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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

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Product Status	Obsolete
Core Processor	F ² MC-8FX
Core Size	8-Bit
Speed	16MHz
Connectivity	LINbus, SIO, UART/USART
Peripherals	LVD, POR, PWM, WDT
Number of I/O	16
Program Memory Size	20KB (20K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	496 x 8
Voltage - Supply (Vcc/Vdd)	2.4V ~ 5.5V
Data Converters	A/D 6x8/10b
Oscillator Type	External
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	20-TSSOP (0.173", 4.40mm Width)
Supplier Device Package	20-TSSOP
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb95f264hpft-g-sne2

Email: info@E-XFL.COM

Address: Room A, 16/F, Full Win Commercial Centre, 573 Nathan Road, Mongkok, Hong Kong



Part number						
	MB95F282H	MB95F283H	MB95F284H	MB95F282K	MB95F283K	MB95F284K
Parameter						
Watch prescaler	Eight different time	e intervals can be s	selected.			
Flash memory	 It supports automatic programming, Embedded Algorithm, program/erase/erase-suspend/erase-resume commands. It has a flag indicating the completion of the operation of Embedded Algorithm. Number of program/erase cycles: 100000 Data retention time: 20 years Flash security feature for protecting the content of the Flash memory 					
Standby mode	Sleep mode, stop mode, watch mode, time-base timer mode					
Package	LCC-32P-M19 DIP-16P-M06 FPT-16P-M06					



4. Pin Assignment





7. Pin Description (MB95260H Series, 20 pins)

Pin no.	Pin name	I/O circuit type*	Function
1	PF0	D	General-purpose I/O port
1	X0	D	Main clock input oscillation pin
2	PF1	D	General-purpose I/O port
2	X1		Main clock I/O oscillation pin
3	V _{SS}	—	Power supply pin (GND)
4	PG2	6	General-purpose I/O port
4	X1A		Subclock I/O oscillation pin
F	PG1	6	General-purpose I/O port
5	X0A		Subclock input oscillation pin
6	V _{CC}	—	Power supply pin
7	С	—	Capacitor connection pin
	PF2		General-purpose I/O port
8	RST	A	Reset pin This is a dedicated reset pin in MB95F262H/F263H/F264H.
9	P62	D	General-purpose I/O port High-current pin
	TO10		8/16-bit composite timer ch. 1 output pin
10	P63	D	General-purpose I/O port High-current pin
	TO11		8/16-bit composite timer ch. 1 output pin
44	P64	D	General-purpose I/O port
11	EC1		8/16-bit composite timer ch. 1 clock input pin
10	P00	Г	General-purpose I/O port
12	AN00		A/D converter analog input pin
10	P01	F	General-purpose I/O port
15	AN01		A/D converter analog input pin
	P02		General-purpose I/O port
14	INT02	_	External interrupt input pin
14	AN02		A/D converter analog input pin
	SCK		LIN-UART clock I/O pin
	P03		General-purpose I/O port
15	INT03	F	External interrupt input pin
	AN03		A/D converter analog input pin
	SOT		LIN-UART data output pin



9. Pin Description (MB95280H Series, 32 pins)

Pin no.	Pin name	I/O circuit type*	Function
1	PF1	Р	General-purpose I/O port
1	X1	В	Main clock I/O oscillation pin
0	PF0	P	General-purpose I/O port
2 X0		Main clock input oscillation pin	
3	Vss	—	Power supply pin (GND)
4	PG2	0	General-purpose I/O port
4	X1A		Subclock I/O oscillation pin
F	PG1	0	General-purpose I/O port
5	X0A		Subclock input oscillation pin
6	Vcc	—	Power supply pin
7	С	—	Capacitor connection pin
	PF2		General-purpose I/O port
8	RST	A	Reset pin This is a dedicated reset pin in MB95F282H/F283H/F284H.
9	NC	—	It is an internally connected pin. Always leave it unconnected.
10	NC	—	It is an internally connected pin. Always leave it unconnected.
11	NC	—	It is an internally connected pin. Always leave it unconnected.
12	NC	—	It is an internally connected pin. Always leave it unconnected.
13	NC	—	It is an internally connected pin. Always leave it unconnected.
14	NC	—	It is an internally connected pin. Always leave it unconnected.
15	NC	—	It is an internally connected pin. Always leave it unconnected.
16	NC	—	It is an internally connected pin. Always leave it unconnected.
17	P01	F	General-purpose I/O port
17	AN01		A/D converter analog input pin
	P02		General-purpose I/O port
19	INT02		External interrupt input pin
10	AN02		A/D converter analog input pin
	SCK		LIN-UART clock I/O pin
	P03		General-purpose I/O port
10	INT03		External interrupt input pin
19	AN03		A/D converter analog input pin
	SOT	-	LIN-UART data output pin
	P04		General-purpose I/O port
	INT04	-	External interrupt input pin
20	AN04	F	A/D converter analog input pin
	SIN		LIN-UART data input pin
	EC0		8/16-bit composite timer ch. 0 clock input pin



(Continued)

Pin no.	Pin name	I/O circuit type*	Function
	P05		General-purpose I/O port High-current pin
13	INT05	E	External interrupt input pin
	AN05		A/D converter analog input pin
	TO00		8/16-bit composite timer ch. 0 clock input pin
	P06	_	General-purpose I/O port High-current pin
14	INT06	G	External interrupt input pin
	TO01		8/16-bit composite timer ch. 0 clock input pin
15	P07	C	General-purpose I/O port
15	INT07 G	G	External interrupt input pin
	P12		General-purpose I/O port
16	EC0	Н	8/16-bit composite timer ch. 0 clock input pin
	DBG		DBG input pin

*: For the I/O circuit types, see "11. I/O Circuit Type".



11. I/O Circuit Type





15. Block Diagram (MB95270H Series)





16. Block Diagram (MB95280H Series)





17. CPU Core

Memory Space

The memory space of the MB95260H/270H/280H Series is 64 Kbyte in size, and consists of an I/O area, a data area, and a program area. The memory space includes areas intended for specific purposes such as general-purpose registers and a vector table. The memory maps of the MB95260H/270H/280H Series are shown below.

Memory Maps



(Continued)

Address	Register abbreviation	Register name	R/W	Initial value
0FE9 _H	CMCR	Clock monitoring control register	R/W	00000000 _B
0FEA _H	CMDR	Clock monitoring data register	R/W	00000000 _B
0FEB _H	WDTH	Watchdog timer selection ID register (Upper)	R/W	XXXXXXXAB
0FEC _H	WDTL	Watchdog timer selection ID register (Lower)	R/W	XXXXXXXAB
0FED _H	—	(Disabled)		—
0FEE _H	ILSR	Input level select register	R/W	00000000 _B
0FEF _H to 0FFF _H	_	(Disabled)	_	_

R/W access symbols

- R/W : Readable / Writable
- R : Read only

Initial value symbols

- 0 : The initial value of this bit is "0".
- 1 : The initial value of this bit is "1".
- X : The initial value of this bit is undefined.

Note: Do not write to an address that is "(Disabled)". If a "(Disabled)" address is read, an indeterminate value is returned.

22. Interrupt Source Table (MB95270H Series)

	Internut	Vector tab	le address	Dit nome of	Priority order of
Interrupt source	request number	Upper	Lower	interrupt level setting register	the same level (occurring simultaneously)
External interrupt ch. 4	IRQ00	FFFA _H	FFFB _H	L00 [1:0]	Hiah
—	IRQ01	FFF8 _H	FFF9 _H	L01 [1:0]	l ingli
_		EEEA		1.02 [1:0]	1
External interrupt ch. 6		ггон	ггг/Н	L02 [1.0]	
	IRO03	FFF4.	EEE5.	1.03 [1:0]	
	integos	H	III SH	200 [1.0]	
	IRQ04	FFF2 _H	FFF3 _H	L04 [1:0]	
8/16-bit composite timer ch. 0 (Lower)	IRQ05	FFF0 _H	FFF1 _H	L05 [1:0]	
8/16-bit composite timer ch. 0 (Upper)	IRQ06	FFEE _H	FFEF _H	L06 [1:0]	
_	IRQ07	FFEC _H	FFED _H	L07 [1:0]	
—	IRQ08	FFEA _H	FFEB _H	L08 [1:0]	
_	IRQ09	FFE8 _H	FFE9 _H	L09 [1:0]	
_	IRQ10	FFE6 _H	FFE7 _H	L10 [1:0]	
_	IRQ11	FFE4 _H	FFE5 _H	L11 [1:0]	
_	IRQ12	FFE2 _H	FFE3 _H	L12 [1:0]	
—	IRQ13	FFE0 _H	FFE1 _H	L13 [1:0]	
_	IRQ14	FFDE _H	FFDF _H	L14 [1:0]	
—	IRQ15	FFDC _H	FFDD _H	L15 [1:0]	
—	IRQ16	FFDA _H	FFDB _H	L16 [1:0]	
—	IRQ17	FFD8 _H	FFD9 _H	L17 [1:0]	
8/10-bit A/D converter	IRQ18	FFD6 _H	FFD7 _H	L18 [1:0]	
Time-base timer	IRQ19	FFD4 _H	FFD5 _H	L19 [1:0]	
Watch prescaler	IRQ20	FFD2 _H	FFD3 _H	L20 [1:0]	
_	IRQ21	FFD0 _H	FFD1 _H	L21 [1:0]]
_	IRQ22	FFCE _H	FFCF _H	L22 [1:0]]
Flash memory	IRQ23	FFCC _H	FFCD _H	L23 [1:0]	Low

24.2 Recommended Operating Conditions

 $(V_{SS} = 0.0 V)$

Parameter	Symbol	Value		Unit	Remarks		
Falameter	Symbol	Min	Max	Onit	relidirs		
		2.4* ^{1*2}	5.5* ¹		In normal operation	Other than on chin dobug mode	
Power supply voltage	V	2.3	5.5	V	Hold condition in stop mode		
	VCC	2.9	5.5	v	In normal operation	On ahin dahug mada	
		2.3	5.5		Hold condition in stop mode		
Smoothing capacitor	C _S	0.022	1	μF	*3	-	
Operating temperature	т	-40	+ 85	ŝ	Other than on-chip debug mode		
	ΙA	+ 5	+ 35		On-chip debug mode		

*1: The value varies depending on the operating frequency, the machine clock and the analog guaranteed range.

*2: The value is 2.88 V when the low-voltage detection reset is used.

*3: Use a ceramic capacitor or a capacitor with equivalent frequency characteristics. The bypass capacitor for the V_{CC} pin must have a capacitance larger than C_S. For the connection to a smoothing capacitor C_S, see the diagram below. To prevent the device from unintentionally entering an unknown mode due to noise, minimize the distance between the C pin and C_S and the distance between C_S and the V_{SS} pin when designing the layout of a printed circuit board.

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 within these ranges. Always use semiconductor devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure. No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their representatives beforehand.

24.4.3 External Reset

$(V_{CC} = 5.0)$	V+10%	Vee =	0.0 V	T ₄ =	-40°C to	+ 85°C)
$(V_{CC} = 0.0)$	v±1070,	• SS -	0.0 v,	'A -	40 0 10	1000)

Parameter	Symbol	Value	Unit	Pomarka	
Farameter Symbol		Min	Max	Onit	itellia ka
		2 t _{MCLK} *1	—	ns	In normal operation
RST "L" level pulse width t _{RSTL}	t _{RSTL}	Oscillation time of the oscillator* 2 + 100	_	μs	In stop mode, subclock mode, sub-sleep mode, watch mode, and power-on
		100	_	μs	In time-base timer mode

*1 : See "24.4.2. Source Clock / Machine Clock" for t_{MCLK}.

*2 : The oscillation time of an oscillator is the time for it to reach 90% of its amplitude. The crystal oscillator has an oscillation time of between several ms and tens of ms. The ceramic oscillator has an oscillation time of between hundreds of µs and several ms. The external clock has an oscillation time of 0 ms. The CR oscillator clock has an oscillation time of between several µs and several ms.

24.4.4 Power-on Reset

 $(V_{SS} = 0.0 \text{ V}, \text{ T}_{A} = -40^{\circ}\text{C to} + 85^{\circ}\text{C})$

Parameter	Symbol	Condition	Value		Unit	Pomarka	
Faidilietei	Symbol	Condition	Min	Max	Unit	Rellidi K3	
Power supply rising time	t _R	-	_	50	ms		
Power supply cutoff time	t _{OFF}	—	1	—	ms	Wait time until power-on	

Note: A sudden change of power supply voltage may activate the power-on reset function. When changing the power supply voltage during the operation, set the slope of rising to a value below within 30 mV/ms as shown below.

24.5.2 Notes on Using the A/D Converter

External impedance of analog input and its sampling time

The A/D converter has a sample and hold circuit. If the external impedance is too high to keep sufficient sampling time, the analog voltage charged to the capacitor of the internal sample and hold circuit is insufficient, adversely affecting A/D conversion precision. Therefore, to satisfy the A/D conversion precision standard, considering the relationship between the external impedance and minimum sampling time, either adjust the register value and operating frequency or decrease the external impedance so that the sampling time is longer than the minimum value. In addition, if sufficient sampling time cannot be secured, connect a capacitor of about 0.1 μ F to the analog input pin.

A/D conversion error

As |V_{CC}-V_{SS}| decreases, the A/D conversion error increases proportionately.

27. Ordering Information

Part Number	Package
MB95F262HWQN-G-SNE1 MB95F262HWQN-G-SNERE1 MB95F262KWQN-G-SNERE1 MB95F263HWQN-G-SNERE1 MB95F263HWQN-G-SNERE1 MB95F263KWQN-G-SNERE1 MB95F264HWQN-G-SNERE1 MB95F264HWQN-G-SNERE1 MB95F264KWQN-G-SNERE1 MB95F264KWQN-G-SNERE1	32-pin plastic QFN (LCC-32P-M19)
MB95F262HP-G-SH-SNE2 MB95F262KP-G-SH-SNE2 MB95F263HP-G-SH-SNE2 MB95F263KP-G-SH-SNE2 MB95F264HP-G-SH-SNE2 MB95F264KP-G-SH-SNE2	24-pin plastic SDIP (DIP-24P-M07)
MB95F262HPF-G-SNE2 MB95F262KPF-G-SNE2 MB95F263HPF-G-SNE2 MB95F263KPF-G-SNE2 MB95F264HPF-G-SNE2 MB95F264KPF-G-SNE2	20-pin plastic SOP (FPT-20P-M09)
MB95F262HPFT-G-SNE2 MB95F262KPFT-G-SNE2 MB95F263HPFT-G-SNE2 MB95F263KPFT-G-SNE2 MB95F264HPFT-G-SNE2 MB95F264KPFT-G-SNE2	20-pin plastic TSSOP (FPT-20P-M10)
MB95F282HWQN-G-SNE1 MB95F282HWQN-G-SNERE1 MB95F282KWQN-G-SNERE1 MB95F283HWQN-G-SNERE1 MB95F283HWQN-G-SNERE1 MB95F283HWQN-G-SNERE1 MB95F283KWQN-G-SNERE1 MB95F284HWQN-G-SNERE1 MB95F284HWQN-G-SNERE1 MB95F284KWQN-G-SNERE1	32-pin plastic QFN (LCC-32P-M19)
MB95F282HPH-G-SNE2 MB95F282KPH-G-SNE2 MB95F283HPH-G-SNE2 MB95F283KPH-G-SNE2 MB95F284HPH-G-SNE2 MB95F284KPH-G-SNE2	16-pin plastic DIP (DIP-16P-M06)

16-pin plastic SOP	Lead pitch	1.27 mm
	Package width \times package length	5.3 imes10.15 mm
	Lead shape	Gullwing
	Sealing method	Plastic mold
	Mounting height	2.25 mm MAX
	Weight	0.20 g
(FPT-16P-M06)	Code (Reference)	P-SOP16-5.3×10.15-1.27

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
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