



Welcome to [E-XFL.COM](#)

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](#)"

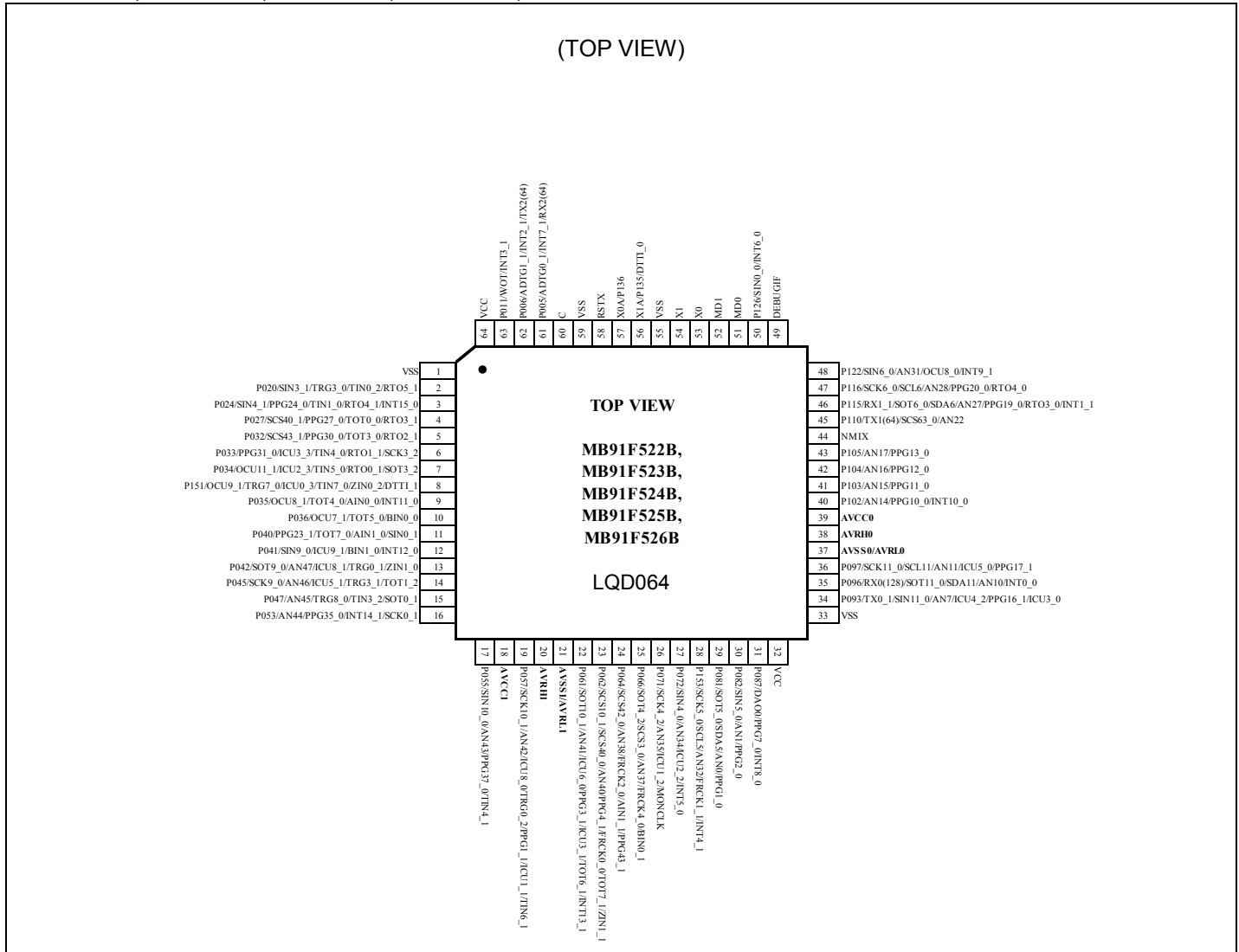
Details

Product Status	Obsolete
Core Processor	FR81S
Core Size	32-Bit Single-Core
Speed	80MHz
Connectivity	CANbus, CSIO, EBI/EMI, I ² C, LINbus, SPI, UART/USART
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	120
Program Memory Size	1.0625MB (1.0625M x 8)
Program Memory Type	FLASH
EEPROM Size	64K x 8
RAM Size	136K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 48x12b; D/A 2x8b
Oscillator Type	External
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	144-LQFP
Supplier Device Package	144-LQFP (20x20)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb91f526khhbpmc-gs-f4k5e1

2. Pin Assignment

MB91F52xB

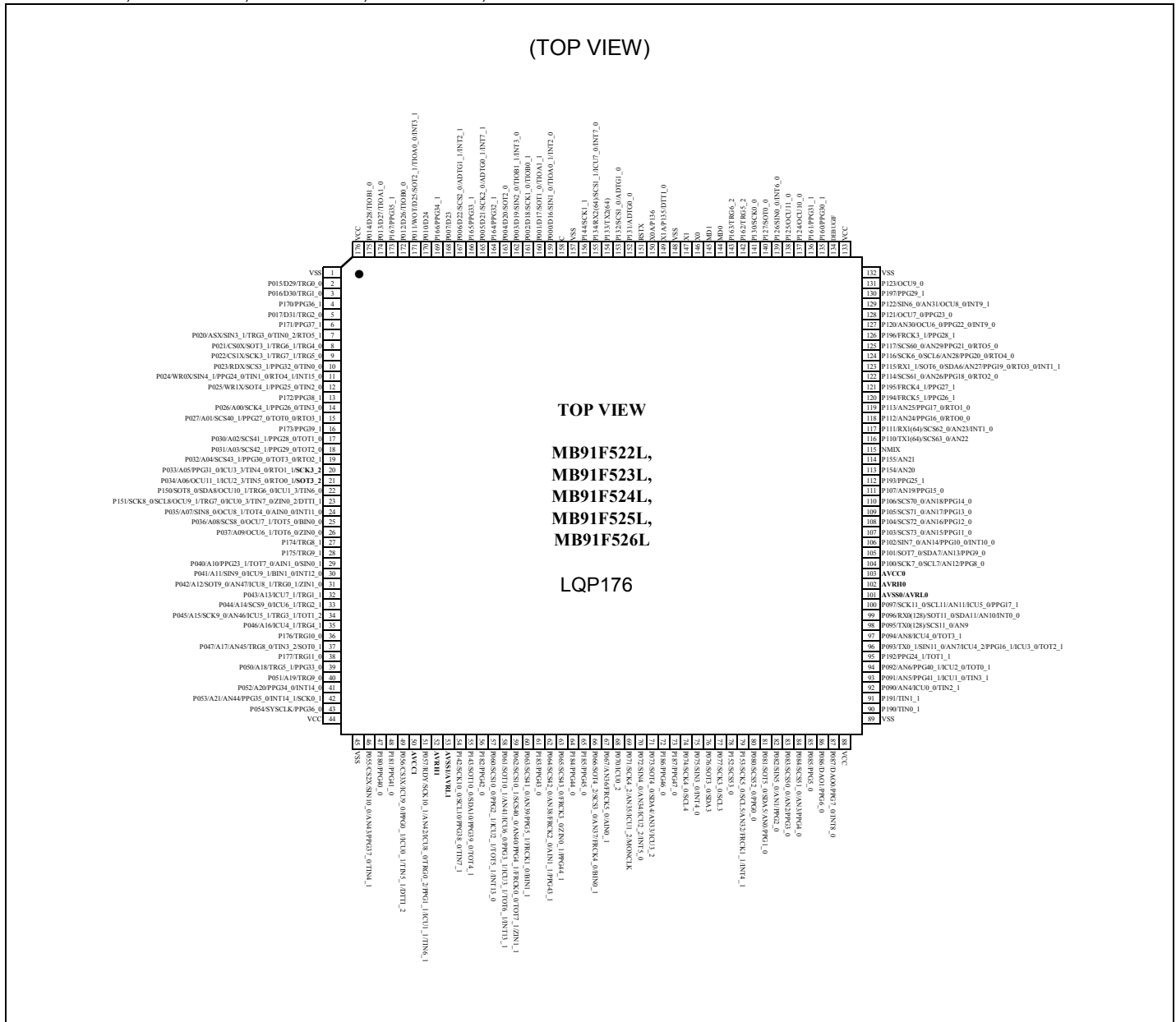
MB91F522B, MB91F523B, MB91F524B, MB91F525B, MB91F526B



* In a single clock product, pin 56 and pin 57 are the general-purpose ports.

MB91F52xL

MB91F522L, MB91F523L, MB91F524L, MB91F525L, MB91F526L



* In a single clock product, pin 149 and pin 150 are the general-purpose ports.

Pin no.						Pin Name	Polarity	I/O circuit types*8	Function*9
64	80	100	120	144	176				
-	-	40	46	54	68	P070	-	A	General-purpose I/O port
-	-	-	-	-	-	ICU0_2	-		Input capture ch.0 input (2)
26	33	41	47	55	69	P071	-	G	General-purpose I/O port
						SCK4_2	-		Multi-function serial ch.4 clock I/O (2)
						AN35	-		ADC analog 35 input
						ICU1_2	-		Input capture ch.1 input (2)
						MONCLK	-		Clock monitor output pin
						-	-		-
27	34	42	48	56	70	P072	-	G	General-purpose I/O port
						SIN4_0	-		Multi-function serial ch.4 serial data input (0)
						AN34	-		ADC analog 34 input
						ICU2_2	-		Input capture ch.2 input (2)
						INT5_0	-		INT5 External interrupt input (0)
-	35 ⁻³	43 ⁻⁴	49	57	71	P073	-	D	General-purpose I/O port
						SOT4_0/ SDA4 ^{-3, -4}	-		Multi-function serial ch.4 serial data output (0)/I ² C bus serial data I/O
						AN33	-		ADC analog 33 input
						ICU3_2	-		Input capture ch.3 input (2)
-	-	-	-	-	72	P186	-	A	General-purpose I/O port
						PPG46_0	-		PPG ch.46 output (0)
-	-	-	-	-	73	P187	-	A	General-purpose I/O port
						PPG47_0	-		PPG ch.47 output (0)
-	-	-	50	58	74	P074	-	E	General-purpose I/O port
						SCK4_0/ SCL4	-		Multi-function serial ch.4 clock I/O (0)/ I ² C bus serial clock I/O
-	-	-	51	59	75	P075	-	F	General-purpose I/O port
						SIN3_0	-		Multi-function serial ch.3 serial data input (0)
						INT4_0	-		INT4 External interrupt input (0)
-	-	-	52	60	76	P076	-	E	General-purpose I/O port
						SOT3_0/ SDA3	-		Multi-function serial ch.3 serial data output (0)/I ² C bus serial data I/O
-	-	-	53	61	77	P077	-	E	General-purpose I/O port
						SCK3_0/ SCL3	-		Multi-function serial ch.3 clock I/O (0)/ I ² C bus serial clock I/O
-	-	44	54	62	78	P152	-	A	General-purpose I/O port
						SCS53_0	-		Serial chip select 53 output (0)
28	36	45	55	63	79	P153	-	G	General-purpose I/O port
						SCK5_0/ SCL5	-		Multi-function serial ch.5 clock I/O (0)/ I ² C bus serial clock I/O
						AN32	-		ADC analog 32 input
						FRCK1_1	-		Free-run timer 1 clock input (1)
						INT4_1	-		INT4 External interrupt input (1)

Pin no.						Pin Name	Polarity	I/O circuit types*8	Function*9
64	80	100	120	144	176				
-	-	-	-	76	94	P092	-	B	General-purpose I/O port
						AN6	-		ADC analog 6 input
						PPG40_1	-		PPG ch.40 output (1)
						ICU2_0	-		Input capture ch.2 input (0)
						TOT0_1	-		Reload timer ch.0 output (1)
-	-	-	-	-	95	P192	-	A	General-purpose I/O port
						PPG24_1	-		PPG ch.24 output (1)
						TOT1_1	-		Reload timer ch.1 output (1)
34 *1	42 *1	52	62	77	96	P093	-	J	General-purpose I/O port
						TX0_1	-		CAN transmission data 0 output (1)
						SIN11_0	-		Multi-function serial ch.11 serial data input (0)
						AN7	-		ADC analog 7 input
						ICU4_2	-		Input capture ch.4 input (2)
						PPG16_1	-		PPG ch.16 output (1)
						ICU3_0	-		Input capture ch.3 input (0)
						TOT2_1 *2, *3	-		Reload timer ch.2 output (1)
-	-	-	-	78	97	P094	-	B	General-purpose I/O port
						AN8	-		ADC analog 8 input
						ICU4_0	-		Input capture ch.4 input (0)
						TOT3_1	-		Reload timer ch.3 output (1)
-	-	53	63	79	98	P095	-	B	General-purpose I/O port
						TX0(128)	-		CAN transmission data 0 output
						SCS11_0	-		Serial chip select 11 I/O (0)
						AN9	-		ADC analog 9 input
35	43	54	64	80	99	P096	-	G	General-purpose I/O port
						RX0(128)	-		CAN reception data 0 input
						SOT11_0 / SDA11	-		Multi-function serial ch.11 serial data output (0)/I ² C bus serial data I/O
						AN10	-		ADC analog 10 input
						INT0_0	-		INT0 External interrupt input (0)
36	44	55	65	81	100	P097	-	G	General-purpose I/O port
						SCK11_0 / SCL11	-		Multi-function serial ch.11 clock I/O (0)/I ² C bus serial clock I/O
						AN11	-		ADC analog 11 input
						ICU5_0	-		Input capture ch.5 input (0)
						PPG17_1	-		PPG ch.17 output (1)

6. Handling Devices

This section explains the latch-up prevention and pin processing.

■ For latch-up prevention

If a voltage higher than VCC or a voltage lower than VSS is applied to an I/O pin, or if a voltage exceeding the ratings is applied between VCC and VSS pins, a latch-up may occur in CMOS IC. If the latch-up occurs, the power supply current increases excessively and device elements may be damaged by heat. Take care to prevent any voltage from exceeding the maximum ratings in device application.

Also, the analog power supply (AVCC, AVRH) and analog input must not be exceed the digital power supply (VCC) when the power supply to the analog system is turned on or off.

In the correct power-on sequence of the microcontroller, turn on the digital power supply (VCC) and analog power supplies (AVCC, AVRH) simultaneously. Or, turn on the digital power supply (VCC), and then turn on analog power supplies (AVCC, AVRH).

■ Treatment of unused pins

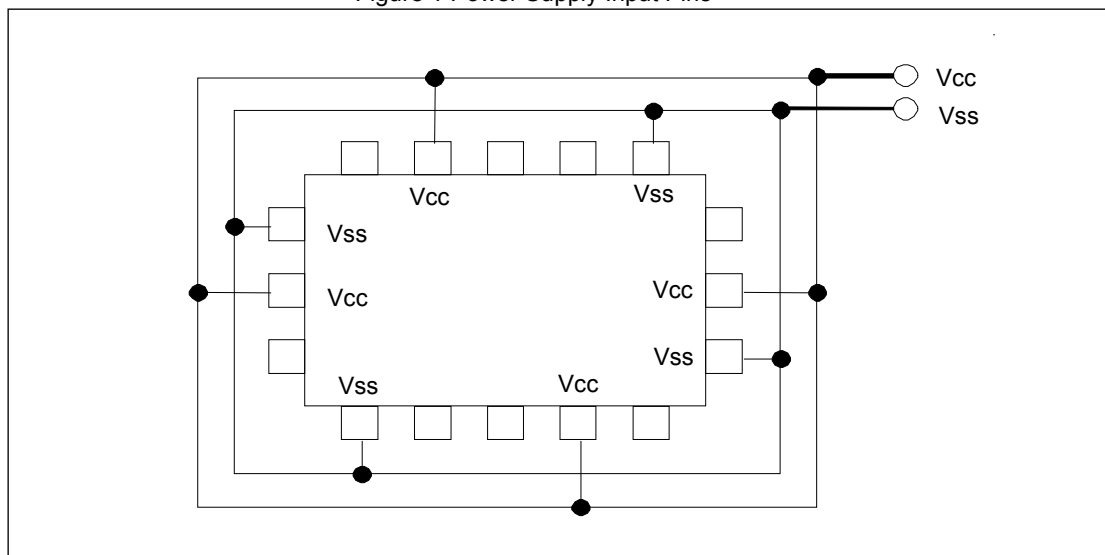
If unused input pins are left open, they may cause a permanent damage to the device due to malfunction or latch-up. Connect at least a 2kΩ resistor to each of the unused pins for pull-up or pull-down processing.

Also, if I/O pins are not used, they must be set to the output state for releasing or they must be set to the input state and treated in the same way as for the input pins.

■ Power supply pins

The device is designed to ensure that if the device contains multiple VCC or VSS pins, the pins that should be at the same potential are interconnected to prevent latch-up or other malfunctions. Further, connect these pins to an external power supply or ground to reduce unwanted radiation, prevent strobe signals from malfunctioning due to a raised ground level, and fulfill the total output current standard, etc. As shown in figure 1, all Vss power supply pins must be treated in the similar way. If multiple Vcc or Vss systems are connected, the device cannot operate correctly even within the guaranteed operating range.

Figure 1 Power Supply Input Pins

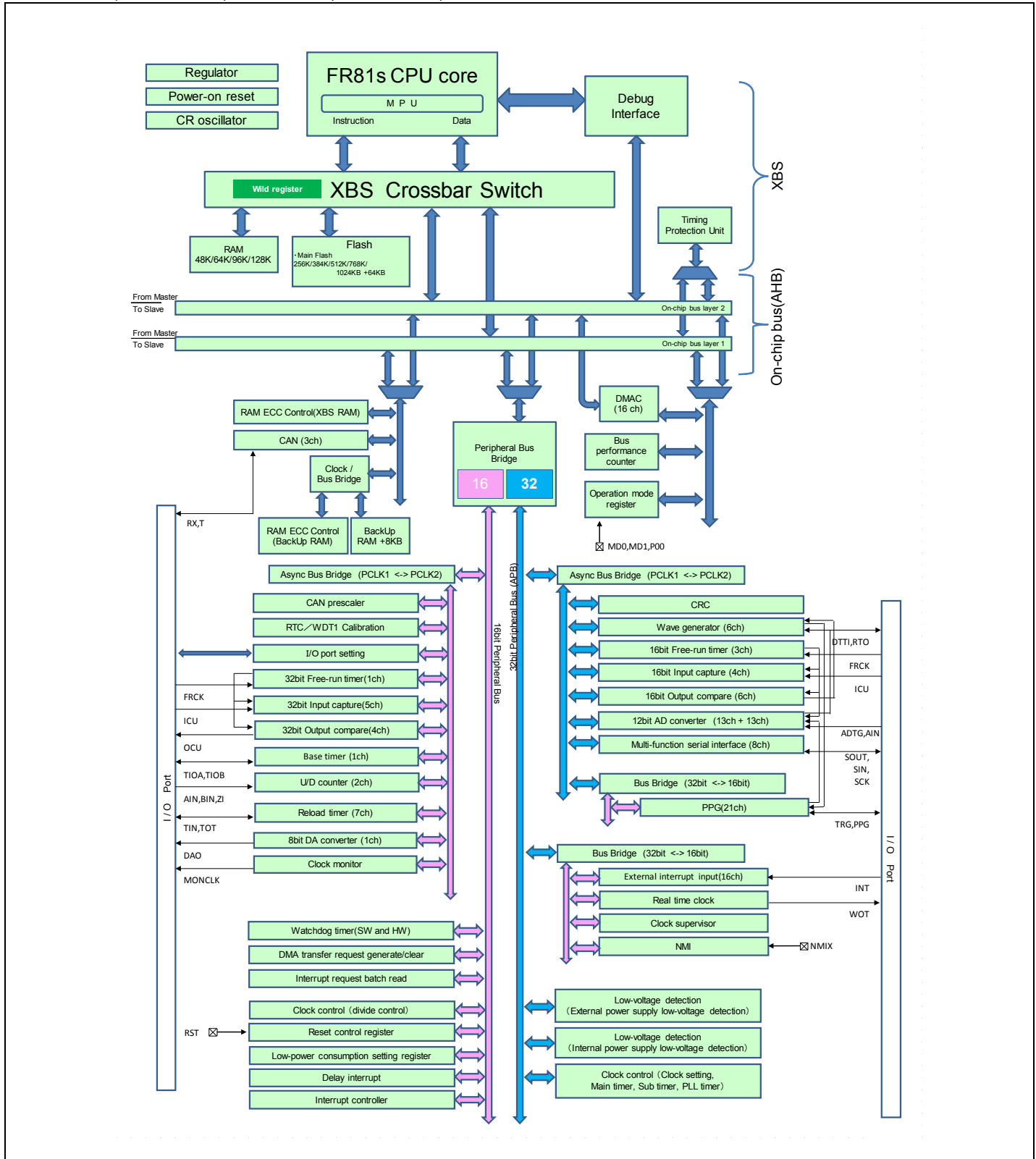


The power supply pins should be connected to VCC and VSS pins of this device at the low impedance from the power supply source.

In the area close to this device, a ceramic capacitor having the capacitance larger than the capacitor of C pin is recommended to use as a bypass capacitor between VCC and VSS pins.

7. Block Diagram

MB91F522B, MB91F523B, MB91F524B, MB91F525B, MB91F526B



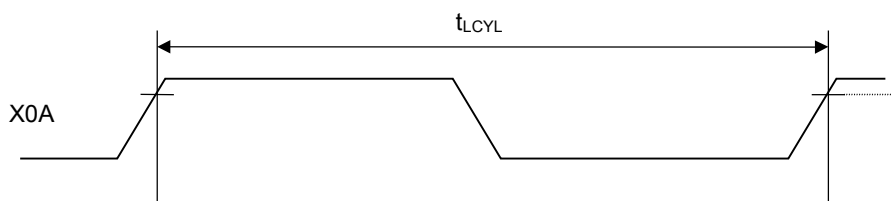
Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
002254 _H	IF2DTB12 [R/W] B,H,W 00000000 00000000		IF2DTB22 [R/W] B,H,W 00000000 00000000		CAN2 (64msb)
002258 _H	—	—	—	—	
00225C _H	—	—	—	—	
002260 _H , 002264 _H	Reserved (IF2 data mirror)				
002268 _H to 00227C _H	—				
002280 _H	TREQR22 [R] B,H,W 00000000 00000000		TREQR12 [R] B,H,W 00000000 00000000		
002284 _H	TREQR42 [R] B,H,W 00000000 00000000		TREQR32 [R] B,H,W 00000000 00000000		
002288 _H	—	—	—	—	
00228C _H	—	—	—	—	
002290 _H	NEWDT22 [R] B,H,W 00000000 00000000		NEWDT12 [R] B,H,W 00000000 00000000		
002294 _H	NEWDT42 [R] B,H,W 00000000 00000000		NEWDT32 [R] B,H,W 00000000 00000000		
002298 _H	—	—	—	—	
00229C _H	—	—	—	—	
0022A0 _H	INTPND22 [R] B,H,W 00000000 00000000		INTPND12 [R] B,H,W 00000000 00000000		
0022A4 _H	INTPND42 [R] B,H,W 00000000 00000000		INTPND32 [R] B,H,W 00000000 00000000		
0022A8 _H	—	—	—	—	
0022AC _H	—	—	—	—	
0022B0 _H	MSGVAL22 [R] B,H,W 00000000 00000000		MSGVAL12 [R] B,H,W 00000000 00000000		
0022B4 _H	MSGVAL42 [R] B,H,W 00000000 00000000		MSGVAL32 [R] B,H,W 00000000 00000000		
0022B8 _H	—	—	—	—	
0022BC _H	—	—	—	—	
0022C0 _H to 0022EC _H	—				

(1-2) Sub clock timing

(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	Typ	Max		
Source oscillation clock frequency	F _{CL}	X0A, X1A	-	-	32.7 68	-	kHz	
Source oscillation clock cycle time	t _{LCYL}	X0A, X1A		-	30.5 2	-	μs	

· X0A,X1A clock timing



SCSx output

SCSy output

SCK output

t_{scc}

When Serial chip select is used , Serial clock output mark level "H"
 ,Serial chip select Inactive level "H"
 Internal shift clock mode , Example of switching clock by round operation (x,y=0,1,2,3)

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

(4-1-8) Bit setting: SMR:MD2=0, SMR:MD1=1, SMR:MD0=0,

When Serial chip select is used: SCSCR:CSEN=1,

Serial clock output mark level "L" : SMR,SCSFR:SCINV=1,

Serial chip select Inactive level "L" : SCSCR,SCSFR:CSLVL=0

(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)

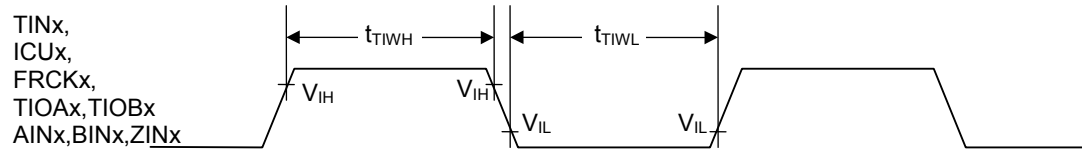
Parameter	Symbol	Pin name	Conditions	Value		Unit	Remarks
				Min	Max		
SCS↑→SCK↑ setup time	t _{CSSI}	SCK1 , SCK2, SCK5 to SCK11 SCS1 , SCS2, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11	-	t _{CSSU} -50 *1	t _{CSSU} +0 *1	ns	Internal shift clock mode output pin : C _L =50pF
		SCK3 , SCK4 SCS3 , SCS40 to SCS43		t _{CSSU} -50 *1	t _{CSSU} +300 *1	ns	
SCK↓→SCS↓ hold time	t _{CSHI}	SCK1 , SCK2, SCK5 to SCK11 SCS1 , SCS2, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11		t _{CSHD} -10 *2	t _{CSHD} +50 *2	ns	
		SCK3 , SCK4 SCS3 , SCS40 to SCS43		t _{CSHD} -300 *2	t _{CSHD} +50 *2	ns	
SCS deselect time	t _{CSDI}	SCS1 to SCS3, SCS40 to SCS43, SCS50 to SCS53, SCS60 to SCS63, SCS70 to SCS73, SCS8 to SCS11		t _{CSDS} -50 *3	t _{CSDS} +50 *3	ns	

(5) Timer input timing

(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		
Input pulse width	t _{TIWH} , t _{TIWL}	TIN0 to TIN7 ICU0 to ICU9 FRCK0 to FRCK5 TIOA0, TIOA1, TIOB0, TIOB1, AIN0, AIN1, BIN0, BIN1, ZIN0, ZIN1	—	4t _{CPP}	—	ns	

• Timer input timing

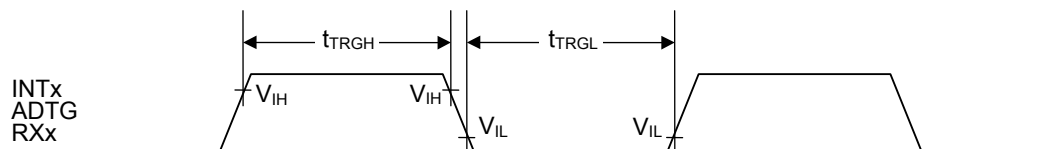


(6) Trigger input timing

(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		
Input pulse width	t _{TRGH} , t _{TRGL}	INT0 to INT15, ADTG, RX0, RX1, RX2	—	5t _{CPP}	—	ns	
				1	—	μs	At stop mode

• Trigger input timing

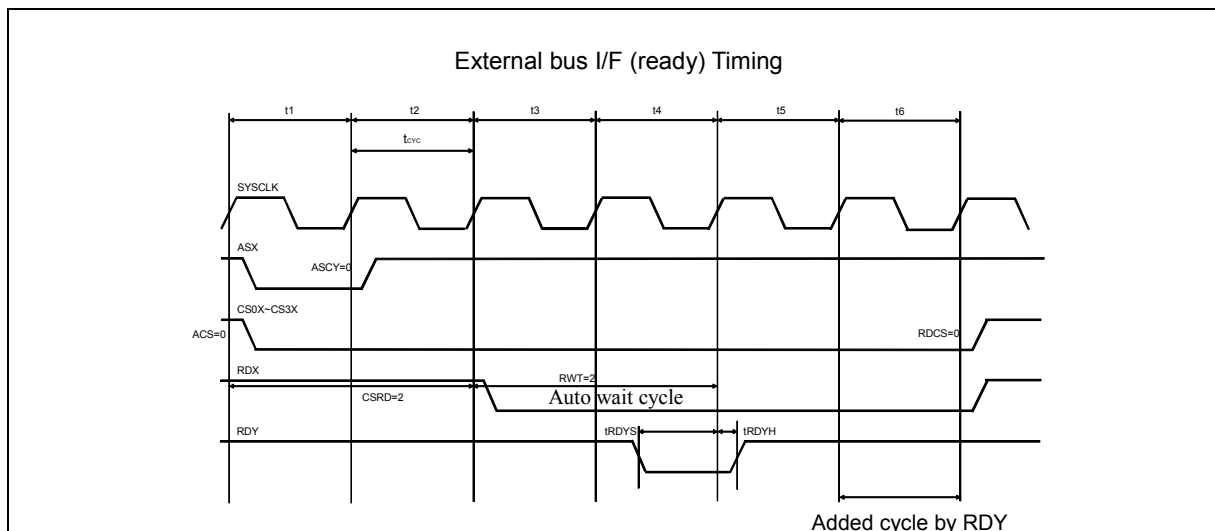


(12) External bus I/F (ready) Timing

(T_A: -40°C to +105°C, V_{CC}=AV_{CC}=5.0V ± 10%/V_{CC}= AV_{CC}=3.3V±0.3V, V_{SS}=AV_{SS}=0.0V)

(external load capacitance 50pF)

Parameter	Symbol	Pin name	Value		Unit	Remarks
			Min	Max		
Cycle time	t _{CYC}	SYSCLK	50	-	ns	If using RDY, set SYSCLK to 20 MHz or less.
RDY setup time → SYSCLK↑	t _{RDYS}	SYSCLK, RDY	28	-	ns	
SYSCLK↑→ RDY hold time	t _{RDYH}	SYSCLK, RDY	0	-	ns	



Part number	Sub clock	CSV Initial value	LVD Initial value	Package*2
MB91F526DWBPMC	Yes	ON	ON	LQH • 80 pin, Plastic
MB91F526DYBPMC			OFF	
MB91F526DJBPMC		OFF	ON	
MB91F526DLBPMC			OFF	
MB91F525DWBPMC		ON	ON	
MB91F525DYBPMC			OFF	
MB91F525DJBPMC		OFF	ON	
MB91F525DLBPMC			OFF	
MB91F524DWBPMC		ON	ON	
MB91F524DYBPMC			OFF	
MB91F524DJBPMC		OFF	ON	
MB91F524DLBPMC			OFF	
MB91F523DWBPMC		ON	ON	
MB91F523DYBPMC			OFF	
MB91F523DJBPMC		OFF	ON	
MB91F523DLBPMC			OFF	
MB91F522DWBPMC		ON	ON	
MB91F522DYBPMC			OFF	
MB91F522DJBPMC		OFF	ON	
MB91F522DLBPMC			OFF	
MB91F526DSBPMC	None	ON	ON	
MB91F526DUBPMC			OFF	
MB91F526DHBPMC		OFF	ON	
MB91F526DKBPMC			OFF	
MB91F525DSBPMC		ON	ON	
MB91F525DUBPMC			OFF	
MB91F525DHBPMC		OFF	ON	
MB91F525DKBPMC			OFF	
MB91F524DSBPMC		ON	ON	
MB91F524DUBPMC			OFF	
MB91F524DHBPMC		OFF	ON	
MB91F524DKBPMC			OFF	
MB91F523DSBPMC		ON	ON	
MB91F523DUBPMC			OFF	
MB91F523DHBPMC		OFF	ON	
MB91F523DKBPMC			OFF	
MB91F522DSBPMC		ON	ON	
MB91F522DUBPMC			OFF	
MB91F522DHBPMC		OFF	ON	
MB91F522DKBPMC			OFF	

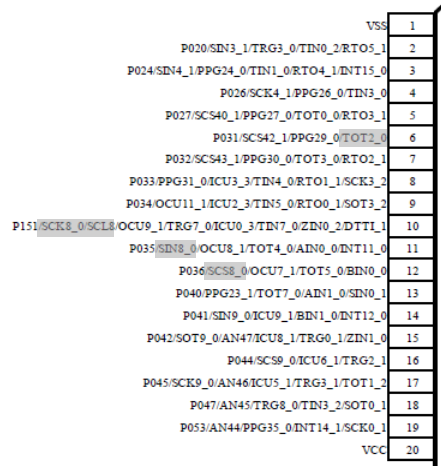
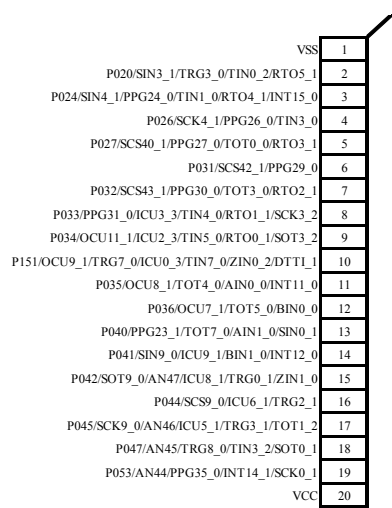
14. Ordering Information MB91F52xxxC*¹

Part number	Sub clock	CSV Initial value	LVD Initial value	Package ⁷²
MB91F526LWCPMC	Yes	ON	ON	LQP • 176 pin, Plastic
MB91F526LYCPMC			OFF	
MB91F526LJCPMC		OFF	ON	
MB91F526LLCPMC			OFF	
MB91F525LWCPMC		ON	ON	
MB91F525LYCPMC			OFF	
MB91F525LJCPMC		OFF	ON	
MB91F525LLCPMC			OFF	
MB91F524LWCPMC		ON	ON	
MB91F524LYCPMC			OFF	
MB91F524LJCPMC		OFF	ON	
MB91F524LLCPMC			OFF	
MB91F523LWCPMC		ON	ON	
MB91F523LYCPMC			OFF	
MB91F523LJCPMC		OFF	ON	
MB91F523LLCPMC			OFF	
MB91F522LWCPMC		ON	ON	
MB91F522LYCPMC			OFF	
MB91F522LJCPMC		OFF	ON	
MB91F522LLCPMC			OFF	
MB91F526LSCPMC	None	ON	ON	
MB91F526LUCPMC			OFF	
MB91F526LHCPMC		OFF	ON	
MB91F526LKCPMC			OFF	
MB91F525LSCPMC		ON	ON	
MB91F525LUCPMC			OFF	
MB91F525LHCPMC		OFF	ON	
MB91F525LKCPMC			OFF	
MB91F524LSCPMC		ON	ON	
MB91F524LUCPMC			OFF	
MB91F524LHCPMC		OFF	ON	
MB91F524LKCPMC			OFF	
MB91F523LSCPMC		ON	ON	
MB91F523LUCPMC			OFF	
MB91F523LHCPMC		OFF	ON	
MB91F523LKCPMC			OFF	
MB91F522LSCPMC		ON	ON	
MB91F522LUCPMC			OFF	
MB91F522LHCPMC		OFF	ON	
MB91F522LKCPMC			OFF	

19. Major Changes

Spanion Publication Number: MB91F526L_DS705-00011

Page	Section	Change Results
Revision 1.0		
-	-	Initial release
Revision 2.0		
3	■FEATURES	Corrected the following description. 5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 Automotive input ↓ 5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 CMOS hysteresis input
33 to 36	■I/O CIRCUIT TYPE	Corrected the following description to "Type F, G, I, J, K, M". Schmitt input → CMOS hysteresis input Corrected the following description to "Type D, E". I ² C Schmitt input → I ² C hysteresis input
44 to 49	■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
138	■ELECTRICAL CHARACTERISTICS 2. Recommended operating conditions	Added the following description. *1 : When it is used outside recommended operation guarantee range (range 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
139,140	■ELECTRICAL CHARACTERISTICS 3.DC characteristics	Corrected the value of "ICCT5 When using sub clock 32kHz TA=+25°C". Max 1420μA → Max 2000μA
139	■ELECTRICAL CHARACTERISTICS 3.DC characteristics	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) ↓ (TA:-40°C to +105°C, Vcc=AVcc=5.0V±10%/3.3V±0.3V, VSS=AVSS=0.0V)
140,141	■ELECTRICAL CHARACTERISTICS 3.DC characteristics	Corrected the value of "Power supply voltage range". (TA:-40°C to +125°C, Vcc=AVcc=2.7V to 5.5V, VSS=AVSS=0.0V) ↓ (TA:-40°C to +125°C, Vcc=AVcc=5.0V±10%/3.3V±0.3V, VSS=AVSS=0.0V)
141	■ELECTRICAL CHARACTERISTICS 3.DC characteristics	Corrected the value of " Pull-up resistance R _{UP1} ". Vcc=3.3V±0.3V Min 49 Max 140 →Min 45 Max 140

Page	Section	Change Results
14	■ Pin Assignment MB91F52xD	Signals indicated by the shading below deleted in Figure. - Left side  ↓ 

Page	Section	Change Results																
24	■PIN Description	A List of "Pin Description" modified. (Error) <table><tr><td>Function^{*2}</td></tr><tr><td>General-purpose I/O port</td></tr><tr><td>External Bus chip select 3 output pin(0)</td></tr><tr><td>Input capture ch.9 input pin(0)</td></tr><tr><td>PPG ch.0 output pin(1)</td></tr><tr><td>Input capture ch.0 input pin(1)</td></tr><tr><td>Reload timer ch.5 event input pin(1)</td></tr><tr><td>Waveform generator ch.0 to ch.5 input pin(2)</td></tr></table> (Correct) <table><tr><td>Function^{*9}</td></tr><tr><td>General-purpose I/O port</td></tr><tr><td>External Bus chip select 3 output pin</td></tr><tr><td>Input capture ch.9 input pin(0)</td></tr><tr><td>PPG ch.0 output pin(1)</td></tr><tr><td>Input capture ch.0 input pin(1)</td></tr><tr><td>Reload timer ch.5 event input pin(1)</td></tr><tr><td>Waveform generator ch.0 to ch.5 input pin(2)</td></tr></table>	Function ^{*2}	General-purpose I/O port	External Bus chip select 3 output pin(0)	Input capture ch.9 input pin(0)	PPG ch.0 output pin(1)	Input capture ch.0 input pin(1)	Reload timer ch.5 event input pin(1)	Waveform generator ch.0 to ch.5 input pin(2)	Function ^{*9}	General-purpose I/O port	External Bus chip select 3 output pin	Input capture ch.9 input pin(0)	PPG ch.0 output pin(1)	Input capture ch.0 input pin(1)	Reload timer ch.5 event input pin(1)	Waveform generator ch.0 to ch.5 input pin(2)
Function ^{*2}																		
General-purpose I/O port																		
External Bus chip select 3 output pin(0)																		
Input capture ch.9 input pin(0)																		
PPG ch.0 output pin(1)																		
Input capture ch.0 input pin(1)																		
Reload timer ch.5 event input pin(1)																		
Waveform generator ch.0 to ch.5 input pin(2)																		
Function ^{*9}																		
General-purpose I/O port																		
External Bus chip select 3 output pin																		
Input capture ch.9 input pin(0)																		
PPG ch.0 output pin(1)																		
Input capture ch.0 input pin(1)																		
Reload timer ch.5 event input pin(1)																		
Waveform generator ch.0 to ch.5 input pin(2)																		

Page	Section	Change Results																																																												
141	■Interrupt Vector Table	The interrupt factor in Interrupt vector 176pin modified as follows: (Error) <table><tr><td>Base timer 1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR 45</td><td rowspan="4">308_H</td><td rowspan="4">000F FF08_H</td><td>45^{*5}</td></tr><tr><td>Base timer 1 IRQ1</td></tr><tr><td>—</td></tr><tr><td>—</td></tr></table> (Correct) <table><tr><td>Base timer 1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR 45</td><td rowspan="4">308_H</td><td rowspan="4">000F FF08_H</td><td>45</td></tr><tr><td>Base timer 1 IRQ1</td></tr><tr><td>—</td></tr><tr><td>—</td></tr></table>	Base timer 1 IRQ0	61	3D	ICR 45	308 _H	000F FF08 _H	45 ^{*5}	Base timer 1 IRQ1	—	—	Base timer 1 IRQ0	61	3D	ICR 45	308 _H	000F FF08 _H	45	Base timer 1 IRQ1	—	—																																								
Base timer 1 IRQ0	61	3D	ICR 45						308 _H	000F FF08 _H	45 ^{*5}																																																			
Base timer 1 IRQ1																																																														
—																																																														
—																																																														
Base timer 1 IRQ0	61	3D	ICR 45	308 _H	000F FF08 _H	45																																																								
Base timer 1 IRQ1																																																														
—																																																														
—																																																														
141	■Interrupt Vector Table	The following sentence deleted from Interrupt vector 176pins. (Error) ^{*5}: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.																																																												
142	■Electrical Characteristics 1. Absolute Maximum Ratings	The remarks of "L" level average output current" and "H" level average output current" modified as follows. (Error) <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Sym bol</th><th colspan="2">Rating</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Max</th></tr><tr><td rowspan="2">"L" level average output current^{*4}</td><td>I_{OLAV1}</td><td>-</td><td>4</td><td>mA</td><td></td></tr><tr><td>I_{OLAV2}</td><td>-</td><td>12</td><td>mA</td><td></td></tr><tr><td rowspan="2">"H" level average output current^{*4}</td><td>I_{OHAV1}</td><td>-</td><td>-4</td><td>mA</td><td></td></tr><tr><td>I_{OHAV2}</td><td>-</td><td>-12</td><td>mA</td><td></td></tr></table> (Correct) <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Sym bol</th><th colspan="2">Rating</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Max</th></tr><tr><td rowspan="2">"L" level average output current^{*4}</td><td>I_{OLAV1}</td><td>-</td><td>4</td><td>mA</td><td>^{*9}</td></tr><tr><td>I_{OLAV2}</td><td>-</td><td>12</td><td>mA</td><td>^{*10}</td></tr><tr><td rowspan="2">"H" level average output current^{*4}</td><td>I_{OHAV1}</td><td>-</td><td>-4</td><td>mA</td><td>^{*9}</td></tr><tr><td>I_{OHAV2}</td><td>-</td><td>-12</td><td>mA</td><td>^{*10}</td></tr></table>	Parameter	Sym bol	Rating		Unit	Remarks	Min	Max	"L" level average output current ^{*4}	I _{OLAV1}	-	4	mA		I _{OLAV2}	-	12	mA		"H" level average output current ^{*4}	I _{OHAV1}	-	-4	mA		I _{OHAV2}	-	-12	mA		Parameter	Sym bol	Rating		Unit	Remarks	Min	Max	"L" level average output current ^{*4}	I _{OLAV1}	-	4	mA	^{*9}	I _{OLAV2}	-	12	mA	^{*10}	"H" level average output current ^{*4}	I _{OHAV1}	-	-4	mA	^{*9}	I _{OHAV2}	-	-12	mA	^{*10}
Parameter	Sym bol	Rating			Unit	Remarks																																																								
		Min	Max																																																											
"L" level average output current ^{*4}	I _{OLAV1}	-	4	mA																																																										
	I _{OLAV2}	-	12	mA																																																										
"H" level average output current ^{*4}	I _{OHAV1}	-	-4	mA																																																										
	I _{OHAV2}	-	-12	mA																																																										
Parameter	Sym bol	Rating		Unit	Remarks																																																									
		Min	Max																																																											
"L" level average output current ^{*4}	I _{OLAV1}	-	4	mA	^{*9}																																																									
	I _{OLAV2}	-	12	mA	^{*10}																																																									
"H" level average output current ^{*4}	I _{OHAV1}	-	-4	mA	^{*9}																																																									
	I _{OHAV2}	-	-12	mA	^{*10}																																																									

Page	Section	Change Results
188	11. Electrical Characteristics (9) Low voltage detection (Internal low-voltage detection)	The following sentence modified as following: (Error) (9) Low voltage detection (RAM retention low-voltage detection) (Correct) (9) Low voltage detection (Internal low-voltage detection)
		The following symbol should be modified as follows: (Error) * (Correct) *1
		Note of Detection voltage should be added as follows: (Correct) Detection voltage *2 *2: The detection voltage of the internal low voltage detection is 0.9V±0.1V. This LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed MCU operation voltage, as this detection level is below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.
233 to 235	18. Errata	Limitation for Watch mode (power off) should be added in Errata.

Document History

Document Title: MB91520 Series 32-bit FR81S Microcontroller

Document Number: 002-04662

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	—	—	—	Initial release
	—	—	2/20/2014	Features: Corrected the following description. 5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 Automotive input ↓ 5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 CMOS hysteresis input I/O CIRCUIT TYPE: Corrected the following description to "Type F, G, I, J, K, M". Schmitt input → CMOS hysteresis input