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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 "Embedded - Microcontrollers"

Details	
Product Status	Obsolete
Core Processor	FR81S
Core Size	32-Bit Single-Core
Speed	80MHz
Connectivity	CANbus, CSIO, I²C, LINbus, SPI, UART/USART
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	44
Program Memory Size	448KB (448K x 8)
Program Memory Type	FLASH
EEPROM Size	64K x 8
RAM Size	56K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 26x12b; D/A 1x8b
Oscillator Type	External
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	64-LQFP
Supplier Device Package	64-LQFP (10x10)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb91f523bscpmc1-gse2

Product lineup comparison 120 pins

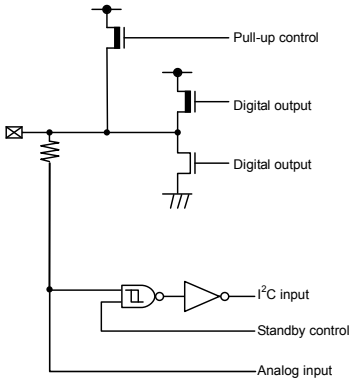
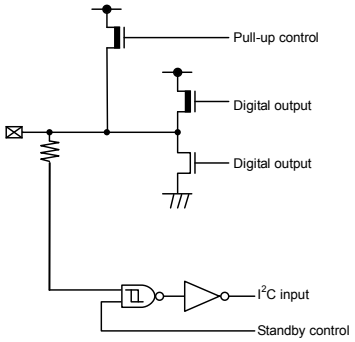
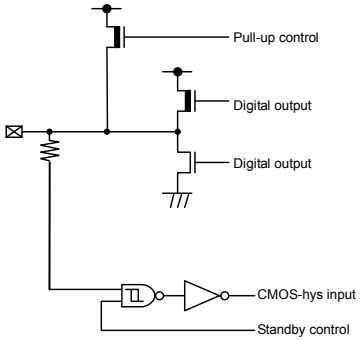
	MB91F522J	MB91F523J	MB91F524J	MB91F525J	MB91F526J
System Clock	On chip PLL Clock multiple method				
Minimum instruction execution time	12.5ns (80MHz)				
Flash Capacity (Program)	(256+64)KB	(384+64)KB	(512+64)KB	(768+64)KB	(1024+64)KB
Flash Capacity (Data)	64KB				
RAM Capacity	(48+8)KB		(64+8)KB	(96+8)KB	(128+8)KB
External BUS I/F (22address/16data/4cs)	None				
DMA Transfer	16ch				
16-bit Base Timer	2ch				
Free-run Timer	16bit×3ch, 32bit×3ch				
Input capture	16bit×4ch, 32bit×6ch				
Output Compare	16bit×6ch, 32bit×6ch				
16-bit Reload Timer	8ch				
PPG	16bit×38ch				
Up/down Counter	2ch				
Clock Supervisor	Yes				
External Interrupt	8ch×2units				
A/D converter	12bit×26ch (1unit), 12bit×16ch (1unit)				
D/A converter (8bit)	2ch				
Multi-Function Serial Interface	12ch*1				
CAN	64msg×2ch/128msg×1ch				
Hardware Watchdog Timer	Yes				
CRC Formation	Yes				
Low-voltage detection reset	Yes				
Flash Security	Yes				
ECC Flash/WorkFlash	Yes				
ECC RAM	Yes				
Memory Protection Function (MPU)	Yes				
Floating point arithmetic (FPU)	Yes				
Real Time Clock (RTC)	Yes				
General-purpose port (#GPIOs)	96 ports				
SSCG	Yes				
Sub clock	Yes				
CR oscillator	Yes				
NMI request function	Yes				
OCD (On Chip Debug)	Yes				
TPU (Timing Protection Unit)	Yes				
Key code register	Yes				
Waveform generator	6ch				
Operation guaranteed temperature (T_A)	-40°C to +125°C				
Power supply	2.7V to 5.5V *2				
Package	LQM120				

*1: Only channel 3 and channel 4 support the I^2C (fast mode/standard mode).
Only channel 5, channel 6, channel 7, channel 8 and channel 11 support the I^2C (standard mode).

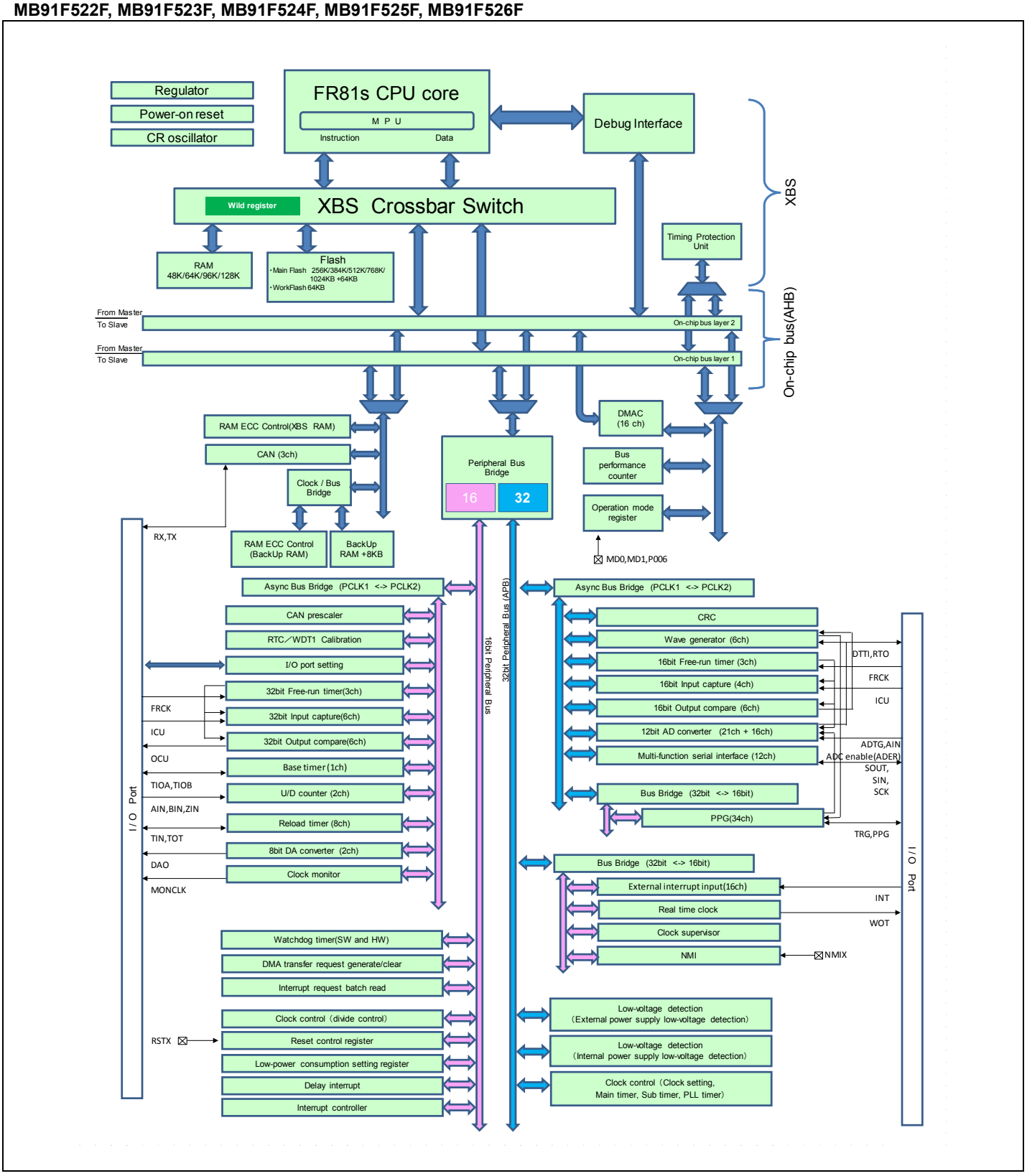
*2: The initial detection voltage of the external low voltage detection is 2.8V±8% (2.576V to 3.024V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

Pin no.						Pin Name	Polarity	I/O circuit types*8	Function*9
64	80	100	120	144	176				
3 *1	3 *1	3 *1	6 *1	9	11	P024	-	F	General-purpose I/O port
						WR0X *2, *3, *4, *5	-		External bus/Write strobe 0 output
						SIN4_1	-		Multi-function serial ch.4 serial data input (1)
						PPG24_0	-		PPG ch.24 output (0)
						TIN1_0	-		Reload timer ch.1 event input (0)
						RTO4_1	-		Waveform generator ch.4 output pin (1)
						INT15_0	-		INT15 External interrupt input (0)
-	-	4 *1	7 *1	10	12	P025	-	A	General-purpose I/O port
						WR1X *4, *5	-		External bus/Write strobe 1 output
						SOT4_1	-		Multi-function serial ch.4 serial data output (1)
						PPG25_0	-		PPG ch.25 output (0)
						TIN2_0	-		Reload timer ch.2 event input (0)
-	-	-	-	-	13	P172	-	A	General-purpose I/O port
						PPG38_1	-		PPG ch.38 output (1)
-	4 *1	5 *1	8 *1	11	14	P026	-	F	General-purpose I/O port
						A00 *3, *4, *5	-		External bus/Address bit0 output (0)
						SCK4_1	-		Multi-function serial ch.4 clock I/O (1)
						PPG26_0	-		PPG ch.26 output (0)
						TIN3_0	-		Reload timer ch.3 event input (0)
4 *1	5 *1	6 *1	9 *1	12	15	P027	-	A	General-purpose I/O port
						A01 *2, *3, *4, *5	-		External bus/Address bit1 output (0)
						SCS40_1	-		Serial chip select 40 I/O (1)
						PPG27_0	-		PPG ch.27 output (0)
						TOT0_0	-		Reload timer ch.0 output (0)
						RTO3_1	-		Waveform generator ch.3 output pin (1)
-	-	-	-	-	16	P173	-	A	General-purpose I/O port
						PPG39_1	-		PPG ch.39 output (1)
-	-	7 *1	10 *1	13	17	P030	-	A	General-purpose I/O port
						A02 *4, *5	-		External bus/Address bit2 output (0)
						SCS41_1	-		Serial chip select 41 output (1)
						PPG28_0	-		PPG ch.28 output (0)
						TOT1_0	-		Reload timer ch.1 output (0)
-	6 *1	8 *1	11 *1	14	18	P031	-	A	General-purpose I/O port
						A03 *3, *4, *5	-		External bus/Address bit3 output (0)
						SCS42_1	-		Serial chip select 42 output (1)
						PPG29_0	-		PPG ch.29 output (0)
						TOT2_0 *3	-		Reload timer ch.2 output (0)

Pin no.						Pin Name	Polarity	I/O circuit types*8	Function*9
64	80	100	120	144	176				
9 *1	11 *1	14 *1	17 *1	20	24	P035	-	I	General-purpose I/O port
						A07 *2, *3, *4, *5	-		External bus/Address bit7 output
						SIN8_0 *2, *3	-		Multi-function serial ch.8 serial data input (0)
						OCU8_1	-		Output compare ch.8 output (1)
						TOT4_0	-		Reload timer ch.4 output (0)
						AIN0_0	-		U/D counter ch.0 AIN input (0)
						INT11_0	-		INT11 External interrupt input (0)
10 *1	12 *1	15 *1	18 *1	21	25	P036	-	A	General-purpose I/O port
						A08 *2, *3, *4, *5	-		External bus/Address bit8 output (0)
						SCS8_0 *2, *3	-		Serial chip select 8 I/O (0)
						OCU7_1	-		Output compare ch.7 output (1)
						TOT5_0	-		Reload timer ch.5 output (0)
						BIN0_0	-		U/D counter ch.0 BIN input (0)
-	-	16 *1	19 *1	22	26	P037	-	A	General-purpose I/O port
						A09 *4, *5	-		External bus/Address bit9 output (0)
						OCU6_1	-		Output compare ch.6 output (1)
						TOT6_0	-		Reload timer ch.6 output (0)
						ZIN0_0	-		U/D counter ch.0 ZIN input (0)
-	-	-	-	-	27	P174	-	A	General-purpose I/O port
						TRG8_1	-		PPG trigger 8 input (1)
-	-	-	-	-	28	P175	-	A	General-purpose I/O port
						TRG9_1	-		PPG trigger 9 input (1)
11 *1	13 *1	17 *1	20 *1	23	29	P040	-	A	General-purpose I/O port
						A10 *2, *3, *4, *5	-		External bus/Address bit10 output (0)
						PPG23_1	-		PPG ch.23 output (1)
						TOT7_0	-		Reload timer ch.7 output (0)
						AIN1_0	-		U/D counter ch.1 AIN input (0)
						SIN0_1	-		Multi-function serial ch.0 serial data input (1)
12 *1	14 *1	18 *1	21 *1	24	30	P041	-	I	General-purpose I/O port
						A11 *2, *3, *4, *5	-		External bus/Address bit11 output (0)
						SIN9_0	-		Multi-function serial ch.9 serial data input (0)
						ICU9_1	-		Input capture ch.9 input (1)
						BIN1_0	-		U/D counter ch.1 BIN input (0)
						INT12_0	-		INT12 External interrupt input (0)

Type	Circuit	Remarks
D		•I²C Analog input, General-purpose I/O port •Output 3mA •Pull-up resistor control 50kΩ •I²C hysteresis input
E		•I²C,General-purpose I/O port •Output 3mA •Pull-up resistor control 50kΩ •I²C hysteresis input
F		•General-purpose I/O port •Output 4mA •Pull-up resistor control 50kΩ •CMOS hysteresis input

MB91F522F, MB91F523F, MB91F524F, MB91F525F, MB91F526F



Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
000120_H	OCCP6 [R/W] W 00000000 00000000 00000000 00000000				Output Compare 6,7 32-bit OCU
000124_H	OCCP7 [R/W] W 00000000 00000000 00000000 00000000				
000128_H	—	—	OCSH67 [R/W] B,H,W ---0--00	OCSL67 [R/W] B,H,W 0000--00	
$00012C_H$	OCCP8 [R/W] W 00000000 00000000 00000000 00000000				Output Compare 8,9 32-bit OCU
000130_H	OCCP9 [R/W] W 00000000 00000000 00000000 00000000				
000134_H	—	—	OCSH89 [R/W] B,H,W ---0--00	OCSL89 [R/W] B,H,W 0000--00	
000138_H to $0001B4_H$	—	—	—	—	Reserved
$0001B8_H$	EPFR64 [R/W] B,H,W -----00-	EPFR65 [R/W] B,H,W 0000-000	EPFR66 [R/W] B,H,W --000000	EPFR67 [R/W] B,H,W ----0000	Extended port function register
$0001BC_H$	EPFR68 [R/W] B,H,W ----0000	EPFR69 [R/W] B,H,W ----0000	EPFR70 [R/W] B,H,W ---00000	EPFR71 [R/W] B,H,W -0-0-0-0	
$0001C0_H$	EPFR72 [R/W] B,H,W 000000-0	EPFR73 [R/W] B,H,W 00000000	EPFR74 [R/W] B,H,W 00000000	EPFR75 [R/W] B,H,W 00000000	
$0001C4_H$	EPFR76 [R/W] B,H,W 00000000	EPFR77 [R/W] B,H,W --000000	EPFR78 [R/W] B,H,W ------00	EPFR79 [R/W] B,H,W 00000000	
$0001C8_H$	EPFR80 [R/W] B,H,W ---00000	EPFR81 [R/W] B,H,W 00000000	EPFR82 [R/W] B,H,W 00000000	EPFR83 [R/W] B,H,W -0000000	
$0001CC_H$	EPFR84 [R/W] B,H,W 00000000	EPFR85 [R/W] B,H,W --000000	EPFR86 [R/W] B,H,W ---00000	EPFR87 [R/W] B,H,W ------00	
$0001D0_H$	EPFR88 [R/W] B,H,W -------0	—	—	—	
$0001D4_H$	—	—	—	—	Reserved
$0001D8_H$	TMRLRA4 [R/W] H XXXXXXXX XXXXXXXX		TMR4 [R] H XXXXXXXX XXXXXXXX		Reload Timer 4
$0001DC_H$	TMRLRB4 [R/W] H XXXXXXXX XXXXXXXX		TMCSR4 [R/W] B, H,W 00000000 0-000000		
$0001E0_H$ to $0001EC_H$	—	—	—	—	Reserved
$0001F0_H$	TMRLRA5 [R/W] H XXXXXXXX XXXXXXXX		TMR5 [R] H XXXXXXXX XXXXXXXX		Reload Timer 5
$0001F4_H$	TMRLRB5 [R/W] H XXXXXXXX XXXXXXXX		TMCSR5 [R/W] B, H,W 00000000 0-000000		

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
0008F4$_H$	WRDR14 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				Wild Register [S]
0008F8$_H$	WRAR15 [R/W] W -------- --XXXXXX XXXXXXXX XXXXXX--				
0008FC$_H$	WRDR15 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000900$_H$	TPUUNLOCK [R/W] W 00000000 00000000 00000000 00000000				Time Protection Unit [S]
000904$_H$	TPULST [R] B,H,W -------0	—	TPUVST [R/W] B,H,W -----000	—	
000908$_H$	TPUCFG [R/W] B,H,W -------0 0-000000 -------- -------0				
00090C$_H$	TPUTIR [R] B,H,W 00000000	—	—	—	
000910$_H$	TPUTST [R] B,H,W 00000000	—	—	—	
000914$_H$	TPUTIE [R/W] B,H,W 00000000	—	—	—	
000918$_H$	TPUTMID [R] B,H,W 00000000 00000000 00000000 00000000				
00091C$_H$ to 00092C$_H$	—	—	—	—	
000930$_H$	TPUTCN00 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
000934$_H$	TPUTCN01 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
000938$_H$	TPUTCN02 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
00093C$_H$	TPUTCN03 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
000940$_H$	TPUTCN04 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
000944$_H$	TPUTCN05 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
000948$_H$	TPUTCN06 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
00094C$_H$	TPUTCN07 [R/W] B,H,W 000000-- 00000000 00000000 00000000				
000950$_H$	TPUTCN10 [R/W] B,H,W ---00000	—	—	—	

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
001200_H	TCGS [R/W] B,H,W ------00	—	—	TCGSE [R/W] B,H,W -----000	16-bit Free-run timer synchronous activation
001204_H	CPCLRB0/CPCLR0 [W] H,W 11111111 11111111		TCDT0 [R/W] H,W 00000000 00000000		16-bit Free-run Timer 0
001208_H	TCCS0 [R/W] B,H,W 00000000 01000000 ----0000 --------				
$00120C_H$	CPCLRB1/CPCLR1 [W] H,W 11111111 11111111		TCDT1 [R/W] H,W 00000000 00000000		16-bit Free-run Timer 1
001210_H	TCCS1 [R/W] B,H,W 00000000 01000000 ----0000 --------				
001214_H	CPCLRB2/CPCLR2 [W] H,W 11111111 11111111		TCDT2 [R/W] H,W 00000000 00000000		16-bit Free-run Timer 2
001218_H	TCCS2 [R/W] B,H,W 00000000 01000000 ----0000 --------				
$00121C_H$ to 001230_H	—	—	—	—	Reserved
001234_H	FRS0 [R/W] B,H,W -------- --00--00 --00--00 --00--00				16-bit Free-run timer selection
001238_H	—		FRS1 [R/W] B,H,W --00--00 --00--00		
$00123C_H$	FRS2 [R/W] B,H,W --00--00 --00--00 --00--00 --00--00				
001240_H	FRS3 [R/W] B,H,W --00--00 --00--00 --00--00 --00--00				
001244_H	FRS4 [R/W] B,H,W --00--00 --00--00 --00--00 --00--00				
001248_H	—	—	—	—	Reserved
$00124C_H$	OCCPB0/OCCP0 [R/W] H,W 00000000 00000000		OCCPB1/OCCP1 [R/W] H,W 00000000 00000000		16-bit Output compare 0/1
001250_H	OCS01 [R/W] B,H,W -110--00 00001100		—	OCMOD01 [R/W] B,H,W ------00	
001254_H	OCCPB2/OCCP2 [R/W] H,W 00000000 00000000		OCCPB3/OCCP3 [R/W] H,W 00000000 00000000		16-bit Output compare 2/3
001258_H	OCS23 [R/W] B,H,W -110--00 00001100		—	OCMOD23 [R/W] B,H,W ------00	

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
001840$_H$	SCR6/(IBCR6) [R/W] B,H,W 0--00000	SMR6[R/W] B,H,W 000-00-0	SSR6[R/W] B,H,W 0-000011	ESCR6/(IBSR6)[R/W] B,H,W 00000000	Multi-UART6
001844$_H$	— /(RDR16/(TDR16))[R/W] B,H,W -------- -------- *3		RDR06/(TDR06)[R/W] B,H,W -------0 00000000 *1		Multi-UART6 *1: Byte access is possible only for access to lower 8 bits. *2: Reserved because I2C mode is not set immediately after reset. *3: Reserved because CSIO mode is not set immediately after reset. *4: Reserved because LIN2.1 mode is not set immediately after reset.
001848$_H$	SACSR6[R/W] B,H,W 0----000 00000000		STMR6[R] B,H,W 00000000 00000000		
00184C$_H$	STMCR6[R/W] B,H,W 00000000 00000000		— /(SCSCR6/SFUR6)[R/W] B,H,W -------- -------- *3 *4		
001850$_H$	— /(SCSTR36)/ (LAMSR6) [R/W] B,H,W -------- *3	— /(SCSTR26)/ (LAMCR6) [R/W] B,H,W -------- *3	— /(SCSTR16)/ (SFLR16) [R/W] B,H,W -------- *3	— /(SCSTR06)/ (SFLR06) [R/W] B,H,W -------- *3	
001854$_H$	—	— /(SCSFR26) [R/W] B,H,W -------- *3	— /(SCSFR16) [R/W] B,H,W -------- *3	— /(SCSFR06) [R/W] B,H,W -------- *3	
001858$_H$	—/(TBYTE36)/ (LAMESR6) [R/W] B,H,W -------- *3	—/(TBYTE26)/ (LAMERT6) [R/W] B,H,W -------- *3	—/(TBYTE16)/ (LAMIER6) [R/W] B,H,W -------- *3	TBYTE06/(LAMRID6) / (LAMTID6) [R/W] B,H,W 00000000	
00185C$_H$	BGR6[R/W] H, W 00000000 00000000		— /(ISMK6)[R/W] B,H,W -------- *2	— /(ISBA6)[R/W] B,H,W -------- *2	
001860$_H$	FCR16[R/W] B,H,W ---00100	FCR06[R/W] B,H,W -0000000	FBYTE6[R/W] B,H,W 00000000 00000000		
001864$_H$	FTICR6[R/W] B,H,W 00000000 00000000		—	—	
001868$_H$	SCR7/(IBCR7) [R/W] B,H,W 0--00000	SMR7[R/W] B,H,W 000-00-0	SSR7[R/W] B,H,W 0-000011	ESCR7/(IBSR7)[R/W] B,H,W 00000000	Multi-UART7 *1: Byte access is possible only for access to lower 8 bits. *2: Reserved because I^2C mode is not set immediately after reset.
00186C$_H$	— /(RDR17/(TDR17))[R/W] B,H,W -------- -------- *3		RDR07/(TDR07)[R/W] B,H,W -------0 00000000 *1		
001870$_H$	SACSR7[R/W] B,H,W 0----000 00000000		STMR7[R] B,H,W 00000000 00000000		
001874$_H$	STMCR7[R/W] B,H,W 00000000 00000000		— /(SCSCR7/SFUR7)[R/W] B,H,W -------- -------- *3 *4		

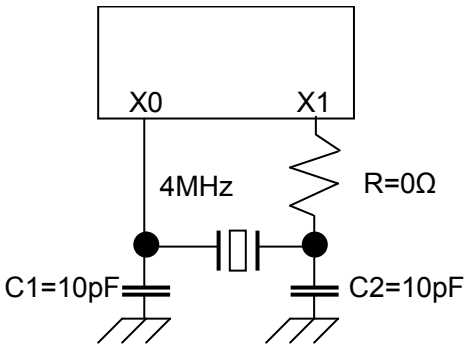
(T_A: -40°C to +125°C, V_{CC}= AVcc=5.0V±10%/3.3V±0.3V, V_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Pin name	Conditions		Value			Unit	Remarks
					Min	Typ	Max		
Power supply current	$I_{CC}5$	VCC	Operating frequency F_{CP}=80MHz, Fcpp=40MHz, at normal operation		-	60	102	mA	
			Operating frequency F_{CP}=80MHz, Fcpp=40MHz, at Flash write		-	70	115	mA	
			Operating frequency F_{CP}=80MHz, Fcpp=40MHz, at Flash erase		-	70	115	mA	
			Operating frequency F_{CP}=64MHz, Fcpp=32MHz, at normal operation		-	54	92	mA	
			Operating frequency F_{CP}=64MHz, Fcpp=32MHz, at Flash write		-	64	105	mA	
			Operating frequency F_{CP}=64MHz, Fcpp=32MHz, at Flash erase		-	64	105	mA	
			Operating frequency F_{CP}=48MHz, Fcpp=24MHz, at normal operation		-	46	82	mA	
			Operating frequency F_{CP}=48MHz, Fcpp=24MHz, at Flash write		-	56	95	mA	
			Operating frequency F_{CP}=48MHz, Fcpp=24MHz, at Flash erase		-	56	95	mA	
	$I_{CCS}5$		Operating frequency F_{CP}=80MHz, Fcpp=40MHz, at CPU sleep mode		-	45	82	mA	
	$I_{CCBS}5$		Operating frequency F_{CP}=80MHz, Fcpp=40MHz, at bus sleep mode		-	23	72	mA	
	$I_{CCT}5$		Watch mode	When using crystal 4MHz T_A=+25°C*	-	1500	2610	µA	
				When using built-in CR clock 50kHz T_A=+25°C*	-	450	2000		
				When using sub clock 32kHz T_A=+25°C*	-	460	2000		
	$I_{CCH}5$		Stop mode	T_A=+25°C*	-	450	2000	µA	
	$I_{CCT}52$		Watch mode (power off)	When using crystal 4MHz T_A=+25°C*	-	1100	1300	µA	LVD/ RTC operation , Backup RAM 8KB retention
				When using built-in CR clock 50kHz , T_A=+25°C*	-	77	267		
				When using sub clock 32kHz T_A=+25°C*	-	100	285		
	$I_{CCH}52$		Stop mode (power off)	T_A=+25°C*	-	74	265	µA	Backup RAM 8KB retention

Oscillation clock frequency vs. Internal operation clock frequency

		Internal operation clock frequency							
			PLL clock						
		Main Clock	Multiplied by 1	Multiplied by 2	Multiplied by 3	Multiplied by 4	...	Multiplied by 19	Multiplied by 20
Oscillation clock frequency	4MHz	2MHz	4MHz	8MHz	12MHz	16MHz	...	76MHz	80MHz

・Example of oscillation circuit



Note: As to the product with its clock supervisor's initial value is "ON", when the oscillator is unable to start within 20ms from the stop state the clock supervisor will detect the oscillation stop. As a result, the CPU moves to the fail safe operation.
Design your print circuit board so that the oscillator can start oscillation within 20ms. Moreover, it is recommended to be designed after the match evaluation of the circuit is requested to the departure pendulum maker when the oscillation circuit is composed.

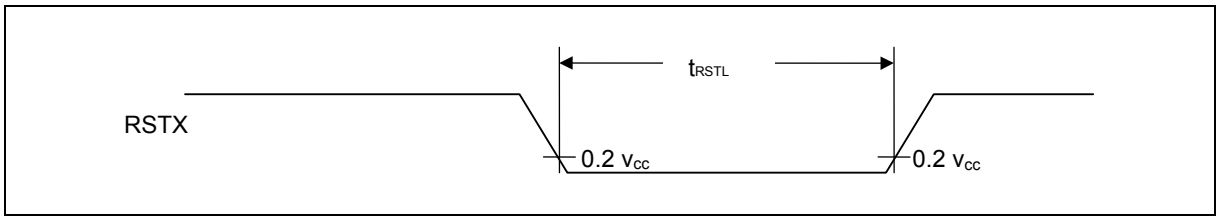
(2) Reset Input

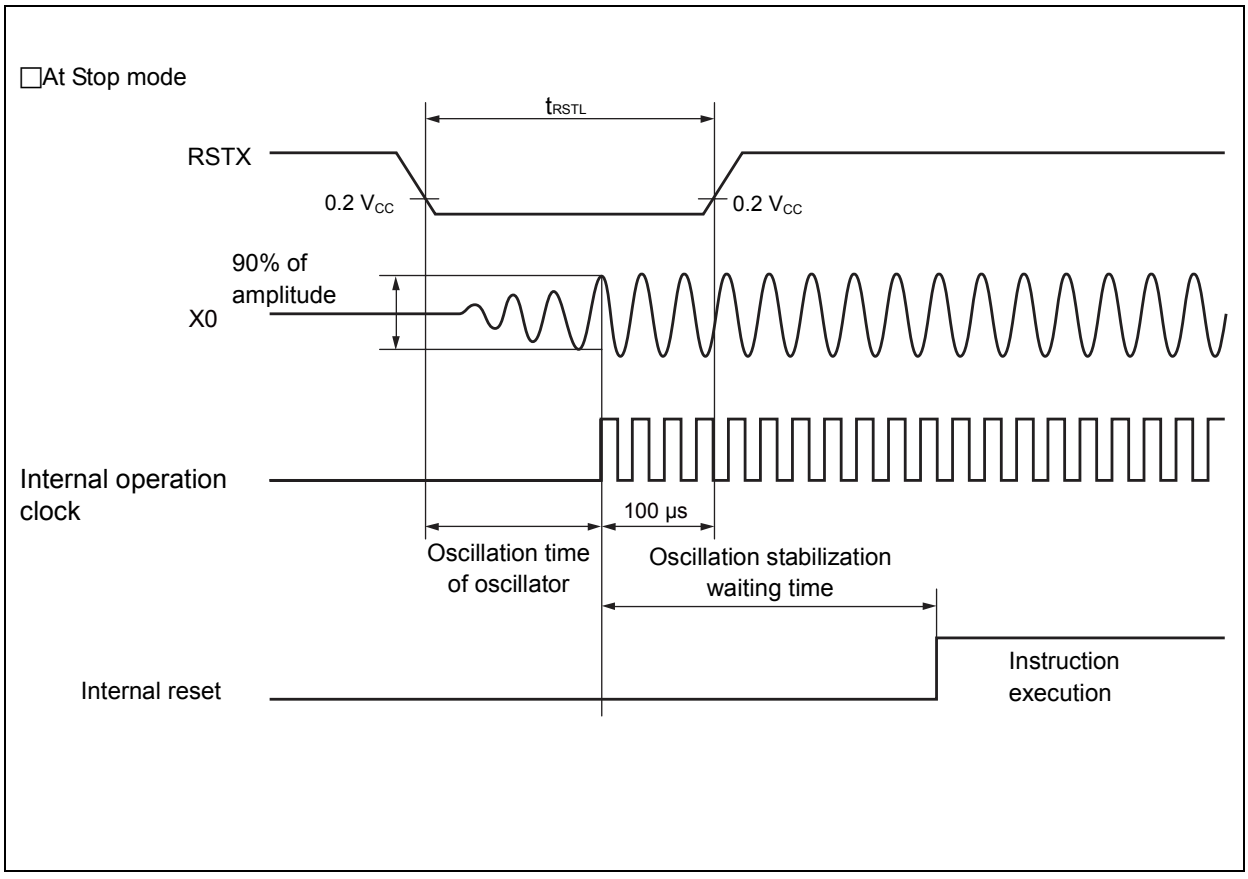
(T_A: -40°C to +125°C, V_{CC}= AV_{CC}=5.0V ± 10%/V_{CC}=AV_{CC}=3.3V±0.3V, V_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Pin name	Conditions	Value		Unit	Remarks
				Min	Max		
Reset input time	t_{RSTL}	RSTX	–	10	–	µs	When normal operation
				Oscillation time of oscillator* +100	–	µs	At Stop mode At Power-on*2
				100	–	µs	At Watch mode
Width for reset input removal				1	–	µs	

*1: The oscillation time of the oscillator is the time it takes for the amplitude of the oscillations to reach 90%. For crystal oscillators, this time is between several ms and several tens of ms, for ceramic oscillators the time is between several hundred µs and several ms, and for an external clock, the time is 0 ms.

*2: In case of using MB91F52xxxD or MB91F52xxxE and corresponding to note in (3) Power-on Conditions of next subsection, assert RSTX with power-on.

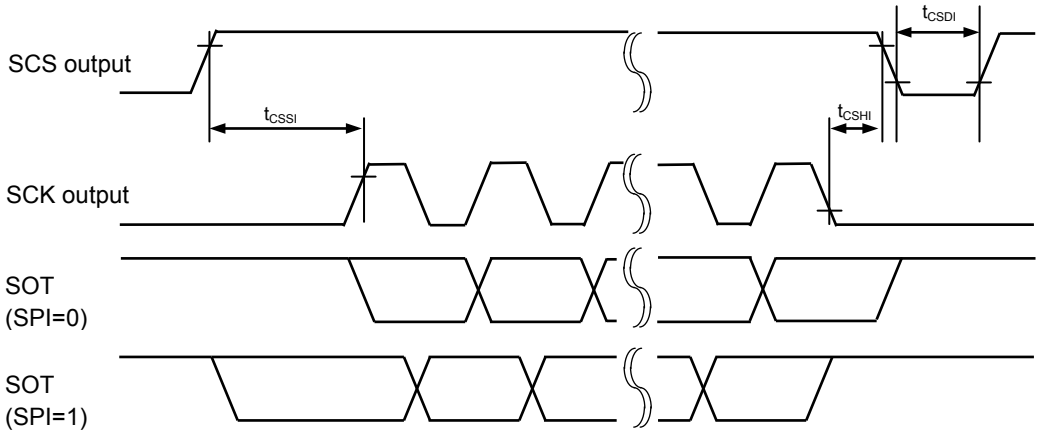




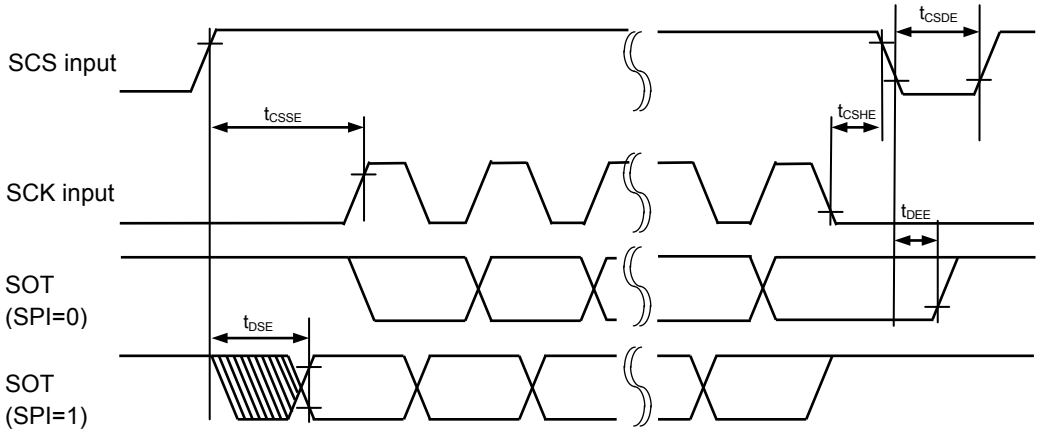
Parameter	Symbol	Pin name	Conditions	Value		Unit	Remarks
				Min	Max		
SCS↓→SCK↑ setup time	t_{CSSE}	SCK1 to SCK11 SCS1 to SCS3, SCS40 to SCS43, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11	-	$3t_{CPP}$+30	-	ns	External shift clock mode output pin: C_L=50pF
SCK↓→SCS↑ hold time	t_{CSHE}			+0	-	ns	
SCS deselect time	t_{CSDE}	SCS1 to SCS3, SCS40 to SCS43, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11		$3t_{CPP}$+30	-	ns	
SCS↓→SOT delay time	t_{DSE}	SCS1 , SCS2, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11 SOT1 , SOT2, SOT5 to SOT11		-	40	ns	
		SCS3, SCS40 to SCS43 SOT3 , SOT4		-	300	ns	
SCS↑→SOT delay time	t_{DEE}	SCS1 to SCS3, SCS40 to SCS43, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11 SOT1 to SOT11	-	+0	-	ns	External shift clock mode output pin: C_L=50pF
SCK↑→SCS↓ clock switch time	t_{SCC}	SCK1 , SCK2, SCK5 to SCK11 SCS1 , SCS2, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11	-	$3t_{CPP}$-10	$3t_{CPP}$+50	ns	Internal shift clock mode Round operation output pin: C_L=50pF
		SCK3 , SCK4 SCS3 , SCS40 to SCS43		$3t_{CPP}$-300	$3t_{CPP}$+50	ns	

*1: t_{CSSU} =SCSTR:CSSU7-0×Serial chip select timing operating clock
*2: t_{CSHD}=SCSTR:CSHD7-0×Serial chip select timing operating clock
*3: t_{CSDS}=SCSTR:CSDS15-0×Serial chip select timing operating clock
Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again

Please see the hardware manual for details of above-mentioned *1,*2, and *3



When Serial chip select is used , Serial clock output mark level "L",
Serial chip select Inactive level "L"
Master mode



When Serial chip select is used , Serial clock output mark level "L",
Serial chip select Inactive level "L"
Slave mode

Part number	Sub clock	CSV Initial value	LVD Initial value	Package*2
MB91F526KWBPMC1	Yes	ON	ON	LQN・144 pin, (Lead pitch 0.4mm) Plastic
MB91F526KYBPMC1			OFF	
MB91F526KJBPMC1		OFF	ON	
MB91F526KLBPMC1			OFF	
MB91F525KWBPMC1		ON	ON	
MB91F525KYBPMC1			OFF	
MB91F525KJBPMC1		OFF	ON	
MB91F525KLBPMC1			OFF	
MB91F524KWBPMC1		ON	ON	
MB91F524KYBPMC1			OFF	
MB91F524KJBPMC1		OFF	ON	
MB91F524KLBPMC1			OFF	
MB91F523KWBPMC1		ON	ON	
MB91F523KYBPMC1			OFF	
MB91F523KJBPMC1		OFF	ON	
MB91F523KLBPMC1			OFF	
MB91F522KWBPMC1		ON	ON	
MB91F522KYBPMC1			OFF	
MB91F522KJBPMC1		OFF	ON	
MB91F522KLBPMC1			OFF	
MB91F526KSBPMC1	None	ON	ON	
MB91F526KUBPMC1			OFF	
MB91F526KHBPMC1		OFF	ON	
MB91F526KKBPMC1			OFF	
MB91F525KSBPMC1		ON	ON	
MB91F525KUBPMC1			OFF	
MB91F525KHBPMC1		OFF	ON	
MB91F525KKBPMC1			OFF	
MB91F524KSBPMC1		ON	ON	
MB91F524KUBPMC1			OFF	
MB91F524KHBPMC1		OFF	ON	
MB91F524KKBPMC1			OFF	
MB91F523KSBPMC1		ON	ON	
MB91F523KUBPMC1			OFF	
MB91F523KHBPMC1		OFF	ON	
MB91F523KKBPMC1			OFF	
MB91F522KSBPMC1		ON	ON	
MB91F522KUBPMC1			OFF	
MB91F522KHBPMC1		OFF	ON	
MB91F522KKBPMC1			OFF	

18. Errata

This section describes the errata for the MB91520 Series. Details include errata trigger conditions, scope of impact, available workarounds, and silicon revision applicability. Contact your local Cypress Sales Representative if you have questions.

Part Numbers Affected

Part Number
MB91F522B/D/F/J/K/L MB91F523B/D/F/J/K/L MB91F524B/D/F/J/K/L MB91F525B/D/F/J/K/L MB91F526B/D/F/J/K/L

MB91F522/3/4/5/6 Qualification Status

Product Status: Production

Errata Summary

The following table defines the errata applicability to available MB91520 Series devices.

Items	Part Number	Silicon Revision	Fix Status
[1]. Power-on Conditions is not enough in the Datasheet Specification	MB91F522B/D/F/J/K/L MB91F523B/D/F/J/K/L MB91F524B/D/F/J/K/L MB91F525B/D/F/J/K/L MB91F526B/D/F/J/K/L	B, C	Will be fixed in production silicon version D, E
[2]. Limitation for Watch mode (power off)		B, C, D, E	-

1. Power-on Conditions is not enough in the Datasheet Specification

■ **Problem Definition**

If the Power-On-Reset and Internal Low Voltage Detection are not generated, some port functions will not be available.

■ **Parameters Affected**

t_{OFF} for Power off time on Power-on Conditions

VCC Power ramp rate on Power-on Conditions

■ **Trigger Condition**

When the power supply voltage to the MCU has been turned off but has not reached 0 V when the power supply voltage is turned on again, MCU does not generate an internal power-on-reset signal (Power-On reset or Internal LVD reset). Then, some port functions will not be available.

If below condition (1) or (2) or (3) is satisfied, Power-On Reset (Initialization-Reset signal) is generated and no problem occurs.

(1) The VCC voltage is less than 200 mV for 50 ms or longer (t_{OFF})

(2) VCC Power ramp rate less than 4 mV/µs (dV/dt) until a voltage level for a safe Power-On detection is reached

(3) C-pin voltage is below 60 mV when VCC is turned on again

<table>
<tr><th>Page</th><th>Section</th><th>Change Results</th></tr>
<tr><td>19</td><td>■PIN Description</td><td>A List of "Pin Description" modified.

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<table>
<tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr>
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<tr><td>ASX</td></tr>
<tr><td>SIN3_1</td></tr>
<tr><td>TRG3_0</td></tr>
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<tr><td>RTO5_1</td></tr>
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<tr><td>SOT3_1</td></tr>
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<tr><td>PPG32_0</td></tr>
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<tr><td>WR0X</td></tr>
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<tr><td>A06 *2, *3, *4, *5</td></tr>
<tr><td>OCU11_1</td></tr>
<tr><td>ICU2_3</td></tr>
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<tr><td>RTO0_1</td></tr>
<tr><td>SOT3_2</td></tr>
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<tr><td>ADTG0_1</td></tr>
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Revision	ECN	Orig. of Change	Submission Date	Description of Change
				Corrected the following description to "Type D, E". I^2C Schmitt input → I^2C hysteresis input Block Diagram Corrected the following description. • MB91F522B, MB91F523B, MB91F524B, MB91F525B, MB91F526B • MB91F522D, MB91F523D, MB91F524D, MB91F525D, MB91F526D • MB91F522F, MB91F523F, MB91F524F, MB91F525F, MB91F526F • MB91F522J, MB91F523J, MB91F524J, MB91F525J, MB91F526J • MB91F522K, MB91F523K, MB91F524K, MB91F525K, MB91F526K • MB91F522L, MB91F523L, MB91F524L, MB91F525L, MB91F526L Electrical Characteristics 2. Recommended operating conditions: *1 of the operation guarantee),contact your sales representative. Moreover, minimum value with an effective external low-voltage detection reset becomes a voltage until generating low-voltage detection reset Electrical Characteristics 3.DC characteristics Corrected the value of "ICCT5 When using sub clock 32kHz TA=+25°C ". Max 1420µA → Max 2000µA Corrected the value of "Power supply voltage range". (TA:-40°C to +105°C,Vcc=AVcc=2.7V to 5.5V,VSS=AVSS=0.0V) ↓ (T_A:-40°C to +105°C,Vcc=AVcc=5.0V±10%/3.3V±0.3V,V_{SS}=AV_{SS}=0.0V) Corrected the value of "Power supply voltage range". (T_A:-40°C to +125°C,Vcc=AVcc=2.7V to 5.5V,VSS=AVSS=0.0V) ↓ (T_A:-40°C to +125°C,Vcc=AVcc=5.0V±10%/3.3V±0.3V,V_{SS}=AV_{SS}=0.0V) Corrected the value of " Pull-up resistance R_{UP1}". Vcc=3.3V±0.3V Min 49 Max 140 →Min 45 Max 140 Corrected the following description. Pull-up resistance R_{UP2} Port pin other than P035,041,093,122 → P073,074,076,077 Corrected the value of " Pull-up resistance R_{UP2}". VCC=5.0V±10% Min 25 Max 100 →Min 25 Max 60 VCC=3.3V±0.3V Min 49 Max 140 →Min 33 Max 90 Added the value of " Pull-up resistance R_{UP3}". Pin name : Port pin other than P035,041,073,074,076,077,093,122 VCC=5.0V±10% Min 25 Max 100 VCC=3.3V±0.3V Min 45 Max 140 Electrical Characteristics 4. AC characteristics (4) Multi-function Serial (4-1) CSIO timing (4-1-1),(4-1-2),(4-1-3),(4-1-4) (4-1-1),(4-1-4)SCK↓⇒SOT delay time t_{SLOVI} (4-1-2),(4-1-3)SCK↑⇒SOT delay time t_{SHOVI} Corrected the following description. Pin name: SCK0 to SCK11 SOT0 to SOT11