Renesas Electronics America Inc - R5F563T6EDFL#V0 Datasheet

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Applications of "Embedded - Microcontrollers"

Details	
Product Status	Not For New Designs
Core Processor	RX
Core Size	32-Bit Single-Core
Speed	100MHz
Connectivity	I²C, LINbus, SCI, SPI
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	25
Program Memory Size	64KB (64K x 8)
Program Memory Type	FLASH
EEPROM Size	32K x 8
RAM Size	8K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 3.6V
Data Converters	A/D 8x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	48-LQFP
Supplier Device Package	48-LQFP (7x7)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f563t6edfl-v0

Table 1.3 List of Products (4/4)

Group	Part No.	Order Part No.	Package	On-chip ROM Capacity	On-chip RAM Capacity	Option	Operating Voltage	Operating Temperature
RX63T	R5F563TBAGFA	R5F563TBAGFA#V1	PLQP0120KA-A	256 Kbytes	24 Kbytes	CAN module included	VCC/ PLLVCC 4.0 to 5.5V VCC_USB 3.0 to 3.6V AVCC/ AVCC0 4.0 to 5.5V	-40 to +105°C (G Version)*1
	R5F563TBAGFH	R5F563TBAGFH#V1	PLQP0112JA-A	256 Kbytes	24 Kbytes	CAN module included		
	R5F563TBAGFP	R5F563TBAGFP#V1	PLQP0100KB-A	256 Kbytes	24 Kbytes	CAN module included		
	R5F563TEBGFB	R5F563TEBGFB#V1	PLQP0144KA-A	512 Kbytes	48 Kbytes	CAN module included	VCC/ PLLVCC/ VCC_USB 2.7 to 3.6V AVCC/ AVCC0 3.0 to 3.6V or 4.0 to 5.5V	
	R5F563TEBGFA	R5F563TEBGFA#V1	PLQP0120KA-A	512 Kbytes	48 Kbytes	CAN module included		
	R5F563TEBGFH	R5F563TEBGFH#V1	PLQP0112JA-A	512 Kbytes	48 Kbytes	CAN module included		
	R5F563TEBGFP	R5F563TEBGFP#V1	PLQP0100KB-A	512 Kbytes	48 Kbytes	CAN module included		
	R5F563TCBGFB	R5F563TCBGFB#V1	PLQP0144KA-A	384 Kbytes	32 Kbytes	CAN module included		
	R5F563TCBGFA	R5F563TCBGFA#V1	PLQP0120KA-A	384 Kbytes	32 Kbytes	CAN module included		
	R5F563TCBGFH	R5F563TCBGFH#V1	PLQP0112JA-A	384 Kbytes	32 Kbytes	CAN module included		
	R5F563TCBGFP	R5F563TCBGFP#V1	PLQP0100KB-A	384 Kbytes	32 Kbytes	CAN module included		
	R5F563TBBGFB	R5F563TBBGFB#V1	PLQP0144KA-A	256 Kbytes	24 Kbytes	CAN module included		
	R5F563TBBGFA	R5F563TBBGFA#V1	PLQP0120KA-A	256 Kbytes	24 Kbytes	CAN module included		
	R5F563TBBGFH	R5F563TBBGFH#V1	PLQP0112JA-A	256 Kbytes	24 Kbytes	CAN module included		
	R5F563TBBGFP	R5F563TBBGFP#V1	PLQP0100KB-A	256 Kbytes	24 Kbytes	CAN module included		
	R5F563T6EGFM	R5F563T6EGFM#V0	PLQP0064KB-A	64 Kbytes	8 Kbytes	CAN module not included	VCC/ PLLVCC 2.7 to 3.6V AVCC0 3.0 to 3.6V	
	R5F563T5EGFM	R5F563T5EGFM#V0	PLQP0064KB-A	48 Kbytes	8 Kbytes	CAN module not included		
	R5F563T4EGFM	R5F563T4EGFM#V0	PLQP0064KB-A	32 Kbytes	8 Kbytes	CAN module not included		
	R5F563T6EGFL	R5F563T6EGFL#V0	PLQP0048KB-A	64 Kbytes	8 Kbytes	CAN module not included		
	R5F563T5EGFL	R5F563T5EGFL#V0	PLQP0048KB-A	48 Kbytes	8 Kbytes	CAN module not included		
	R5F563T4EGFL	R5F563T4EGFL#V0	PLQP0048KB-A	32 Kbytes	8 Kbytes	CAN module not included		

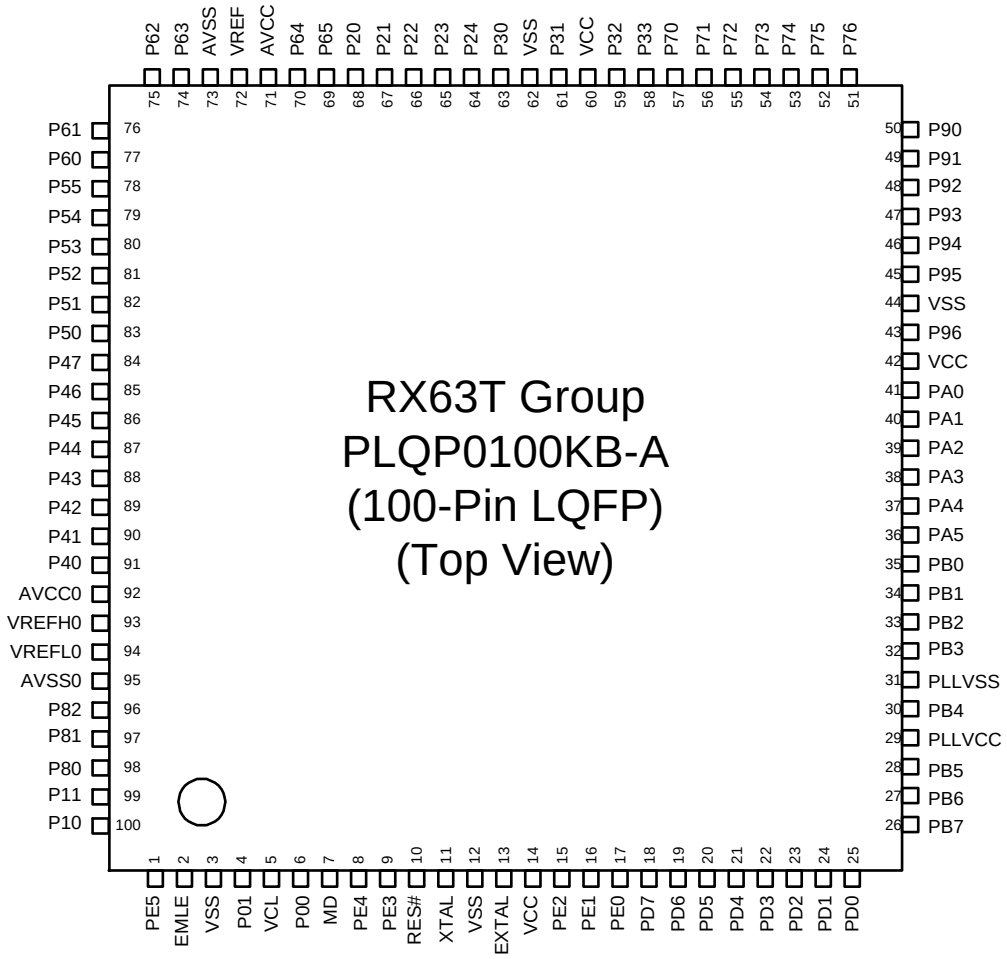
Note: • Orderable part numbers are current as of when this manual was published. Please make sure to refer to the relevant product page on the Renesas website for the latest part numbers.

Note: • The products with the product ID code 1 (ex. R5F563TEADFB#V1) are the revised version to the specification constraints of technical update TX-RX*-A84A / E described.

Note 1. Please contact Renesas Electronics sales office for derating of operation under Ta = +85°C to +105°C. Derating is the systematic reduction of load for the sake of improved reliability.

Table 1.4 Pin Functions (4/5)

Classifications	Pin Name	I/O	Description
USB 2.0 host/function module	VCC_USB	Input	Power supply pin for USB
	VSS_USB	Input	Ground pin for USB
	USB0_DP	I/O	USB internal transceiver D + input and output pins
	USB0_DM	I/O	USB internal transceiver D - input and output pins
	USB0_EXICEN	Output	Low power control signal for OTG chip
	USB0_VBUSEN	Output	Supply enable signal of VBUS (5 V) to OTG chip
	USB0_ID	Input	Mini AB connector ID input pin for use in OTG operation
	USB0_DPRPD	Output	D+ signal pull-down control pin for use during host operation
	USB0_DRPD	Output	D- signal pull-down control pin for use during host operation
	USB0_DPUPE	Output	D+ signal pull-up control pin for use during function operation
	USB0_VBUS	Input	Pin for monitoring USB cable connection
	USB0_OVRCURA, USB0_OVRCURB	Input	Pin for detecting external over current
CAN module	CRX1	Input	Input pins
	CTX1	Output	Output pins
Serial peripheral interface	RSPCKA, RSPCKB	I/O	Clock input/output pins
	MOSIA, MOSIB	I/O	Inputs or outputs data output from the master
	MISOA, MISOB	I/O	Inputs or outputs data output from the slave
	SSLA0, SSLB0	I/O	Input or output pins for slave selection
	SSLA1 to SSLA3 SSLB1 to SSLB3	Output	Output pins for slave selection
12-bit A/D converter	AN000 to AN007 AN100 to AN103	Input	Input pins for the analog signals to be processed by the A/D converter
	ADTRG0#, ADTRG1#	Input	Input pins for the external trigger signals that start the A/D conversion
	CVREFH	Input	Input pin for the high-level reference voltage to the comparator
	CVREFL	Input	Input pin for the low-level reference voltage to the comparator
10-bit A/D converter	AN0 to AN19	Input	Input pins for the analog signals to be processed by the 10-bit A/D converter
	ADTRG#	Input	Input pins for the external trigger signals that start the A/D conversion
D/A converter	DA0, DA1	Output	Output pins for the analog signals to be processed by the 10-bit A/D converter
Analog power supply	AVCC0	—	Analog voltage supply pin for the 12-bit A/D converter. Connect this pin to VCC if the 12-bit A/D converter is not to be used
	AVSS0	—	Analog ground pin for the 12-bit A/D converter. Connect this pin to VSS if the 12-bit A/D converter is not to be used
	VREFH0	—	Reference voltage supply pin for the 12-bit A/D converter. Connect this pin to VCC if the 12-bit A/D converter is not to be used
	VREFL0	—	Reference ground pin for the 12-bit A/D converter. Connect this pin to VSS if the 12-bit A/D converter is not to be used
	AVCC	—	Analog voltage supply pin for the 10-bit A/D converter and the 10-bit D/A converter. Connect this pin to the power supply of the system if the A/D converter and the D/A converter are not to be used.
	AVSS	—	Ground pin for the 10-bit A/D converter and 10-bit D/A converter. Connect this pin to the power-supply ground for the system (0 V).
	VREF	—	Reference-voltage input pin for the 10-bit A/D converter and the 10-bit D/A converter. Connect this pin to the power supply for the system if the A/D converter and the D/A converter are not to be used.



Note: • This figure indicates the power supply pins and I/O port pins. For the pin configuration, see Table 1.8, List of Pins and Pin Functions (100-Pin LQFP).

Figure 1.6 Pin Assignment (100-Pin LQFP)

Table 1.5 List of Pins and Pin Functions (144-Pin LQFP) (1/4)

Pin Number 144-Pin LQFP	Power Supply Clock System Control	I/O Port	Bus	Timer (MTU3, GPT, POE3, CAC)	Communications (SCIc, SCId, RSPI, RIIC, CAN, USB)	Interrupt	S12ADB, AD, DA
1	VCC_USB						
2		PE5	BCLK		USB0_VBUS	IRQ0	
3	EMLE						
4	TRSYNC	P03			RXD2/SMISO2/SSCL2	IRQ7	
5	TRDATA3	P02			TXD2/SMOSI2/SSDA2		
6	VSS						
7		P01	RD#		CTS0#/RTS0#/SS0#/ USB0_DRPD		
8	VCL						
9		P00	CS1#	CACREF			
10	MD/FINED						
11		PE4	A10	POE10#/MTCLKC		IRQ1	
12		PE3	A11	POE11#/MTCLKD		IRQ2-DS	
13	TRDATA2	P14			SCK2		
14	VCC						
15		P13			CTS2#/RTS2#/SS2#/ USB0_VBUSEN		
16	RES#						
17	XTAL						
18	VSS						
19	EXTAL						
20	VCC						
21		PE2		POE10#		NMI	
22		PE1	WR0#/WR#		CTS12#/RTS12#/ SS12#/SSLA3/SSLB3/ USB0_OVRCURA		
23		PE0	WR1#/BC1#/ WAIT#		SSLA2/SSLB2/CRX1/ USB0_OVRCURB	IRQ7	
24		PD7		GTIOC0A	CTS0#/RTS0#/SS0#/ SSLA1/SSLB1/CTX1		
25		PD6		GTIOC0B	SSLA0/SSLB0		
26		PD5		GTIOC1A	RXD1/SMISO1/SSCL1	IRQ6	
27	VSS						
28		PD4		GTIOC1B	SCK1		
29		PD3		GTIOC2A	TXD1/SMOSI1/SSDA1		
30		PD2	CS2#	GTIOC2B	MOSIA/MOSIB/ USB0_ID		
31		PD1	CS0#	GTIOC3A	MISOA/MISOB/ USB0_EXICEN		
32		PD0	A12	GTIOC3B	RSPCKA/RSPCKB		
33		PF4	CS3#				
34		PF3			TXD1/SMOSI1/SSDA1		
35		PF2	CS1#		RXD1/SMISO1/SSCL1	IRQ5	
36	TRST#	PF1					
37	TMS	PF0					
38		PB7	A19		SCK12		

Table 1.5 List of Pins and Pin Functions (144-Pin LQFP) (3/4)

Pin Number 144-Pin LQFP	Power Supply Clock System Control	I/O Port	Bus	Timer (MTU3, GPT, POE3, CAC)	Communications (SCIc, SCId, RSPI, RIIC, CAN, USB)	Interrupt	S12ADB, AD, DA
72		PG3		GTIOC6A	TXD3/SMOSI3/SSDA3		
73		PG2			SCK2	IRQ2	
74		PG1		GTIOC7B	RXD2/SMISO2/SSCL2	IRQ1	
75		PG0		GTIOC7A	TXD2/SMOSI2/SSDA2	IRQ0	
76		P76	D0/[A0/D0]	MTIOC4D/GTIOC2B			
77		P75	D1/[A1/D1]	MTIOC4C/GTIOC1B			
78		P74	D2/[A2/D2]	MTIOC3D/GTIOC0B			
79		P73	D3/[A3/D3]	MTIOC4B/GTIOC2A			
80		P72	D4/[A4/D4]	MTIOC4A/GTIOC1A			
81		P71	D5/[A5/D5]	MTIOC3B/GTIOC0A			
82		P70	D6/[A6/D6]	POE0#	CTS1#/RTS1#/SS1#	IRQ5-DS	
83		P33	D7/[A7/D7]	MTIOC3A/MTCLKA	SSLA3/SSLB3		
84		P32	D8/[A8/D8]	MTIOC3C/MTCLKB	SSLA2/SSLB2		
85	VCC						
86		P31	D9/[A9/D9]	MTIOC0A/MTCLKC	SSLA1/SSLB1		
87	VSS						
88		P30	D10/[A10/D10]	MTIOC0B/MTCLKD	SCK0/SSLA0/SSLB0		
89		P26	CS0#		TXD1/SMOSI1/SSDA1/SDA1		
90		P25	CS1#		SCK1/SCL1		
91		P24	D11/[A11/D11]		CTS0#/RTS0#/SS0#/RSPCKA/RSPCKB	IRQ4	
92		P23	D12/[A12/D12]	CACREF	TXD0/SMOSI0/SSDA0/MOSIA/MOSIB/CTX1		
93		P22	D13/[A13/D13]		RXD0/SMISO0/SSCL0/MISOA/MISOB/CRX1		ADTRG#
94		P21	D14/[A14/D14]	MTCLKA		IRQ6-DS	ADTRG1#
95		P20	D15/[A15/D15]	MTCLKB		IRQ7-DS	ADTRG0#
96		PC5					AN19
97		PC4					AN18
98		P65	A0/BC0#				AN5
99		P64	A1				AN4
100		PC3					AN17
101		PC2					AN16
102	AVCC						
103	VREF						
104	AVSS						
105		PC1					AN15
106		PC0					AN14
107		P63	A2				AN3
108		P62	A3				AN2
109		P61	A4				AN1

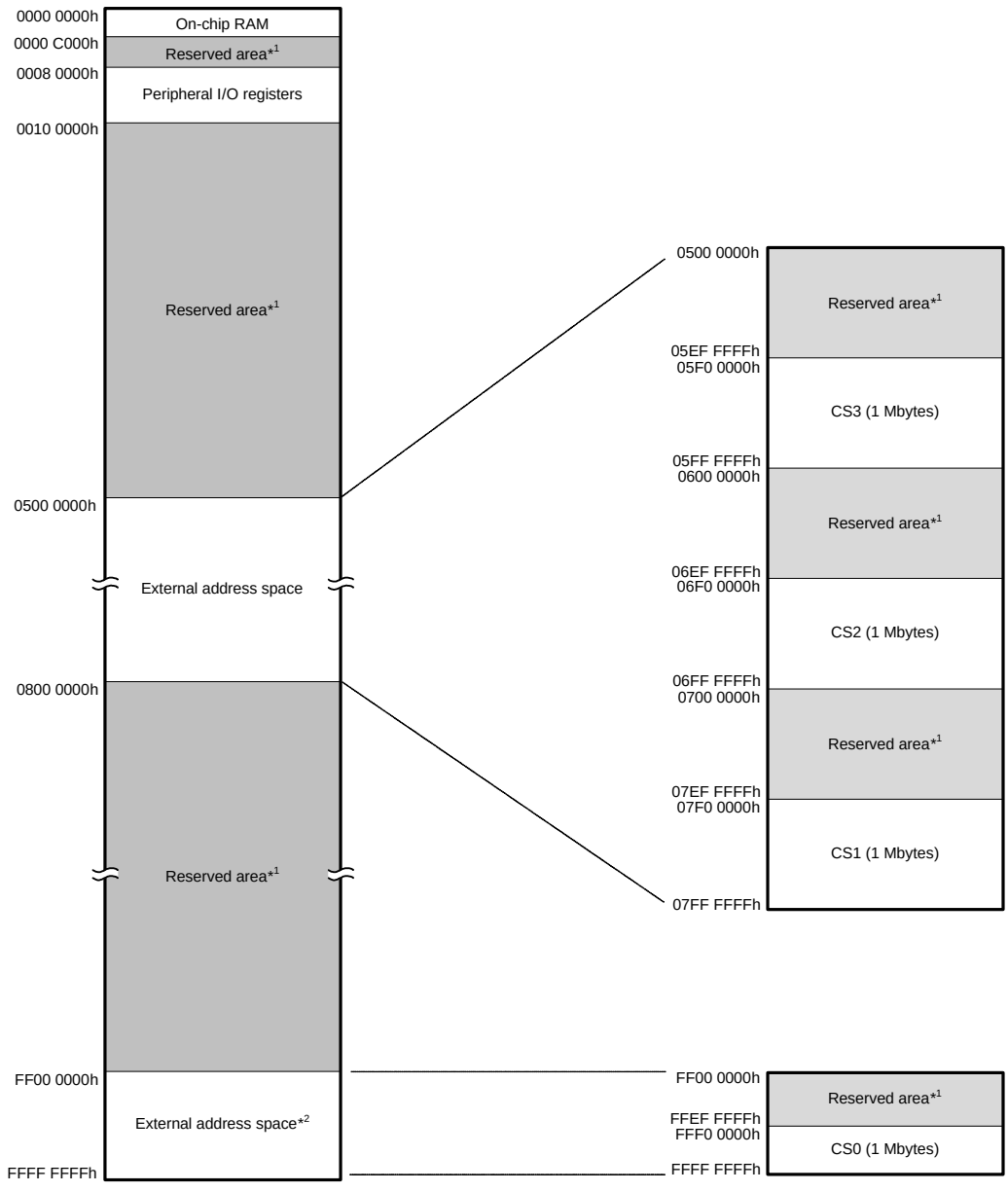
Table 1.6 List of Pins and Pin Functions (120-Pin LQFP) (4/4)

Pin Number 120-Pin LQFP	Power Supply Clock System Control	I/O Port	Bus	Timer (MTU3, GPT, POE3, CAC)	Communications (SCIc, SCId, RSPI, RIIC, CAN, USB)	Interrupt	S12ADB, AD, DA
111		P82	WAIT#	MTIC5U	SCK12	IRQ3	
112		P81	A8	MTIC5V	TXD12/SMOSI12/ SSDA12/TXDX12/ SIOX12		
113		P80	A9	MTIC5W	RXD12/SMISO12/ SSCL12/RXDX12	IRQ5	
114		P12	CS3#		USB0_DPRPD		
115		P11	ALE	MTCLKC		IRQ1-DS	
116		P10		MTCLKD		IRQ0-DS	
117					USB0_DPUPE		
118	VSS_USB						
119					USB0_DM		
120					USB0_DP		

3.2 External Address Space

The external address space is divided into up to four CS areas (CS0 to CS3), each corresponding to the CSn# signal output from a CSn# (n = 0 to 3) pin.

Figure 3.2 shows the address ranges corresponding to the individual CS areas (CS0 to CS3) in on-chip ROM disabled extended mode.



Note 1. Reserved areas should not be accessed.
Note 2. The CS0 area is disabled in on-chip ROM enabled extended mode.
In this mode, the address space for addresses above 0800 0000h is as shown in Figure 3.1, Memory Map in Each Operating Mode.

Figure 3.2 Correspondence between External Address Spaces and CS Areas (In On-Chip ROM Disabled Extended Mode)

4. I/O Registers

This section gives information on the on-chip I/O register addresses. The information is given as shown below. Notes on writing to registers are also given at the end.

(1) I/O register addresses (address order)

- Registers are listed from the lower allocation addresses.
- Registers are classified according to module symbols.
- The number of access cycles indicates the number of cycles based on the specified reference clock.
- Among the internal I/O register area, addresses not listed in the list of registers are reserved. Reserved addresses must not be accessed. Do not access these addresses; otherwise, the operation when accessing these bits and subsequent operations cannot be guaranteed.

(2) Notes on writing to I/O registers

When writing to an I/O register, the CPU starts executing the subsequent instruction before completing I/O register write. This may cause the subsequent instruction to be executed before the post-update I/O register value is reflected on the operation.
As described in the following examples, special care is required for the cases in which the subsequent instruction must be executed after the post-update I/O register value is actually reflected.

[Examples of cases requiring special care]

- The subsequent instruction must be executed while an interrupt request is disabled with the IENj bit in IERn of the ICU (interrupt request enable bit) cleared to 0.
- A WAIT instruction is executed immediately after the preprocessing for causing a transition to the low power consumption state.

In the above cases, after writing to an I/O register, wait until the write operation is completed using the following procedure and then execute the subsequent instruction.

(a) Write to an I/O register.
(b) Read the value from the I/O register to a general register.
(c) Execute the operation using the value read.
(d) Execute the subsequent instruction.

[Instruction examples]

- Byte-size I/O registers

```
MOV.L  #SFR_ADDR, R1
MOV.B  #SFR_DATA, [R1]
CMP    [R1].UB, R1
;; Next process
```

- Word-size I/O registers

```
MOV.L  #SFR_ADDR, R1
MOV.W  #SFR_DATA, [R1]
CMP    [R1].W, R1
;; Next process
```

Table 4.1 List of I/O Registers (Address Order) (12/48)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Module Name	Remarks
						ICLK ≥ PCLK	ICLK < PCLK		
0008 732C	ICU	Interrupt Source Priority Register 044	IPR044	8	8	2 ICLK		ICUb	Not present in versions with 64 or 48 pins.
0008 732Dh	ICU	Interrupt Source Priority Register 045	IPR045	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7331h	ICU	Interrupt Source Priority Register 049	IPR049	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7334h	ICU	Interrupt Source Priority Register 052	IPR052	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7336h	ICU	Interrupt Source Priority Register 054	IPR054	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7337h	ICU	Interrupt Source Priority Register 055	IPR055	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7338h	ICU	Interrupt Source Priority Register 056	IPR056	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7339h	ICU	Interrupt Source Priority Register 057	IPR057	8	8	2 ICLK			
0008 733Ah	ICU	Interrupt Source Priority Register 058	IPR058	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 733Bh	ICU	Interrupt Source Priority Register 059	IPR059	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 733Ch	ICU	Interrupt Source Priority Register 060	IPR060	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 733Dh	ICU	Interrupt Source Priority Register 061	IPR061	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 733Eh	ICU	Interrupt Source Priority Register 062	IPR062	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7340h	ICU	Interrupt Source Priority Register 064	IPR064	8	8	2 ICLK			
0008 7341h	ICU	Interrupt Source Priority Register 065	IPR065	8	8	2 ICLK			
0008 7342h	ICU	Interrupt Source Priority Register 066	IPR066	8	8	2 ICLK			
0008 7343h	ICU	Interrupt Source Priority Register 067	IPR067	8	8	2 ICLK			
0008 7344h	ICU	Interrupt Source Priority Register 068	IPR068	8	8	2 ICLK			
0008 7345h	ICU	Interrupt Source Priority Register 069	IPR069	8	8	2 ICLK			
0008 7346h	ICU	Interrupt Source Priority Register 070	IPR070	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7347h	ICU	Interrupt Source Priority Register 071	IPR071	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 735Ah	ICU	Interrupt Source Priority Register 090	IPR090	8	8	2 ICLK			Not present in versions with 112, 100, 64 or 48 pins.
0008 7362h	ICU	Interrupt Source Priority Register 098	IPR098	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7366h	ICU	Interrupt Source Priority Register 102	IPR102	8	8	2 ICLK			
0008 7367h	ICU	Interrupt Source Priority Register 103	IPR103	8	8	2 ICLK			
0008 7368h	ICU	Interrupt Source Priority Register 104	IPR104	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7369h	ICU	Interrupt Source Priority Register 105	IPR105	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 736Ah	ICU	Interrupt Source Priority Register 106	IPR106	8	8	2 ICLK			Not present in versions with 64 or 48 pins.
0008 7372h	ICU	Interrupt Source Priority Register 114	IPR114	8	8	2 ICLK			
0008 737Ah	ICU	Interrupt Source Priority Register 122	IPR122	8	8	2 ICLK			
0008 737Eh	ICU	Interrupt Source Priority Register 126	IPR126	8	8	2 ICLK			
0008 7382h	ICU	Interrupt Source Priority Register 130	IPR130	8	8	2 ICLK			
0008 7385h	ICU	Interrupt Source Priority Register 133	IPR133	8	8	2 ICLK			
0008 7387h	ICU	Interrupt Source Priority Register 135	IPR135	8	8	2 ICLK			
0008 7389h	ICU	Interrupt Source Priority Register 137	IPR137	8	8	2 ICLK			
0008 738Bh	ICU	Interrupt Source Priority Register 139	IPR139	8	8	2 ICLK			
0008 738Dh	ICU	Interrupt Source Priority Register 141	IPR141	8	8	2 ICLK			
0008 7391h	ICU	Interrupt Source Priority Register 145	IPR145	8	8	2 ICLK			
0008 7392h	ICU	Interrupt Source Priority Register 146	IPR146	8	8	2 ICLK			
0008 7396h	ICU	Interrupt Source Priority Register 150	IPR150	8	8	2 ICLK			
0008 7397h	ICU	Interrupt Source Priority Register 151	IPR151	8	8	2 ICLK			

Table 4.1 List of I/O Registers (Address Order) (24/48)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Module Name	Remarks
						ICLK ≥ PCLK	ICLK < PCLK		
0008 C086h	PORT3	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK	I/O Ports	Not present in versions with 144, 120, 112, or 100 pins.
0008 C087h	PORT3	Open Drain Control Register 1	ODR1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64 or 48 pins.
0008 C090h	PORT8	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C092h	PORT9	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 144, 120, 112, 100 or 48 pins.
0008 C093h	PORT9	Open Drain Control Register 1	ODR1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C094h	PORTA	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C095h	PORTA	Open Drain Control Register 1	ODR1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C096h	PORTB	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		
0008 C097h	PORTB	Open Drain Control Register 1	ODR1	8	8	2, 3 PCLKB	2 ICLK		
0008 C09Ah	PORTD	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		
0008 C09Bh	PORTD	Open Drain Control Register 1	ODR1	8	8	2, 3 PCLKB	2 ICLK		
0008 C09Eh	PORTF	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 100, 64, or 48 pins.
0008 C0A0h	PORTG	Open Drain Control Register 0	ODR0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 100, 64, or 48 pins.
0008 C0A1h	PORTG	Open Drain Control Register 1	ODR1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 100, 64, or 48 pins.
0008 C0F2h	PORT	Driving Ability Control Register 1	DSCR1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C0F3h	PORT	Driving Ability Control Register 2	DSCR2	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C100h	MPC	CS Output Enable Register	PFCSE	8	8	2, 3 PCLKB	2 ICLK	MPC	Not present in versions with 64 or 48 pins.
0008 C102h	MPC	CS Output Pin Select Register 0	PFCSS0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C104h	MPC	Address Output Enable Register 0	PFAOE0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C105h	MPC	Address Output Enable Register 1	PFAOE1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C106h	MPC	External Bus Control Register 0	PFBCR0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C107h	MPC	External Bus Control Register 1	PFBCR1	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C114h	MPC	USB0 Control Register	PFUSB0	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 112, 100, 64, or 48 pins.
0008 C11Fh	MPC	Write-Protect Register	PWPR	8	8	2, 3 PCLKB	2 ICLK		
0008 C140h	MPC	P00 Pin Function Control Register	P00PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C141h	MPC	P01 Pin Function Control Register	P01PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C142h	MPC	P02 Pin Function Control Register	P02PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64, or 48 pins.
0008 C143h	MPC	P03 Pin Function Control Register	P03PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64, or 48 pins.
0008 C148h	MPC	P10 Pin Function Control Register	P10PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C149h	MPC	P11 Pin Function Control Register	P11PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C14Ah	MPC	P12 Pin Function Control Register	P12PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 100, 64, or 48 pins.
0008 C14Bh	MPC	P13 Pin Function Control Register	P13PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 112, 100, 64, or 48 pins.

Table 4.1 List of I/O Registers (Address Order) (26/48)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Module Name	Remarks
						ICLK ≥ PCLK	ICLK < PCLK		
0008 C174h	MPC	P64 Pin Function Control Register	P64PFS	8	8	2, 3 PCLKB	2 ICLK	MPC	Not present in versions with 64 or 48 pins.
0008 C175h	MPC	P65 Pin Function Control Register	P65PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C178h	MPC	P70 Pin Function Control Register	P70PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C179h	MPC	P71 Pin Function Control Register	P71PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C17Ah	MPC	P72 Pin Function Control Register	P72PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C17Bh	MPC	P73 Pin Function Control Register	P73PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C17Ch	MPC	P74 Pin Function Control Register	P74PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C17Dh	MPC	P75 Pin Function Control Register	P75PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C17Eh	MPC	P76 Pin Function Control Register	P76PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C180h	MPC	P80 Pin Function Control Register	P80PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C181h	MPC	P81 Pin Function Control Register	P81PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C182h	MPC	P82 Pin Function Control Register	P82PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C188h	MPC	P90 Pin Function Control Register	P90PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C189h	MPC	P91 Pin Function Control Register	P91PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C18Ah	MPC	P92 Pin Function Control Register	P92PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C18Bh	MPC	P93 Pin Function Control Register	P93PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C18Ch	MPC	P94 Pin Function Control Register	P94PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C18Dh	MPC	P95 Pin Function Control Register	P95PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C18Eh	MPC	P96 Pin Function Control Register	P96PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C190h	MPC	PA0 Pin Function Control Register	PA0PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C191h	MPC	PA1 Pin Function Control Register	PA1PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 64 or 48 pins.
0008 C192h	MPC	PA2 Pin Function Control Register	PA2PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C193h	MPC	PA3 Pin Function Control Register	PA3PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C194h	MPC	PA4 Pin Function Control Register	PA4PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C195h	MPC	PA5 Pin Function Control Register	PA5PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C196h	MPC	PA6 Pin Function Control Register	PA6PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64 or 48 pins.
0008 C198h	MPC	PB0 Pin Function Control Register	PB0PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C199h	MPC	PB1 Pin Function Control Register	PB1PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C19Ah	MPC	PB2 Pin Function Control Register	PB2PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C19Bh	MPC	PB3 Pin Function Control Register	PB3PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C19Ch	MPC	PB4 Pin Function Control Register	PB4PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C19Dh	MPC	PB5 Pin Function Control Register	PB5PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C19Eh	MPC	PB6 Pin Function Control Register	PB6PFS	8	8	2, 3 PCLKB	2 ICLK		
0008 C19Fh	MPC	PB7 Pin Function Control Register	PB7PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 48 pins.
0008 C1A0h	MPC	PC0 Pin Function Control Register	PC0PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64, or 48 pins.
0008 C1A1h	MPC	PC1 Pin Function Control Register	PC1PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64, or 48 pins.
0008 C1A2h	MPC	PC2 Pin Function Control Register	PC2PFS	8	8	2, 3 PCLKB	2 ICLK		Not present in versions with 120, 112, 100, 64, or 48 pins.

Table 4.1 List of I/O Registers (Address Order) (34/48)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Module Name	Remarks
						ICLK ≥ PCLK	ICLK < PCLK		
000C 120Fh	MTU	Timer Output Control Register 2A	TOCR2A	8	8	4, 5 PCLKA	2, 3 ICLK	MTU3	
000C 1210h	MTU3	Timer Counter	TCNT	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1212h	MTU4	Timer Counter	TCNT	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1214h	MTU	Timer Cycle Data Register A	TCDRA	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1216h	MTU	Timer Dead Time Data Register A	TDDRA	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1218h	MTU3	Timer General Register A	TGRA	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 121Ah	MTU3	Timer General Register B	TGRB	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 121Ch	MTU4	Timer General Register A	TGRA	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 121Eh	MTU4	Timer General Register B	TGRB	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1220h	MTU	Timer Subcounter A	TCNTSA	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1222h	MTU	Timer Cycle Buffer Register A	TCBRA	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1224h	MTU3	Timer General Register C	TGRC	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1226h	MTU3	Timer General Register D	TGRD	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1228h	MTU4	Timer General Register C	TGRC	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 122Ah	MTU4	Timer General Register D	TGRD	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 122Ch	MTU3	Timer Status Register	TSR	8	8, 16	4, 5 PCLKA	2, 3 ICLK		
000C 122Dh	MTU4	Timer Status Register	TSR	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1230h	MTU	Timer Interrupt Skipping Set Register 1A	TITCR1A	8	8, 16	4, 5 PCLKA	2, 3 ICLK		
000C 1231h	MTU	Timer Interrupt Skipping Counters 1A	TITCNT1A	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1232h	MTU	Timer Buffer Transfer Set Register A	TBTERA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1234h	MTU	Timer dead time enable register A	TDERA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1236h	MTU	Timer output level buffer register A	TOLBRA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1238h	MTU3	Timer Buffer Operation Transfer Mode Register	TBTM	8	8, 16	4, 5 PCLKA	2, 3 ICLK		
000C 1239h	MTU4	Timer Buffer Operation Transfer Mode Register	TBTM	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 123Ah	MTU	Timer Interrupt Skipping Mode Register A	TITMRA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 123Bh	MTU	Timer Interrupt Skipping Set Register 2A	TITCR2A	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 123Ch	MTU	Timer Interrupt Skipping Counters 2A	TITCNT2A	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1240h	MTU4	Timer A/D Converter Start Request Control Register	TADCR	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1244h	MTU4	Timer A/D Converter Start Request Cycle Set Register A	TADCORA	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1246h	MTU4	Timer A/D Converter Start Request Cycle Set Register B	TADCORB	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1248h	MTU4	Timer A/D Converter Start Request Cycle Set Buffer Register A	TADCOBRA	16	16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 124Ah	MTU4	Timer A/D Converter Start Request Cycle Set Buffer Register B	TADCOBRB	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1260h	MTU	Timer Waveform Control Register A	TWCRA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1270h	MTU	Timer Mode Register 2A	TMDR2A	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1272h	MTU3	Timer General Register E	TGRE	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1274h	MTU4	Timer General Register E	TGRE	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1276h	MTU4	Timer General Register F	TGRF	16	16	4, 5 PCLKA	2, 3 ICLK		
000C 1280h	MTU	Timer Start Register A	TSTRA	8	8, 16	4, 5 PCLKA	2, 3 ICLK		
000C 1281h	MTU	Timer Synchronous Register A	TSYRA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1282h	MTU	Timer Counter Synchronous Start Register	TCSYSTR	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1284h	MTU	Timer Read/Write Enable Register A	TRWERA	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1300h	MTU0	Timer Control Register	TCR	8	8, 16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1301h	MTU0	Timer Mode Register 1	TMDR1	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1302h	MTU0	Timer I/O Control Register H	TIORH	8	8, 16	4, 5 PCLKA	2, 3 ICLK		
000C 1303h	MTU0	Timer I/O Control Register L	TIORL	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1304h	MTU0	Timer Interrupt Enable Register	TIER	8	8, 16, 32	4, 5 PCLKA	2, 3 ICLK		
000C 1305h	MTU0	Timer Status Register	TSR	8	8	4, 5 PCLKA	2, 3 ICLK		
000C 1306h	MTU0	Timer Counter	TCNT	16	16	4, 5 PCLKA	2, 3 ICLK		

Table 4.1 List of I/O Registers (Address Order) (38/48)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Module Name	Remarks
						ICLK ≥ PCLK	ICLK < PCLK		
000C 211Ah	GPT0	General PWM Timer Compare Capture Register F	GTCCRF	16	16, 32	2 to 5 PCLKA	2, 3 ICLK	GPT	
000C 211Ch	GPT0	General PWM Timer Cycle Setting Register	GTPR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 211Eh	GPT0	General PWM Timer Cycle Setting Buffer Register	GTPBR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2120h	GPT0	General PWM Timer Cycle Setting Double-Buffer Register	GTPDBR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2124h	GPT0	A/D Converter Start Request Timing Register A	GTADTRA	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2126h	GPT0	A/D Converter Start Request Timing Buffer Register A	GTADTBRA	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2128h	GPT0	A/D Converter Start Request Timing Double-Buffer Register A	GTADTDBRA	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 212Ch	GPT0	A/D Converter Start Request Timing Register B	GTADTRB	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 212Eh	GPT0	A/D Converter Start Request Timing Buffer Register B	GTADTBRB	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2130h	GPT0	A/D Converter Start Request Timing Double-Buffer Register B	GTADTDBRB	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2134h	GPT0	General PWM Timer Output Negate Control Register	GTONCR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2136h	GPT0	General PWM Timer Dead Time Control Register	GTDTCR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2138h	GPT0	General PWM Timer Dead Time Value Register U	GTDVU	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 213Ah	GPT0	General PWM Timer Dead Time Value Register D	GTDVD	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 213Ch	GPT0	General PWM Timer Dead Time Buffer Register U	GTDBU	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 213Eh	GPT0	General PWM Timer Dead Time Buffer Register D	GTDBD	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2140h	GPT0	General PWM Timer Output Protection Function Status Register	GTSOS	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2142h	GPT0	General PWM Timer Output Protection Function Temporary Release Register	GTSOTR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2180h	GPT1	General PWM Timer I/O Control Register	GTIOR	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2182h	GPT1	General PWM Timer Interrupt Output Setting Register	GTINTAD	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2184h	GPT1	General PWM Timer Control Register	GTCR	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2186h	GPT1	General PWM Timer Buffer Enable Register	GTBER	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2188h	GPT1	General PWM Timer Count Direction Register	GTUDC	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 218Ah	GPT1	General PWM Timer Interrupt, A/D Converter Start Request Skipping Setting Register	GTITC	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 218Ch	GPT1	General PWM Timer Status Register	GTST	16	8, 16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 218Eh	GPT1	General PWM Timer Counter	GTCNT	16	16	2 to 5 PCLKA	2, 3 ICLK		
000C 2190h	GPT1	General PWM Timer Compare Capture Register A	GTCCRA	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2192h	GPT1	General PWM Timer Compare Capture Register B	GTCCRB	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2194h	GPT1	General PWM Timer Compare Capture Register C	GTCCRC	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2196h	GPT1	General PWM Timer Compare Capture Register D	GTCCRD	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 2198h	GPT1	General PWM Timer Compare Capture Register E	GTCCRE	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 219Ah	GPT1	General PWM Timer Compare Capture Register F	GTCCRF	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 219Ch	GPT1	General PWM Timer Cycle Setting Register	GTPR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 219Eh	GPT1	General PWM Timer Cycle Setting Buffer Register	GTPBR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 21A0h	GPT1	General PWM Timer Cycle Setting Double-Buffer Register	GTPDBR	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		
000C 21A4h	GPT1	A/D Converter Start Request Timing Register A	GTADTRA	16	16, 32	2 to 5 PCLKA	2, 3 ICLK		

Table 4.1 List of I/O Registers (Address Order) (47/48)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Module Name	Remarks
						ICLK ≥ PCLK	ICLK < PCLK		
000C3056h	DPC	Control Calculation Parameter Setting Register KQ2	PARAMKQ2	16	16	3 to 5 PCLKA	2, 3 ICLK	DPC	Not present in versions with 64 or 48 pins.
000C305Ah	DPC	Control Calculation Parameter Setting Register KF2	PARAMKF2	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C305Eh	DPC	Control Calculation Parameter Setting Register KP3	PARAMKP3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3062h	DPC	Control Calculation Parameter Setting Register KI3	PARAMKI3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3066h	DPC	Control Calculation Parameter Setting Register KQ3	PARAMKQ3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C306Ah	DPC	Control Calculation Parameter Setting Register KF3	PARAMKF3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C306Ch	DPC	Control Calculation Result Higher-Order Bits Store Register 0	RESULTU0	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C306Eh	DPC	Control Calculation Result Lower-Order Bits Store Register 0	RESULTL0	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3070h	DPC	Control Calculation Result Higher-Order Bits Store Register 1	RESULTU1	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3072h	DPC	Control Calculation Result Lower-Order Bits Store Register 1	RESULTL1	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3074h	DPC	Control Calculation Result Higher-Order Bits Store Register 2	RESULTU2	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3076h	DPC	Control Calculation Result Lower-Order Bits Store Register 2	RESULTL2	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3078h	DPC	Control Calculation Result Higher-Order Bits Store Register 3	RESULTU3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C307Ah	DPC	Control Calculation Result Lower-Order Bits Store Register 3	RESULTL3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C307Eh	DPC	Input Code Monitor Enable Register	TMONEN	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3082h	DPC	Maximum Input Code Monitor Register 0	TMONMAX0	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3086h	DPC	Minimum Input Code Monitor Register 0	TMONMIN0	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C308Ah	DPC	Maximum Input Code Monitor Register 1	TMONMAX1	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C308Eh	DPC	Minimum Input Code Monitor Register 1	TMONMIN1	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3092h	DPC	Maximum Input Code Monitor Register 2	TMONMAX2	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C3096h	DPC	Minimum Input Code Monitor Register 2	TMONMIN2	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C309Ah	DPC	Maximum Input Code Monitor Register 3	TMONMAX3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C309Eh	DPC	Minimum Input Code Monitor Register 3	TMONMIN3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C30A2h	DPC	Overvoltage Output Error Judgment Threshold Setting Register 0	ERRVTH0	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C30A6h	DPC	Overvoltage Output Error Judgment Threshold Setting Register 1	ERRVTH1	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C30AAh	DPC	Overvoltage Output Error Judgment Threshold Setting Register 2	ERRVTH2	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C30AEh	DPC	Overvoltage Output Error Judgment Threshold Setting Register 3	ERRVTH3	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
000C30B2h	DPC	PWM Shut-Down at Overvoltage Output Error Setting Register	ERRDWN	16	16	3 to 5 PCLKA	2, 3 ICLK		Not present in versions with 64 or 48 pins.
007F C402h	FLASH	Flash Mode Register	FMODR	8	8	2, 3 FCLK	2, 3 ICLK	ROM/ E2 DataFlash Memory	
007F C410h	FLASH	Flash Access Status Register	FASTAT	8	8	2, 3 FCLK	2, 3 ICLK		
007F C411h	FLASH	Flash Access Error Interrupt Enable Register	FAEINT	8	8	2, 3 FCLK	2, 3 ICLK		
007F C412h	FLASH	Flash Ready Interrupt Enable Register	FRDYIE	8	8	2, 3 FCLK	2, 3 ICLK	ROM	
007F C440h	FLASH	E2 DataFlash Read Enable Register 0	DFLRE0	16	16	2, 3 FCLK	2, 3 ICLK	E2 DataFlash Memory	
007F C442h	FLASH	E2 DataFlash Read Enable Register 1	DFLRE1	16	16	2, 3 FCLK	2, 3 ICLK		
007F C450h	FLASH	E2 DataFlash P/E Enable Register 0	DFLWE0	16	16	2, 3 FCLK	2, 3 ICLK		
007F C452h	FLASH	E2 DataFlash P/E Enable Register 1	DFLWE1	16	16	2, 3 FCLK	2, 3 ICLK		

Table 5.6 Permissible Power Consumption (G version product only)

Note: Common standard values for conditions not given in the table are listed as “Condition 1” to “Condition 3” below.

Condition 1: VCC = PLLVCC = 2.7 to 3.6 V, VSS = PLLVSS = AVSS0 = AVSS = VREFL0 = 0 V
AVCC0 = AVCC = 3.0 to 3.6V, VREFH0 = 3.0 V to AVCC0, VREF = 3.0 V to AVCC

Condition 2: VCC = PLLVCC = 2.7 to 3.6 V, VSS = PLLVSS = AVSS0 = AVSS = VREFL0 = 0V
AVCC0 = AVCC = 4.0 to 5.5 V, VREFH0 = 4.0 V to AVCC0, VREF = 4.0 V to AVCC

Condition 3: VCC = PLLVCC = 4.0 to 5.5 V, VSS = PLLVSS = AVSS0 = AVSS = VREFL0 = 0V
AVCC0 = AVCC = 4.0 to 5.5V, VREFH0 = 4.0 V to AVCC0, VREF = 4.0 V to AVCC

Ta = -40 to +105°C. Ta is common to conditions 1 to 3.

Item	Symbol	Typ.	Max.	Unit	Test Conditions
Total permissible power consumption*1	Pd	—	345	mW	85°C < Ta ≤ 105°C

Note: • Please contact Renesas Electronics sales office for derating of operation under Ta = +85°C to +105°C. Derating is the systematic reduction of load for the sake of improved reliability.

Note 1. The total power consumption of the whole chip including output current.

5.3.1 Reset Timing

Table 5.8 Reset Timing

Note: Common standard values for conditions not given in the table are listed as “Condition 1” to “Condition 3” below.

Condition 1: VCC = PLLVCC = VCC_USB = 2.7 to 3.6 V, VSS = PLLVSS = VSS_USB = AVSS0 = AVSS = VREFL0 = 0 V
AVCC0 = AVCC = VREF = 3.0 to 3.6 V, VREFH0 = 3.0 V to AVCC0

Condition 2: VCC = PLLVCC = VCC_USB = 2.7 to 3.6 V, VSS = PLLVSS = VSS_USB = AVSS0 = AVSS = VREFL0 = 0 V
AVCC0 = AVCC = VREF = 4.0 to 5.5 V, VREFH0 = 4.0 V to AVCC0

Condition 3: VCC = PLLVCC = 4.0 to 5.5 V, VCC_USB = 3.0 to 3.6 V, VSS = PLLVSS = VSS_USB = AVSS0 = AVSS = VREFL0 = 0 V
AVCC0 = AVCC = VREF = 4.0 to 5.5 V, VREFH0 = 4.0 V to AVCC0

$T_a = T_{opr}$. T_a is common to conditions 1 to 3.

Item		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
RES# pulse width	Power-on	t_{RESWP}	2	—	—	ms	Figure 5.1
	Deep software standby mode	t_{RESWD}	1	—	—	ms	Figure 5.2
	Software standby mode	t_{RESWS}	1	—	—	ms	
	Programming or erasure of the ROM or E2 DataFlash memory or blank checking of the E2 DataFlash memory	t_{RESWF}	200	—	—	µs	
	Other than above	t_{RESW}	200	—	—	µs	
Wait time after RES# cancellation		t_{RESWT}	59	—	60	t_{cyc}	
Internal reset time (independent watchdog timer reset, watchdog timer reset, software reset)		t_{RESW2}	112	—	120	t_{cyc}	

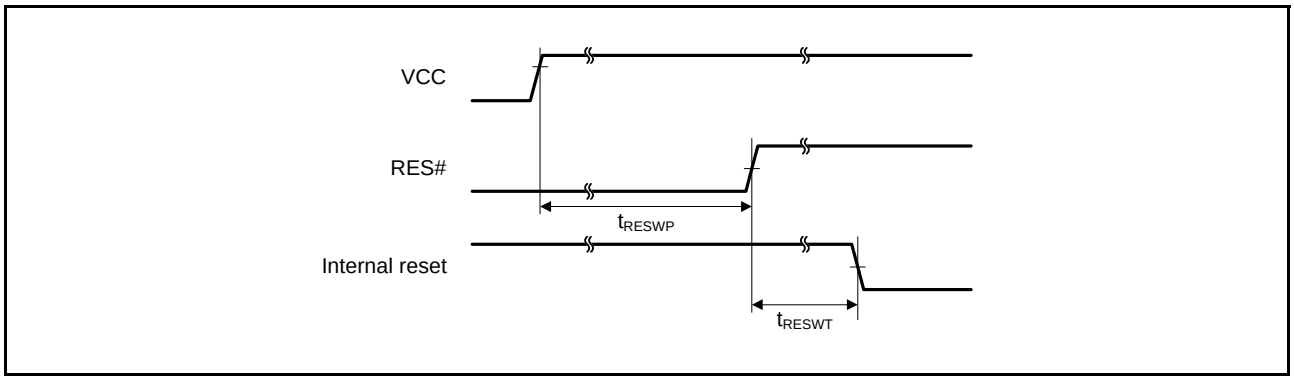


Figure 5.1 Reset Input Timing at Power-On

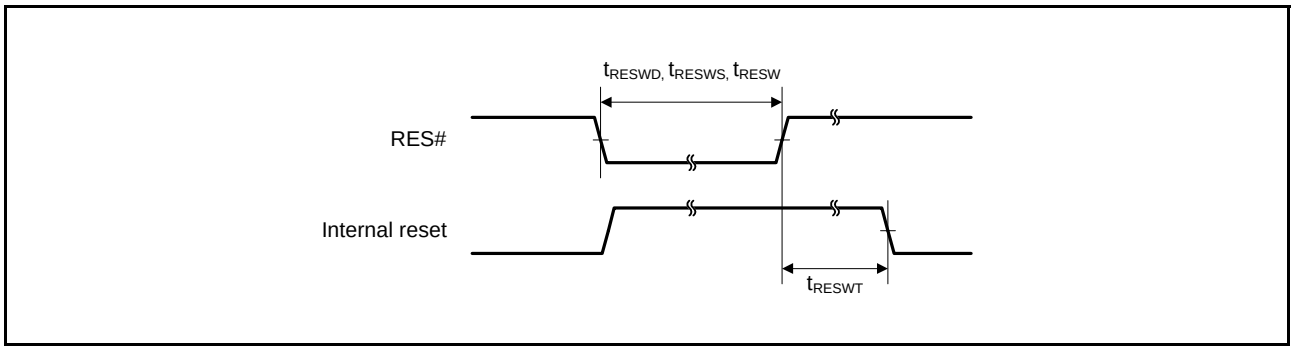


Figure 5.2 Reset Input Timing

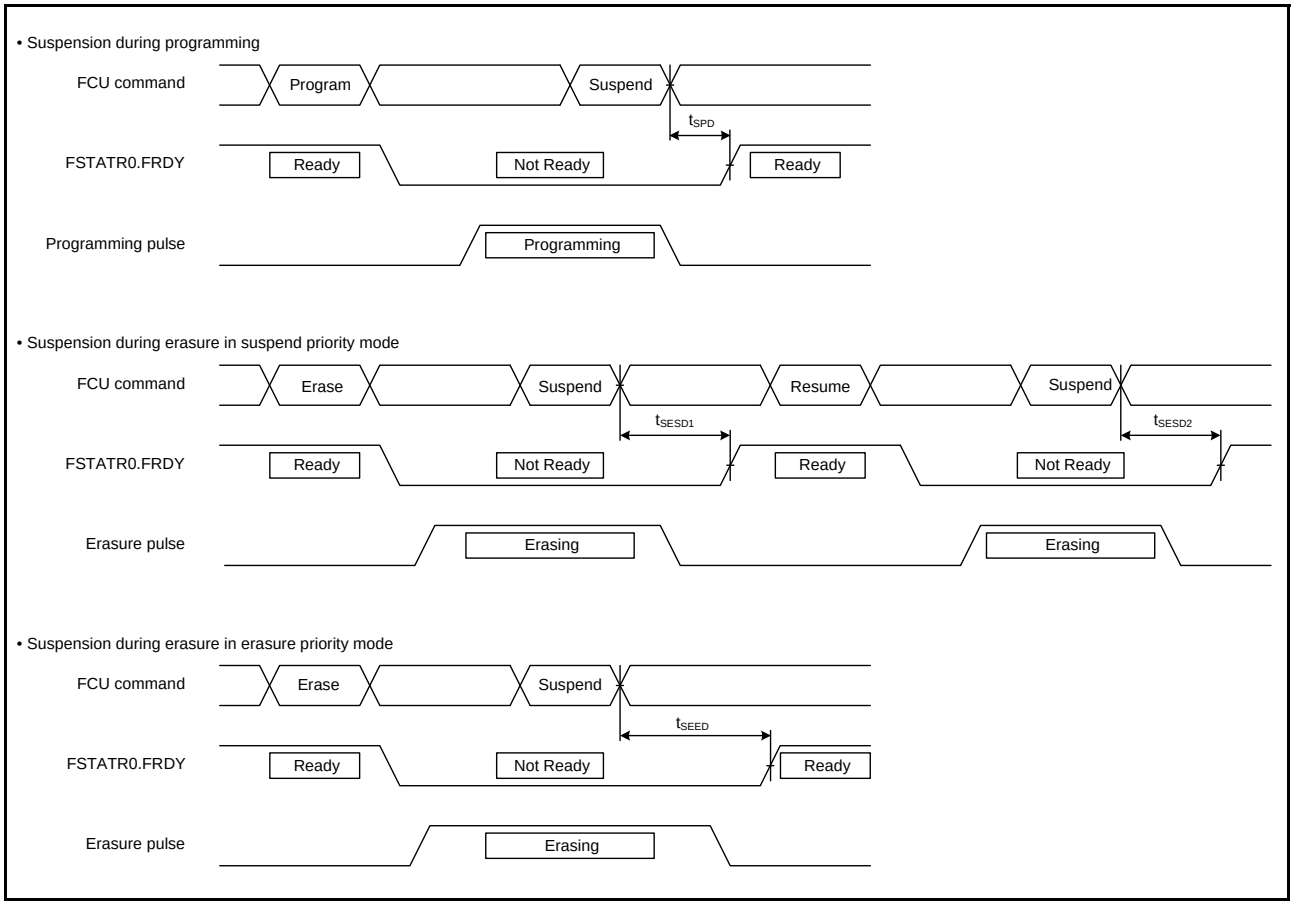


Figure 5.44 Flash Memory Program/Erase Suspend Timing

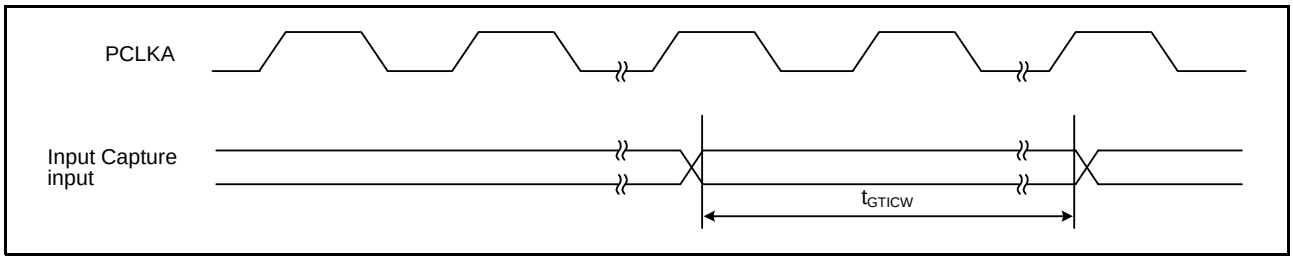


Figure 6.15 GPT Input/Output Timing

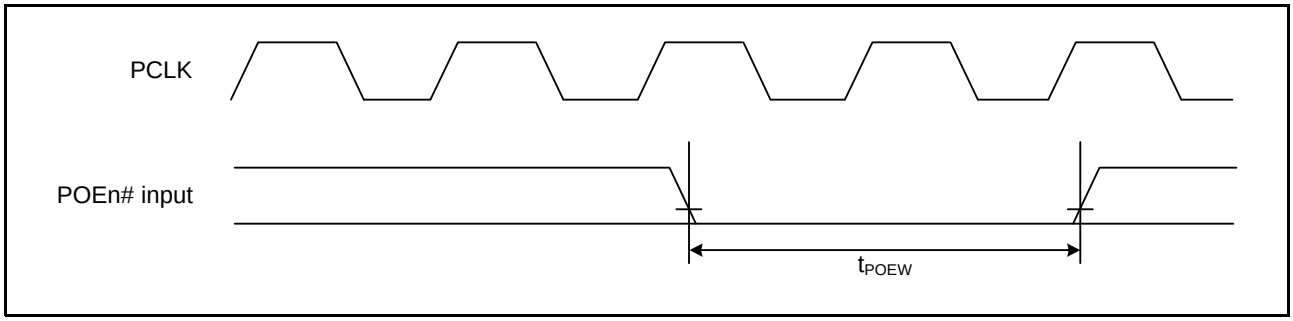


Figure 6.16 POE3# Input Timing

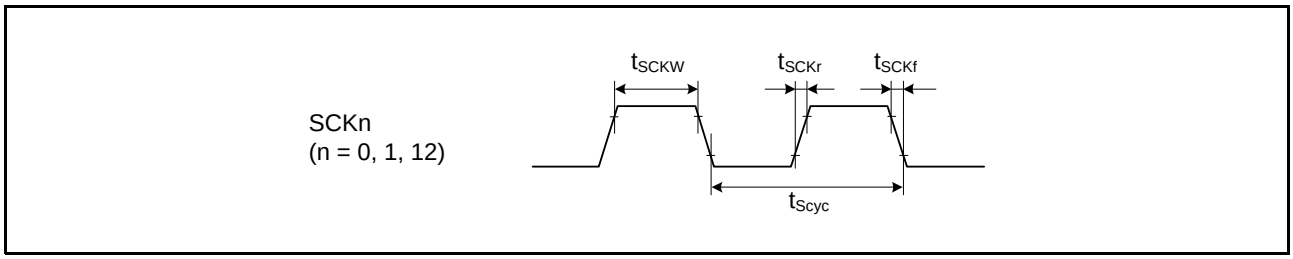


Figure 6.17 SCK Clock Input Timing

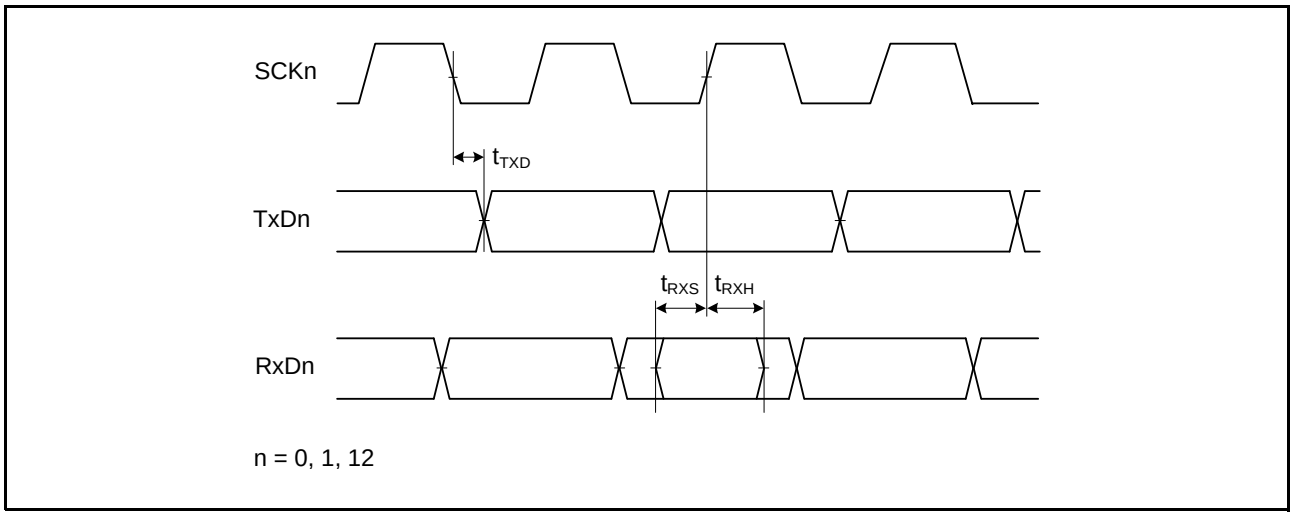


Figure 6.18 SCI Input/Output Timing: Clock Synchronous Mode

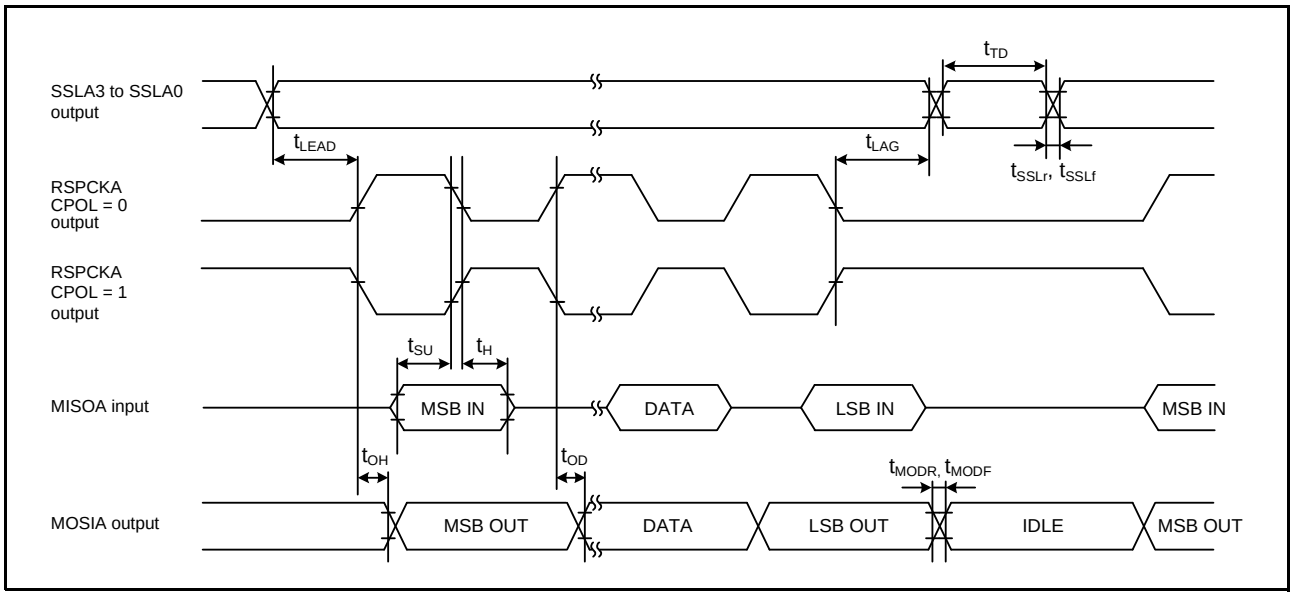


Figure 6.22 RSPI Timing (Master, CPHA = 1) and Simple SPI Timing (Master, CKPH = 0)

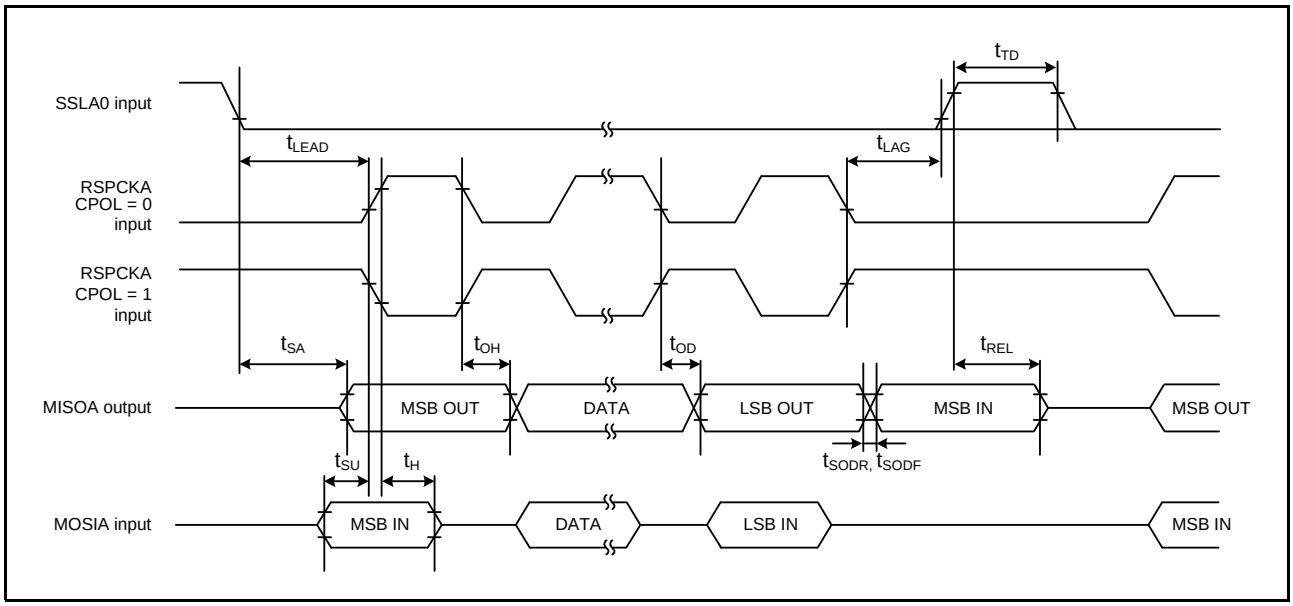


Figure 6.23 RSPI Timing (Slave, CPHA = 0) and Simple SPI Timing (Slave, CKPH = 1)

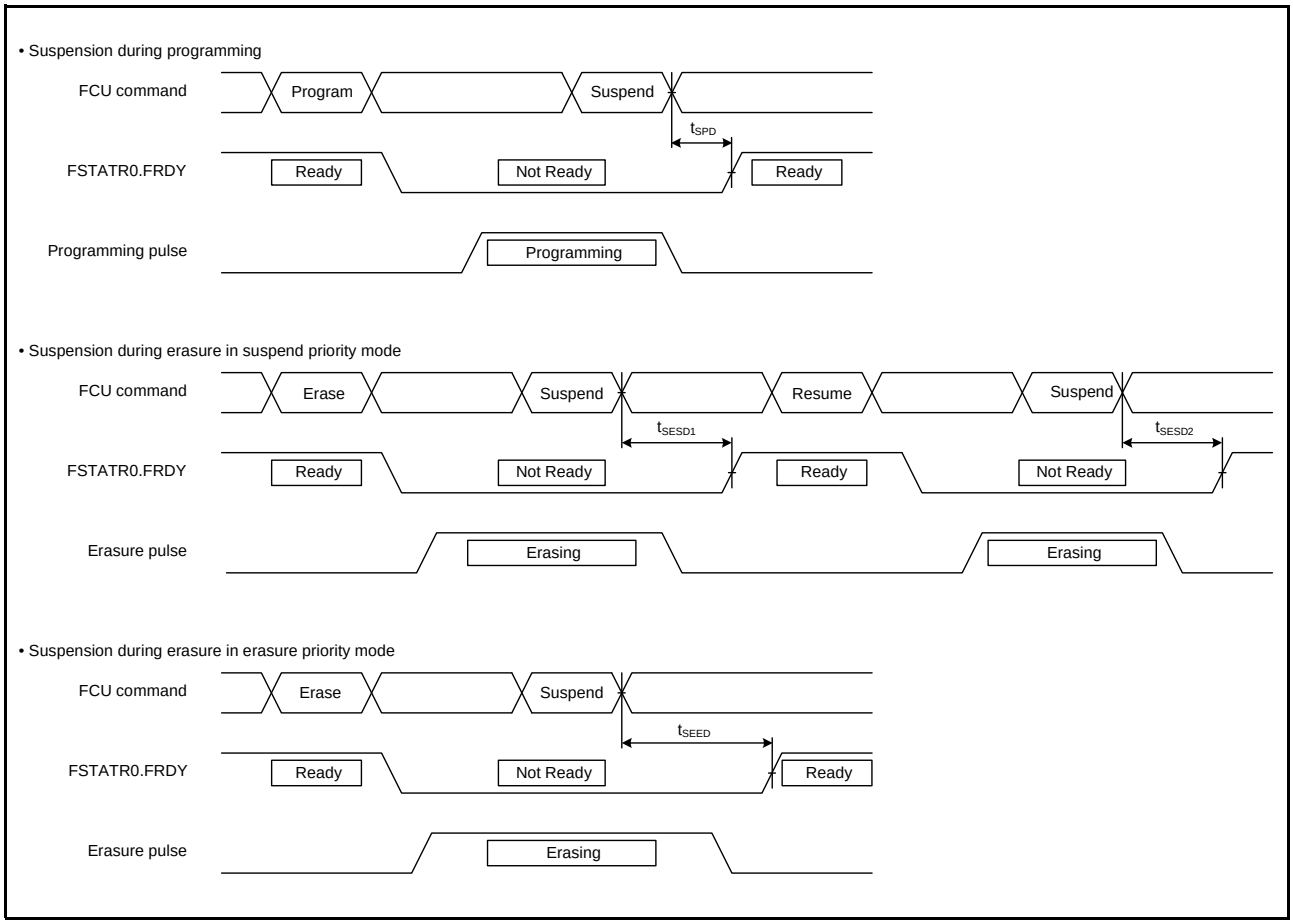


Figure 6.31 Flash Memory Program/Erase Suspend Timing