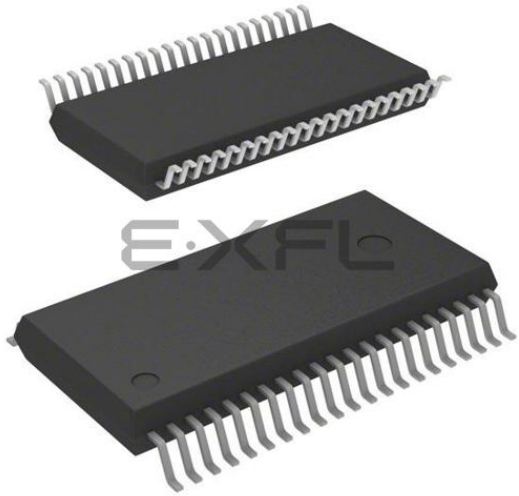
Renesas Electronics America Inc - M30263F3AFP#U5A Datasheet



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Applications of "Embedded - Microcontrollers"

Details	
Product Status	Obsolete
Core Processor	M16C/60
Core Size	16-Bit
Speed	20MHz
Connectivity	I²C, IEBus, SIO, UART/USART
Peripherals	DMA, PWM, Voltage Detect, WDT
Number of I/O	33
Program Memory Size	24KB (24K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	1K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 10x10b
Oscillator Type	Internal
Operating Temperature	-20°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	42-SOP (0.330", 8.40mm Width)
Supplier Device Package	42-SSOP
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/m30263f3afp-u5a

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1. Overview

The M16C/26A Group (M16C/26A, M16C/26B, M16C/26T) is a single-chip control MCU, fabricated using high-performance silicon gate CMOS technology, embedding the M16C/60 Series CPU core. The M16C/26A Group (M16C/26A, M16C/26B, M16C/26T) is housed in 42-pin and 48-pin plastic molded packages. With a 1M byte address space, this MCU combines advanced instruction manipulation capabilities to process complex instructions by less bytes and execute instructions at higher speed. The M16C/26A Group (M16C/26A, M16C/26B, M16C/26T) has a multiplier and DMAC adequate for office automation, communication devices and industrial equipment, and other high-speed processing applications.

1.1 Applications

Audio, cameras, office/communications/portable/ equipment, air-conditioning equipment, home appliances, etc.

1.2 Performance Outline

Table 1.1 and **1.2** outline performance overview of the M16C/26A Group (M16C/26A, M16C/26B, M16C/26T).

Table 1.1. M16C/26A Group(M16C/26A, M16C/26B, M16C/26T) Performance (48-Pin Package)

Item		Specification
CPU	Basic instructions	91 instructions
	Minimun instruction execution time	41.7 ns (f(BCLK) = 24MHz(4), Vcc = 4.2 to 5.5 V) (M16C/26B) 50 ns (f(BCLK) = 20MHz, Vcc = 3.0 to 5.5 V) (M16C/26A, M16C/26B, M16C/26T(T-ver.)) 100 ns (f(BCLK) = 10MHz, Vcc = 2.7 to 5.5 V) (M16C/26A , M16C/26B) 50 ns (f(BCLK) = 20MHz, Vcc = 4.2 to 5.5 V -40 to 105°C) (M16C/26T(V-ver.)) 62.5 ns (f(BCLK) = 16MHz, Vcc = 4.2 to 5.5 V -40 to 125°C) (M16C/26T(V-ver.))
	Operating mode	Single-chip mode
	Address space	1 Mbyte
	Memory capacity	See **1.4 Product Information**
Peripheral Function	I/O ports	39 I/O pins
	Multifunction timers	TimerA:16 bits x 5 channels, TimerB:16 bits x 3 channels Three-phase motor control timer
	Serial I/O	2 channels (UART, clock synchronous serial I/O) 1 channel (UART, clock synchronous, I2C bus(1) , or IEBus(2))
	A/D converter	10 bit A/D Converter : 1 circuit, 12 channels
	DMAC	2 channels
	CRC calcuration circuit	1 circuit (CRC-CCITT and CRC-16) with MSB/LSB selectable
	Watchdog timer	15 bits x 1 channel (with prescaler)
	Interrupts	20 internal and 8 external sources, 4 software sources, Interrupt priority level: 7
	Clock generation circuit	4 circuits Main clock oscillation circuit(*), Sub-clock oscillation circuit(*) On-chip oscillator, PLL frequency synthesizer (*)Equipped with a built-in feedback resister.
	Oscillation stop detection	Main clock oscillation stop, re-oscillation detection function
	Voltage detection circuit	On-chip (M16C/26A, M16C/26B), not on-chip (M16C/26T)
Electrical Characteristics	Power supply voltage	Vcc = 4.2 to 5.5 V (f(BCLK) = 24 MHz)(4) (M16C/26B) Vcc = 3.0 to 5.5 V (f(BCLK) = 20 MHz) (M16C/26A, M16C/26B) Vcc = 2.7 to 5.5 V (f(BCLK) = 10 MHz) Vcc = 3.0 to 5.5 V (M16C/26T(T-ver.)) Vcc = 4.2 to 5.5 V (M16C/26T(V-ver.))
	Power consumption	16 mA (Vcc = 5 V, f(BCLK) = 20 MHz) 25 µA (f(XCIN) = 32 KHz on RAM) 3 µA (Vcc = 3 V, f(XCIN) = 32 KHz, in wait mode) 0.7 µA (Vcc = 3 V, in stop mode)
Flash Memory Version	Programming /erasure voltage	2.7 to 5.5 V (M16C/26A, M16C/26B) 3.0 to 5.5 V (M16C/26T(T-ver.)) 4.2 to 5.5 V (M16C/26T(V-ver.))
	Programming /erasure endurance	100 times (all area) or 1,000 times (block 0 to 3) / 10,000 times (block A, block B)(3)
Operating Ambient Temperature		-20 to 85°C / -40 to 85°C (3) (M16C/26A , M16C/26B) -40 to 85°C (M16C/26T(T-ver.)) -40 to 105°C / -40 to 125°C (M16C/26T(V-ver.))
Package		48-pin plastic molded QFP

NOTES:
1. I2C bus is a trademark of Koninklijke Philips Electronics N. V.
2. IEBus is a trademark of NEC Electronics Corporation.
3. See **Table 1.7 Product Code** for the program and erase endurance, and operating ambient temperature.
4. The PLL frequency synthesizer is used to run the M16C/26B at f(BCLK) = 24 MHz.

Table 1.2. Performance outline of M16C/26A group (M16C/26A, M16C/26B) (42-pin device)

	Item	Performance
CPU	Basic instructions	91 instructions
	Minimun instruction execution time	41.7 ns (f(BCLK) = 24 MHz (4), VCC = 4.2 to 5.5 V (M16C/26B) 50 ns (f(BCLK) = 20 MHz, Vcc = 3.0 to 5.5 V) (M16C/26A, M16C/26B) 100 ns (f(BCLK) = 10 MHz, Vcc = 2.7 to 5.5 V) (M16C/26A, M16C/26B)
	Operation mode	Single-chip mode
	Address space	1M byte
	Memory capacity	See **1.4 Product Information**
Peripheral function	Port	33 I/O pins
	Multifunction timer	Timer A: 16 bits x 5 channels, Timer B: 16 bits x 3 channels Three-phase motor control timer
	Serial I/O	1 channel (UART, clock synchronous serial I/O) 1 channel (UART, clock synchronous, I^2C bus(1) , or IEBus(2))
	A/D converter	10 bit A/D converter: 1 circuit, 10 channels
	DMAC	2 channels
	CRC calcuration circuit	1 circuits (CRC-CCITT and CRC-16) with MSB/LSB selectable
	Watchdog timer	15 bits x 1 channel (with prescaler)
	Interrupt	18 internal and 8 external sources, 4 software sources, Interrupt priority level: 7
	Clock generation circuit	4 circuits Main clock(*), Sub-clock(*) On-chip oscillator, PLL frequency synthesizer (*)Equipped with a built-in feedback resister.
	Oscillation stop detection	Main clock oscillation stop, re-oscillation detection function
	Voltage detection circuit	On-chip
Electrical Characteristics	Supply voltage	Vcc = 4.2 to 5.5 V (f(BCLK) = 24 MHz)(4) (M16C/26B) Vcc = 3.0 to 5.5 V (f(BCLK) = 20 MHz) (M16C/26A, M16C/26B) Vcc = 2.7 to 5.5 V (f(BCLK) = 10 MHz)
	Power Consumption	16 mA (Vcc = 5 V, f(BCLK) = 20 MHz) 25 μA (f(XCIN) = 32 KHz on RAM) 3 μA (Vcc = 3 V, f(XCIN) = 32 KHz, in wait mode) 0.7 μA (Vcc = 3 V, in stop mode)
Flash memory	Programming/erasure voltage	2.7 to 5.5 V
	Programming/erasure endurance	100 times (all area) or 1,000 times (block 0 to 3) / 10,000 times (block A, block B)(3)
Operating Ambient Temperature		-20 to 85°C / -40 to 85°C (3)
Package		42-pin plastic molded SSOP

NOTES:
1. I^2C bus is a trademark of Koninklijke Philips Electronics N. V.
2. IEBus is a trademark of NEC Electronics Corporation.
3. See **Table 1.7 Product Code** for the program and erase endurance, and operating ambient temperature.
4. The PLL frequency synthesizer is used to run the M16C/26B at f(BCLK) = 24 MHz.

1.3 Block Diagram

Figure 1.1 and **1.2** show block diagrams of the M16C/26A Group (M16C/26A, M16C/26B, M16C/26T) 48-pin package and 42-pin package.

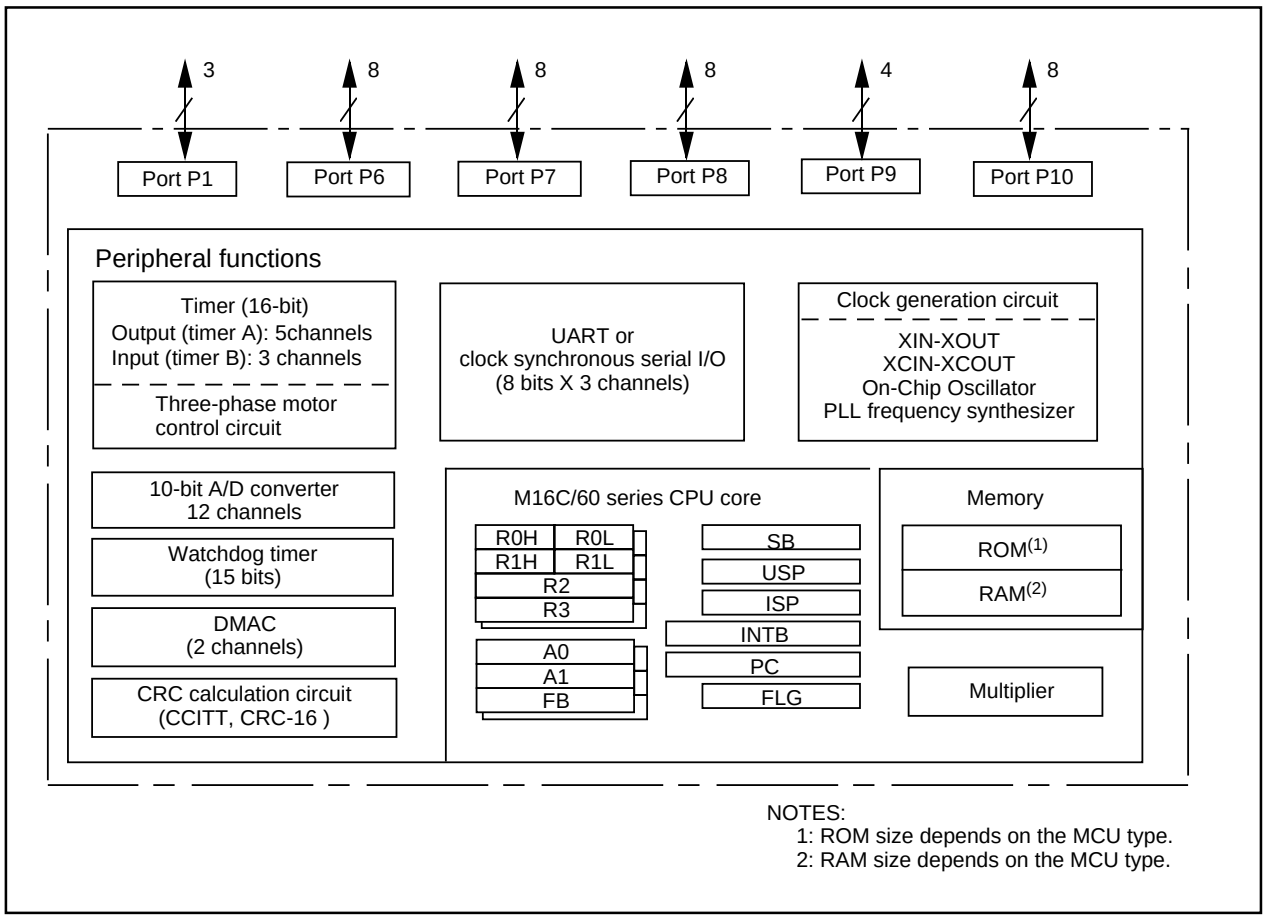


Figure 1.1 Block Diagram(48-pin Package)

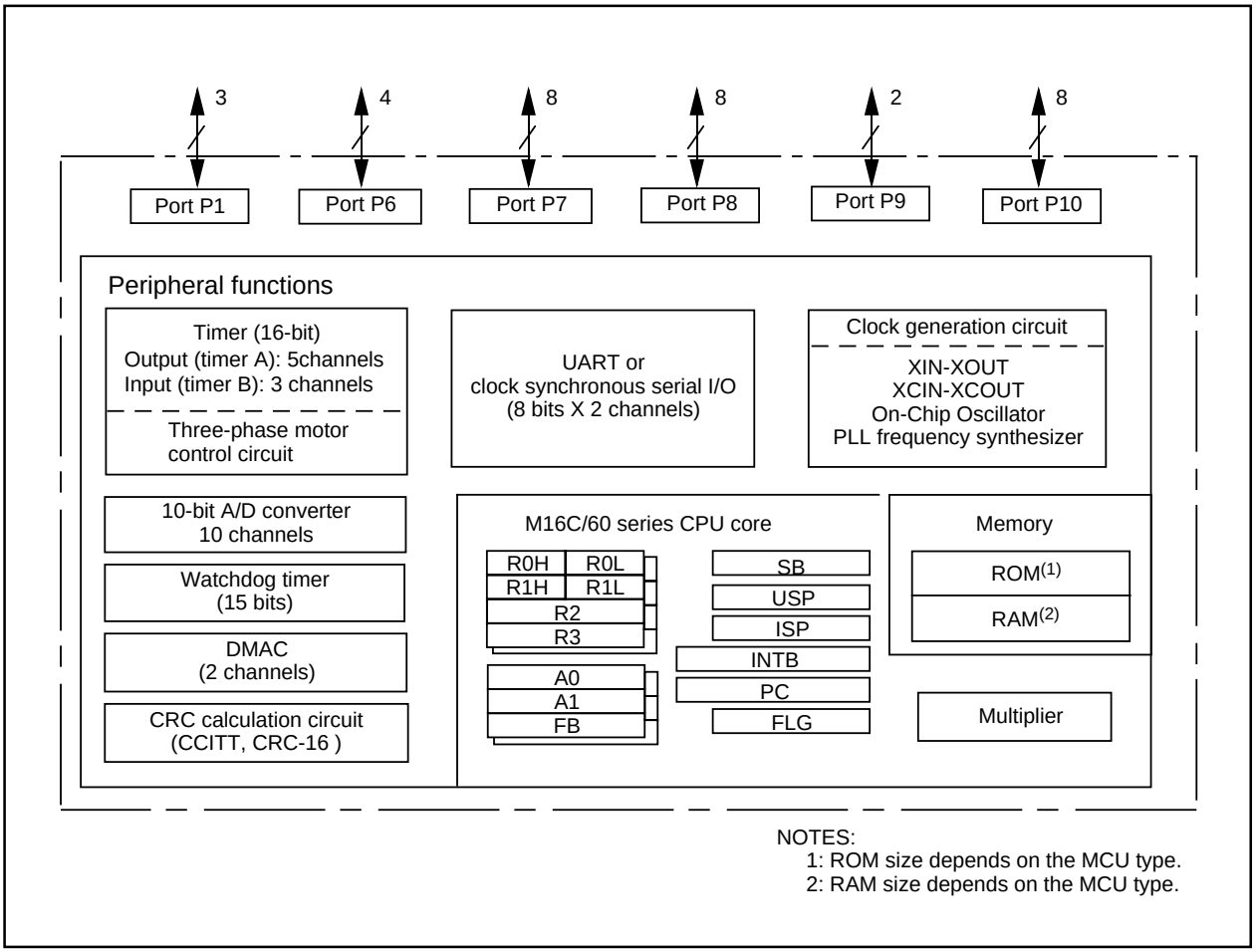


Figure 1.2 Block Diagram(42-pin Package)

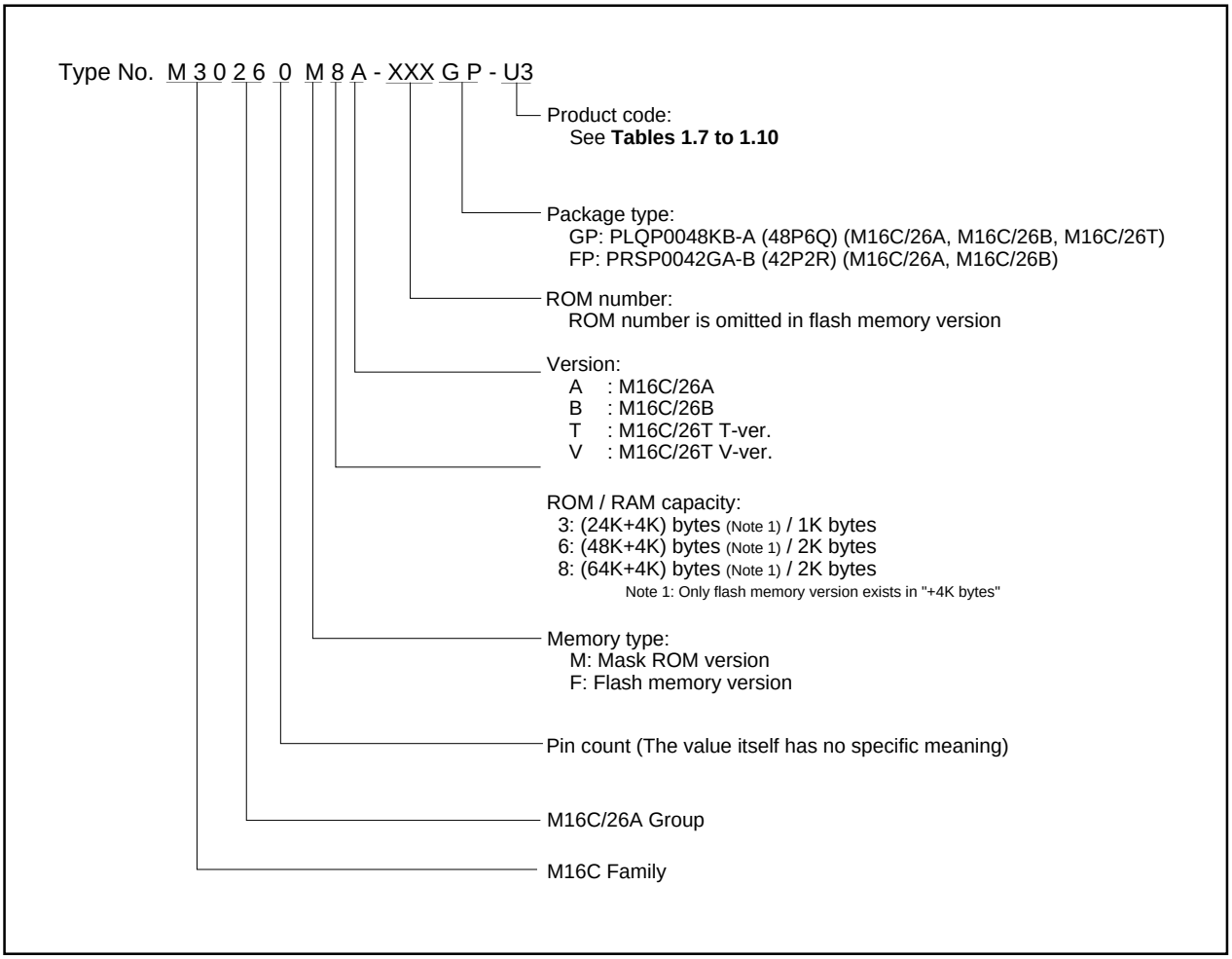


Figure 1.3 Product Numbering System

Table 1.7 Product Code (Flash Memory Version) - M16C/26A, M16C/26B

Product Code	Package	Internal ROM (User Program Space)		Internal ROM (Data Space)		Operating Ambient Temperature
		Program and Erase Endurance	Temperature Range	Program and Erase Endurance	Temperature Range	
U3	Lead free	100	0 to 60°C	100	0 to 60°C	-40 to 85°C
U5						-20 to 85°C
U7		1,000		10,000	-40 to 85°C	-40 to 85°C
U9					-20 to 85°C	-20 to 85°C

Table 1.8 Product Code (Mask ROM Version - M16C/26A)

Product Code	Package	Operating Ambient Temperature
U3	Lead free	-40°C to 85°C
U5		-20°C to 85°C

NOTE:

1. The lead contained products, D3, D5, D7, and D9 are put together with U3, U5, U7, and U9 respectively. Lead-free products can be mounted by both conventional Sn-Pb paste and Lead-free paste (Sn-Ag-Cu plating).

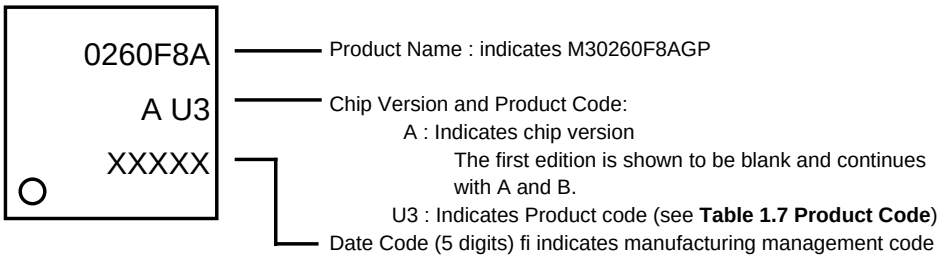
Table 1.9 Product Code (Flash Memory Version) - M16C/26T T-ver.

Product Code	Package	Internal ROM (User Program Space)		Internal ROM (Data Space)		Operating Ambient Temerature
		Programming and erasure endurance	Temperature range	Programming and erasure endurance	Temperature range	
U3	Lead free	100	0°C to 60°C	100	-40°C to 85°C	-40°C to 85°C
U7		1,000		10,000		

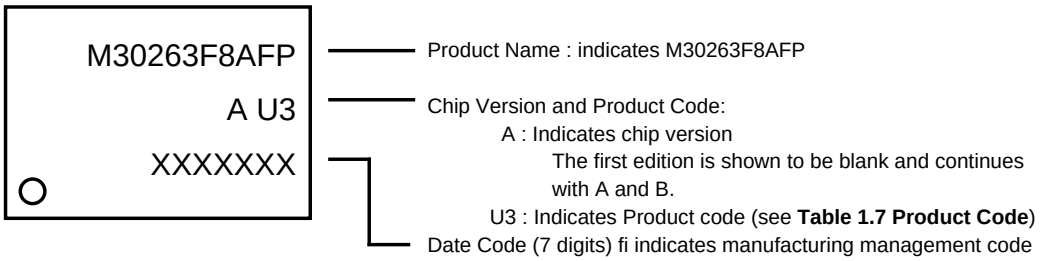
Table 1.10 Product Code (Flash Memory Version) - M16C/26T V-ver.

Product Code	Package	Internal ROM (User Program Space)		Internal ROM (Data Space)		Operating Ambient Temerature
		Programming and erasure endurance	Temperature range	Programming and erasure endurance	Temperature range	
U3	Lead free	100	0°C to 60°C	100	-40°C to 125°C	-40°C to 125°C
U7		1,000		10,000		

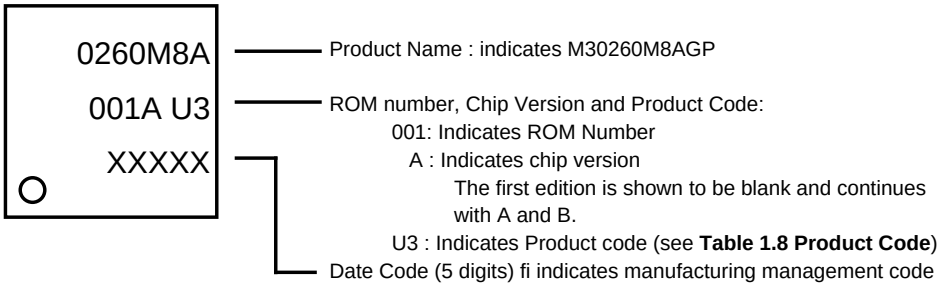
(1) Flash memory version, PLQP0048KB-A (48P6Q), M16C/26A, M16C/26B



(2) Flash memory version, PRSP0042GA-B (42P2R), M16C/26A, M16C/26B



(3) MASK ROM version, PLQP0048KB-A (48P6Q), M16C/26A



(4) MASK ROM version, PRSP0042GA-B (42P2R), M16C/26A

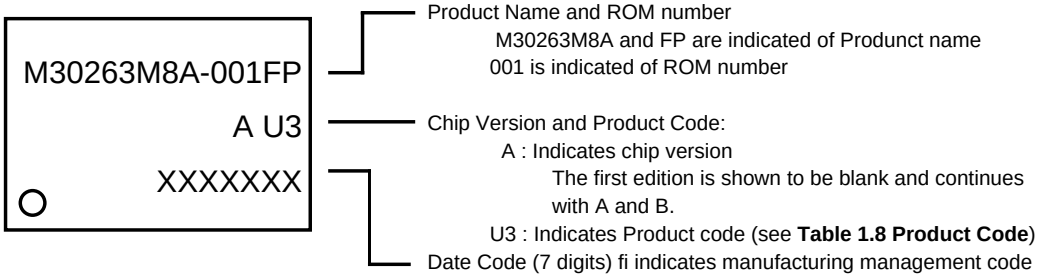
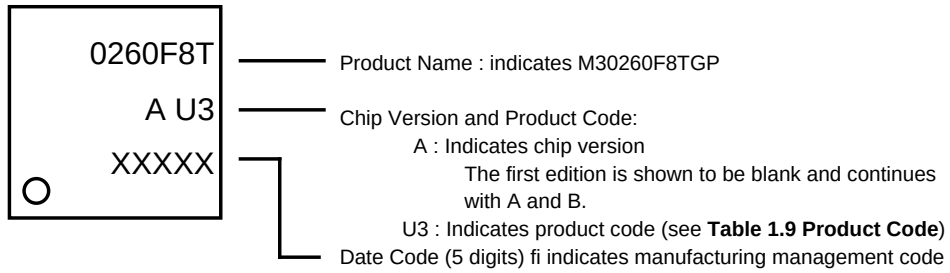


Figure 1.4 Marking Diagram (M16C/26A , M16C/26B)

(1) Flash memory version, PLQP0048KB-A (48P6Q), M16C/26T T-ver.



(2) Flash memory version, PLQP0048KB-A (48P6Q), M16C/26T V-ver.

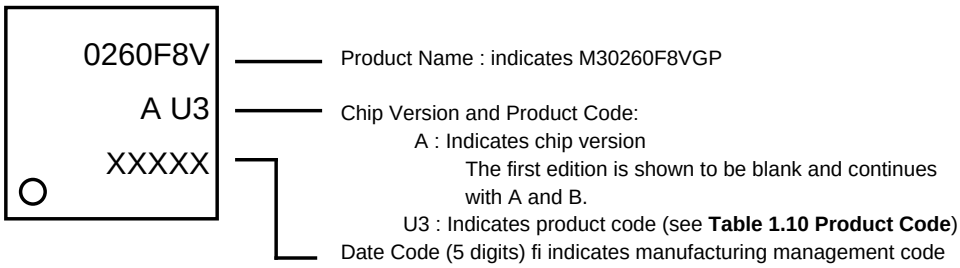
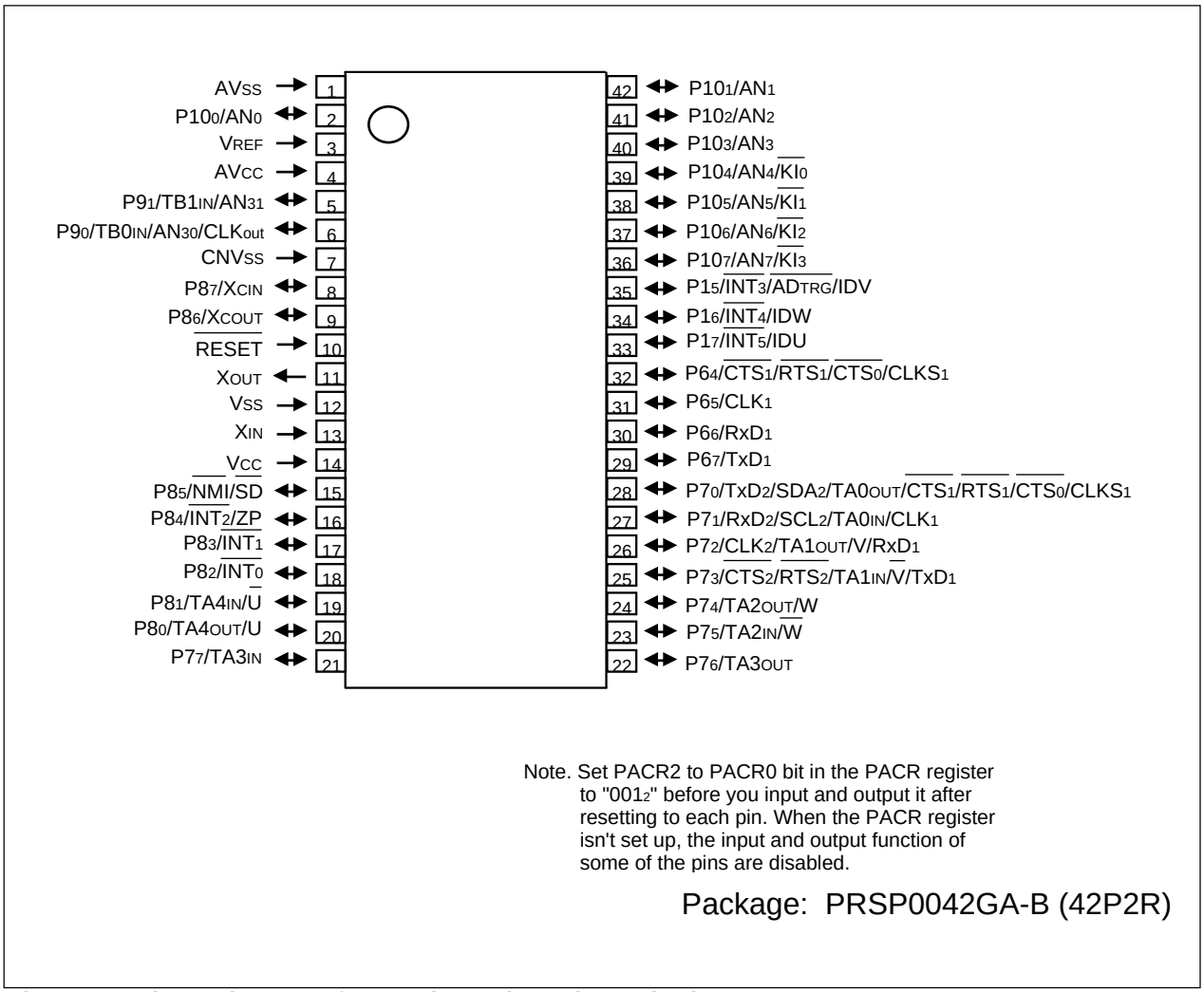


Figure 1.5 Marking Diagram (M16C/26T)

Table 1.11 Pin Characteristics for 48-Pin Package

Pin No.	Control Pin	Port	Interrupt Pin	Timer Pin	UART Pin	Analog Pin
1		$P9_2$		TB_{2IN}		$AN3_2$
2		$P9_1$		TB_{1IN}		$AN3_1$
3		$P9_0$		TB_{0IN}	CLK_{OUT}	$AN3_0$
4	CNVss					
5	X_{CIN}	$P8_7$				
6	X_{COUT}	$P8_6$				
7	$\overline{RESET}$					
8	X_{OUT}					
9	Vss					
10	X_{IN}					
11	Vcc					
12		$P8_5$	$\overline{NMI}$	$\overline{SD}$		
13		$P8_4$	$\overline{INT_2}$	ZP		
14		$P8_3$	$\overline{INT_1}$			
15		$P8_2$	$\overline{INT_0}$			
16		$P8_1$		TA_{4IN} / $\overline{U}$		
17		$P8_0$		TA_{4OUT} / U		
18		$P7_7$		TA_{3IN}		
19		$P7_6$		TA_{3OUT}		
20		$P7_5$		TA_{2IN} / $\overline{W}$		
21		$P7_4$		TA_{2OUT} / W		
22		$P7_3$		TA_{1IN} / $\overline{V}$	$\overline{CTS_2}$ / $\overline{RTS_2}$ / TxD_1	
23		$P7_2$		TA_{1OUT} / V	CLK_2 / RxD_1	
24		$P7_1$		TA_{0IN}	RxD_2 / SCL_2 / CLK_1	
25		$P7_0$		TA_{0OUT}	TxD_2 / SDA_2 / $\overline{RTS_1}$ / $\overline{CTS_1}$ / $\overline{CTS_0}$ / $CLKS_1$	
26		$P6_7$			TxD_1	
27		$P6_6$			RxD_1	
28		$P6_5$			CLK_1	
29		$P6_4$			$\overline{RTS_1}$ / $\overline{CTS_1}$/ $\overline{CTS_0}$ / $CLKS_1$	
30		$P6_3$			TxD_0	
31		$P6_2$			RxD_0	
32		$P6_1$			CLK_0	
33		$P6_0$			$\overline{RTS_0}$ / $\overline{CTS_0}$	
34		$P1_7$	$\overline{INT_5}$	IDU		
35		$P1_6$	$\overline{INT_4}$	IDW		
36		$P1_5$	$\overline{INT_3}$	IDV		$\overline{ADTRG}$
37		$P10_7$	$\overline{KI_3}$			AN_7
38		$P10_6$	$\overline{KI_2}$			AN_6
39		$P10_5$	$\overline{KI_1}$			AN_5
40		$P10_4$	$\overline{KI_0}$			AN_4
41		$P10_3$				AN_3
42		$P10_2$				AN_2
43		$P10_1$				AN_1
44	AVss					
45		$P10_0$				AN_0
46	V_{REF}					
47	AVcc					
48		$P9_3$				$AN2_4$



Note. Set PACR2 to PACR0 bit in the PACR register to "001_2" before you input and output it after resetting to each pin. When the PACR register isn't set up, the input and output function of some of the pins are disabled.

Package: PRSP0042GA-B (42P2R)

Figure 1.7 Pin Assignment for 42-Pin Package (Top View)

1.6 Pin Description

Table 1.13 Pin Description (48-Pin and 42-Pin Packages)

Classification	Pin Name	I/O Type	Description
Power Supply	VCC, VSS	I	Apply 0V to the Vss pin. Apply following voltage to the Vcc pin. 2.7 to 5.5 V (M16C/26A, M16C/26B), 3.0 to 5.5 V (M16C/26T T-ver.), 4.2 to 5.5 V (M16C/26T V-ver.)
Analog Power Supply	AVCC AVSS	I	Supplies power to the A/D converter. Connect the AVCC pin to VCC and the AVSS pin to VSS
Reset Input	$\overline{\text{RESET}}$	I	The MCU is in a reset state when "L" is applied to the $\overline{\text{RESET}}$ pin
CNVSS	CNVSS	I	Connect the CNVSS pin to VSS
Main Clock Input	XIN	I	I/O pins for the main clock oscillation circuit. Connect a ceramic resonator or crystal oscillator between XIN and XOUT. To apply external clock, apply it to XIN and leave XOUT open. If XIN is not used (for external oscillator or external clock), connect XIN pin to VCC and leave XOUT open
Main Clock Output	XOUT	O	
Sub Clock Input	XCIN	I	I/O pins for the sub clock oscillation circuit. Connect a crystal oscillator between XCIN and XCOUT
Sub Clock Output	XCOUT	O	
Clock Output	CLKOUT	O	Outputs the clock having the same frequency as f1, f8, f32, or fC
$\overline{\text{INT}}$ Interrupt Input	$\overline{\text{INT0}}$ to $\overline{\text{INT5}}$	I	Input pins for the $\overline{\text{INT}}$ interrupt. $\overline{\text{INT2}}$ can be used for Timer A Z-phase function
$\overline{\text{NMI}}$ Interrupt Input	$\overline{\text{NMI}}$	I	$\overline{\text{NMI}}$ interrupt input pin. $\overline{\text{NMI}}$ cannot be used as I/O port while the three-phase motor control is enabled. Apply a stable "H" to $\overline{\text{NMI}}$ after setting it's direction register to "0" when the three-phase motor control is enabled
Key Input Interrupt	$\overline{\text{KI0}}$ to $\overline{\text{KI3}}$	I	Input pins for the key input interrupt
Timer A	TA0OUT to TA4OUT	I/O	I/O pins for the timer A0 to A4
	TA0IN to TA4IN	I	Input pins for the timer A0 to A4
	ZP	I	Input pin for Z-phase
Timer B	TB0IN to TB1IN	I	Timer B0 to B1 input pins
Three-Phase Motor Control Timer Output	U, $\overline{\text{U}}$, V, $\overline{\text{V}}$, W, $\overline{\text{W}}$	O	Output pins for the three-phase motor control timer
	IDU, IDW, IDV, $\overline{\text{SD}}$	I/O	I/O pins for the three-phase motor control timer
Serial I/O	$\overline{\text{CTS1}}$ to $\overline{\text{CTS2}}$	I	Input pins to control data transmission
	$\overline{\text{RTS1}}$ to $\overline{\text{RTS2}}$	O	Output pins to control data reception
	CLK1 to CLK2	I/O	Inputs and outputs the transfer clock
	RxD1 to RxD2	I	Inputs serial data
	TxD1 to TxD2	O	Outputs serial data
	CLKS1	O	Output pin for transfer clock
Reference Voltage Input	VREF	I	Applies reference voltage to the A/D converter
A/D Converter	AN0 to AN7 AN30 to AN31	I	Analog input pins for the A/D converter
	$\overline{\text{ADTRG}}$	I	Input pin for an external A/D trigger
I/O Ports	P15 to P17	I/O	I/O ports for CMOS. Each port can be programmed for input or output under the control of the direction register. An input port can be set, by program, for a pull-up resistor available or for no pull-up resister available in 3-bit units
	P64 to P67 P70 to P77 P80 to P87 P100 to P107 P90 to P91	I/O	I/O ports for CMOS. Each port can be programmed for input or output under the control of the direction register. An input port can be set, by program, for a pull-up resistor available or for no pull-up resister available in 4-bit units

I : Input O : Output I/O : Input and output

2. Central Processing Unit (CPU)

Figure 2.1 shows the CPU registers. The register bank is comprised of seven registers (R0, R1, R2, R3, A0, A1 and FB) out of 13 registers. There are two sets of register bank.

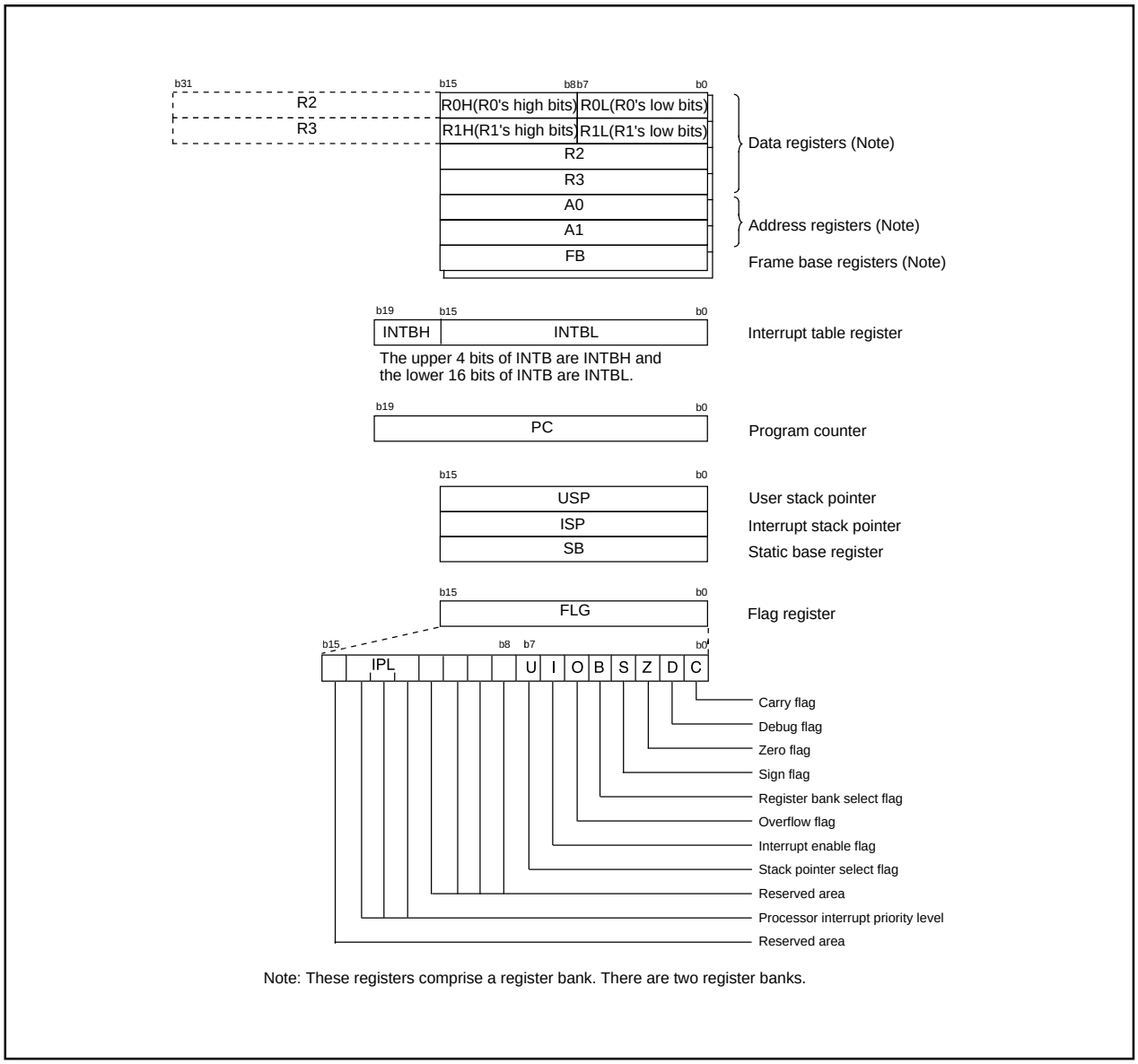


Figure 2.1. CPU Register

2.1 Data Registers (R0, R1, R2 and R3)

The R0 register consists of 16 bits, and is used mainly for transfers and arithmetic/logic operations. R1 to R3 are the same as R0.

The R0 register can be separated between high (R0H) and low (R0L) for use as two 8-bit data registers. R1H and R1L are the same as R0H and R0L. Conversely, R2 and R0 can be combined for use as a 32-bit data register (R2R0). R3R1 is the same as R2R0.

2.2 Address Registers (A0 and A1)

The register A0 consists of 16 bits, and is used for address register indirect addressing and address register relative addressing. They also are used for transfers and arithmetic/logic operations. A1 is the same as A0.

In some instructions, registers A1 and A0 can be combined for use as a 32-bit address register (A1A0).

3. Memory

Figure 3.1 is a memory map of the M16C/26A Group (M16C/26A, M16C/26B, M16C/26T). The M16C/26A Group provides 1-Mbyte address space addresses 00000_{16} to $FFFFF_{16}$.

The internal ROM is allocated lower address, beginning with address $FFFFF_{16}$. For example, a 64-Kbyte internal ROM area is allocated in addresses $F0000_{16}$ to $FFFFF_{16}$. The flash memory version has two sets of 2-Kbyte internal ROM area, block A and block B, for data space. These blocks are allocated addresses $F000_{16}$ to $FFFF_{16}$.

The fixed interrupt vectors are allocated addresses $FFFDC_{16}$ to $FFFFF_{16}$ and they store the start address of each interrupt routine.

The internal RAM is allocated higher addresses, beginning with address 00400_{16}. For example, a 1-Kbyte internal RAM area is allocated in addresses 00400_{16} to $007FF_{16}$. The internal RAM is used for temporarily storing data. The area is also used as stacks when subroutines are called or interrupt requests are acknowledged.

The SFR is allocated addresses 00000_{16} to $003FF_{16}$. The peripheral function control registers are allocated here. All blank spaces within SFR location are reserved and cannot be accessed by users.

The special page vectors are allocated addresses $FFE00_{16}$ to $FFFDB_{16}$. They are used for the JMPS instruction and JSRS instruction. Refer to the Renesas publication **M16C/60 and M16C/20 Series Software Manual** for details.

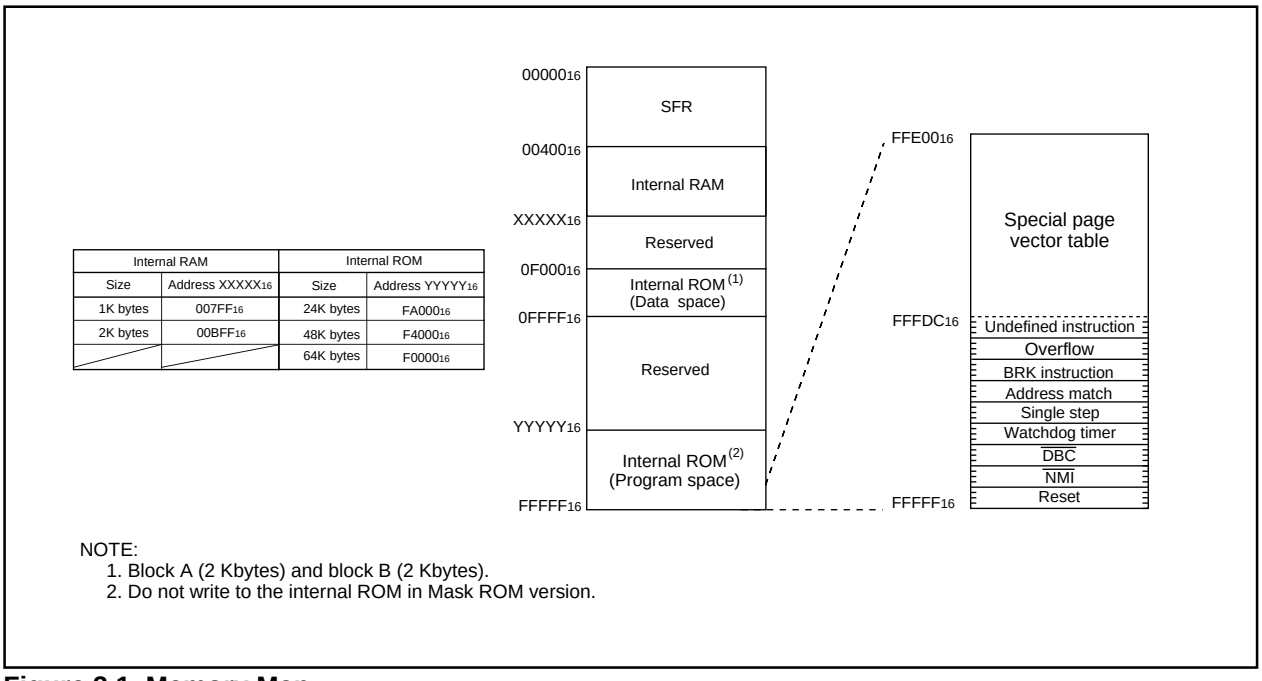


Figure 3.1 Memory Map

Table 4.2 SFR Information(2)(1)

Address	Register	Symbol	After reset
0040₁₆			
0041₁₆			
0042₁₆			
0043₁₆			
0044₁₆	INT3 interrupt control register	INT3IC	XX00X000₂
0045₁₆			
0046₁₆			
0047₁₆			
0048₁₆	INT5 interrupt control register	INT5IC	XX00X000₂
0049₁₆	INT4 interrupt control register	INT4IC	XX00X000₂
004A₁₆	UART2 Bus collision detection interrupt control register	BCNIC	XXXXX000₂
004B₁₆	DMA0 interrupt control register	DM0IC	XXXXX000₂
004C₁₆	DMA1 interrupt control register	DM1IC	XXXXX000₂
004D₁₆	Key input interrupt control register	KUPIC	XXXXX000₂
004E₁₆	A/D conversion interrupt control register	ADIC	XXXXX000₂
004F₁₆	UART2 transmit interrupt control register	S2TIC	XXXXX000₂
0050₁₆	UART2 receive interrupt control register	S2RIC	XXXXX000₂
0051₁₆	UART0 transmit interrupt control register	S0TIC	XXXXX000₂
0052₁₆	UART0 receive interrupt control register	S0RIC	XXXXX000₂
0053₁₆	UART1 transmit interrupt control register	S1TIC	XXXXX000₂
0054₁₆	UART1 receive interrupt control register	S1RIC	XXXXX000₂
0055₁₆	TimerA0 interrupt control register	TA0IC	XXXXX000₂
0056₁₆	TimerA1 interrupt control register	TA1IC	XXXXX000₂
0057₁₆	TimerA2 interrupt control register	TA2IC	XXXXX000₂
0058₁₆	TimerA3 interrupt control register	TA3IC	XXXXX000₂
0059₁₆	TimerA4 interrupt control register	TA4IC	XXXXX000₂
005A₁₆	TimerB0 interrupt control register	TB0IC	XXXXX000₂
005B₁₆	TimerB1 interrupt control register	TB1IC	XXXXX000₂
005C₁₆	TimerB2 interrupt control register	TB2IC	XXXXX000₂
005D₁₆	INT0 interrupt control register	INT0IC	XX00X000₂
005E₁₆	INT1 interrupt control register	INT1IC	XX00X000₂
005F₁₆	INT2 interrupt control register	INT2IC	XX00X000₂
0060₁₆			
0061₁₆			
0062₁₆			
0063₁₆			
0064₁₆			
0065₁₆			
0066₁₆			
0067₁₆			
0068₁₆			
0069₁₆			
006A₁₆			
006B₁₆			
006C₁₆			
006D₁₆			
006E₁₆			
006F₁₆			
0070₁₆			
0071₁₆			
0072₁₆			
0073₁₆			
0074₁₆			
0075₁₆			
0076₁₆			
0077₁₆			
0078₁₆			
0079₁₆			
007A₁₆			
007B₁₆			
007C₁₆			
007D₁₆			
007E₁₆			
007F₁₆			

NOTE:
1. Blank spaces are reserved. No access is allowed.

X: Undefined

Table 4.3 SFR Information(3)(1)

Address	Register	Symbol	After reset
008016			
008116			
008216			
008316			
008416			
008516			
008616			
≈			≈
01B016			
01B116			
01B216			
01B316	Flash memory control register 4 (Note 2)	FMR4	010000002
01B416			
01B516	Flash memory control register 1 (Note 2)	FMR1	000XXX0X2
01B616			
01B716	Flash memory control register 0 (Note 2)	FMR0	0116
01B816			
01B916			
01BA16			
01BB16			
01BC16			
01BD16			
01BE16			
01BF16			
≈			≈
025016			
025116			
025216			
025316			
025416			
025516			
025616			
025716			
025816			
025916			
025A16	Three phase protect control register	TPRC	0016
025B16			
025C16	On-chip oscillator control register	ROCR	000001012
025D16	Pin assignment control register	PACR	0016
025E16	Peripheral clock select register	PCLKR	000000112
025F16			
≈			≈
033016			
033116			
033216			
033316			
033416			
033516			
033616			
033716			
033816			
033916			
033A16			
033B16			
033C16			
033D16			
033E16	NMI digital debounce register	NDDR	FF16
033F16	Port17 digital debounce register	P17DDR	FF16

NOTES:
1. Blank spaces are reserved. No access is allowed.
2. This register is included in the flash memory version.

X: Undefined

Table 4.4 SFR Information(4)(1)

Address	Register	Symbol	After reset
034016			
034116			
034216	Timer A1-1 register	TA11	XX16
034316			XX16
034416	Timer A2-1 register	TA21	XX16
034516			XX16
034616	Timer A4-1 register	TA41	XX16
034716			XX16
034816	Three phase PWM control register 0	INVC0	0016
034916	Three phase PWM control register 1	INVC1	0016
034A16	Three phase output buffer register 0	IDB0	3F16
034B16	Three phase output buffer register 1	IDB1	3F16
034C16	Dead time timer	DTT	XX16
034D16	Timer B2 Interrupt occurrence frequency set counter	ICTB2	XX16
034E16	Position-data-retain function control register	PDRF	XXXX00002
034F16			
035016			
035116			
035216			
035316			
035416			
035516			
035616			
035716			
035816	Port function control register	PFCR	001111112
035916			
035A16			
035B16			
035C16			
035D16			
035E16	Interrupt request cause select register 2	IFSR2A	XXXXXXX02
035F16	Interrupt request cause select register	IFSR	0016
036016			
036116			
036216			
036316			
036416			
036516			
036616			
036716			
036816			
036916			
036A16			
036B16			
036C16			
036D16			
036E16			
036F16			
037016			
037116			
037216			
037316			
037416	UART2 special mode register 4	U2SMR4	0016
037516	UART2 special mode register 3	U2SMR3	000X0X0X2
037616	UART2 special mode register 2	U2SMR2	X00000002
037716	UART2 special mode register	U2SMR	X00000002
037816	UART2 transmit/receive mode register	U2MR	0016
037916	UART2 bit rate register	U2BRG	XX16
037A16	UART2 transmit buffer register	U2TB	XXXXXXXX2
037B16			XXXXXXXX2
037C16	UART2 transmit/receive control register 0	U2C0	000010002
037D16	UART2 transmit/receive control register 1	U2C1	000000102
037E16	UART2 receive buffer register	U2RB	XXXXXXXX2
037F16			XXXXXXXX2

NOTE:
1. Blank spaces are reserved. No access is allowed.

X : Undefined

Table 4.5 SFR Information(5)(1)

Address	Register	Symbol	After reset
038016	Count start flag	TABSR	0016
038116	Clock prescaler reset flag	CPSRF	0XXXXXXX2
038216	One-shot start flag	ONSF	0016
038316	Trigger select register	TRGSR	0016
038416	Up-dowm flag	UDF	0016
038516			
038616	Timer A0 register	TA0	XX16
038716			XX16
038816	Timer A1 register	TA1	XX16
038916			XX16
038A16	Timer A2 register	TA2	XX16
038B16			XX16
038C16	Timer A3 register	TA3	XX16
038D16			XX16
038E16	Timer A4 register	TA4	XX16
038F16			XX16
039016	Timer B0 register	TB0	XX16
039116			XX16
039216	Timer B1 register	TB1	XX16
039316			XX16
039416	Timer B2 register	TB2	XX16
039516			XX16
039616	Timer A0 mode register	TA0MR	0016
039716	Timer A1 mode register	TA1MR	0016
039816	Timer A2 mode register	TA2MR	0016
039916	Timer A3 mode register	TA3MR	0016
039A16	Timer A4 mode register	TA4MR	0016
039B16	Timer B0 mode register	TB0MR	00XX00002
039C16	Timer B1 mode register	TB1MR	00XX00002
039D16	Timer B2 mode register	TB2MR	00XX00002
039E16	Timer B2 special mode register	TB2SC	X00000002
039F16			
03A016	UART0 transmit/receive mode register	U0MR	0016
03A116	UART0 bit rate register	U0BRG	XX16
03A216	UART0 transmit buffer register	U0TB	XXXXXXXX2
03A316			XXXXXXXX2
03A416	UART0 transmit/receive control register 0	U0C0	000010002
03A516	UART0 transmit/receive control register 1	U0C1	000000102
03A616	UART0 receive buffer register	U0RB	XXXXXXXX2
03A716			XXXXXXXX2
03A816	UART1 transmit/receive mode register	U1MR	0016
03A916	UART1 bit rate register	U1BRG	XX16
03AA16	UART1 transmit buffer register	U1TB	XXXXXXXX2
03AB16			XXXXXXXX2
03AC16	UART1 transmit/receive control register 0	U1C0	000010002
03AD16	UART1 transmit/receive control register 1	U1C1	000000102
03AE16	UART1 receive buffer register	U1RB	XXXXXXXX2
03AF16			XXXXXXXX2
03B016	UART transmit/receive control register 2	UCON	X00000002
03B116			
03B216			
03B316			
03B416	CRC snoop address register	CRCSAR	XX16
03B516			00XXXXXX2
03B616	CRC mode register	CRCMR	0XXXXXX02
03B716			
03B816	DMA0 request cause select register	DM0SL	0016
03B916			
03BA16	DMA1 request cause select register	DM1SL	0016
03BB16			
03BC16	CRC data register	CRCD	XX16
03BD16			XX16
03BE16	CRC input register	CRCIN	XX16
03BF16			

NOTE:
1. Blank spaces are reserved. No access is allowed.

X : Undefined

Table 4.6 SFR Information(6)(1)

Address	Register	Symbol	After Reset
03C0₁₆	A/D register 0	AD0	XXXXXXXX₂
03C1₁₆			XXXXXXXX₂
03C2₁₆	A/D register 1	AD1	XXXXXXXX2
03C3₁₆			XXXXXXXX₂
03C4₁₆	A/D register 2	AD2	XXXXXXXX₂
03C5₁₆			XXXXXXXX₂
03C6₁₆	A/D register 3	AD3	XXXXXXXX₂
03C7₁₆			XXXXXXXX₂
03C8₁₆	A/D register 4	AD4	XXXXXXXX₂
03C9₁₆			XXXXXXXX₂
03CA₁₆	A/D register 5	AD5	XXXXXXXX₂
03CB₁₆			XXXXXXXX₂
03CC₁₆	A/D register 6	AD6	XXXXXXXX₂
03CD₁₆			XXXXXXXX₂
03CE₁₆	A/D register 7	AD7	XXXXXXXX₂
03CF₁₆			XXXXXXXX₂
03D0₁₆			
03D1₁₆			
03D2₁₆	A/D trigger control register	ADTRGCON	00₁₆
03D3₁₆	A/D status register 0	ADSTAT0	00000X00₂
03D4₁₆	A/D control register 2	ADCON2	00₁₆
03D5₁₆			
03D6₁₆	A/D control register 0	ADCON0	00000XXX₂
03D7₁₆	A/D control register 1	ADCON1	00₁₆
03D8₁₆			
03D9₁₆			
03DA₁₆			
03DB₁₆			
03DC₁₆			
03DD₁₆			
03DE₁₆			
03DF₁₆			
03E0₁₆			
03E1₁₆	Port P1 register	P1	XX₁₆
03E2₁₆			
03E3₁₆	Port P1 direction register	PD1	00₁₆
03E4₁₆			
03E5₁₆			
03E6₁₆			
03E7₁₆			
03E8₁₆			
03E9₁₆			
03EA₁₆			
03EB₁₆			
03EC₁₆	Port P6 register	P6	XX₁₆
03ED₁₆	Port P7 register	P7	XX₁₆
03EE₁₆	Port P6 direction register	PD6	00₁₆
03EF₁₆	Port P7 direction register	PD7	00₁₆
03F0₁₆	Port P8 register	P8	XX₁₆
03F1₁₆	Port P9 register	P9	XXXXXXXX₂
03F2₁₆	Port P8 direction register	PD8	00₁₆
03F3₁₆	Port P9 direction register	PD9	XXXX0000₂
03F4₁₆	Port P10 register	P10	XX₁₆
03F5₁₆			
03F6₁₆	Port P10 direction register	PD10	00₁₆
03F7₁₆			
03F8₁₆			
03F9₁₆			
03FA₁₆			
03FB₁₆			
03FC₁₆	Pull-up control register 0	PUR0	00₁₆
03FD₁₆	Pull-up control register 1	PUR1	00₁₆
03FE₁₆	Pull-up control register 2	PUR2	00₁₆
03FF₁₆	Port control register	PCR	00₁₆

NOTE:
1. Blank spaces are reserved. No access is allowed.

X: Undefined