can cause abnormal operation. In such cases, use anti-static measures or processing to prevent discharges.

3. Corrosive Gases, Dust, or Oil

Exposure to corrosive gases or contact with dust or oil may lead to chemical reactions that will adversely affect the device. If you use devices in such conditions, consider ways to prevent such exposure or to protect the devices.

4. Radiation, Including Cosmic Radiation

Most devices are not designed for environments involving exposure to radiation or cosmic radiation. Users should provide shielding as appropriate.

5. Smoke, Flame

CAUTION: Plastic molded devices are flammable, and therefore should not be used near combustible substances. If devices begin to smoke or burn, there is danger of the release of toxic gases.

Customers considering the use of Cypress products in other special environmental conditions should consult with sales representatives.



C Pin

This series contains the regulator. Be sure to connect a smoothing capacitor (CS) for the regulator between the C pin and the GND pin. Please use a ceramic capacitor or a capacitor of equivalent frequency characteristics as a smoothing capacitor. However, some laminated ceramic capacitors have the characteristics of capacitance variation due to thermal fluctuation (F

characteristics and Y5V characteristics). Please select the capacitor that meets the specifications in the operating conditions to use by evaluating the temperature characteristics of a capacitor.

A smoothing capacitor of about 4.7µF would be recommended for this series.



Mode pins (MD0, MD1)

Connect the MD pin (MD0, MD1) directly to VCC or VSS pins. Design the printed circuit board such that the pull-up/down resistance stays low, as well as the distance between the mode pins and VCC pins or VSS pins is as short as possible and the connection impedance is low, when the pins are pulled-up/down such as for switching the pin level and rewriting the Flash memory data. It is because of preventing the device erroneously switching to test mode due to noise.

Notes on power-on

Turn power on/off in the following order or at the same time. If not using the A/D converter, connect AVCC = VCC and AVSS = VSS.

Turning on: VCC \rightarrow AVCC \rightarrow AVRH

Turning off: AVRH \rightarrow AVCC \rightarrow VCC

Serial Communication

There is a possibility to receive wrong data due to the noise or other causes on the serial communication.

Therefore, design a printed circuit board so as to avoid noise.

Consider the case of receiving wrong data due to noise, perform error detection such as by applying a checksum of data at the end. If an error is detected, retransmit the data.

Differences in features among the products with different memory sizes and between Flash memory products and MASK products

The electric characteristics including power consumption, ESD, latch-up, noise characteristics, and oscillation characteristics among the products with different memory sizes and between Flash memory products and MASK products are different because chip layout and memory structures are different.

If you are switching to use a different product of the same series, please make sure to evaluate the electric characteristics.



8. Block Diagram



*: For the MB9AF1A1L and MB9AF1A2L, Multi-function Serial Interface does not support hardware flow control in these products.



9. Memory Size

See Memory size in Product Lineup to confirm the memory size.

10. Memory Map

Memory Map (1)





us type	Function	Power-on reset or low-voltage detection state		Device internal reset state	Run mode or Sleep mode state	or Timer mode, RTC mode, or Stop mode state		Deep Standb or Deep Sta mode	by RTC mode andby Stop state	Return from Deep Standby mode state			
in stat	group	Power supply unstable	Power supply stable		Power supply stable	Power sup	Power supply stable		Power supply stable				
α.		-	INITX = 0	INITX = 1	INITX = 1	INIT	X = 1	INIT	X = 1	INITX = 1			
		-	-	-	-	SPL = 0	SPL = 1	SPL = 0	SPL = 1	-			
н	Resource selected			LI; 7 /	Maintain	Maintain	Hi-7 /	GPIO selected Internal input fixed at 0	u; 7 /	GPIO selected			
	GPIO selected	Hi-Z Input enablec	Input enabled	Input enabled	Maintain previous state	previous state	Internal input fixed at 0	Output maintains previous state / Internal input fixed at 0	Internal input fixed at 0	Maintain previous state			
1	NMIX selected	Setting disabled	Setting disabled	Setting disabled			Maintain previous state						
	Resource other than above selected GPIO selected		Hi-Z / Hi-Z / Input Input	Hi-Z / Input	Maintain previous state	Maintain previous state i	tain ous Hi-Z / Internal input fixed	WKUP input enabled xed	Hi-Z / WKUP input enabled	GPIO selected			
			enableu	enableu			at 0			Maintain previous state			
	Analog input selected	Hi-Z	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled			
J	Resource other than above selected				Maintain	Maintain	Hi-Z /	GPIO selected Internal input fixed at 0	u; 7 /	GPIO selected			
	GPIO selected	Setting disabled	Setting disabled	Setting disabled	previous state	previous state	Vaintain previous state at 0		ain bus Internal input fixed at 0 stat Inter fixe		Internal Output input fixed maintains at 0 previous state / Internal input fixed at 0		Internal input fixed at 0



atus type	Function	Power-on reset or low-voltage detection state Power	INITX input state	Device internal reset state	Run mode or Sleep mode state Power	r Timer mode, RTC mode, or Stop mode state Power supply stable		Deep Standk or Deep Sta mode	oy RTC mode andby Stop state	Return from Deep Standby mode state
in sta	group	supply unstable		Power supply stable		supply Power sup stable		Power sup	oply stable	Power supply stable
Δ.		-	INITX = 0	INITX = 1	INITX = 1	INITX = 1		INITX = 1		INITX = 1
		-	-	-	-	SPL = 0	SPL = 1	SPL = 0	SPL = 1	-
к	Analog input selected	Hi-Z	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled
	External interrupt enabled selected						Maintain previous state	GPIO selected		GPIO selected
	Resource other than above Setting selected disabled GPIO selected	Setting disabled	Setting disabled	Setting disabled	Maintain previous state	ain Maintain us previous state	Hi-Z /	Internal input fixed at 0	Hi-Z / Internal input fixed at 0	GI IO Selected
							Internal input fixed at 0	Output maintains previous state / Internal input fixed at 0		Maintain previous state
	Analog input selected	Hi-Z	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled	Hi-Z / Internal input fixed at 0 / Analog input enabled
	WKUP enabled						Hi-Z / Internal input fixed at 0	WKUP input enabled	Hi-Z / WKUP input enabled	
L	External interrupt enabled selected				Maintain	Maintain	Maintain previous state	GPIO selected		GPIO selected
	Resource other than above selected	Setting disabled	ietting Setting S isabled disabled d	Setting disabled	previous state	previous state	Hi-Z /	Internal input fixed at 0	Hi-Z / Internal input	
	GPIO selected						Internal input fixed at 0	Output maintains previous state / Internal input fixed at "0"		Maintain previous state





tus type	Function	Power-on reset or low-voltage detection state	INITX input state	INITX Device input internal state state		a Run mode or Timer mode, D Sleep RTC mode, or mode Stop mode state state Power		Deep Standb or Deep Sta mode	Return from Deep Standby mode state	
in stat	group	Power supply unstable	Power su	Power supply stable		Supply Power supply stable stable		Power sup	oply stable	Power supply stable
a.		-	INITX = 0	INITX = 1	INITX = 1		X = 1		X = 1	INITX = 1
	Ma da	-	-	-	-	SPL = 0	SPL = 1	SPL = 0	SPL = 1	-
	Mode input pin	Input enabled	Input enabled	Input enabled	Input enabled	Input enabled	Input enabled	Input enabled	Input enabled	Input enabled
Р	GPIO selected	Setting disabled	Setting disabled	Setting disabled	Maintain previous state	Maintain previous state	Hi-Z / input enabled	Maintain previous state	Hi-Z / input enabled	Maintain previous state
	CEC enabled	Setting disabled	Setting disabled	Setting disabled	Maintain previous state	Maintain previous state	Maintain previous state	Maintain previous state	Maintain previous state	Maintain previous state
Q	Resource other than above selected						Hi-Z /	GPIO selected Internal input fixed at 0		GPIO selected
	GPIO selected	Hi-Z	HI-Z / Input enabled	Input enabled	previous state	previous state	Internal input fixed at 0	Output maintains previous state / Internal input fixed at 0	Internal input fixed at 0	Maintain previous state
	CEC enabled	Setting disabled	Setting disabled	Setting disabled	Maintain previous state	Maintain previous state	Maintain previous state	Maintain previous state	Maintain previous state	Maintain previous state
	WKUP enabled	Setting	Setting	Setting			Hi-Z / Internal input fixed at 0	WKUP input enabled	Hi-Z / WKUP input enabled	
R	External interrupt enabled selected	disabled	disabled	disabled	Maintain	Maintain	Maintain previous state	GPIO selected		GPIO selected
R	Resource other than above selected				previous state	previous state	Hi-Z /	Internal input fixed at 0	Hi-Z / Internal input	
	GPIO selected	Hi-Z	Input enabled	Input enabled			Internal input fixed at 0	Output maintains previous state / Internal input fixed at 0		Maintain previous state



12. Electrical Characteristics

12.1 Absolute Maximum Ratings

	Symbol	Ra	ting		_ .	
Parameter	Symbol	Min	Max	Unit	Remarks	
Power supply voltage*1,*2	Vcc	Vss - 0.5	Vss + 6.5	V		
Analog power supply voltage*1,*3	AVcc	Vss - 0.5	Vss + 6.5	V		
Analog reference voltage*1,*3	AVRH	Vss - 0.5	Vss + 6.5	V		
Input voltage*1	VI	V _{SS} - 0.5	V _{CC} + 0.5 (≤ 6.5 V)	V		
		V _{SS} - 0.5	V _{SS} + 6.5	V	5V tolerant	
Analog pin input voltage*1	VIA	V _{SS} - 0.5	AV _{CC} + 0.5 (≤ 6.5 V)	V		
Output voltage*1	Vo	V _{SS} - 0.5	V _{cc} + 0.5 (≤ 6.5 V)	V		
L level maximum output current*4	lol	-	10	mA		
L level average output current*5	IOLAV	-	4	mA		
L level total maximum output current	∑lol	-	100	mA		
L level total average output current*6	∑IOLAV	-	50	mA		
H level maximum output current*4	Іон	-	- 10	mA		
H level average output current*5	IOHAV	-	- 4	mA		
H level total maximum output current	Σloh	-	- 100	mA		
H level total average output current*6	ΣΙομαν	-	- 50	mA		
Power consumption	PD	-	400	mW		
Storage temperature	T _{STG}	- 55	+ 150	°C		

*1: These parameters are based on the condition that $V_{SS} = AV_{SS} = 0$ V.

*2: V_{CC} must not drop below V_{SS} - 0.5 V.

*3: Be careful not to exceed V_{CC} + 0.5 V, for example, when the power is turned on.

*4: The maximum output current is defined as the value of the peak current flowing through any one of the corresponding pins.

*5: The average output current is defined as the average current value flowing through any one of the corresponding pins for a 100 ms period.

*6: The total average output current is defined as the average current value flowing through all of corresponding pins for a 100 ms.

WARNING:

 Semiconductor devices may be permanently damaged by application of stress (including, without limitation, voltage, current or temperature) in excess of absolute maximum ratings.
 Do not exceed any of these ratings.



12.2 Recommended Operating Conditions

 $(V_{SS} = AV_{SS} = 0.0V)$

-			Conditions	Va	ue			
Par	ameter	Symbol	Conditions	Min	Max	Unit	Remarks	
Power supply	voltage	Vcc	-	1.8	5.5	V		
Analog power	supply voltage	AVcc	-	1.8	5.5	V	AVcc = Vcc	
Analog reference voltage				2.7	A\/	V	$AV_{CC} \ge 2.7 V$	
		Ανκη	-	AVcc	AVCC		AV _{CC} < 2.7 V	
Smoothing cap	pacitor	Cs	-	1	10	μF	For built-in Regulator *	
Operating Temperature	LQD064, LQG064, LQH080, LQJ080, LQI100, PQH100	TA	-	- 40	+ 85	°C		

*: See C Pin in Handling Devices for the smoothing capacitor.

WARNING:

The recommended operating conditions are required in order to ensure the normal operation of the semiconductor device. All
of the device's electrical characteristics are warranted when the device is operated under these conditions.

Any use of semiconductor devices will be under their recommended operating condition.

Operation under any conditions other than these conditions may adversely affect reliability of device and could result in device failure.

No warranty is made with respect to any use, operating conditions or combinations not represented on this data sheet. If you are considering application under any conditions other than listed herein, please contact sales representatives beforehand.



12.4.11 PC Timing

Deremeter	Symbol	Conditions	Standar	d-mode	Fast-mode		l Imit	Domorko
Parameter	Symbol	Conditions	Min	Max	Min	Max	Unit	Remarks
SCL clock frequency	fscl		0	100	0	400	kHz	
(Repeated) START condition hold time SDA $\downarrow \rightarrow$ SCL \downarrow	t _{HDSTA}		4.0	-	0.6	-	μs	
SCL clock L width	tLOW		4.7	-	1.3	-	μs	
SCL clock H width	t _{ніGH}		4.0	-	0.6	-	μs	
(Repeated) START condition setup time $SCL \uparrow \rightarrow SDA \downarrow$	t susta	C _L = 50 pF,	4.7	-	0.6	-	μs	
Data hold time SCL $\downarrow \rightarrow$ SDA $\downarrow \uparrow$	t hddat	$R = (V_P/I_OL)^{*1}$	0	3.45* ²	0	0.9* ³	μs	
Data setup time $SDA \downarrow \uparrow \rightarrow SCL \uparrow$	t sudat		250	-	100	-	ns	
STOP condition setup time SCL $\uparrow \rightarrow$ SDA \uparrow	tsusтo		4.0	-	0.6	-	μs	
Bus free time between STOP condition and START condition	tвuғ		4.7	-	1.3	-	μs	
Noise filter	tsp	-	2 tcycp*4	-	2 tcycp*4	-	ns	

(V_{CC} = 1.8V to 5.5V, V_{SS} = 0V, T_A = - $40^\circ C$ to + $85^\circ C$)

*1: R and C_L represent the pull-up resistor and load capacitance of the SCL and SDA lines, respectively. V_P indicates the power supply voltage of the pull-up resistor and I_{OL} indicates V_{OL} guaranteed current.

*2: The maximum t_{HDDAT} must satisfy that it does not extend at least L period (t_{LOW}) of device's SCL signal.

*3: A Fast-mode I²C bus device can be used on a Standard-mode I²C bus system as long as the device satisfies the requirement of $t_{SUDAT} \ge 250 \text{ ns.}$

*4: t_{CYCP} is the APB bus clock cycle time.

About the APB bus number which I²C is connected to, see Block Diagram in this data sheet. To use Standard-mode, set the APB bus clock at 2 MHz or more. To use Fast-mode, set the APB bus clock at 8 MHz or more.







Operation example of return from Low-Power consumption mode (by internal resource interrupt*)

*: Internal resource interrupt is not included in return factor by the kind of Low-Power consumption mode.

Notes:

- The return factor is different in each Low-Power consumption modes.
 See Chapter 6: Low Power Consumption Mode and Operations of Standby Modes in FM3 Family Peripheral Manual.
- When interrupt recoveries, the operation mode that CPU recoveries depend on the state before the Low-Power consumption mode transition. See Chapter 6: Low Power Consumption Mode in FM3 Family Peripheral Manual.











Document History

Document Title: MB9A1A0N Series 32-bit ARM® Cortex®-M3 FM3 Microcontroller

Document Number: 002-05675

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	-	AKIH	06/30/2015	Migrated to Cypress and assigned document number 002-05675. No change to document contents or format.
*A	5193131	AKIH	03/31/2016	Updated to Cypress format.
*В	5513616	HTER	02/08/2017	Modified RTC description in "Features, Real-Time Clock(RTC)". Changed starting count value from 01 to 00. Deleted "second, or day of the week" in the Interrupt function. (Page 2) Changed package code as the following table in following section. 2. Package (Page 7) 3. Pin Assignment (Page 8 -11) 12. Electrical Characteristics (Page 53) 13. Ordering Information (Page 87) 14. Package Dimensions (Page 88 - 93) Before After FPT-64P-M38 LQD064 FPT-64P-M39 LQG064 FPT-80P-M40 LQJ080 FPT-100P-M23 LQI100 FPT-100P-M23 LQI100 FPT-100P-M06 PQH100 Added the Baud rate spec in "12.4.9 CSIO/UART Timing" (Page 64 - 70) Changed Part numbers in 13. Ordering Information (Page 87) "MB9AF1A2LPMC-G-SNE2" to "MB9AF1A2LPMC-G-UNE2" "MB9AF1A2NPMC-G-SNE2" to "MB9AF1A2NPMC-G-UNE2" "MB9AF1A2NPMC-G-SNE2" to "MB9AF1A2NPMC-G-UNE2" "MB9AF1A1MPMC-G-SNE2" to "MB9AF1A2NPMC-G-UNE2" "MB9AF1A2NPMC1-G-SNE2" to "MB9AF1A2NPMC1-G-UNE2" "MB9AF1A2MPMC1-G-SNE2" to "MB9AF1A2MPMC1-G-UNE2" "MB9AF1A2MPMC1-G-SNE2" to "MB9AF1A2MPMC1-G-UNE2"



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