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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

Details	
Product Status	Active
Core Processor	R8C
Core Size	16-Bit
Speed	20MHz
Connectivity	I <sup>2</sup> C, LINbus, SIO, SSU, UART/USART
Peripherals	POR, PWM, Voltage Detect, WDT
Number of I/O	19
Program Memory Size	16KB (16K x 8)
Program Memory Type	FLASH
EEPROM Size	4K x 8
RAM Size	1.5К х 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 5.5V
Data Converters	A/D 8x10b; D/A 2x8b
Oscillator Type	Internal
Operating Temperature	-20°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	24-WFQFN Exposed Pad
Supplier Device Package	24-HWQFN (4x4)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f213g4mnnp-u0

Email: info@E-XFL.COM

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

# 1.1.2 Specifications

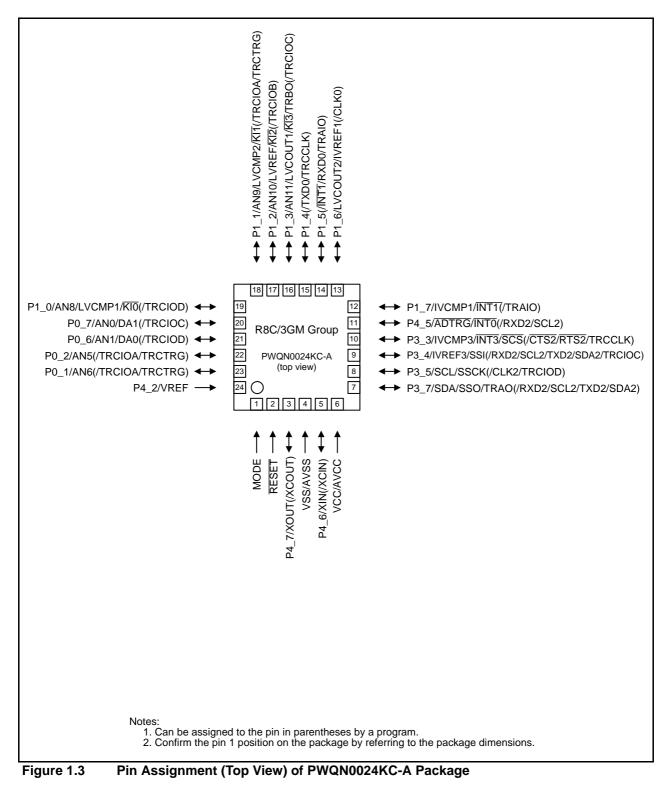
Tables 1.1 and 1.2 outline the Specifications for R8C/3GM Group.

ltem	Function	Specification			
CPU	Central processing	R8C CPU core			
	unit	<ul> <li>Number of fundamental instructions: 89</li> </ul>			
		Minimum instruction execution time:			
		50 ns (f(XIN) = 20 MHz, VCC = 2.7 to 5.5 V)			
		200 ns (f(XIN) = 5 MHz, VCC = 1.8 to 5.5 V)			
		• Multiplier: 16 bits $\times$ 16 bits $\rightarrow$ 32 bits			
		• Multiply-accumulate instruction: 16 bits $\times$ 16 bits + 32 bits $\rightarrow$ 32 bits			
		Operation mode: Single-chip mode (address space: 1 Mbyte)			
Memory	ROM, RAM, Data	Refer to Table 1.3 Product List for R8C/3GM Group.			
mornery	flash				
Power Supply	Voltage detection	Power-on reset			
Voltage	circuit	Voltage detection 3 (detection level of voltage detection 0 and voltage			
Detection	onoun	detection 1 selectable)			
I/O Ports	Programmable I/O	Input-only: 1 pin			
1/01/01/3	ports	CMOS I/O ports: 19, selectable pull-up resistor			
	pono	High current drive ports: 19			
Clock	Clock generation	4 circuits: XIN clock oscillation circuit,			
CIOCK	circuits	XCIN clock oscillation circuit (32 kHz),			
	Circuits	High-speed on-chip oscillator (with frequency adjustment function),			
		Low-speed on-chip oscillator			
		Oscillation stop detection: XIN clock oscillation stop detection function			
		• Frequency divider circuit: Dividing selectable 1, 2, 4, 8, and 16			
		Low power consumption modes:     Standard appreting mode (kigh appendiate kigh appendiate			
		Standard operating mode (high-speed clock, low-speed clock, high-speed			
		on-chip oscillator, low-speed on-chip oscillator), wait mode, stop mode			
1 4 4		Real-time clock (timer RE)			
Interrupts		Number of interrupt vectors: 69			
		• External Interrupt: 7 (INT × 3, Key input × 4)			
		Priority levels: 7 levels			
Watchdog Tim	er	• 14 bits × 1 (with prescaler)			
		Reset start selectable			
		Low-speed on-chip oscillator for watchdog timer selectable			
DTC (Data Tra	insfer Controller)	• 1 channel			
		Activation sources: 23			
		Transfer modes: 2 (normal mode, repeat mode)			
Timer	Timer RA	8 bits x 1 (with 8-bit prescaler)			
		Timer mode (period timer), pulse output mode (output level inverted every			
		period), event counter mode, pulse width measurement mode, pulse period			
		measurement mode			
	Timer RB	8 bits × 1 (with 8-bit prescaler)			
		Timer mode (period timer), programmable waveform generation mode (PWM			
		output), programmable one-shot generation mode, programmable wait one-			
		shot generation mode			
	Timer RC	16 bits x 1 (with 4 capture/compare registers)			
		Timer mode (input capture function, output compare function), PWM mode			
		(output 3 pins), PWM2 mode (PWM output pin)			
	Timer RE	8 bits × 1			
		Real-time clock mode (count seconds, minutes, hours, days of week)			

## Table 1.1 Specifications for R8C/3GM Group (1)

## 1.4 Pin Assignment

Figure 1.3 shows Pin Assignment (Top View) of PWQN0024KC-A Package. Table 1.4 outlines the Pin Name Information by Pin Number.





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

R0 is a 16-bit register for transfer, arithmetic, and logic operations. The same applies to R1 to R3. R0 can be split into high-order bits (R0H) and low-order bits (R0L) to be used separately as 8-bit data registers. R1H and R1L are analogous to R0H and R0L. R2 can be combined with R0 and used as a 32-bit data register (R2R0). R3R1 is analogous to R2R0.

## 2.2 Address Registers (A0 and A1)

A0 is a 16-bit register for address register indirect addressing and address register relative addressing. It is also used for transfer, arithmetic, and logic operations. A1 is analogous to A0. A1 can be combined with A0 and as a 32-bit address register (A1A0).

## 2.3 Frame Base Register (FB)

FB is a 16-bit register for FB relative addressing.

#### 2.4 Interrupt Table Register (INTB)

INTB is a 20-bit register that indicates the starting address of an interrupt vector table.

# 2.5 Program Counter (PC)

PC is 20 bits wide and indicates the address of the next instruction to be executed.

# 2.6 User Stack Pointer (USP) and Interrupt Stack Pointer (ISP)

The stack pointers (SP), USP and ISP, are each 16 bits wide. The U flag of FLG is used to switch between USP and ISP.

#### 2.7 Static Base Register (SB)

SB is a 16-bit register for SB relative addressing.

#### 2.8 Flag Register (FLG)

FLG is an 11-bit register indicating the CPU state.

#### 2.8.1 Carry Flag (C)

The C flag retains carry, borrow, or shift-out bits that have been generated by the arithmetic and logic unit.

#### 2.8.2 Debug Flag (D)

The D flag is for debugging only. Set it to 0.

# 2.8.3 Zero Flag (Z)

The Z flag is set to 1 when an arithmetic operation results in 0; otherwise to 0.

# 2.8.4 Sign Flag (S)

The S flag is set to 1 when an arithmetic operation results in a negative value; otherwise to 0.

#### 2.8.5 Register Bank Select Flag (B)

Register bank 0 is selected when the B flag is 0. Register bank 1 is selected when this flag is set to 1.

#### 2.8.6 Overflow Flag (O)

The O flag is set to 1 when an operation results in an overflow; otherwise to 0.



# 2.8.7 Interrupt Enable Flag (I)

The I flag enables maskable interrupts.

Interrupts are disabled when the I flag is set to 0, and are enabled when the I flag is set to 1. The I flag is set to 0 when an interrupt request is acknowledged.

# 2.8.8 Stack Pointer Select Flag (U)

ISP is selected when the U flag is set to 0; USP is selected when the U flag is set to 1. The U flag is set to 0 when a hardware interrupt request is acknowledged or the INT instruction of software interrupt numbers 0 to 31 is executed.

# 2.8.9 Processor Interrupt Priority Level (IPL)

IPL is 3 bits wide and assigns processor interrupt priority levels from level 0 to level 7. If a requested interrupt has higher priority than IPL, the interrupt is enabled.

## 2.8.10 Reserved Bit

If necessary, set to 0. When read, the content is undefined.



# 3. Memory

## 3.1 R8C/3GM Group

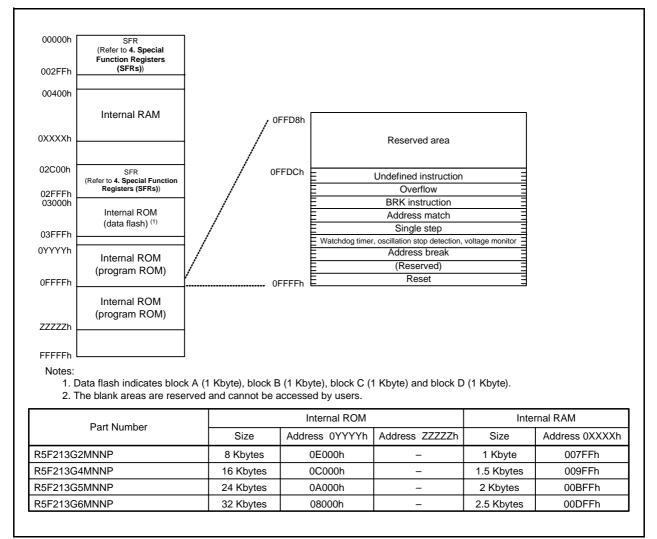
Figure 3.1 is a Memory Map of R8C/3GM Group. The R8C/3GM Group has a 1-Mbyte address space from addresses 00000h to FFFFFh. For example, a 32-Kbyte internal ROM area is allocated addresses 08000h to 0FFFFh.

The fixed interrupt vector table is allocated addresses 0FFDCh to 0FFFFh. The starting address of each interrupt routine is stored here.

The internal ROM (data flash) is allocated addresses 03000h to 03FFFh.

The internal RAM is allocated higher addresses, beginning with address 00400h. For example, a 2.5-Kbyte internal RAM area is allocated addresses 00400h to 00DFFh. The internal RAM is used not only for data storage but also as a stack area when a subroutine is called or when an interrupt request is acknowledged.

Special function registers (SFRs) are allocated addresses 00000h to 002FFh and 02C00h to 02FFFh. Peripheral function control registers are allocated here. All unallocated spaces within the SFRs are reserved and cannot be accessed by users.







#### **Special Function Registers (SFRs)** 4.

An SFR (special function register) is a control register for a peripheral function. Tables 4.1 to 4.12 list the special function registers. Table 4.13 lists the ID Code Areas and Option Function Select Area.

Address	Register	Symbol	After Reset			
0000h	i togiotoi	- Cymbol				
00001h						
0002h						
0002h						
0003h	Processor Mode Register 0	PM0	00h			
0004n 0005h	Processor Mode Register 0 Processor Mode Register 1	PM1	00h			
	Processor Mode Register 1	Sur indue register i FIVI UUII UUII				
0006h	System Clock Control Register 0	CMO	00101000b			
0007h	System Clock Control Register 1	CM1	0010000b			
0008h	Module Standby Control Register	MSTCR	00h			
0009h	System Clock Control Register 3	CM3	00h			
000Ah	Protect Register	PRCR	00h			
000Bh	Reset Source Determination Register	RSTFR	0XXXXXXXb <sup>(2)</sup>			
000Ch	Oscillation Stop Detection Register	OCD	00000100b			
000Dh	Watchdog Timer Reset Register	WDTR	XXh			
000Eh	Watchdog Timer Start Register	WDTS	XXh			
000Fh	Watchdog Timer Control Register	WDTC	00111111b			
0010h	······································					
0011h						
0012h						
0012h						
0013h						
0014h 0015h	High Speed On Chip Oppillator Control Desigter 7		When obigging			
	High-Speed On-Chip Oscillator Control Register 7	FRA7	When shipping			
0016h						
0017h						
0018h						
0019h						
001Ah						
001Bh						
001Ch	Count Source Protection Mode Register	CSPR	00h			
			1000000b (3)			
001Dh						
001Eh						
001Fh						
0020h						
0020h						
0021h						
0022h	High-Speed On-Chip Oscillator Control Register 0	FRA0	00h			
		-				
0024h	High-Speed On-Chip Oscillator Control Register 1	FRA1 When shipp				
0025h	High-Speed On-Chip Oscillator Control Register 2	FRA2	00h			
0026h	On-Chip Reference Voltage Control Register	OCVREFCR	00h			
0027h						
0028h	Clock Prescaler Reset Flag	CPSRF	00h			
0029h	High-Speed On-Chip Oscillator Control Register 4	FRA4	When Shipping			
002Ah	High-Speed On-Chip Oscillator Control Register 5	FRA5	When Shipping			
002Bh	High-Speed On-Chip Oscillator Control Register 6	FRA6	When Shipping			
002Ch						
002Dh						
002Eh						
002Fh	High-Speed On-Chip Oscillator Control Register 3	FRA3	When shipping			
0030h	Voltage Monitor Circuit/Comparator A Control Register	CMPA	00h			
0031h	Voltage Monitor Circuit Edge Select Register					
0032h						
0033h	Voltage Detect Register 1	VCA1	00001000b			
	Voltage Detect Register 1     VCA1     000010000       Voltage Detect Register 2     VCA2     00h ( <sup>4</sup> )					
0034h		VCAZ				
			0010000b (5)			
0035h						
0036h	Voltage Detection 1 Level Select Register	VD1LS	00000111b			
0037h	-	İ				
0038h	Voltage Monitor 0 Circuit Control Register	VW0C	1100X010b (4)			
	<u> </u>		1100X011b (5)			
0039h	Voltage Monitor 1 Circuit Control Register	VW1C	10001010b			

	Table 4.1	SFR Information (1) <sup>(1)</sup>
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X: Undefined Notes:

1. 2.

The blank areas are reserved and cannot be accessed by users. The CWR bit in the RSTFR register is set to 0 after power-on and voltage monitor 0 reset. Hardware reset, software reset, or watchdog timer reset does not affect this bit.

3. The CSPROINI bit in the OFS register is set to 0.

The LVDAS bit in the OFS register is set to 1. 4.

5. The LVDAS bit in the OFS register is set to 0.



0038h         Voltage Monitor 2 Circuit Control Register         VV2C         1000010b           0038h         Control Register         FMRDVIC         XXXXX000b           0038h         Control Register         FMRDVIC         XXXXX000b           0048h         Larrer Control Register         FMRDVIC         XXXXX000b           0048h         Larrer Control Register         TREIC         XXXXX00b           0048h         Larrer Control Register         SZIIC         XXXXX00b           0048h         LART2 Reaction Register         REIC         XXXXX00b         XXXXX00b           0048h         LART2 Transmit Interrupt Control Register         SUIIC / IICIC         XXXXX00b         XXXXX00b           0048h         LART0 Transmit Interrupt Control Register         XXXXX00b         XXXXX00b         XXXXX00b           0056h         LartPT Transmit Interrupt Control Register         SUIIC / IICIC         XXXXX00b           0056h         Lart	Address	Register	Symbol	After Reset
0935h				
0030h	003Bh			
000Eh     enclosed       004bh     Fash Memory Ready Interrupt Control Register     FMRCPYIC       0041h     Fash Memory Ready Interrupt Control Register     FMRCPYIC       0043h     Fash Memory Ready Interrupt Control Register     FMRCPYIC       0043h     Fash Memory Ready Interrupt Control Register     FREIC       0043h     Fash Memory Ready Interrupt Control Register     FREIC       0043h     Fash Memory Ready Interrupt Control Register     SPIC       0044h     Timer RE Interrupt Control Register     SPIC       0055h     LARTO Receive Interrupt Control Register     SPIC       0055h     LARTO Receive Interrupt Control Register     SPIC       0055h     Timer RE Interrupt Control Register     TRBIC       0055h     Timer RE Interrupt Control Register     TRBIC       0055h     Timer RE Interrupt Control Register     TRBIC </td <td></td> <td></td> <td></td> <td></td>				
0007h         Sector         FIRIDYIC         XXXXX000b           0047h         Firsh Memory Ready Interrupt Control Register         FIRIDYIC         XXXXX000b           0047h         Firsh Memory Ready Interrupt Control Register         FIRIDYIC         XXXXX000b           0047h         Firsh Ready Interrupt Control Register         TRCIC         XXXXX000b           0047h         Firsh Re Tenterrupt Control Register         TRCIC         XXXXX000b           0047h         Firsh Re Tenterrupt Control Register         TREIC         XXXXX000b           0047h         Timer RE Interrupt Control Register         TREIC         XXXXX000b           0047h         Timer RE Interrupt Control Register         TREIC         XXXXX000b           0047h         LAPT2 Receive Interrupt Control Register         RUPIC         XXXXX000b           0047h         AUG Conversion Interrupt Control Register         XXXXX000b           0056h         LAPTO Receive Interrupt Control Register         TREIC         XXXXXX00b         XXXXX00b				
0000h         Fash Memory Ready Interrupt Control Register         FMRDYIC         XXXXX000b           0041h         Fash Memory Ready Interrupt Control Register         FMRDYIC         XXXXX00b           0044h         Fash Memory Ready Interrupt Control Register         FMRDYIC         XXXXX00b           0044h         Fmer RC Interrupt Control Register         TRCIC         XXXXX00b           0044h         Fmer RC Interrupt Control Register         SZIC         XXXXX00b           0044h         Fmer RC Interrupt Control Register         SZIC         XXXXX00b           0044h         Fmer RC Interrupt Control Register         SZIC         XXXXX00b           0044h         UART2 Transmit Interrupt Control Register         SZIC         XXXXX00b           0044h         UART2 Transmit Interrupt Control Register         ADIC         XXXXX00b           0044h         SUI Interrupt Control Register         ADIC         XXXXX00b           0044h         UART0 Transmit Interrupt Control Register         ADIC         XXXXX00b           0055h         UART0 Transmit Interrupt Control Register         ADIC         XXXXX00b           0055h         Timer RA Interrupt Control Register         TRAC         XXXXX00b           0055h         Timer RA Interrupt Control Register         TRAC         XXXXX00b				
0041h         Flach Memory Ready Interrupt Control Register         FMRDYIC         XXXXX000b           0043b				
0943b				
0943h		Flash Memory Ready Interrupt Control Register	FMRDYIC	XXXXX000b
0044h         me         me           0045b         me         me           0047b         Timer RC Interrupt Control Register         TRCIC         XXXXX000b           0048b         me         RE Interrupt Control Register         SZRIC         XXXXX000b           0048b         Timer RE Interrupt Control Register         SZRIC         XXXXX000b         XXXXX000b           0048b         UART2 Receive Interrupt Control Register         SZRIC         XXXXX000b         XXXXX00b           0041b         KAPT2 Receive Interrupt Control Register         ADIC         XXXXX00b         XXXXX00b           0041b         KAPT2 Receive Interrupt Control Register         ADIC         XXXXX00b         XXXXX00b           0041b         KAPT2 Receive Interrupt Control Register         SUIC INIC         XXXXX00b         XXXXX00b           0041b         KAPT Conversion Interrupt Control Register         SUIC INIC         XXXXX00b         XXXXX00b           0051b         UART0 reaeve Interrupt Control Register         SUIC XXXXX00b         XXXXX00b         XXXXX00b           0055b         UART0 Reaeve Interrupt Control Register         TRAIC         XXXXX00b         XXXXX00b           0055b         Timer RA Interrupt Control Register         TRAIC         XXXXX00b         XXXXX00b				
0046h         Free RC Interrupt Control Register         TRCIC         XXXXX000b           0047h         Timer RC Interrupt Control Register         TRCIC         XXXXX000b           0048h         Free RC Interrupt Control Register         S2HC         XXXXX000b           0048h         Vart2 Transmit Interrupt Control Register         S2HC         XXXXX000b           0047h         UART2 Transmit Interrupt Control Register         S2HC         XXXXX000b           0047h         ART2 Transmit Interrupt Control Register         S2HC         XXXXX000b           0047h         ART0 Transmit Interrupt Control Register         SDHC / ICC         XXXXX000b           0047h         ART0 Transmit Interrupt Control Register         SDHC         XXXXX000b           0047h         UART0 Transmit Interrupt Control Register         SDHC         XXXXX000b           0058h         Timer RA Interrupt Control Register         SDHC         XXXXX000b           0058h         Timer RA Interrupt Control Register         ITRIC         XXXXX000b           0058h         Timer RA Interrupt Control Register         ITRIC         XX0XX000b           0058h         Timer RA Interrupt Control Register         ITRIC         XX0XX000b           0058h         Timer RA Interrupt Control Register         ITRIC         XX0XX000b<				
0046h         Immer RC Interrupt Control Register         TRCIC         XXXX000b           0048h         Immer RE Interrupt Control Register         TREIC         XXXX000b           0048h         Immer RE Interrupt Control Register         S211C         XXXX000b           0048h         VART2 Transmit Interrupt Control Register         S211C         XXXX000b           0048h         VART2 Transmit Interrupt Control Register         RUPC         XXXX000b           0048h         ADIC         XXXX000b         XXXX000b           0048h         ADIC Conversion Interrupt Control Register         SUIC/ I/C/C         XXXX000b           0048h         ADIC Conversion Interrupt Control Register         SUIC / I/C/C         XXXX000b           0058h         UART0 Transmit Interrupt Control Register         SUIC / I/C/C         XXXX000b           0058h         UART0 Transmit Interrupt Control Register         SUIC / I/C/C         XXXX000b           0056h         UART0 Transmit Interrupt Control Register         TRAIC         XXXX000b           0056h         Immer RA Interrupt Control Register         ITRAIC         XXXX000b           0056h         Immer RA Interrupt Control Register         ITRAIC         XXXX000b           0056h         Immer RA Interrupt Control Register         ITRAIC         XXXXX00				
0047h         Timer RC Interrupt Control Register         TRCIC         XXXXX000b           0048h         File         XXXXX000b				
0048h         Immediate         Immediate           0044h         Timer RE Interrupt Control Register         SZHIC         XXXXX000b           0047h         UART2 Transmit Interrupt Control Register         SZHIC         XXXXX000b           0047h         UART2 Transmit Interrupt Control Register         SZHIC         XXXXX000b           0047h         KSU pluz Interrupt Control Register         ADIC         XXXXX000b           0047h         SSUI returnst Control Register         ADIC         XXXXX000b           0047h         SSUI returnst Control Register         SSUIC7 IECC         XXXXX000b           0058h         UART0 Transmit Interrupt Control Register         SSUIC XXXXX000b         XXXXX000b           0058h         Timer RA Interrupt Control Register         TRAIC         XXXXX000b           0058h         Timer RA Interrupt Control Register         TRAIC         XXXXX000b           0058h         Timer RA Interrupt Control Register         INT3IC         XX00X00b           0058h         Timer RA Interrupt Control Register         INT3IC         XX00X00b           0058h         INTer RA Interrupt Control Register         INT3IC         XX00X00b           0058h         INTer RA Interrupt Control Register         INT3IC         XX00X00b           0058h         <		Timer RC Interrupt Control Register	TRCIC	XXXXX000b
0049h         Tmer RE Interrupt Control Register         TREIC         XXXXX000b           0044h         UART2 Teacewin Interrupt Control Register         S2RIC         XXXXX000b           0047h         MART2 Receive Interrupt Control Register         KUPIC         XXXXX000b           0047h         MART2 Receive Interrupt Control Register         ADIC         XXXXX000b           0047h         ADIC Conversion Interrupt Control Register         SUIC         XXXXX000b           0057h         UART0 Transmit Interrupt Control Register         SORIC         XXXXX000b           0057h         UART0 Receive Interrupt Control Register         SORIC         XXXXX000b           0058h         Interrupt Control Register         SORIC         XXXXX000b           0058h         Interrupt Control Register         TRAIC         XXXX000b           0058h         Interrupt Control Register         TRAIC         XXXX000b           0058h         Inter Re Interrupt Control Register         TRBIC         XXXX000b           0058h         Inter Re Interrupt Control Register         TRBIC         XXXX000b           0058h         Interrupt Control Register         INTIC         XX0X00b           0058h         Interrupt Control Register         INTIC         XX0XX000b           0056h			11000	
004Ah         Timer RE Interrupt Control Register         SZIIC         XXXXX000b           004Bh         UART2 Transmit Interrupt Control Register         SZIIC         XXXXX000b           004Dh         Key Input Interrupt Control Register         KUPIC         XXXXX000b           004Dh         Key Input Interrupt Control Register         ADIC         XXXXX000b           004Dh         Key Input Interrupt Control Register         ADIC         XXXXX000b           004Fh         SSUIC Tructor         XXXXX000b         XXXXX000b           004Fh         SSUIC Tructor         XXXXX000b         XXXXX000b           005h         UART0 Transmit Interrupt Control Register         SOTIC         XXXXX000b           0055h         Immer RE Interrupt Control Register         SORIC         XXXXX000b           0055h         Immer RE Interrupt Control Register         TREIC         XXXXX000b           0055h         Immer RE Interrupt Control Register         TREIC         XXXXX000b           0055h         Immer RE Interrupt Control Register         INTI Interrupt Control Register         INTI Interrupt Control Register           0055h         INTO Interrupt Control Register         INTOIC         XX0XX000b           0055h         INTO Interrupt Control Register         INTOIC         XX0XX000b </td <td></td> <td></td> <td></td> <td></td>				
004B         UART2 Transmit Interrupt Control Register         SZTIC         XXXXX000b           004Dh         UART2 Receive Interrupt Control Register         KUPIC         XXXXX000b           004Dh         Key Input Interrupt Control Register         ADIC         XXXXX000b           004Bh         AD Conversion Interrupt Control Register         ADIC         XXXXX000b           004Bh         ADIC         XXXXX000b         Exceeded and the second and the secon		Timer RE Interrupt Control Register	TREIC	XXXXX000b
004Ch         UART2 Receive Interrupt Control Register         SZRC         XXXXX000b           004Dh         KAD Conversion Interrupt Control Register         ADIC         XXXXX000b           004Fh         SSUC / IICIC         XXXXX000b         XXXXX000b           004Fh         SSUC / IICIC         XXXXX000b         XXXX000b           005h         UART0 Receive Interrupt Control Register //P         SUC / IICIC         XXXXX000b           0053h         UART0 Receive Interrupt Control Register         SORIC         XXXXX000b           0053h         IART Receive Interrupt Control Register         SORIC         XXXXX000b           0053h         ITmer RA Interrupt Control Register         TRAIC         XXXXX000b           0056h         ITmer RB Interrupt Control Register         TRBIC         XXXXX000b           0057h         ITMER RB Interrupt Control Register         INTTIC         XX00X00b           0056h         ITTIC         XX00X00b         SORIC         XX00X00b           0056h         ITTIC         XX00X00b         SORIC         XX00X00b           0056h         INTO Interrupt Control Register         INTOIC         XX00X00b           0056h         INTO Interrupt Control Register         INTOIC         XX00X00b           0056h				
004bh         Key Input Interrupt Control Register         NUPIC         XXXXX000b           004bh         AD Conversion Interrupt Control Register         SSUC / IICIC         XXXXX000b           004bh         AD Conversion Interrupt Control Register         SOTC         XXXXX000b           005h         IATTO Receive Interrupt Control Register         SOTC         XXXXX000b           005h         SOTC         XXXXX000b         XXXXX000b           005h         SOTC         XXXXX000b         XXXXX000b           005h         SOTC         XXXXX000b         XXXXX000b           005h         Tmer RA Interrupt Control Register         TRAIC         XXXXX000b           005h         ITTER RA Interrupt Control Register         TRAIC         XXXXX000b           005h         ITT Interrupt Control Register         TRAIC         XXXX000b           005h         INT1 Interrupt Control Register         INTIC         XX0XX000b           005h         INT1 Interrupt Control Register         INTIC         XX0XX000b           005h         INT0 Interrupt Control Register         INTIC         XX0XX000b           005h         UART2 Bus Collision Detection Interrupt Control Register         INTIC         XX0XX000b           006h         Interrupt Control Register		UART2 Receive Interrupt Control Register		
004Eh         ADC Conversion Interrupt Control Register / IIC bus Interrupt Control Register         SUIC / IICC         XXXXX000b           005h         UARTO Receive Interrupt Control Register         SOTIC         XXXXX000b           0053h         UARTO Receive Interrupt Control Register         SOTIC         XXXXX000b           0053h         UARTO Receive Interrupt Control Register         SOTIC         XXXXX000b           0053h         Timer RA Interrupt Control Register         TRAIC         XXXXX000b           0056h         Timer RA Interrupt Control Register         TRBIC         XXXXX000b           0056h         Timer RB Interrupt Control Register         INT IIC         XX00X00b           0056h         INT I Interrupt Control Register         INTIC         XX00X00b           0056h         INT I Interrupt Control Register         INTIC         XX00X00b           0056h         INT Interrupt Control Register         INTOIC         XX00X00b           0056h         INT II Interrupt Control Register         INTOIC         XX00X00b           0056h         INT II Interrupt Control Register         INTOIC         XX00X00b           0056h         INTOIC         XX00X00b         INTOIC         XX00X00b		Key Input Interrupt Control Register	KUPIC	
0044h         SSUIC / IICC         XXXXX000b           0050h         V         XXXXX000b           0051h         UARTO Transmit Interrupt Control Register         SOTIC         XXXXX000b           0054h         UARTO Receive Interrupt Control Register         SORIC         XXXXX000b           0054h         UARTO Receive Interrupt Control Register         SORIC         XXXXX000b           0056h         Timer RA Interrupt Control Register         TRAIC         XXXXX000b           0056h         Timer RA Interrupt Control Register         TRAIC         XXXXX000b           0056h         Timer RB Interrupt Control Register         INT1IC         XX00X00b           0056h         Timer RD Interrupt Control Register         INT1IC         XX00X00b           0056h         INT2 Interrupt Control Register         INT0IC         XX00X00b           0056h         INT2 Interrupt Control Register         INT0IC         XX00X00b           0056h         INT0I Interrupt Control Register         U2BCNIC         XXXXX000b           0056h         INT0I Interrupt Control Register         INT0IC         XX00X00b           0056h         INT0I Interrupt Control Register         U2BCNIC         XXXXX000b           0056h         INT0I Interrupt Control Register         U2BCNIC	004Eh	A/D Conversion Interrupt Control Register	ADIC	XXXXX000b
0050h         LARTO Transmit Interrupt Control Register         SOTIC         XXXX000b           0051h         UARTO Receive Interrupt Control Register         SORIC         XXXXX000b           0053h         IARTO Transmit Interrupt Control Register         SORIC         XXXXX000b           0055h         Immer RA Interrupt Control Register         TRAIC         XXXXX000b           0056h         Immer RA Interrupt Control Register         TRAIC         XXXXX000b           0057h         Immer RB Interrupt Control Register         INT1IC         XXXX000b           0056h         INT1 Interrupt Control Register         INT3IC         XX0000b           0056h         INT0 Interrupt Control Register         INT0IC         XX0000b           0056h         INT0 Interrupt Control Register         U28CNIC         XXXX000b           0066h         Immer Ration Interrupt Control Register         U28CNIC         XXXXX000b		SSU Interrupt Control Register / IIC bus Interrupt Control Register (2)	SSUIC / IICIC	
0052h         UART0 Receive Interrupt Control Register         SORIC         XXXXX000b           0053h				
0052h         UART0 Receive Interrupt Control Register         SORIC         XXXXX000b           0053h		UART0 Transmit Interrupt Control Register	SOTIC	
0053h	0052h			
0055h         mer A Interupt Control Register         TRAIC         XXXXX000b           0057h         Tmer A Interupt Control Register         TRBIC         XXXXX000b           0058h         Timer AB Interupt Control Register         INT11C         XX00X00b           0058h         Imer AB Interupt Control Register         INT11C         XX00X00b           0058h         INT3 Interupt Control Register         INT31C         XX00X00b           0056h         MT3 Interupt Control Register         INT31C         XX00X00b           0055h         UART2 Bus Collision Detection Interupt Control Register         UZECNIC         XXXXX000b           0056h         UART2 Bus Collision Detection Interupt Control Register         UZECNIC         XXXXX000b           0066h         INT0 Interupt Control Register         INT01         XXXXX000b           0066h         INT0         INT01         INT01         INT01           0066h         INT0         INT01         INT01         INT01         INT01         INT01           0065h         INT0         INT01         INT01 <t< td=""><td></td><td></td><td></td><td></td></t<>				
0056h         Timer RA Interrupt Control Register         TRAIC         XXXX000b           0057h         Timer RB Interrupt Control Register         TRBIC         XXXX000b           0058h         INT1 Interrupt Control Register         INT3IC         XX0X000b           0058h         INT3 Interrupt Control Register         INT3IC         XX0X000b           0056h         INT3 Interrupt Control Register         INT0IC         XX0X000b           0057h         INT0 Interrupt Control Register         INT0IC         XX0X000b           0056h         INT0 Interrupt Control Register         UZBCNIC         XX0X000b           0057h         INT0 Interrupt Control Register         UZBCNIC         XXXX000b           0057h         INT0 Interrupt Control Register         UZBCNIC         XXXXX000b           0057h         INT1 Interrupt Control Register         UZBCNIC         XXXXX000b           0067h         INT0 Interrupt Control Register         UZBCNIC         XXXXX000b           0068h         INT0         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0066h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0066h         Interrupt Control Reg				
0057h				
0058h         Timer RB Interrupt Control Register         TRBIC         XXXXX000b           0059h         INT1 Interrupt Control Register         INT3IC         XX00X000b           0058h         INT3 Interrupt Control Register         INT3IC         XX00X000b           0055h         INT0 Interrupt Control Register         INT0IC         XX00X000b           0055h         INT0 Interrupt Control Register         INT0IC         XX00X000b           0055h         INT0 Interrupt Control Register         U28CNIC         XXXX000b           0065h         INT0         INT0 Interrupt Control Register         INT0 Interrupt Control Register         INT0 Interrupt Control Register           0066h         INT0         INT0         INT0         INT0         INT0 Interrupt Control Register         INT0           0068h         INT0         INT0         INT0         INT0         INT0           0068h         INT0         INT0         INT0         INT0         INT0           0066h         INT		Timer RA Interrupt Control Register	TRAIC	XXXXX000b
0059h         INT1 Interrupt Control Register         INT1C         XX00X000b           005Ah         INT3 Interrupt Control Register         INT3C         XX00X00b           005Bh         INT0 Interrupt Control Register         INT3C         XX00X00b           005Ch         UART2 Bus Collision Detection Interrupt Control Register         U28CNIC         XXXXX000b           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U28CNIC         XXXXX000b           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U28CNIC         XXXXX000b           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U28CNIC         XXXXX000b           0065h         INT0         INT0         INT0         INT0           0065h         INT0         INT0         INT0         INT0           0065h         INT0         INT0         INT0         INT0           0066h         <				
005Ah         INT3 Interrupt Control Register         INT3IC         XX00X000b           005Bh         INT0 Interrupt Control Register         INT0C         XX00X000b           005Dh         INT0 Interrupt Control Register         U2BCNIC         XX0XX000b           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XX0XX000b           005Fh         INT0         INT0         INT0         INT0           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XX0XX000b           005Fh         INT0         INT0         INT0         INT0           0061h         Interrupt Control Register         U2BCNIC         XX0XX000b           0062h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0066h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0066h         Interrupt Control Register         VCMP1IC         XXXXX000b           0067h         Interrupt Control Register         VCMP2IC         XXXXX000b           0071h         Interrupt Control Register         VCMP2IC         XXXXX000b           0077h         Interrupt Control Register         VCMP2IC         XXXXX000b		Timer RB Interrupt Control Register		
005Bh         INT0 Interrupt Control Register         INT0IC         XX00X000b           005Ch         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XXXXX000b           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XXXXX000b           005Fh         INT0 Interrupt Control Register         U2BCNIC         XXXXX000b           0060h         Interrupt Control Register         U2BCNIC         XXXXX000b           0061h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0063h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0065h         Interrupt Control Register         VCMP1IC         XXXXX000b           0067h         Interrupt Control Register         VCMP1IC         XXXX000b           0067h         Interrupt Control Register         VCMP2IC         XXXX000b           0072h         Voltage Monitor 1/Comparator A1 Interrupt Control Register         VCMP1IC         XXXX000b           0073h         Interrupt Control Register         VCMP1IC         XXXX000b           0073h         Interrupt Control Register         VCMP2IC         XXXXX000b           0077h         Interrupt Control Register		INT1 Interrupt Control Register		
005Ch         INTO Interrupt Control Register         INTOIC         XX00X000b           005Eh         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XXXXX000b           005Fh         INTO Interrupt Control Register         U2BCNIC         XXXXX000b           005Fh         INTO Interrupt Control Register         U2BCNIC         XXXXX000b           0060h         INTO Interrupt Control Register         INTO Interrupt Control Register         INTO Interrupt Control Register           0063h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0066h         Interrupt Control Register         Interrupt Control Register         Interrupt Control Register           0066h         Interrupt Control Register         VCMP1IC         XXXXX000b           0070h         Interrupt Control Register         VCMP1IC         XXXXX000b           0077h         Voltage Monitor 1/Comparator A1 Interrupt Control Register         VCMP1IC         XXXXX000b           0077h         Interrupt Control Register         VCMP1IC         XXXXX000b           0077h         Interrupt Control Register         VCMP2IC         XXXXX000b           0077h         Interrupt Control Register         VCMP2IC         XXXXX000b           0077h         Interru		INT3 Interrupt Control Register	INT3IC	XX00X000b
005Dh         INT0 Interrupt Control Register         INTOIC         XX00X00b           005Fh         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XXXXX00b           0060h               0060h               0061h               0062h               0063h                0063h				
005Eh         UART2 Bus Collision Detection Interrupt Control Register         U2BCNIC         XXXXX000b           0057h		INTO Interment Operated Devictor	INITOLO	XX00X000h
005Fh				
0060h            0061h            0062h            0063h            0064h            0065h            0066h            0067h            0068h            0067h            0068h            0071h            0072h         Voltage Monitor 1/Comparator A1 Interrupt Control Register         VCMP1IC           0072h         Voltage Monitor 2/Comparator A2 Interrupt Control Register         VCMP2IC           0073h             0075h             0075h             007			UZBCINIC	**********
0061h				
0062h				
0063h				
0064h				
0065h				
0066h				
0067h				
0068h				
006Ah	0068h			
006Bh	0069h			
006Ch				
006Dh				
006Eh				
006FhImage: constraint of the systemImage: constraint of the system0070hImage: constraint of the systemVCMP1IC0072hVoltage Monitor 1/Comparator A1 Interrupt Control RegisterVCMP1IC0073hVoltage Monitor 2/Comparator A2 Interrupt Control RegisterVCMP2IC0074hImage: constraint of the systemVCMP2IC0075hImage: constraint of the systemImage: constraint of the system0075hImage: constraint of the systemImage: constraint of the system0076hImage: constraint of the systemImage: constraint of the system0078hImage: constraint of the systemImage: constraint of the system0078h <t< td=""><td></td><td></td><td></td><td></td></t<>				
0070hImage: constraint of the second sec				
0071hImage: constraint of the second sec				
0072hVoltage Monitor 1/Comparator A1 Interrupt Control RegisterVCMP1ICXXXX000b0073hVoltage Monitor 2/Comparator A2 Interrupt Control RegisterVCMP2ICXXXX000b0074h0075h0076h0077h0078h0079h0077h0078h0077h0078h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h0077h </td <td></td> <td></td> <td></td> <td></td>				
0073h         Voltage Monitor 2/Comparator A2 Interrupt Control Register         VCMP2IC         XXXX000b           0074h				
0074h				
0075h		voltage Monitor 2/Comparator A2 Interrupt Control Register	VCMP2IC	XXXXXUUUb
0076h				
0077h				
0078h         Image: Constraint of the system         Image: Consthe system         I				
0079h				
007Ah				
007Bh				
007Ch				
007Dh				
007Eh 007Fh 007Fh				
007Fh				
				1
	X: Undefined	1		I

SFR Information (2)<sup>(1)</sup> Table 4.2

Notes: 1. 2.

The blank areas are reserved and cannot be accessed by users. Selectable by the IICSEL bit in the SSUIICSR register.



000C0h         AD         XXh           000C1h         AD         AD         000000XXb           000C3h         AD Register 1         AD 1         XXh           000C3h         AD Register 2         AD 2         XXh           000C3h         AD Register 3         AD 3         XXh           000C3h         AD Register 4         AD 3         XXh           000C3h         AD Register 4         AD 4         XXh           00C3h         AD Register 5         AD 5         XXh           00C3h         AD Register 5         AD 5         XXh           00C3h         AD Register 7         AD 7         XXh           00C3h         AD Register         AD 7         XXh	Addroso	Pogiator	Symbol	After Reset
00C1h         000000Xb         000000Xb         000000Xb         000000Xb           00C3h         AD Register 1         AD Register 2         XXh         000000Xb           00C3h         AD Register 3         AD Register 3         XXh         000000Xb           00C6h         AD Register 4         000000Xb         000000Xb         000000Xb           00C6h         AD Register 4         000000Xb         000000Xb         000000Xb           00C6h         AD Register 4         000000Xb         000000Xb         000000Xb           00C6h         AD Register 7         AD Register 7         000000Xb         000000Xb           00C7h         AD Register 7         AD Register 7         000000Xb         000000Xb           00D7h         -         -         000000Xb         000000Xb           00D7h         -         -         -         000000Xb           00D7h         -         -         -         000000Xb           00D7h         -         -         -         000000Xb           00D7h         AD Register 7         ADMOD         00h         00h           00D8h         AD Register 7         ADMOD         00h         00h           00D8h         AD I				
00C2h         AD Register 1         AD1         XXh           00C3h         AD Register 2         AD2         XXh           00C3h         AD Register 3         AD3         XXh           00C3h         AD Register 3         AD3         XXh           00C3h         AD Register 3         AD4         XXh           00C3h         AD Register 5         AD5         XXh           00C3h         AD Register 5         AD5         XXh           00C3h         AD Register 6         AD6         XXh           00C3h         AD Register 7         AD7         XXh           00C3h         AD Input Select Register         AD7         XXh           00C3h         AD Input Select Register         AD7         XXh           00D0h         -         -         -         -           00D0h         -         -         -         -           00D0h         AD Input Select R		A/D Register 0	ADU	
00C3h         AD Register 3         00000Xb         00000Xb           00C6h         AD Register 3         AD Xh         00000Xb         00000Xb           00C7h         AD Register 3         AD Xh         00000Xb         00000Xb           00C7h         AD Register 4         AD 4         Xh           00C8h         AD Register 5         00000Xb         00000Xb           00C8h         AD Register 6         000000Xb         000000Xb           00C7h         AD Register 7         000000Xb         000000Xb           00D1h				
00C4h         ADD         Register 2         AD2         XXh           00C5h         AD Register 3         AD3         XXh         00000Xb           00C6h         AD Register 4         AD4         XXh         00000Xb           00C6h         AD Register 4         AD4         XXh         00000Xb           00C6h         AD Register 6         AD6         XXh         00000Xb           00C7h         AD Register 6         AD6         XXh         00000Xb           00C7h         AD Register 7         AD7         XXh         00000Xb           00C7h         AD Register 7         AD7         XXh         00000Xb           00C7h         AD Register 7         AD7         XXh         00000Xb           00D7h         C         C         C         00000Xb           00D7h         C         C         C         00000Xb           00D7h         AD Input Select Register         ADMOD         00h         00h           00D7h         AD Control Register 1         ADCON1         00h         00h           00D7h         AD Control Register 1         ADCON1         00h         00h           00D7h         AD Control Register 1         ADCON1		A/D Register 1	AD1	
00C5h         AD Register 3         AD Register 4         000000Xb           00C5h         AD Register 4         AD A         XXh           00C5h         AD Register 4         AD A         XXh           00C5h         AD Register 5         ADS         XXh           00C6h         AD Register 5         ADS         XXh           00C6h         AD Register 6         AD6         000000Xb           00C6h         AD Register 7         000000Xb         000000Xb           00C6h         AD Register 7         000000Xb         000000Xb           00C6h         AD Register 7         000000Xb         00000Xb           00C6h         AD Register 7         000000Xb         00000Xb           00D0h         -         -         -         -           00D0h         -         -         -         -           00D1h         -         -         -         -           00D2h         -         -         -         -           00D3h         AD Input Select Register         -         ADMOD         -           00D3h         AD Control Register 0         -         ADCON         -           00D3h         AD Register 0	00C3h			
OPCEN         ADR Register 3         ADS         XXh           00C7h         ADR Register 4         AD4         XXh           00C60h         AD Register 5         AD5         XXh           00C7h         AD Register 6         AD6000XXb         00000XXb           00C7h         AD Register 7         AD6         XXh           00C000X         AD7         XXh         00000XXb           00C7h         AD Register 7         AD7         XXh           00C000X         000000XXb         000000XXb         000000Xb           00D7h         AD Register 7         AD7         XXh           00D2h          000000XXb         000000Xb           00D2h           000000Xb         000000Xb           00D2h                00D2h                 00D2h           ADF00D         00h             00D2h         AD Extra Register 1         ADA0         00h             00D2h         ADA Extra Register 1         ADCON1         0h <td></td> <td>A/D Register 2</td> <td>AD2</td> <td></td>		A/D Register 2	AD2	
ODCR/n         AD Register 4         ODC8         AD Register 4         ODC8         AD Register 5         AD5         XXh           OGCAN         AD Register 5         AD6         XXh         D00000Xb         D00000Xb           OGCAN         AD Register 5         AD6         XXh         D00000Xb         D00000Xb           OGCCA         AD Register 6         AD7         XXh         D00000Xb         D00000Xb           OGCEN         AD Register 7         AD7         XXh         D00000Xb         D00000Xb           ODD0         Image: Comparison of the compar				
00C8h         AD Register 4         ADA         XXh           00C8h         AD Register 5         AD5         XXh           00C8h         AD Register 5         000000Xb         000000Xb           00C6h         AD Register 6         AD6         000000Xb           00C6h         AD Register 7         AD7         XXh           00C6h         AD Register 7         AD7         XXh           00D0h	00C6h	A/D Register 3	AD3	XXh
00C3h         0.00000Xb           00C3h         AD Register 5         ADS         XXh           00C3h         AD Register 6         AD6         XXh           00C5h         AD Register 7         AD7         XXh           00D7h         AD Node Register 7         AD8000         00h           00D5h         AD Control Register 7         AD1000000         00h           00D5h         AD Control Register 0         AD20000000000         00h           00D5h         AD Control Register 1         AD4000000000000000000000000000000000000	00C7h			000000XXb
00C3h         0.00000Xb           00C3h         AD Register 5         ADS         XXh           00C3h         AD Register 6         AD6         XXh           00C5h         AD Register 7         AD7         XXh           00D7h         AD Node Register 7         AD8000         00h           00D5h         AD Control Register 7         AD1000000         00h           00D5h         AD Control Register 0         AD20000000000         00h           00D5h         AD Control Register 1         AD4000000000000000000000000000000000000	00C8h	A/D Register 4	AD4	XXh
00CAn         ADS Register 5         ADS         XXn         000000XXb           00CEn         AD Register 6         ADS         XXn         000000XXb           00CEn         AD Register 7         AD7         XXn         000000XXb           00CEn         AD Register 7         AD7         XXn         000000XXb           00CEn         AD7         XXn         000000XXb           00D0h				
00CEh         ADR Register 6         ADB         XXh           00CCh         AD Register 7         AD         Xh           00CFh         AD Register 7         AD         Xxh           00CDh		A/D Register 5	AD5	
ODCCh         AD Register 6         AD5         XNh           ODCDh         AD7         XXh         000000XXb           ODCFh         AD7         XXh         000000Xxb           ODCDh         -         -         000000Xxb           ODD1h         -         -         000000Xxb           ODD1h         -         -         -           ODD2h         -         -         -           ODD3h         AD8 Control Register         ADCON1         00h           ODD3h         AD4 Control Register         DA1         00h           ODD3h         D/A1 Register         DA2         00h         -           ODD3h         D/A1 Register         DA2         00h         -           ODD5h         D/A2 Control Register         DA2         00h         -           ODD5h         D/A Control Register         DA2         00h         -           ODD5h         D/A Control Register         DA2 <t< td=""><td>00CBh</td><td>, 10 Noglotol 0</td><td></td><td></td></t<>	00CBh	, 10 Noglotol 0		
00CDR 00CFR 00CFR 00D0h         AD7 XXh 00000XXb           00D01 00D1h	00CCh	A/D Register 6		
D0CEh         AD Register 7         DD7         XR           00CFh         000000Xb         000000000000000000000000000000000000			100	
000CFh         000000XXb           000D1h         Image: Constraint of the second		A/D Desister 7	4.07	
0000h		A/D Register 7	AD7	
0001h				0000000
0002h         AD Mode Register         ADMOD         00h           0005h         A/D Input Select Register         ADINSEL         1100000b           0005h         A/D Control Register 0         ADCON1         00h           0005h         A/D Control Register 1         ADCON1         00h           0005h         A/D Control Register 1         ADCON1         00h           0005h         D/A Register         DA0         00h           0005h         D/A Register         DA1         00h           0005h         D/A Register         DA2         00h           0005h         D/A Register         DA2         00h           0005h         D/A Control Register         DACON         00h           0005h         D/A Control Register         DACON         00h           0005h         Dot Pot PO Register         PO         XXh           0016h         Pot P1 Pot Register         PO         XXh           0016h         Pot P1 Pot Register         PO         XXh           0016h         Pot P1 Pot Register         PO         Xh           0016h         Pot P1 Pot Register         PO         Oh           0016h         Pot P1 Pot Pot Register         PO				
0003h         AD Mode Register         ADMOD         00h           0005h         AD Dont Select Register         ADINSEL         1100000b           0005h         AD Control Register 1         ADCON0         00h           0005h         AD Control Register 1         ADCON1         00h           0005h         AD Control Register 1         ADCON1         00h           0005h         AD Control Register         DA0         00h           0005h         D/A Register         DA1         00h           0005h         D/A Register         DA1         00h           0005h         D/A Control Register         DACON         0h           0005h         D/A Control Register         DACON         0h           0005h         Port Po Register         PO         XXh           0005h         Port Po Register         PO         XXh           0055h         Port Po Register         PO1         0h           0055h         Port Po Register         PO1         0h           0055h         Port PJ Register         PO3         0h           0055h         Port PJ Register         PO3         0h           0055h         Port PJ Register         PO3         0h <td>00D1h</td> <td></td> <td></td> <td></td>	00D1h			
0004h         A/D Mode Register         A/D Mode Register         00h           0005h         A/D port Steet Register 0         ADINSEL         100000b           0005h         A/D Control Register 1         ADCONI         00h           0005h         A/D Control Register 1         ADCONI         00h           0005h         D/A O Register         D/A         00h           0005h         D/A Register         D/A         00h           0005h         D/A Control Register         D/A         00h           0005h         D/A Control Register         D/A         00h           0005h         D/A Control Register         D/ACON         00h           0005h         D/A Control Register         D/ACON         00h           0005h         Port PD Register         PO         XXh           0005h         Port PD Register         PO         XXh           005ch         Port P1 Direction Register         PO         XXh           005ch         Port P1 Bigister         PO         XXh           005ch         Port P1 Sigister         PO         O/A           005ch         Port P3 Register         P3         XXh           005ch         Port P4 Register         P3				
0005h         A/D Input Select Register         ADControl Register 1         ADCONN         00h           0007h         A/D Control Register 1         DAO         00h           0008h         D/A0 Register 1         DAO         00h           0008h         D/A1 Register         DAO         00h           0008h         D/A1 Register         DA1         00h           0008h         D/A1 Register         DA1         00h           0008h         D/A Control Register         DA1         00h           0008h         D/A Control Register         DACON         00h           0008h         D/A Control Register         DACON         00h           0008h         D/A Control Register         DACON         00h           0008h         Port PO Register         PO         XXh           0061h         Port PO Register         PO         Xxh           0062h         Port PO Register         PD         00h           0058h         Port PJ Register         PJ         XXh           0062h         Port PJ Register         PJ         Xh           0062h         Port PJ Register         PJ         D           0062h         Port PJ Register         PJ <td< td=""><td></td><td></td><td></td><td></td></td<>				
000Eh         AD Control Register 1         ADCON0         00h           0007h         AD Control Register 1         ADCON1         00h           0008h         D/A0 Register         DA0         00h           0008h         D/A1 Register         DA1         00h           0008h         D/A1 Register         DA1         00h           0008h         D/A Control Register         DACON         00h           0008h         D/A Control Register         DACON         00h           0008h         D/A Control Register         DACON         00h           0008h         Port PO Register         PO         XXh           0018h         Port PO Register         PO         Xh           0018h         Port PO Register         PO         Xh           0018h         Port PO Register         PO         OOh           0018h         Port PO Register         PO         OOh           0018h         Port PO Register         PO         OOh           001				
0007h         AD Control Register         DAO         Oh           0008h         D/AO Register         DA1         Oh           0008h         D/AI Register         DA1         Oh           0008h         D/A Control Register         DA2         DA2           0008h         D/A Control Register         DACON         Oh           0008h         DA2 Control Register         DACON         Oh           0008h         DA2 Control Register         DA2         DA2           0008h         DA2 Control Register         PO         XXh           0008h         Port PD Register         PO         XXh           0086h         Port PD Register         PO         XXh           0087h         Port PD Direction Register         PD         Xh           0087h         Port PD Direction Register         PD         Qh           0087h         Port PD Register         PD         Qh           0087h         Port PD Register         PD         Qh           0087h         Port PD Register         PD         Qh           0087h         Port PA Register         PD         Qh           0088h         Port PA Direction Register         PD4         Qh		A/D Input Select Register		
0007h         AD Control Register         DAO         Oh           0008h         D/AO Register         DA1         Oh           0008h         D/AI Register         DA1         Oh           0008h         D/A Control Register         DA2         DA2           0008h         D/A Control Register         DACON         Oh           0008h         DA2 Control Register         DACON         Oh           0008h         DA2 Control Register         DA2         DA2           0008h         DA2 Control Register         PO         XXh           0008h         Port PD Register         PO         XXh           0086h         Port PD Register         PO         XXh           0087h         Port PD Direction Register         PD         Xh           0087h         Port PD Direction Register         PD         Qh           0087h         Port PD Register         PD         Qh           0087h         Port PD Register         PD         Qh           0087h         Port PD Register         PD         Qh           0087h         Port PA Register         PD         Qh           0088h         Port PA Direction Register         PD4         Qh		A/D Control Register 0		00h
0008h         D/A/ Register         DA0         00h           0009h         D/A1 Register         DA1         00h           000Bh         D/A Control Register         DACON         00h           000Dh         D/A Control Register         DACON         00h           000Dh         D/A Control Register         DACON         00h           000Dh         Port P0 Register         PO         XXh           00E1h         Port P1 Register         PO         XXh           00E2h         Port P0 Direction Register         PD1         00h           00E3h         Port P1 Stegister         PD1         00h           00E4h         Port P3 Register         PD1         00h           00E5h         Port P3 Register         PD3         00h           00E5h         Port P4 Direction Register         PD4         00h           00E5h         Port P4 Register         PD4         00h           00E5h         Port P4 Direction Register         PD4         00h           00E5h         Port P4 Register         PD4         00h           00E6h         Image: Port P4 Direction Register         PD4         00h           00E5h         Image: Port P4 Directin Register         PD4<	00D7h	A/D Control Register 1	ADCON1	00h
0009h         D/A1         00h           0008h         DA1         00h           0008h         DA20N         00h           0008h         DA20N         00h           0009h         Port PD Register         Port           0019h         Port PD Direction Register         P1           0019h         Port P1 Direction Register         P1           0019h         Port P1 Direction Register         P20           0019h         Port P3 Direction Register         P3           0019h         Port P3 Direction Register         P3           0019h         Port P4 Register         P4           0019h         Port P4 Direction Register         P4           <	00D8h	D/A0 Register		
000DAh				00h
000Bh         D/A Control Register         DACON         00h           000Dch         DACON         00h         00h           000Dch         DACON         00h         00h           000Dch         DACON         00h         00h           000Dch         DACON         00h         00ch           000Dch         Port P0 Register         PO         Xkh           00E3h         Port P1 Direction Register         PD0         00h           00E3h         Port P3 Register         PD1         00h           00E6h         Port P3 Register         P3         Xkh           00E6h         Port P3 Register         P3         00h           00E6h         Port P4 Register         P4         Xkh           00E6h         Port P4 Register         P4         Xkh           00E6h         Port P4 Direction Register         PD4         00h           00E6h         Port P4 Direction Register         PD4         PO1				
000Ch         D/A Control Register         DACON         00h           000DFh <td></td> <td></td> <td></td> <td></td>				
OODDh		D/A Control Register	DACON	00b
00DEh			DACON	0011
00DFh         Pot PN Register         P0         XXh           00E1h         Port P1 Register         P1         XXh           00E2h         Port P0 Direction Register         PD0         00h           00E3h         Port P1 Direction Register         PD1         00h           00E4h         P01         00h         00h           00E5h         Port P3 Register         P3         XXh           00E6h         Port P3 Register         P3         XXh           00E6h         Port P4 Register         P4         XXh           00E6h         Port P4 Register         P4         XXh           00E6h         Port P4 Register         P04         00h           00E8h         Port P4 Register         PD4         00h           00E6h         POI         POI         00h           00E6h         POI         POI         POI           00F1h         POI         POI         POI	00000			
ODEOh         Port P0 Register         P0         XXh           00E1h         Port P1 Register         P1         XXh           00E2h         Port P1 Direction Register         PD0         00h           00E3h         Port P1 Direction Register         PD1         00h           00E4h         Port P3 Register         P3         XXh           00E6h         Port P3 Register         P3         00h           00E7h         Port P3 Direction Register         PD3         00h           00E8h         Port P4 Register         PD3         00h           00E8h         Port P4 Register         P04         XXh           00E8h         Port P4 Direction Register         PD4         00h           00E8h         Port P4 Direction Register         PD4         0h           00E7h         PO1         PO1         PO1         PO1           00E8h         PO1         PO1         PO1         PO1           00E7h         PO1				
00E1h         Port P1 Register         P1         XXh           00E2h         Port P1 Direction Register         PD0         00h           00E3h         Port P1 Direction Register         PD1         00h           00E5h         Port P3 Register         P3         XXh           00E5h         Port P3 Register         P3         00h           00E5h         Port P3 Register         P03         00h           00E8h         P01 P4 Register         P03         00h           00E8h         P01 P4 Register         P04         XXh           00E8h         P01 P4 Register         P04         00h           00E6h         P01 P4 Direction Register         PD4         00h           00E6h         P01 P4 Direction Register         PD4         00h           00E6h         P01 P14 Direction Register         PD4         00h           00E6h         P01 P14         P01 P14         P14         P14           00E6h         P01 P14         P14         P14         P14         P14           00E6h         P04         P14         P14 </td <td></td> <td>Dest DO De sister</td> <td>DO</td> <td></td>		Dest DO De sister	DO	
00E2h         Port P0 Direction Register         PD0         00h           00E3h         Port P1 Direction Register         PD1         00h           00E4h              00E5h         Port P3 Register         P3         XXh           00E6h              00E7h         Port P3 Register         PD3         00h           00E8h         Port P4 Register         PD4         XXh           00E8h         Port P4 Register         PD4         00h           00E8h         Port P4 Direction Register         PD4         00h           00E8h         Port P4 Direction Register         PD4         00h           00E8h               00E8h               00E8h                00E8h                 00E8h                  00F8h <td></td> <td></td> <td></td> <td></td>				
ODE3h         Port P1 Direction Register         PD1         O0h           ODE5h         Port P3 Register         P3         XXh           ODE6h         PD1         00h         P3         XXh           ODE7h         Port P3 Direction Register         PD3         00h         00h           ODE8h         Port P4 Register         P4         XXh         P3         XXh           ODE9h         P4         XXh         P3				
ODE4h         Pat         XXh           ODE5h         Port P3 Register         P3         XXh           ODE7h         Port P3 Direction Register         PD3         00h           ODE8h         Port P4 Register         P4         XXh           ODE8h         Port P4 Register         P04         00h           ODE8h         Port P4 Infection Register         PD4         00h           ODE6h              ODE6h               ODE6h                ODE6h                 ODE7h	00E2h	Port P0 Direction Register		
ODE5h         Port P3 Register         P3         XXh           ODE6h		Port P1 Direction Register	PD1	00h
ODE 6h         P           00E7h         Port P3 Direction Register         PD3         00h           00E8h         Port P4 Register         P4         XXh           00E8h         Port P4 Direction Register         PD4         00h           00E8h         Port P4 Direction Register         PD4         00h           00E6h         Port P4 Direction Register         PD4         PD4           00E6h         Port P4 Direction Register         PD4         PD4           00E6h         Port P4         PD4         PD4         PD4           00F7h         Port P4         PD4         PD4         PD4           00F7h         Port P4         PD4         PD4         PD4           00F7h         Port P4 <t< td=""><td></td><td></td><td></td><td></td></t<>				
00E7h         Port P3 Direction Register         PD3         00h           00E8h         Port P4 Register         P4         XXh           00E9h              00EAh         Port P4 Direction Register         PD4         00h           00EBh              00ECh               00EEh               00EFh               00EFh               00F7h               00F8h               00F8h               00F8h               00F8h               00F8h               00F8h               00F8h               00F8h <td></td> <td>Port P3 Register</td> <td>P3</td> <td>XXh</td>		Port P3 Register	P3	XXh
00E8h         Port P4 Register         P4         XXh           00E9h				
00E9h         00EAh         Port P4 Direction Register         PD4         00h           00EBh         PD4         00h         00E         0	00E7h	Port P3 Direction Register	PD3	00h
O0EAh         Port P4 Direction Register         PD4         00h           00EBh	00E8h	Port P4 Register	P4	XXh
O0EAh         Port P4 Direction Register         PD4         00h           00EBh	00E9h			
00EBh		Port P4 Direction Register	PD4	00h
00ECh				
00EDh				
O0EEh         Image: Constraint of the second s				
00EFh            00F0h            00F1h            00F2h            00F3h            00F3h            00F3h            00F4h            00F3h            00F3h            00F3h            00F3h            00F3h            00F3h            00F3h            00F6h            00F8h            00F8h            00F9h            00F8h            00F8h            00F8h            00F8h            00F9h            00F8h				
00F0h         Image: constraint of the system         Image: consthe system         I				
00F1h         Image: Constraint of the system         Image: Consthe system         I				
00F2h				
00F3h				
00F4h             00F5h              00F6h              00F7h              00F8h              00F8h              00F8h              00F9h              00F8h              00F8h              00F8h              00F8h              00F8h              00F8h              00F8h              00F8h              00F9h               00F8h               00F8h               00F9h				
00F5h				
00F6h            00F7h            00F8h            00F9h            00F9h            00F8h            00F8h            00F8h            00FBh            00FCh            00FDh            00FEh            00FFh				
00F7h				
00F8h	00F6h			
00F9h	00F7h			
00FAh	00F8h			
00FAh	00F9h			
00FBh				
00FCh				
00FDh				
00FEh 00FFh 00FFh				
00FFh				
	UUFFn X: Undefined			

SFR Information (4)<sup>(1)</sup> Table 4.4

X: Undefined Note: 1. The blank areas are reserved and cannot be accessed by users.



Address	Register	Symbol	After Reset
0100h	Timer RA Control Register	TRACR	00h
0100h	Timer RA I/O Control Register	TRAIOC	00h
0102h	Timer RA Mode Register	TRAMR	00h
0103h	Timer RA Prescaler Register	TRAPRE	FFh
0104h	Timer RA Register	TRA	FFh
0105h	LIN Control Register 2	LINCR2	00h
0106h	LIN Control Register	LINCR	00h
0107h	LIN Status Register	LINST	00h
0108h	Timer RB Control Register	TRBCR	00h
0109h	Timer RB One-Shot Control Register	TRBOCR	00h
010Ah	Timer RB I/O Control Register	TRBIOC	00h
010Bh	Timer RB Mode Register	TRBMR	00h
010Ch	Timer RB Prescaler Register	TRBPRE	FFh
010Dh	Timer RB Secondary Register	TRBSC	FFh
010Eh	Timer RB Primary Register	TRBPR	FFh
010Fh		TRDI IR	
0110h			
0110h			
0112h			
0113h			
0114h			
0115h			
0116h			
0117h			
0118h	Timer RE Second Data Register	TRESEC	00h
0119h	Timer RE Minute Data Register	TREMIN	00h
011Ah	Timer RE Hour Data Register	TREHR	00h
011Bh	Timer RE Day of Week Data Register	TREWK	00h
011Ch	Timer RE Control Register 1	TRECR1	00h
011Dh	Timer RE Control Register 2	TRECR2	00h
011Eh	Timer RE Count Source Select Register	TRECSR	00001000b
011Fh	g		
0120h	Timer RC Mode Register	TRCMR	01001000b
0121h	Timer RC Control Register 1	TRCCR1	00h
0121h	Timer RC Interrupt Enable Register	TRCIER	01110000b
0122h	Timer RC Status Register	TRCSR	01110000b
0123h	Timer RC I/O Control Register 0	TRCIOR0	10001000b
0124n 0125h	Timer RC I/O Control Register 0	TRCIOR0	
			10001000b
0126h	Timer RC Counter	TRC	00h
0127h		TRACE	00h
0128h	Timer RC General Register A	TRCGRA	FFh
0129h			FFh
012Ah	Timer RC General Register B	TRCGRB	FFh
012Bh			FFh
012Ch	Timer RC General Register C	TRCGRC	FFh
012Dh			FFh
012Eh	Timer RC General Register D	TRCGRD	FFh
012Fh			FFh
0130h	Timer RC Control Register 2	TRCCR2	00011000b
0131h	Timer RC Digital Filter Function Select Register	TRCDF	00h
0132h	Timer RC Output Master Enable Register	TRCOER	01111111b
0133h	Timer RC Trigger Control Register	TRCADCR	00h
0134h		1	1
0135h		1	
0136h			
0137h			
0137h		<u> </u>	+
0139h			
0139h 013Ah			
013Bh			
013Ch			
013Dh			
013Eh			
013Fh			

SFR Information (5)<sup>(1)</sup> Table 4.5

Note: 1. The blank areas are reserved and cannot be accessed by users.

Address	Register	Symbol	After Reset
01C0h	Address Match Interrupt Register 0	RMAD0	XXh
01C1h			XXh
01C2h 01C3h	Address Motch Interrupt English Degister 0	AIER0	0000XXXXb
01C3h 01C4h	Address Match Interrupt Enable Register 0 Address Match Interrupt Register 1	RMAD1	00h XXh
01C4n 01C5h	Address Match Interrupt Register 1	RIMADT	XXh
01C5h			
01C6n	Address Match Interrupt Enable Register 1	AIER1	0000XXXXb 00h
01C7h	Address Match Interrupt Enable Register 1	AIER I	0011
01C8h			
01C9h			
01CBh			
01CDh			
01CDh			
01CEh			
01CFh			
01D0h			
01D1h			
01D2h			
01D3h			
01D4h		ľ	
01D5h			
01D6h			
01D7h			
01D8h			
01D9h			
01DAh			
01DBh			
01DCh			
01DDh			
01DEh			
01DFh		DUDA	
01E0h	Pull-Up Control Register 0	PUR0	00h
01E1h 01E2h	Pull-Up Control Register 1	PUR1	00h
01E2h			
01E3h			
01E4h			
01E6h			
01E7h			
01E8h			
01E9h			
01EAh			
01EBh			
01ECh		ľ	
01EDh			
01EEh			
01EFh			
01F0h	Port P1 Drive Capacity Control Register	P1DRR	00h
01F1h			
01F2h	Drive Capacity Control Register 0	DRR0	00h
01F3h	Drive Capacity Control Register 1	DRR1	00h
01F4h			
01F5h	Input Threshold Control Register 0	VLTO	00h
01F6h	Input Threshold Control Register 1	VLT1	00h
01F7h			
01F8h	Comparator B Control Register 0	INTCMP	00h
01F9h	Future diagont Frankla Danistan O		0.01
01FAh	External Input Enable Register 0	INTEN	00h
01FBh	INT Input Filter Select Pergister 0		00b
01FCh 01FDh	INT Input Filter Select Register 0	INTF	00h
01FDh 01FEh	Key Input Enable Register 0	KIEN	00h
01FEn	ney input chapie negisier u	NEN	
UTEEN			I

#### SFR Information (8)<sup>(1)</sup> Table 4.8

X: Undefined Note: 1. The blank areas are reserved and cannot be accessed by users.



Address	Register	Symbol	After Reset
2C70h	DTC Control Data 6	DTCD6	XXh
2C71h			XXh
2C72h			XXh
2C73h			XXh
2C74h			XXh
2C75h			XXh
2C76h			XXh
2070h	-		XXh
		57057	
2C78h	DTC Control Data 7	DTCD7	XXh
2C79h			XXh
2C7Ah			XXh
2C7Bh			XXh
2C7Ch			XXh
2C7Dh			XXh
2C7Eh			XXh
2C7Fh	-		XXh
	DTO Ocastral Data 0	DTODA	
2C80h	DTC Control Data 8	DTCD8	XXh
2C81h			XXh
2C82h	1		XXh
2C83h			XXh
2C84h			XXh
2C85h	1		XXh
2C86h	1		XXh
2C87h			XXh
2C88h	DTC Control Data 9	DTCD9	XXh
		DICD9	
2C89h	-		XXh
2C8Ah			XXh
2C8Bh			XXh
2C8Ch			XXh
2C8Dh			XXh
2C8Eh			XXh
2C8Fh			XXh
2C90h	DTC Control Data 10	DTCD10	XXh
2C91h		210210	XXh
2C92h			XXh
2C93h	-		XXh
2C94h			XXh
2C95h			XXh
2C96h			XXh
2C97h			XXh
2C98h	DTC Control Data 11	DTCD11	XXh
2C99h			XXh
2C9Ah			XXh
2C9Bh	1		XXh
2C9Bh	4		XXh
2C9Ch	4		
	4		XXh
2C9Eh	4		XXh
2C9Fh			XXh
2CA0h	DTC Control Data 12	DTCD12	XXh
2CA1h			XXh
2CA2h			XXh
2CA3h	1		XXh
2CA4h	1		XXh
2CA5h	4		XXh
2CA6h	4		XXh
	4		
2CA7h			XXh
2CA8h	DTC Control Data 13	DTCD13	XXh
2CA9h			XXh
2CAAh			XXh
2CABh			XXh
2CACh	1		XXh
2CADh	1		XXh
2CAEh	1		XXh
2CAFh	1		XXh
X: Undefined			

Table 4.10	SFR Information (10) <sup>(1)</sup>
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X: Undefined Note: 1. The blank areas are reserved and cannot be accessed by users.



Normal Supply voltage         Institution         Type         Max.           Vis/AVSS         Supply voltage         -         0         -         0         -         Vit           Input "H" voltage         Other than CMOS input         0.8 Vcc         -         Vic         Vic         0.8 Vcc         -         Vcc         V           Vin         Input "H" voltage         Other than CMOS input         Input level selection         4.0 V ≤ Vcc ≤ 5.5 V         0.65 Vcc         -         Vcc         V           Input "H" voltage         Other than CMOS input level selection         4.0 V ≤ Vcc ≤ 5.5 V         0.65 Vcc         -         Vcc         V           Input level selection         0.0 V ≤ Vcc ≤ 5.5 V         0.65 Vcc         -         Vcc         V           Input level selection         0.0 V ≤ Vcc ≤ 5.5 V         0.85 Vcc         -         Vcc         V           Input "L" voltage         Other than CMOS Input level selection         4.0 V ≤ Vcc ≤ 5.5 V         0         -         0.2 Vcc         V           Input "L" voltage         Other than CMOS Input level selection         1.0 V ≤ Vcc ≤ 5.5 V         0         -         0.2 Vcc         V           Input "L" voltage         Other than CMOS Input level selection         1.0 V ≤ Vcc ≤ 5.5 V	Symbol	Demonster			Conditions		Standard		Linit	
Visi/Wis         Input "H" voltage         -         0         -         V           Viri         Input "H" voltage         Other than CMOS input         0.8 Vcc -         -         Vcc Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc <td< th=""><th>Symbol</th><th colspan="4">Parameter</th><th>Conditions</th><th>Min.</th><th>Тур.</th><th>Max.</th><th>Unit</th></td<>	Symbol	Parameter				Conditions	Min.	Тур.	Max.	Unit
Viri         Input "H" voltage         Other than CMOS input         0.8 Vcc         -         Vcc         V           CMOS         Input level         Input level selection:         4.0 V < Vcc < 5.5 V	Vcc/AVcc	Supply voltage					1.8	-	5.5	V
key         CMOS         input level         input level selection: 0.35 Vcc         4.0 V ≤ Vcc 2.5 V         0.55 Vcc          Vcc         V           100 Vcc         2.7 V ≤ Vcc 4.0 V         0.65 Vcc          Vcc         V           110 Vc         0.55 Vcc          Vcc         V          Vcc         V           110 Vc         0.5 Vcc          Vcc         V          Vcc         V           110 Vc         0.7 Vcc          Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vcc         Vccc         Vccc         Vcc	Vss/AVss						-	0	-	V
kinch         input         switching input         0.35 Vcc input/selselection 0.5 Vcc         2.7 V ≤ Vcc < 4.0 V	Viн	Input "H" voltage	Other th	nan CMOS ir	nput		0.8 Vcc	-	Vcc	V
Image: Second						$4.0~V \leq Vcc \leq 5.5~V$	0.5 Vcc	-	Vcc	V
Imput level selection:			input		0.35 Vcc	$2.7~V \leq Vcc < 4.0~V$	0.55 Vcc	-	Vcc	V
Imput level selection:         4.0 v ≤ Voc ≤ 5.5 v         0.6 v ∨ 0         -         Voc V         Voc V           Imput level selection:         1.8 v ≤ Voc ≤ 2.7 v         0.8 v ∨ 0         -         Voc V         Voc V           1.8 v ≤ Voc ≤ 2.7 v         0.8 v ∨ 0         -         Voc V         Voc						$1.8~\text{V} \leq \text{Vcc} < 2.7~\text{V}$	0.65 Vcc	-	Vcc	V
Image: Rest of the second s				(1/O port)	Input level selection:	$4.0 \text{ V} \leq \text{Vcc} \leq 5.5 \text{ V}$	0.65 Vcc	-	Vcc	V
Input "L" voltage         Input level selection: 0.7 Vcc         0.7 Vcc         2.7 V ≤ Vcc < 4.0 V					0.5 Vcc	$2.7~\text{V} \leq \text{Vcc} < 4.0~\text{V}$	0.7 Vcc	-	Vcc	V
Image: book of the section of the sectin of the sectin of the section of the section of the section of						$1.8~\text{V} \leq \text{Vcc} < 2.7~\text{V}$	0.8 Vcc	-	Vcc	V
Image: Section of the seccinc of the section of the sectin of the section of the sectin					Input level selection:	$4.0 \text{ V} \leq \text{Vcc} \leq 5.5 \text{ V}$	0.85 Vcc	-	Vcc	V
Input "L" voltage         External clock input (XOUT)         1.2         -         Vcc         V           VIL         Input "L" voltage         Other than CMOS input         0         -         0.2 Vcc         V           VIL         Input "L" voltage         Other than CMOS input         Input level selection: input         4.0 V ≤ Vcc ≤ 5.5 V         0         -         0.2 Vcc         V           VIL         Input Seven         0.3 Vcc         2.7 V ≤ Vcc < 4.0 V					0.7 Vcc	$2.7~\text{V} \leq \text{Vcc} < 4.0~\text{V}$	0.85 Vcc	-	Vcc	V
Vit.         Input "L" voltage         Other than CMOS input         Input level selection: input % Urb voltage         Input level selection: 0.35 Vcc         0.0 Vcc ≤ 5.5 V         0         -         0.2 Vcc         V           2.7 V ≤ Vcc < 4.0 V						$1.8 \text{ V} \le \text{Vcc} < 2.7 \text{ V}$	0.85 Vcc	-	Vcc	V
Vit.         Input "L" voltage         Other than CMOS input         Input level selection: input % Urb voltage         Input level selection: 0.35 Vcc         0.0 Vcc ≤ 5.5 V         0         -         0.2 Vcc         V           2.7 V ≤ Vcc < 4.0 V			Externa	I clock input	(XOUT)		1.2	_	Vcc	V
key         Formation of the section of the seccien of the section of the seccin of the section of the sectin	VIL	Input "L" voltage					0	_	0.2 Vcc	V
$ \left  \begin{array}{cccccccccccccccccccccccccccccccccccc$					•	4.0 V ≤ Vcc ≤ 5.5 V	0	-	0.2 Vcc	V
here         huncion         huncion         1.8 V ≤ Vcc < 2.7 V			input					_		
$ \left  \begin{array}{cccccccccccccccccccccccccccccccccccc$								_	0.2 Vcc	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				(I/O port)	Input level selection:			_		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$										
$ \begin{array}{                                    $										
$ \begin{array}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$					Input level selection:					
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$ \begin{array}{                                    $										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			Externa	l clock input		1.0 V 3 VCC < 2.7 V				
IOH(sum)         Average sum output "H" current         Sum of all pins IoH(avg)         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         0         mA           IOH(avg)         Average output "H" current         Drive capacity Low         -         -         -         0         mA         -         -         -         -         -         MA           IOL(sum)         Peak sum output "L" current         Sum of all pins IoL(peak)         -         -         -         80         mA           IOL(sum)         Average output "L" current         Drive capacity Low         -         -         400         mA           IOL(sum)         Average output "L" current         Drive capacity Low         -         -         400         mA           IOL(avg)         Average output "L" current         Drive capacity Low         -         -		Peak sum output "H'								
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$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	IOL(peak)	Peak output L curr	ent		•					
Drive capacity High20mAf(XIN)XIN clock input oscillation frequency $2.7 \lor \lor Vcc \le 5.5 \lor$ 20MHz1.8 $\lor \lor Vcc < 2.7 \lor$ 5MHzf(XCIN)XCIN clock input oscillation frequency $1.8 \lor \lor Vcc \le 5.5 \lor$ -32.76850kHzf(XCIN)When used as the count source for timer RC (3) $2.7 \lor \lor Vcc \le 5.5 \lor$ 32-40MHzfOCO-FfOCO-F frequency $1.8 \lor \lor Vcc < 2.7 \lor$ 20MHzfOCO-FfOCO-F frequency $2.7 \lor \lor Vcc \le 5.5 \lor$ 20MHz $1.8 \lor \lor Vcc < 2.7 \lor$ 5MHz $1.8 \lor \lor vcc < 2.7 \lor$ 20MHz $1.8 \lor \lor vcc < 2.7 \lor$ 20MHzf(BCLK)CPU clock frequency $2.7 \lor \lor vcc \le 5.5 \lor$ 20f(BCLK)CPU clock frequency $2.7 \lor \lor vcc \le 5.5 \lor$ 20	1	A		-	· ·		-			
f(XIN)XIN clock input oscillation frequency $2.7 \lor 4 \lor cc \le 5.5 \lor$ $  20$ MHzf(XCIN)XCIN clock input oscillation frequency $1.8 \lor 4 \lor cc \le 5.5 \lor$ $  5$ MHzf(XCIN)XCIN clock input oscillation frequency $1.8 \lor 4 \lor cc \le 5.5 \lor$ $ 32.768$ $50$ kHzf0C040MWhen used as the count source for timer RC (3) $2.7 \lor 4 \lor cc \le 5.5 \lor$ $32$ $ 40$ MHzf0CO-Ff0CO-F frequency $2.7 \lor 4 \lor cc \le 5.5 \lor$ $  20$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  5$ MHz $-$ System clock frequency $2.7 \lor 4 \lor cc \le 5.5 \lor$ $  20$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  5$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  20$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  20$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  5$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  5$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  5$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  5$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  20$ MHz $1.8 \lor 4 \lor cc < 2.7 \lor$ $  20$ MHz $1.8 \lor 4 \lor cc < 5.5 \lor$ $  20$ MHz $1.8 \lor 4 \lor $	IOL(avg)	Average output "L" c	urrent				-			
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KCIN)XCIN clock input oscillation frequency $1.8 \lor \lor Vcc \le 5.5 \lor$ - $32.768$ $50$ kHzfOCO40MWhen used as the count source for timer RC (3) $2.7 \lor \lor Vcc \le 5.5 \lor$ $32$ - $40$ MHzfOCO-FfOCO-F frequency $2.7 \lor \lor Vcc \le 5.5 \lor$ $-$ - $20$ MHz $ 2.7 \lor \lor Vcc \le 5.5 \lor$ $ 20$ MHz $ 8\lor \lor vcc < 2.7 \lor$ $5$ MHz $ 8\lor \lor vcc < 2.7 \lor$ $5$ MHz $ 1.8 \lor \lor vcc < 2.7 \lor$ $20$ MHz $1.8 \lor \lor vcc < 2.7 \lor$ $5$ MHz $f(BCLK)$ CPU clock frequency $2.7 \lor \lor vcc \le 5.5 \lor$ $20$ MHz	T(XIN)	XIN CIOCK INPUT OSCI	lation free	quency				-		
								-		
$ \begin{array}{c ccccc} fOCO-F & fOCO-F \ frequency & 2.7 \ V \leq Vcc \leq 5.5 \ V & - & - & 20 & MHz \\ \hline 1.8 \ V \leq Vcc < 2.7 \ V & - & - & 5 & MHz \\ \hline - & System \ clock \ frequency & 2.7 \ V \leq Vcc \leq 5.5 \ V & - & - & 20 & MHz \\ \hline 1.8 \ V \leq Vcc < 2.7 \ V & - & - & 20 & MHz \\ \hline 1.8 \ V \leq Vcc < 2.7 \ V & - & - & 5 & MHz \\ \hline 1.8 \ V \leq Vcc < 2.7 \ V & - & - & 5 & MHz \\ \hline 2.7 \ V \leq Vcc \leq 5.5 \ V & - & - & 5 & MHz \\ \hline 1.8 \ V \leq Vcc \leq 5.5 \ V & - & - & 20 & MHz \\ \hline 1.8 \ V \leq Vcc \leq 5.5 \ V & - & - & 20 & MHz \\ \hline \end{array} $								32.768		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			ount sour	ce for timer	RC <sup>(3)</sup>			-		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fOCO-F	fOCO-F frequency					-	-		MHz
Image: 1.8 V ≤ Vcc < 2.7 V         -         -         5         MHz           f(BCLK)         CPU clock frequency         2.7 V ≤ Vcc ≤ 5.5 V         -         -         20         MHz							-	-	5	MHz
f(BCLK)CPU clock frequency $2.7 \text{ V} \le \text{Vcc} \le 5.5 \text{ V}$ $  20 \text{ MHz}$	-	System clock freque	ncy				-	-		MHz
									5	MHz
1.8 V ≤ Vcc < 2.7 V – – 5 MHz	f(BCLK)	CPU clock frequency	y						20	MHz
						$1.8~V \leq Vcc < 2.7~V$	_		5	MHz

#### Table 5.2 Recommended Operating Conditions

Notes:

1. Vcc = 1.8 to 5.5 V and  $T_{opr}$  = -20 to 85°C (N version), unless otherwise specified.

2. The average output current indicates the average value of current measured during 100 ms.

3. fOCO40M can be used as the count source for timer RC in the range of Vcc = 2.7 V to 5.5V.

Table 5.15	Power Supply Circuit Timing Characteristics
------------	---------------------------------------------

Symbol	Parameter	Condition		Standard			
Symbol		Condition	Min.	Тур.	Max.	Unit	
td(P-R)	Time for internal power supply stabilization during power-on <sup>(2)</sup>		-	-	2,000	μS	

Notes:

1. The measurement condition is Vcc = 1.8 to 5.5 V and  $T_{opr} = 25^{\circ}C$ .

2. Waiting time until the internal power supply generation circuit stabilizes during power-on.

#### Table 5.16 Timing Requirements of Synchronous Serial Communication Unit (SSU) <sup>(1)</sup>

Symbol	Parameter		Conditions		Stand	l Init		
Symbol	Paramete	Parameter		Min.		Max.	Unit	
tsucyc	SSCK clock cycle tim	е		4	-	-	tCYC <sup>(2)</sup>	
tнı	SSCK clock "H" width	)		0.4	-	0.6	tsucyc	
tLO	SSCK clock "L" width	CK clock "L" width		0.4	-	0.6	tsucyc	
trise	SSCK clock rising	Master		-	-	1	tCYC <sup>(2)</sup>	
	time	Slave		-	-	1	μs	
tFALL	SSCK clock falling	Master		-	-	1	tCYC <sup>(2)</sup>	
	time	Slave		-	-	1	μs	
tsu	SSO, SSI data input	SSO, SSI data input setup time		100	-	-	ns	
tн	SSO, SSI data input I	nold time		1	-	-	tCYC <sup>(2)</sup>	
tlead	SCS setup time	Slave		1tcyc + 50	-	-	ns	
tlag	SCS hold time	Slave		1tcyc + 50	-	-	ns	
tod	SSO, SSI data output	t delay time		-	-	1	tCYC <sup>(2)</sup>	
tsa	SSI slave access time	Э	$2.7 \text{ V} \leq \text{Vcc} \leq 5.5 \text{ V}$	_	-	1.5tcyc + 100	ns	
			$1.8 \text{ V} \leq \text{Vcc} < 2.7 \text{ V}$	-	-	1.5tcyc + 200	ns	
tor	SSI slave out open tir	ne	$2.7 \text{ V} \leq \text{Vcc} \leq 5.5 \text{ V}$	-	-	1.5tcyc + 100	ns	
			$1.8 \text{ V} \leq \text{Vcc} < 2.7 \text{ V}$	-	-	1.5tcyc + 200	ns	

Notes:

1. Vcc = 1.8 to 5.5 V, Vss = 0 V and Topr = -20 to  $85^{\circ}$ C (N version), unless otherwise specified.

2. 1tcyc = 1/f1(s)



Symbol	Parameter	arameter Condition		Standard Min. Typ. Max			Unit	
-				win.				
CC	Power supply current (Vcc = 3.3 to 5.5 V)	High-speed clock mode	XIN = 20 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz No division	_	6.5	15	mA	
	Single-chip mode, output pins are open, other pins		XIN = 16 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz No division	-	5.3	12.5	mA	
	are Vss		XIN = 10 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz No division	-	3.6	_	mA	
			XIN = 20 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	3.0	_	mA	
			XIN = 16 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	2.2	-	mA	
			XIN = 10 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	1.5	-	mA	
		High-speed on-chip oscillator mode	XIN clock off High-speed on-chip oscillator on fOCO-F = 20 MHz Low-speed on-chip oscillator on = 125 kHz No division	-	7.0	15	mA	
			XIN clock off High-speed on-chip oscillator on fOCO-F = 20 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	3.0	-	mA	
			XIN clock off High-speed on-chip oscillator on fOCO-F = 4 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-16, MSTIIC = MSTTRD = MSTTRC = 1	-	1	-	mA	
	Low-speed on-chip oscillator mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8, FMR27 = 1, VCA20 = 0	-	90	400	μA		
		Low-speed clock mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz No division, FMR27 = 1, VCA20 = 0	-	85	400	μA	
			XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz No division, Program operation on RAM Flash memory off, FMSTP = 1, VCA20 = 0	_	47	Ι	μA	
	Wait mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed Peripheral clock operation VCA27 = VCA26 = VCA25 = 0 VCA20 = 1	_	15	100	μA		
		XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed Peripheral clock off VCA27 = VCA26 = VCA25 = 0 VCA20 = 1	_	4	90	μA		
			XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz (peripheral clock off) While a WAIT instruction is executed VCA27 = VCA26 = VCA25 = 0 VCA20 = 1	-	3.5	_	μA	
		Stop mode	XIN clock off, Topr = 25°C High-speed on-chip oscillator off Low-speed on-chip oscillator off CM10 = 1, Peripheral clock off VCA27 = VCA26 = VCA25 = 0	-	2.0	5.0	μA	
			XIN clock off, Topr = 85°C High-speed on-chip oscillator off Low-speed on-chip oscillator off CM10 = 1, Peripheral clock off VCA27 = VCA26 = VCA25 = 0	-	5.0	-	μA	

# Table 5.19Electrical Characteristics (2) $[3.3 V \le Vcc \le 5.5 V]$ <br/>(Topr = -20 to 85°C (N version), unless otherwise specified.)



Symbol	Parameter	Condition		Standard			Unit
Symbol	Parameter			Min.	Тур.	Max.	Uni
lcc	Power supply current (Vcc = 2.7 to 3.3 V) Single-chip mode,	High-speed clock mode	XIN = 10 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz No division	-	3.5	10	mA
	output pins are open, other pins are Vss		XIN = 10 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	1.5	7.5	mA
		High-speed on-chip oscillator	XIN clock off High-speed on-chip oscillator on fOCO-F = 20 MHz Low-speed on-chip oscillator on = 125 kHz No division	-	7.0	15	mA
		mode	XIN clock off High-speed on-chip oscillator on fOCO-F = 20 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	3.0	-	mA
			XIN clock off High-speed on-chip oscillator on fOCO-F = 10 MHz Low-speed on-chip oscillator on = 125 kHz No division	-	4.0	-	mA
			XIN clock off High-speed on-chip oscillator on fOCO-F = 10 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-8	-	1.5	-	mA
			XIN clock off High-speed on-chip oscillator on fOCO-F = 4 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-16 MSTIIC = MSTTRD = MSTTRC = 1	-	1	-	mA
		Low-speed on-chip oscillator mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8, FMR27 = 1, VCA20 = 0	1	90	390	μA
		Low-speed clock mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz No division, FMR27 = 1, VCA20 = 0	_	80	400	μA
			XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz No division, Program operation on RAM Flash memory off, FMSTP = 1, VCA20 = 0	_	40	-	μA
		Wait mode XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed Peripheral clock operation	High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed	-	15	90	μA
	Stop mo		XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed Peripheral clock off VCA27 = VCA26 = VCA25 = 0, VCA20 = 1	-	4	80	μA
			XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz (peripheral clock off) While a WAIT instruction is executed VCA27 = VCA26 = VCA25 = 0, VCA20 = 1	_	3.5	-	μA
		Stop mode	XIN clock off, $T_{opr} = 25^{\circ}C$ High-speed on-chip oscillator off Low-speed on-chip oscillator off CM10 = 1 Peripheral clock off VCA27 = VCA26 = VCA25 = 0	_	2.0	5.0	μA
			$\frac{VCA27 = VCA26 = VCA26 = 0}{\text{XIN clock off, Topr = 85°C}}$ High-speed on-chip oscillator off Low-speed on-chip oscillator off CM10 = 1 Peripheral clock off	-	5.0	_	μA

# Table 5.25Electrical Characteristics (4) $[2.7 V \le Vcc < 3.3 V]$ <br/>(Topr = -20 to 85°C (N version), unless otherwise specified.)



Table 5.31	Electrical Characteristics (6) [1.8 V $\leq$ Vcc $<$ 2.7 V]
	(Topr = $-20$ to 85°C (N version), unless otherwise specified.)

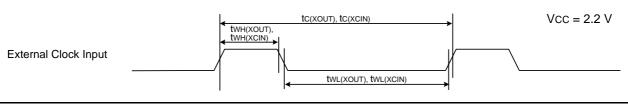
Symbol	Parameter		Condition		Standar	d	Unit
Symbol	Parameter			Min.	Тур.	Max.	Unit
(V Si	Power supply current (Vcc = 1.8 to 2.7 V) Single-chip mode, output pins are open,	High-speed clock mode	High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz No division	-	2.2	_	mA
	other pins are Vss		XIN = 5 MHz (square wave) High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8	_	0.8	-	mA
		High-speed on-chip oscillator	XIN clock off High-speed on-chip oscillator on fOCO-F = 5 MHz Low-speed on-chip oscillator on = 125 kHz No division	_	2.5	10	mA
		mode	XIN clock off High-speed on-chip oscillator on fOCO-F = 5 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-8	_	1.7	-	mA
			XIN clock off High-speed on-chip oscillator on fOCO-F = 4 MHz Low-speed on-chip oscillator on = 125 kHz Divide-by-16 MSTIIC = MSTTRD = MSTTRC = 1	-	1	-	mA
		Low-speed on-chip oscillator mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz Divide-by-8, FMR27 = 1, VCA20 = 0	-	90	300	μA
		Low-speed clock mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz No division, FMR27 = 1, VCA20 = 0	-	80	350	μA
			XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz No division, Program operation on RAM Flash memory off, FMSTP = 1, VCA20 = 0	_	40	-	μA
	Wait mode	XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed Peripheral clock operation VCA27 = VCA26 = VCA25 = 0 VCA20 = 1	-	15	90	μΑ	
			XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator on = 125 kHz While a WAIT instruction is executed Peripheral clock off VCA27 = VCA26 = VCA25 = 0 VCA20 = 1	_	4	80	μA
		XIN clock off High-speed on-chip oscillator off Low-speed on-chip oscillator off XCIN clock oscillator on = 32 kHz (peripheral clock off) While a WAIT instruction is executed VCA27 = VCA26 = VCA25 = 0 VCA20 = 1	_	3.5	-	μA	
	Stop mode	XIN clock off, $T_{opr} = 25^{\circ}C$ High-speed on-chip oscillator off Low-speed on-chip oscillator off CM10 = 1 Peripheral clock off VCA27 = VCA26 = VCA25 = 0	_	2.0	5	μA	
		XIN clock off, Topr = 85°C High-speed on-chip oscillator off Low-speed on-chip oscillator off CM10 = 1 Peripheral clock off VCA27 = VCA26 = VCA25 = 0	_	5.0	-	μA	



#### Timing Requirements (Unless Otherwise Specified: Vcc = 2.2 V, Vss = 0 V at Topr = 25°C)

#### Table 5.32 External Clock Input (XOUT, XCIN)

Symbol	Parameter	Stan	Unit	
Symbol	Falanielei	Min.	Max.	Unit
tc(XOUT)	XOUT input cycle time	200	-	ns
twh(xout)	XOUT input "H" width 90 -			
twl(xout)	XOUT input "L" width	-	ns	
tc(XCIN)	XCIN input cycle time 14 -			
twh(xcin)	XCIN input "H" width 7 –			
twl(xcin)	XCIN input "L" width 7 –			μS



#### Figure 5.16 External Clock Input Timing Diagram when Vcc = 2.2 V

#### Table 5.33 TRAIO Input

Symbol	Parameter		Standard		
			Max.	Unit	
tc(TRAIO)	TRAIO input cycle time	500	=	ns	
twh(traio)	TRAIO input "H" width	200	=	ns	
twl(traio)	TRAIO input "L" width	200	-	ns	

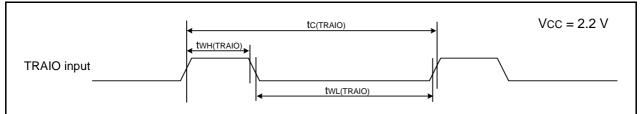


Figure 5.17 TRAIO Input Timing Diagram when Vcc = 2.2 V



#### Table 5.34Serial Interface

Symbol	Derometer		Star	1.1.4.14		
		Parameter			Unit	
tc(CK)	CLKi input cycle time	When external clock is selected	800	-	ns	
tW(CKH)	CLKi input "H" width	CLKi input "H" width 400				
tW(CKL)	CLKi input "L" width		400	-	ns	
td(C-Q)	TXDi output delay time		-	200	ns	
th(C-Q)	TXDi hold time		0	-	ns	
tsu(D-C)	RXDi input setup time		150	-	ns	
th(C-D)	RXDi input hold time		90	-	ns	
td(C-Q)	TXDi output delay time	When internal clock is selected	-	200	ns	
tsu(D-C)	RXDi input setup time		150	-	ns	
th(C-D)	RXDi input hold time		90	-	ns	

i = 0 or 2 Note:

1. Vcc = 2.2 V and Topr = -20 to  $85^{\circ}$ C (N version), unless otherwise specified.

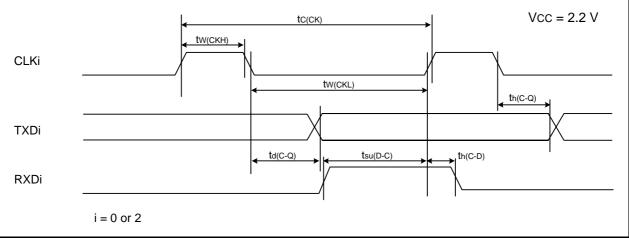


Figure 5.18 Serial Interface Timing Diagram when Vcc = 2.2 V

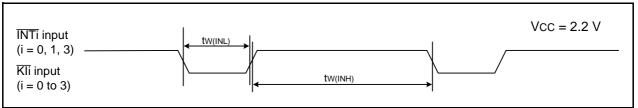
# Table 5.35External Interrupt $\overline{INTi}$ (i = 0, 1, 3) Input, Key Input Interrupt $\overline{Kli}$ (i = 0 to 3)

Symbol	Parameter		Standard		
Symbol			Max.	Unit	
tw(INH)	INTi input "H" width, Kli input "H" width	1000 (1)	-	ns	
tw(INL)	INTi input "L" width, Kli input "L" width	1000 (2)	-	ns	

Notes:

1. When selecting the digital filter by the INTi input filter select bit, use an INTi input HIGH width of either (1/digital filter clock frequency × 3) or the minimum value of standard, whichever is greater.

2. When selecting the digital filter by the INTi input filter select bit, use an INTi input LOW width of either (1/digital filter clock frequency × 3) or the minimum value of standard, whichever is greater.



# Figure 5.19 Input Timing Diagram for External Interrupt $\overline{INTi}$ and Key Input Interrupt $\overline{KIi}$ when Vcc = 2.2 V

REVISION HISTORY R8C/3GM Group Datasheet
------------------------------------------

Rev.	Date		Description
Rev. Date	Page	Summary	
1.00	Jul 27, 2011		First Edition issued

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## General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins

Handle unused pins in accord with the directions given under Handling of Unused Pins in the manual.

- The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.
- 2. Processing at Power-on

The state of the product is undefined at the moment when power is supplied.

- The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.
  - In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do
  not access these addresses; the correct operation of LSI is not guaranteed if they are
  accessed.
- 4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

- When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.
- 5. Differences between Products

Before changing from one product to another, i.e. to one with a different part number, confirm that the change will not lead to problems.

— The characteristics of MPU/MCU in the same group but having different part numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different part numbers, implement a system-evaluation test for each of the products.