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"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "[Embedded - Microcontrollers](#)"

Details

Product Status	Discontinued at Digi-Key
Core Processor	RX
Core Size	32-Bit Single-Core
Speed	100MHz
Connectivity	CANbus, EBI/EMI, I ² C, LINbus, SCI, SPI, USB
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	111
Program Memory Size	1MB (1M x 8)
Program Memory Type	FLASH
EEPROM Size	32K x 8
RAM Size	256K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 3.6V
Data Converters	A/D 8x10b, 21x12b; D/A 2x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	144-LQFP
Supplier Device Package	144-LFQFP (20x20)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f5631yhdfb-v0

1. Overview

1.1 Outline of Specifications

Table 1.1 lists the specifications in outline, and table 1.2 gives a comparison of the functions of products in different packages.

Table 1.1 is for products with the greatest number of functions, so numbers of peripheral modules and channels will differ in accord with the package. For details, see Table 1.2, Comparison of Functions for Different Packages in the RX63N/RX631 Group.

Table 1.1 Outline of Specifications (1/6)

Classification	Module/Function	Description
CPU	CPU	- Maximum operating frequency: 100 MHz 32-bit RX CPU - Minimum instruction execution time: One instruction per state (cycle of the system clock) - Address space: 4-Gbyte linear - Register set of the CPU - General purpose: Sixteen 32-bit registers - Control: Nine 32-bit registers - Accumulator: One 64-bit register - Basic instructions: 73 - Floating-point instructions: 8 - DSP instructions: 9 - Addressing modes: 10 - Data arrangement - Instructions: Little endian - Data: Selectable as little endian or big endian - On-chip 32-bit multiplier: 32 x 32 → 64 bits - On-chip divider: 32 / 32 → 32 bits - Barrel shifter: 32 bits - Memory protection unit (MPU)
	FPU	- Single precision (32-bit) floating point - Data types and floating-point exceptions in conformance with the IEEE754 standard
Memory	ROM	- Capacity: ROMless, 256 Kbytes, 384 Kbytes, 512 Kbytes, 768 Kbytes, 1 Mbyte, 1.5 Mbytes, 2 Mbytes 100 MHz, no-wait access - On-board programming: Four types - Off-board programming (parallel programmer mode) (for products with 100 pins or more)
	RAM	- Capacity: 64 Kbytes, 128 Kbytes, 192 Kbytes, 256 Kbytes 100 MHz, no-wait access
	E2 data flash	Capacity: 32 Kbytes Programming/erasing: 100,000 times
MCU operating modes		Single-chip mode, on-chip ROM enabled expansion mode, and on-chip ROM disabled expansion mode (software switching)
Clock	Clock generation circuit	- Main clock oscillator, subclock oscillator, low-speed/high-speed on-chip oscillator, PLL frequency synthesizer, and IWDG-dedicated on-chip oscillator - Main-clock oscillation stoppage detection - Separate frequency-division and multiplication settings for the system clock (ICLK), peripheral module clock (PCLK), FlashIF clock (FCLK) and external bus clock (BCLK) The CPU and other bus masters run in synchronization with the system clock (ICLK): Up to 100 MHz Peripheral modules run in synchronization with the peripheral module clock (PCLK): Up to 50 MHz Flash IF run in synchronization with the flashIF clock (FCLK): Up to 50 MHz Devices connected to the external bus run in synchronization with the external bus clock (BCLK): Up to 50 MHz
Reset		RES# pin reset, power-on reset, voltage-monitoring reset, independent watchdog timer reset, watchdog timer reset, deep software standby reset, and software reset
Voltage detection circuit		When the voltage on VCC passes the voltage detection level (Vdet), an internal reset or internal interrupt is generated.

Table 1.3 List of Products (7/8)

Group	Part No.	Package	ROM Capacity	RAM Capacity	E2 Data Flash	Operating Frequency (Max.)	Operating Temp. Range
RX631 (D version)	R5F5631NDDFM	PLQP0064KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MCDFM	PLQP0064KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MDDFM	PLQP0064KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631PCDFL	PLQP0048KB-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631PDDFL	PLQP0048KB-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631NCDFL	PLQP0048KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631NDDFL	PLQP0048KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MCDFL	PLQP0048KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MDDFL	PLQP0048KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDLC	PTLG0177KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDLC	PTLG0177KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDLC	PTLG0177KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDBG	PLBG0176GA-A*1	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDBG	PLBG0176GA-A*1	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDBG	PLBG0176GA-A*1	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDFC	PLQP0176KB-A*1	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDFC	PLQP0176KB-A*1	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDFC	PLQP0176KB-A*1	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDLK	PTLG0145KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDLK	PTLG0145KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDLK	PTLG0145KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDFB	PLQP144KA-A*1	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDFB	PLQP144KA-A*1	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDFB	PLQP144KA-A*1	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631PFDLH	PTLG0064JA-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MFDLH	PTLG0064JA-A*1	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5S56310CDFC	PLQP0176KB-A	0 bytes	128 Kbytes	0 bytes	100 MHz	-40 to +85°C
RX631 (G version) *2	R5F5631FDGFC	PLQP0176KB-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631KDGFC	PLQP0176KB-A	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631EDGFC	PLQP0176KB-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631DDGFC	PLQP0176KB-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631YDGFC	PLQP0176KB-A	1 Mbyte	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631WDGFC	PLQP0176KB-A	1 Mbyte	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631BDGFC	PLQP0176KB-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631ADGFC	PLQP0176KB-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318SGFC	PLQP0176KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318DGFC	PLQP0176KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317SGFC	PLQP0176KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317DGFC	PLQP0176KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316SGFC	PLQP0176KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316DGFC	PLQP0176KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631FDGFB	PLQP0144KA-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631KDGFB	PLQP0144KA-A	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631EDGFB	PLQP0144KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631JDGFB	PLQP0144KA-A	1.5 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C

Table 1.4 Pin Functions (2/6)

Classifications	Pin Name	I/O	Description
Bus control	RD#	Output	Strobe signal which indicates that reading from the external bus interface space is in progress.
	WR#	Output	Strobe signal which indicates that writing to the external bus interface space is in progress, in 1-write strobe mode.
	WR0# to WR3#	Output	Strobe signals which indicate that either group of data bus pins (D7 to D0, D15 to D8, D23 to D16, and D31 to D24) is valid in writing to the external bus interface space, in byte strobe mode.
	BC0# to BC3#	Output	Strobe signals which indicate that either group of data bus pins (D7 to D0, D15 to D8, D23 to D16, and D31 to D24) is valid in access to the external bus interface space, in 1-write strobe mode.
	ALE	Output	Address latch signal when address/data multiplexed bus is selected.
	CKE	Output	Output pin for SDRAM clock enable signals.
	SDCS#	Output	Output pin for SDRAM chip select signals.
	RAS#	Output	Output pin for SDRAM row address strobe signals.
	CAS#	Output	Output pin for SDRAM column address strobe signals.
	WE#	Output	Output pin for SDRAM write enable signals.
	DQM0 to DQM3	Output	Output pins for SDRAM I/O data mask enable signals.
	CS0# to CS7#	Output	Select signals for CS area.
	WAIT#	Input	Input pins for wait request signals in access to the external space.
EXDMA controller	EDREQ0, EDREQ1		Input pins for external DMA transfer requests.
	EDACK0, EDACK1		Output pins for single address transfer acknowledge signals.
Interrupt	NMI	Input	Non-maskable interrupt request signal.
	IRQ0 to IRQ15	Input	Maskable interrupt request signals.
Multi-function timer pulse unit 2	MTIOC0A, MTIOC0B MTIOC0C, MTIOC0D	I/O	The TGRA0 to TGRD0 input capture input/output compare output/PWM output pins.
	MTIOC1A, MTIOC1B	I/O	The TGRA1 and TGRB1 input capture input/output compare output/PWM output pins.
	MTIOC2A, MTIOC2B	I/O	The TGRA2 and TGRB2 input capture input/output compare output/PWM output pins.
	MTIOC3A, MTIOC3B MTIOC3C, MTIOC3D	I/O	The TGRA3 to TGRD3 input capture input/output compare output/PWM output pins.
	MTIOC4A, MTIOC4B MTIOC4C, MTIOC4D	I/O	The TGRA4 to TGRD4 input capture input/output compare output/PWM output pins.
	MTIC5U, MTIC5V MTIC5W	Input	The TGRU5, TGRV5, and TGRW5 input capture input/dead time compensation input pins.
	MTCLKA, MTCLKB MTCLKC, MTCLKD	Input	Input pins for external clock signals.
Port output enable 2	POE0# to POE3# POE8#	Input	Input pins for request signals to place the MTU large-current pins in the high impedance state.

Table 1.4 Pin Functions (3/6)

Classifications	Pin Name	I/O	Description
16-bit timer pulse unit	TIOCA0, TIOCB0 TIOCC0, TIOCD0	I/O	The TGRA0 to TGRD0 input capture input/output compare output/PWM output pins.
	TIOCA1, TIOCB1	I/O	The TGRA1 and TGRB1 input capture input/output compare output/PWM output pins.
	TIOCA2, TIOCB2	I/O	The TGRA2 and TGRB2 input capture input/output compare output/PWM output pins.
	TIOCA3, TIOCB3 TIOCC3, TIOCD3	I/O	The TGRA3 to TGRD3 input capture input/output compare output/PWM output pins.
	TIOCA4, TIOCB4	I/O	The TGRA4 and TGRB4 input capture input/output compare output/PWM output pins.
	TIOCA5, TIOCB5	I/O	The TGRA5 and TGRB5 input capture input/output compare output/PWM output pins.
	TCLKA, TCLKB TCLKC, TCLKD	Input	Input pins for external clock signals.
	TIOCA6, TIOCB6 TIOCC6, TIOCD6	I/O	The TGRA6 to TGRD6 input capture input/output compare output/PWM output pins.
	TIOCA7, TIOCB7	I/O	The TGRA7 and TGRB7 input capture input/output compare output/PWM output pins.
	TIOCA8, TIOCB8	I/O	The TGRA8 and TGRB8 input capture input/output compare output/PWM output pins.
	TIOCA9, TIOCB9 TIOCC9, TIOCD9	I/O	The TGRA9 to TGRD9 input capture input/output compare output/PWM output pins.
	TIOCA10, TIOCB10	I/O	The TGRA10 and TGRB10 input capture input/output compare output/PWM output pins.
	TIOCA11, TIOCB11	I/O	The TGRA11 and TGRB11 input capture input/output compare output/PWM output pins.
	TCLKE, TCLKF TCLKG, TCLKH	Input	Input pins for external clock signals.
Programmable pulse generator	PO0 to PO31	Output	Output pins for the pulse signals.
8-bit timer	TMO0 to TMO3	Output	Output pins for the compare match signals.
	TMCI0 to TMCI3	Input	Input pins for the external clock signals that drive for the counters.
	TMRI0 to TMRI3	Input	Input pins for the counter-reset signals.
Serial communications interface (SC1c)	• Asynchronous mode/clock synchronous mode		
	SCK0 to SCK11	I/O	Input/output pins for clock signals.
	RXD0 to RXD11	Input	Input pins for data reception.
	TXD0 to TXD11	Output	Output pins for data transmission.
	CTS0# to CTS11#	Input	Transmit/receive start control input pins
	RTS0# to RTS11#	Output	Transmit/receive start control output pins
	• Simple I ² C mode		
	SSCL0 to SSCL11	I/O	Input/output pins for the I ² C clock
Serial communications interface (SC1c)	SSDA0 to SSDA11	I/O	Input/output pins for the I ² C data
	• Simple SPI mode		
	SCK0 to SCK11	I/O	Input/output pins for the clock
	SMISO0 to SMISO11	I/O	Input/output pins for slave transmit data.
	SMOSI0 to SMOSI11	I/O	Input/output pins for master transmit data.
	SS0# to SS11#	Input	Input pins for chip select signals

	A	B	C	D	E	F	G	H	J	K	L	M	N	
13	PE3	PE4	VSS	PE6	P67	PA2	PA4	PA7	PB1	PB5	VSS	VCC	P74	13
12	PE1	PE2	P70	PE5	P65	PA1	VCC	PB0	PB2	PB6	P73	PC1	P75	12
11	P62	P61	PE0	VCC	P66	VSS	PA6	P71	PB4	PB7	PC2	PC0	PC3	11
10	VSS	VCC	P63	PE7	PA0	PA3	PA5	P72	PB3	P76	PC4	P77	P82	10
9	PD6	PD4	PD7	P64	RX63N Group RX631 Group PTLG0145KA-A (145-pin TFLGA) (Top perspective view)					P80	PC5	P81	PC7	9
8	PD2	PD0	PD3	P60						VCC	P83	PC6	VSS	8
7	P92	P91	PD1	PD5						P51	P52	P50	P55	7
6	P90	P47	VSS	P93						P53	P56	VSS_ USB	USB0_ DP	6
5	P45	P43	P46	VCC	P44					P54	P13	VCC_ USB	USB0_ DM	5
4	P42	VREFL0	P41	P01	EMLE	VBATT	BSCANP	P35	P30	P15	P24	P12	P14	4
3	P40	P05	VREFH0	P03	PJ5	PJ3	MD/ FINED	VSS	P32	P31	P16	P86	P87	3
2	P07	AVCC0	P02	PF5	VCL	XCOUT	RES#	VCC	P33	P26	P23	P17	P20	2
1	AVSS0	VREFH	VREFL	P00	VSS	XCIN	XTAL	EXTAL	P34	P27	P25	P22	P21	1
	A	B	C	D	E	F	G	H	J	K	L	M	N	

Note: This figure indicates the power supply pins and I/O port pins. For the pin configuration, see Table 1.7, List of Pins and Pin Functions (145-Pin TFLGA).

Figure 1.6 Pin Assignment (145-Pin TFLGA)

Table 1.7 List of Pins and Pin Functions (145-Pin TFLGA) (2/5)

Pin No. 145-pin TFLGA	Power Supply Clock System Control	I/O Port	Bus EXDMAC SDRAMC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SC1c, SC1d, RSPI, RIIC, CAN, IEB, USB, and PDC)	Interrupt	S12AD AD DA
D5	VCC						
D6		P93	A19		CTS7#/RTS7#/SS7#		AN017
D7		PD5	D5[A5/D5]	MTIC5W/POE2#	SSLC1	IRQ5	AN013
D8		P60	CS0#				
D9		P64	CS4#/WE#				
D10		PE7	D15[A15/D15]	TIOCB11	MISOB	IRQ7	AN5
D11	VCC						
D12		PE5	D13[A13/D13]	MTIOC4C/MTIOC2B/ TIOCB10	RSPCKB/ET_RX_CLK/ REF50CK	IRQ5	AN3
D13		PE6	D14[A14/D14]	TIOCA11	MOSIB	IRQ6	AN4
E1	VSS						
E2	VCL						
E3		PJ5					
E4	EMLE						
E5		P44				IRQ12-DS	AN004
E10		PA0	A0/BC0#	MTIOC4A/TIOCA0/ PO16	SSLA1/ET_TX_EN/ RMII_TXD_EN		
E11		P66	CS6#/DQM0		CTX2*2		
E12		P65	CS5#/CKE				
E13		P67	CS7#/DQM1		CRX2*2	IRQ15	
F1	XCIN						
F2	XCOUT						
F3		PJ3		MTIOC3C	CTS6#/RTS6#/CTS0#/ RTS0#/SS6#/SS0#		
F4	VBATT						
F10		PA3	A3	MTIOC0D/MTCLKD/ TIOC0D/TCLKB/PO19	RXD5/SMISO5/SSCL5/ ET_MDIO	IRQ6-DS	
F11	VSS						
F12		PA1	A1	MTIOC0B/MTCLKC/ TIOCB0/PO17	SCK5/SSLA2/ET_WOL	IRQ11	
F13		PA2	A2	PO18	RXD5/SMISO5/SSCL5/ SSLA3		
G1	XTAL	P37					
G2	RES#						
G3	MD/FINED						
G4	BSCANP						
G10		PA5	A5	TIOCB1/PO21	RSPCKA/ET_LINKSTA		
G11		PA6	A6	MTIC5V/MTCLKB/ TIOCA2/TMCI3/PO22/ POE2#	CTS5#/RTS5#/SS5# MOSIA/ET_EXOUT		
G12	VCC						
G13		PA4	A4	MTIC5U/MTCLKA/ TIOCA1/TMRI0/PO20	TXD5/SMOSI5/SSDA5/ SSLA0/ET_MDC	IRQ5-DS	
H1	EXTAL	P36					
H2	VCC						
H3	VSS						
H4		P35				NMI	
H10		P72	CS2#		ET_MDC		
H11		P71	CS1#		ET_MDIO		

Table 1.8 List of Pins and Pin Functions (144-Pin LQFP) (3/5)

Pin No. 144-pin LQFP	Power Supply Clock System Control	I/O Port	Bus EXDMAC SDRAMC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SC1c, SC1d, RSPI, RIIC, CAN, IEB, USB, and PDC)	Interrupt	S12AD AD DA
64	TRDATA1	P81	EDACK0	MTIOC3D/PO27	RXD10/SMISO10/ SSCL10/ET_ETXD0/ RMII_TXD0		
65	TRDATA0	P80	EDREQ0	MTIOC3B/PO26	SCK10/ET_TX_EN/ RMII_TXD_EN		
66		PC4	A20/CS3#	MTIOC3D/MTCLKC/ TIOCC6/TCLKE/ TMC11/PO25/POE0#	SCK5/CTS8#/RTS8#/ SS8#/SSLA0/ ET_TX_CLK		
67		PC3	A19	MTIOC4D/TCLKB/ PO24	TXD5/SMOSI5/SSDA5/ IETXD/ET_TX_ER		
68		P77	CS7#	PO23	TXD11/SMOSI11/ SSDA11/ET_RX_ER/ RMII_RX_ER		
69		P76	CS6#	PO22	RXD11/SMISO11/ SSCL11/ET_RX_CLK/ REF50CK		
70		PC2	A18	MTIOC4B/TCLKA/ PO21	RXD5/SMISO5/SSCL5/ SSLA3/IERXD/ ET_RX_DV		
71		P75	CS5#	PO20	SCK11/ET_ERXD0/ RMII_RXD0		
72		P74	CS4#	PO19	CTS11#/RTS11#/ SS11#/ET_ERXD1/ RMII_RXD1		
73		PC1	A17	MTIOC3A/TCLKD/ PO18	SCK5/SSLA2/SDA3/ ET_ERXD2	IRQ12	
74	VCC						
75		PC0	A16	MTIOC3C/TCLKC/ PO17	CTS5#/RTS5#/SS5#/ SSLA1/SCL3/ ET_ERXD3	IRQ14	
76	VSS						
77		P73	CS3#	PO16	ET_WOL		
78		PB7	A15	MTIOC3B/TIOCB5/ PO31	TXD9/SMOSI9/SSDA9/ ET_CRS/ RMII_CRS_DV		
79		PB6	A14	MTIOC3D/TIOCA5/ PO30	RXD9/SMISO9/SSCL9/ ET_ETXD1/RMII_TXD1		
80		PB5	A13	MTIOC2A/MTIOC1B/ TIOCB4/TMRI1/PO29/ POE1#	SCK9/ET_ETXD0/ RMII_TXD0		
81		PB4	A12	TIOCA4/PO28	CTS9#/RTS9#/SS9#/ ET_TX_EN/ RMII_TXD_EN		
82		PB3	A11	MTIOC0A/MTIOC4A/ TIOCD3/TCLKD/TMO0/ PO27/POE3#	SCK4/SCK6/ ET_RX_ER/ RMII_RX_ER		
83		PB2	A10	TIOCC3/TCLKC/PO26	CTS4#/RTS4#/CTS6#/ RTS6#/SS4#/SS6#/ ET_RX_CLK/REF50CK		
84		PB1	A9	MTIOC0C/MTIOC4C/ TIOCB3/TMC10/PO25	TXD4/TXD6/SMOSI4/ SMOSI6/SSDA4/ SSDA6/ET_ERXD0/ RMII_RXD0	IRQ4-DS	
85		P72	CS2#		ET_MDC		
86		P71	CS1#		ET_MDIO		
87		PB0	A8	MTIC5W/TIOCA3/ PO24	RXD4/RXD6/SMISO4/ SMISO6/SSCL4/ SSCL6/RSPCKA/ T_ERXD1/RMII_RXD1	IRQ12	
88		PA7	A7	TIOCB2/PO23	MISOA/ET_WOL		

Table 1.8 List of Pins and Pin Functions (144-Pin LQFP) (4/5)

Pin No. 144-pin LQFP	Power Supply Clock System Control	I/O Port	Bus EXDMAC SDRAMC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SCIC, SCID, RSPI, RIIC, CAN, IEB, USB, and PDC)	Interrupt	S12AD AD DA
89		PA6	A6	MTIC5V/MTCLKB/ TIOCA2/TMC13/PO22/ POE2#	CTS5#/RTS5#/SS5# MOSIA/ET_EXOUT		
90		PA5	A5	TIOCB1/PO21	RSPCKA/ET_LINKSTA		
91	VCC						
92		PA4	A4	MTIC5U/MTCLKA/ TIOCA1/TMRI0/PO20	TXD5/SMOSI5/SSDA5/ SSLA0/ET_MDC	IRQ5-DS	
93	VSS						
94		PA3	A3	MTIOC0D/MTCLKD/ TIOC0D/TCLKB/PO19	RXD5/SMISO5/SSCL5/ ET_MDIO	IRQ6-DS	
95		PA2	A2	PO18	RXD5/SMISO5/SSCL5/ SSLA3		
96		PA1	A1	MTIOC0B/MTCLKC/ TIOCB0/PO17	SCK5/SSLA2/ET_WOL	IRQ11	
97		PA0	A0/BC0#	MTIOC4A/TIOCA0/ PO16	SSLA1/ET_TX_EN/ RMII_TXD_EN		
98		P67	CS7#/DQM1		CRX2*2	IRQ15	
99		P66	CS6#/DQM0		CTX2*2		
100		P65	CS5#/CKE				
101		PE7	D15[A15/D15]	TIOCB11	MISOB	IRQ7	AN5
102		PE6	D14[A14/D14]	TIOCA11	MOSIB	IRQ6	AN4
103	VCC						
104	SDCLK	P70					
105	VSS						
106		PE5	D13[A13/D13]	MTIOC4C/MTIOC2B/ TIOCB10	RSPCKB/ET_RX_CLK/ REF50CK	IRQ5	AN3
107		PE4	D12[A12/D12]	MTIOC4D/MTIOC1A/ TIOCA10/PO28	SSLB0/ET_ERXD2		AN2
108		PE3	D11[A11/D11]	MTIOC4B/TIOCB9/ PO26/POE8#	CTS12#/RTS12#/ SS12#/MISOB/ ET_ERXD3		AN1
109		PE2	D10[A10/D10]	MTIOC4A/TIOCA9/ PO23	RXD12/SMISO12/ SSCL12/RXD12/ SSLB3/MOSIB	IRQ7-DS	AN0
110		PE1	D9[A9/D9]	MTIOC4C/TIOC09/ PO18	TXD12/SMOSI12/ SSDA12/TXD12/ SIOX12/SSLB2/ RSPCKB		ANEX1
111		PE0	D8[A8/D8]	TIOCC9	SCK12/SSLB1		ANEX0
112		P64	CS4#/WE#				
113		P63	CS3#/CAS#				
114		P62	CS2#/RAS#				
115		P61	CS1#/SDCS#				
116	VSS						
117		P60	CS0#				
118	VCC						
119		PD7	D7[A7/D7]	MTIC5U/POE0#	SSLC3	IRQ7	AN7
120		PD6	D6[A6/D6]	MTIC5V/POE1#	SSLC2	IRQ6	AN6
121		PD5	D5[A5/D5]	MTIC5W/POE2#	SSLC1	IRQ5	AN013
122		PD4	D4[A4/D4]	POE3#	SSLC0	IRQ4	AN012
123		PD3	D3[A3/D3]	TIOCB8/TCLKH/ POE8#	RSPCKC	IRQ3	AN011
124		PD2	D2[A2/D2]	MTIOC4D/TIOCA8	MISOC/CRX0	IRQ2	AN010

Table 1.8 List of Pins and Pin Functions (144-Pin LQFP) (5/5)

Pin No. 144-pin LQFP	Power Supply Clock System Control	I/O Port	Bus EXDMAC SDRAMC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SC1c, SC1d, RSPI, RIIC, CAN, IEB, USB, and PDC)	Interrupt	S12AD AD DA
125		PD1	D1[A1/D1]	MTIOC4B/TIOCB7/ TCLKG	MOSIC/CTX0	IRQ1	AN009
126		PD0	D0[A0/D0]	TIOCA7		IRQ0	AN008
127		P93	A19		CTS7#/RTS7#/SS7#		AN017
128		P92	A18		RXD7/SMISO7/SSCL7		AN016
129		P91	A17		SCK7		AN015
130	VSS						
131		P90	A16		TXD7/SMOSI7/SSDA7		AN014
132	VCC						
133		P47				IRQ15-DS	AN007
134		P46				IRQ14-DS	AN006
135		P45				IRQ13-DS	AN005
136		P44				IRQ12-DS	AN004
137		P43				IRQ11-DS	AN003
138		P42				IRQ10-DS	AN002
139		P41				IRQ9-DS	AN001
140	VREFL0						
141		P40				IRQ8-DS	AN000
142	VREFH0						
143	AVCC0						
144		P07				IRQ15	ADTRG0#

Note 1. The BCLK function is multiplexed with the I/O port function for pin P53, so the port function is not available if the external bus is enabled.

Note 2. Enabled only for the ROM capacity: 2 Mbytes/1.5 Mbytes

2.1 General-Purpose Registers (R0 to R15)

This CPU has sixteen general-purpose registers (R0 to R15). R1 to R15 can be used as data registers or address registers. R0, a general-purpose register, also functions as the stack pointer (SP).

The stack pointer is switched to operate as the interrupt stack pointer (ISP) or user stack pointer (USP) by the value of the stack pointer select bit (U) in the processor status word (PSW).

2.2 Control Registers

(1) Interrupt Stack Pointer (ISP)/User Stack Pointer (USP)

The stack pointer (SP) can be either of two types, the interrupt stack pointer (ISP) or the user stack pointer (USP). Whether the stack pointer operates as the ISP or USP depends on the value of the stack pointer select bit (U) in the processor status word (PSW).

Set the ISP or USP to a multiple of four, as this reduces the numbers of cycles required to execute interrupt sequences and instructions entailing stack manipulation.

(2) Interrupt Table Register (INTB)

The interrupt table register (INTB) specifies the address where the relocatable vector table starts.

(3) Program Counter (PC)

The program counter (PC) indicates the address of the instruction being executed.

(4) Processor Status Word (PSW)

The processor status word (PSW) indicates the results of instruction execution or the state of the CPU.

(5) Backup PC (BPC)

The backup PC (BPC) is provided to speed up response to interrupts.

After a fast interrupt has been generated, the contents of the program counter (PC) are saved in the BPC register.

(6) Backup PSW (BPSW)

The backup PSW (BPSW) is provided to speed up response to interrupts.

After a fast interrupt has been generated, the contents of the processor status word (PSW) are saved in the BPSW. The allocation of bits in the BPSW corresponds to that in the PSW.

(7) Fast Interrupt Vector Register (FINTV)

The fast interrupt vector register (FINTV) is provided to speed up response to interrupts.

The FINTV register specifies a branch destination address when a fast interrupt has been generated.

(8) Floating-Point Status Word (FPSW)

The floating-point status word (FPSW) indicates the results of floating-point operations.

When an exception handling enable bit (Ej) enables the exception handling (Ej = 1), the exception cause can be identified by checking the corresponding Cj flag in the exception handling routine. If the exception handling is masked (Ej = 0), the occurrence of exception can be checked by reading the Fj flag at the end of a series of processing. Once the Fj flag has been set to 1, this value is retained until it is cleared to 0 by software (j = X, U, Z, O, or V).

Table 4.1 List of I/O Registers (Address Order) (10/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 719Ch	ICU	DTC activation enable register 156	DTCER156	8	8	2	ICLK	ICUb
0008 719Dh	ICU	DTC activation enable register 157	DTCER157	8	8	2	ICLK	
0008 719Eh	ICU	DTC activation enable register 158	DTCER158	8	8	2	ICLK	
0008 719Fh	ICU	DTC activation enable register 159	DTCER159	8	8	2	ICLK	
0008 71A0h	ICU	DTC activation enable register 160	DTCER160	8	8	2	ICLK	
0008 71A1h	ICU	DTC activation enable register 161	DTCER161	8	8	2	ICLK	
0008 71A2h	ICU	DTC activation enable register 162	DTCER162	8	8	2	ICLK	
0008 71A3h	ICU	DTC activation enable register 163	DTCER163	8	8	2	ICLK	
0008 71A4h	ICU	DTC activation enable register 164	DTCER164	8	8	2	ICLK	
0008 71A5h	ICU	DTC activation enable register 165	DTCER165	8	8	2	ICLK	
0008 71AAh	ICU	DTC activation enable register 170	DTCER170	8	8	2	ICLK	
0008 71ABh	ICU	DTC activation enable register 171	DTCER171	8	8	2	ICLK	
0008 71ADh	ICU	DTC activation enable register 173	DTCER173	8	8	2	ICLK	
0008 71AEh	ICU	DTC activation enable register 174	DTCER174	8	8	2	ICLK	
0008 71B0h	ICU	DTC activation enable register 176	DTCER176	8	8	2	ICLK	
0008 71B1h	ICU	DTC activation enable register 177	DTCER177	8	8	2	ICLK	
0008 71B3h	ICU	DTC activation enable register 179	DTCER179	8	8	2	ICLK	
0008 71B4h	ICU	DTC activation enable register 180	DTCER180	8	8	2	ICLK	
0008 71B7h	ICU	DTC activation enable register 183	DTCER183	8	8	2	ICLK	
0008 71B8h	ICU	DTC activation enable register 184	DTCER184	8	8	2	ICLK	
0008 71BBh	ICU	DTC activation enable register 187	DTCER187	8	8	2	ICLK	
0008 71BCh	ICU	DTC activation enable register 188	DTCER188	8	8	2	ICLK	
0008 71BFh	ICU	DTC activation enable register 191	DTCER191	8	8	2	ICLK	
0008 71C0h	ICU	DTC activation enable register 192	DTCER192	8	8	2	ICLK	
0008 71C3h	ICU	DTC activation enable register 195	DTCER195	8	8	2	ICLK	
0008 71C4h	ICU	DTC activation enable register 196	DTCER196	8	8	2	ICLK	
0008 71C6h	ICU	DTC activation enable register 198	DTCER198	8	8	2	ICLK	
0008 71C7h	ICU	DTC activation enable register 199	DTCER199	8	8	2	ICLK	
0008 71C8h	ICU	DTC activation enable register 200	DTCER200	8	8	2	ICLK	
0008 71C9h	ICU	DTC activation enable register 201	DTCER201	8	8	2	ICLK	
0008 71CAh	ICU	DTC activation enable register 202	DTCER202	8	8	2	ICLK	
0008 71CBh	ICU	DTC activation enable register 203	DTCER203	8	8	2	ICLK	
0008 71CEh	ICU	DTC activation enable register 206	DTCER206	8	8	2	ICLK	
0008 71CFh	ICU	DTC activation enable register 207	DTCER207	8	8	2	ICLK	
0008 71D0h	ICU	DTC activation enable register 208	DTCER208	8	8	2	ICLK	
0008 71D6h	ICU	DTC activation enable register 214	DTCER214	8	8	2	ICLK	
0008 71D7h	ICU	DTC activation enable register 215	DTCER215	8	8	2	ICLK	
0008 71D9h	ICU	DTC activation enable register 217	DTCER217	8	8	2	ICLK	
0008 71DAh	ICU	DTC activation enable register 218	DTCER218	8	8	2	ICLK	
0008 71DCh	ICU	DTC activation enable register 220	DTCER220	8	8	2	ICLK	
0008 71DDh	ICU	DTC activation enable register 221	DTCER221	8	8	2	ICLK	
0008 71DFh	ICU	DTC activation enable register 223	DTCER223	8	8	2	ICLK	
0008 71E0h	ICU	DTC activation enable register 224	DTCER224	8	8	2	ICLK	
0008 71E2h	ICU	DTC activation enable register 226	DTCER226	8	8	2	ICLK	
0008 71E3h	ICU	DTC activation enable register 227	DTCER227	8	8	2	ICLK	
0008 71E5h	ICU	DTC activation enable register 229	DTCER229	8	8	2	ICLK	
0008 71E6h	ICU	DTC activation enable register 230	DTCER230	8	8	2	ICLK	
0008 71E8h	ICU	DTC activation enable register 232	DTCER232	8	8	2	ICLK	
0008 71E9h	ICU	DTC activation enable register 233	DTCER233	8	8	2	ICLK	
0008 71EBh	ICU	DTC activation enable register 235	DTCER235	8	8	2	ICLK	
0008 71ECh	ICU	DTC activation enable register 236	DTCER236	8	8	2	ICLK	

Table 4.1 List of I/O Registers (Address Order) (11/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 71EEh	ICU	DTC activation enable register 238	DTCER238	8	8	2	ICLK	ICUb
0008 71EFh	ICU	DTC activation enable register 239	DTCER239	8	8	2	ICLK	
0008 71F1h	ICU	DTC activation enable register 241	DTCER241	8	8	2	ICLK	
0008 71F2h	ICU	DTC activation enable register 242	DTCER242	8	8	2	ICLK	
0008 71F4h	ICU	DTC activation enable register 244	DTCER244	8	8	2	ICLK	
0008 71F5h	ICU	DTC activation enable register 245	DTCER245	8	8	2	ICLK	
0008 71F7h	ICU	DTC activation enable register 247	DTCER247	8	8	2	ICLK	
0008 71F8h	ICU	DTC activation enable register 248	DTCER248	8	8	2	ICLK	
0008 71FAh	ICU	DTC activation enable register 250	DTCER250	8	8	2	ICLK	
0008 71FBh	ICU	DTC activation enable register 251	DTCER251	8	8	2	ICLK	
0008 7202h	ICU	Interrupt request enable register 02	IER02	8	8	2	ICLK	
0008 7203h	ICU	Interrupt request enable register 03	IER03	8	8	2	ICLK	
0008 7204h	ICU	Interrupt request enable register 04	IER04	8	8	2	ICLK	
0008 7205h	ICU	Interrupt request enable register 05	IER05	8	8	2	ICLK	
0008 7206h	ICU	Interrupt request enable register 06	IER06	8	8	2	ICLK	
0008 7207h	ICU	Interrupt request enable register 07	IER07	8	8	2	ICLK	
0008 7208h	ICU	Interrupt request enable register 08	IER08	8	8	2	ICLK	
0008 7209h	ICU	Interrupt request enable register 09	IER09	8	8	2	ICLK	
0008 720Bh	ICU	Interrupt request enable register 0B	IER0B	8	8	2	ICLK	
0008 720Ch	ICU	Interrupt request enable register 0C	IER0C	8	8	2	ICLK	
0008 720Dh	ICU	Interrupt request enable register 0D	IER0D	8	8	2	ICLK	
0008 720Eh	ICU	Interrupt request enable register 0E	IER0E	8	8	2	ICLK	
0008 720Fh	ICU	Interrupt request enable register 0F	IER0F	8	8	2	ICLK	
0008 7210h	ICU	Interrupt request enable register 10	IER10	8	8	2	ICLK	ICUb
0008 7211h	ICU	Interrupt request enable register 11	IER11	8	8	2	ICLK	
0008 7212h	ICU	Interrupt request enable register 12	IER12	8	8	2	ICLK	
0008 7213h	ICU	Interrupt request enable register 13	IER13	8	8	2	ICLK	
0008 7214h	ICU	Interrupt request enable register 14	IER14	8	8	2	ICLK	
0008 7215h	ICU	Interrupt request enable register 15	IER15	8	8	2	ICLK	
0008 7216h	ICU	Interrupt request enable register 16	IER16	8	8	2	ICLK	
0008 7217h	ICU	Interrupt request enable register 17	IER17	8	8	2	ICLK	
0008 7218h	ICU	Interrupt request enable register 18	IER18	8	8	2	ICLK	
0008 7219h	ICU	Interrupt request enable register 19	IER19	8	8	2	ICLK	
0008 721Ah	ICU	Interrupt request enable register 1A	IER1A	8	8	2	ICLK	
0008 721Bh	ICU	Interrupt request enable register 1B	IER1B	8	8	2	ICLK	
0008 721Ch	ICU	Interrupt request enable register 1C	IER1C	8	8	2	ICLK	
0008 721Dh	ICU	Interrupt request enable register 1D	IER1D	8	8	2	ICLK	
0008 721Eh	ICU	Interrupt request enable register 1E	IER1E	8	8	2	ICLK	
0008 721Fh	ICU	Interrupt request enable register 1F	IER1F	8	8	2	ICLK	
0008 72E0h	ICU	Software interrupt activation register	SWINTR	8	8	2	ICLK	
0008 72F0h	ICU	Fast interrupt set register	FIR	16	16	2	ICLK	
0008 7300h	ICU	Interrupt source priority register 000	IPR000	8	8	2	ICLK	ICUb
0008 7301h	ICU	Interrupt source priority register 001	IPR001	8	8	2	ICLK	
0008 7302h	ICU	Interrupt source priority register 002	IPR002	8	8	2	ICLK	
0008 7303h	ICU	Interrupt source priority register 003	IPR003	8	8	2	ICLK	
0008 7304h	ICU	Interrupt source priority register 004	IPR004	8	8	2	ICLK	
0008 7305h	ICU	Interrupt source priority register 005	IPR005	8	8	2	ICLK	
0008 7306h	ICU	Interrupt source priority register 006	IPR006	8	8	2	ICLK	
0008 7307h	ICU	Interrupt source priority register 007	IPR007	8	8	2	ICLK	
0008 7320h	ICU	Interrupt source priority register 032	IPR032	8	8	2	ICLK	
0008 7321h	ICU	Interrupt source priority register 033	IPR033	8	8	2	ICLK	

Table 4.1 List of I/O Registers (Address Order) (19/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 8313h	RIIC0	I ² C bus receive data register	ICDRR	8	8	2, 3 PCLKB	2 ICLK	RIIC
0008 8320h	RIIC1	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8321h	RIIC1	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8322h	RIIC1	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8323h	RIIC1	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8324h	RIIC1	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8325h	RIIC1	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8326h	RIIC1	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8327h	RIIC1	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8328h	RIIC1	I ² C bus status register 1	ICSR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8329h	RIIC1	I ² C bus status register 2	ICSR2	8	8	2, 3 PCLKB	2 ICLK	
0008 832Ah	RIIC1	Slave address register L0	SARL0	8	8	2, 3 PCLKB	2 ICLK	
0008 832Ah	RIIC1	Timeout Internal Counter L	TMOCNTL	8	8	2, 3 PCLKB	2 ICLK	
0008 832Bh	RIIC1	Slave address register U0	SARU0	8	8	2, 3 PCLKB	2 ICLK	
0008 832Bh	RIIC1	Timeout Internal Counter U	TMOCNTU	8	8	2, 3 PCLKB	2 ICLK	
0008 832Ch	RIIC1	Slave address register L1	SARL1	8	8	2, 3 PCLKB	2 ICLK	
0008 832Dh	RIIC1	Slave address register U1	SARU1	8	8	2, 3 PCLKB	2 ICLK	
0008 832Eh	RIIC1	Slave address register L2	SARL2	8	8	2, 3 PCLKB	2 ICLK	
0008 832Fh	RIIC1	Slave address register U2	SARU2	8	8	2, 3 PCLKB	2 ICLK	
0008 8330h	RIIC1	I ² C bus bit rate low-level register	ICBRL	8	8	2, 3 PCLKB	2 ICLK	
0008 8331h	RIIC1	I ² C bus bit rate high-level register	ICBRH	8	8	2, 3 PCLKB	2 ICLK	
0008 8332h	RIIC1	I ² C bus transmit data register	ICDRT	8	8	2, 3 PCLKB	2 ICLK	
0008 8333h	RIIC1	I ² C bus receive data register	ICDRR	8	8	2, 3 PCLKB	2 ICLK	
0008 8340h	RIIC2	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8341h	RIIC2	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8342h	RIIC2	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8343h	RIIC2	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8344h	RIIC2	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8345h	RIIC2	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8346h	RIIC2	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8347h	RIIC2	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8348h	RIIC2	I ² C bus status register 1	ICSR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8349h	RIIC2	I ² C bus status register 2	ICSR2	8	8	2, 3 PCLKB	2 ICLK	
0008 834Ah	RIIC2	Slave address register L0	SARL0	8	8	2, 3 PCLKB	2 ICLK	
0008 834Bh	RIIC2	Slave address register U0	SARU0	8	8	2, 3 PCLKB	2 ICLK	
0008 834Ch	RIIC2	Slave address register L1	SARL1	8	8	2, 3 PCLKB	2 ICLK	
0008 834Dh	RIIC2	Slave address register U1	SARU1	8	8	2, 3 PCLKB	2 ICLK	
0008 834Eh	RIIC2	Slave address register L2	SARL2	8	8	2, 3 PCLKB	2 ICLK	
0008 834Fh	RIIC2	Slave address register U2	SARU2	8	8	2, 3 PCLKB	2 ICLK	
0008 8350h	RIIC2	I ² C bus bit rate low-level register	ICBRL	8	8	2, 3 PCLKB	2 ICLK	
0008 8351h	RIIC2	I ² C bus bit rate high-level register	ICBRH	8	8	2, 3 PCLKB	2 ICLK	
0008 8352h	RIIC2	I ² C bus transmit data register	ICDRT	8	8	2, 3 PCLKB	2 ICLK	
0008 8353h	RIIC2	I ² C bus receive data register	ICDRR	8	8	2, 3 PCLKB	2 ICLK	
0008 8360h	RIIC3	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8361h	RIIC3	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8362h	RIIC3	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8363h	RIIC3	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8364h	RIIC3	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8365h	RIIC3	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8366h	RIIC3	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8367h	RIIC3	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (22/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 862Ah	MTU4	Timer general register D	TGRD	16	16	2, 3 PCLKB	2 ICLK	MTU2a
0008 862Ch	MTU3	Timer status register	TSR	8	8	2, 3 PCLKB	2 ICLK	
0008 862Dh	MTU4	Timer status register	TSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8630h	MTU	Timer interrupt skipping set register	TITCR	8	8	2, 3 PCLKB	2 ICLK	
0008 8631h	MTU	Timer interrupt skipping counter	TITCNT	8	8	2, 3 PCLKB	2 ICLK	
0008 8632h	MTU	Timer buffer transfer set register	TBTER	8	8	2, 3 PCLKB	2 ICLK	
0008 8634h	MTU	Timer dead time enable register	TDER	8	8	2, 3 PCLKB	2 ICLK	
0008 8636h	MTU	Timer output level buffer register	TOLBR	8	8	2, 3 PCLKB	2 ICLK	
0008 8638h	MTU3	Timer buffer operation transfer mode register	TBTM	8	8	2, 3 PCLKB	2 ICLK	
0008 8639h	MTU4	Timer buffer operation transfer mode register	TBTM	8	8	2, 3 PCLKB	2 ICLK	
0008 8640h	MTU4	Timer A/D converter start request control register	TADCR	16	16	2, 3 PCLKB	2 ICLK	
0008 8644h	MTU4	Timer A/D converter start request cycle set register A	TADCORA	16	16	2, 3 PCLKB	2 ICLK	
0008 8646h	MTU4	Timer A/D converter start request cycle set register B	TADCORB	16	16	2, 3 PCLKB	2 ICLK	
0008 8648h	MTU4	Timer A/D converter start request cycle set buffer register A	TADCOBRA	16	16	2, 3 PCLKB	2 ICLK	
0008 864Ah	MTU4	Timer A/D converter start request cycle set buffer register B	TADCOBRB	16	16	2, 3 PCLKB	2 ICLK	
0008 8660h	MTU	Timer waveform control register	TWCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8680h	MTU	Timer start register	TSTR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8681h	MTU	Timer synchronous register	TSYR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8684h	MTU	Timer read/write enable register	TRWER	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8690h	MTU0	Noise filter control register	NFCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8691h	MTU1	Noise filter control register	NFCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8692h	MTU2	Noise filter control register	NFCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8693h	MTU3	Noise filter control register	NFCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8694h	MTU4	Noise filter control register	NFCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8695h	MTU5	Noise filter control register	NFCR	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 8700h	MTU0	Timer control register	TCR	8	8	2, 3 PCLKB	2 ICLK	
0008 8701h	MTU0	Timer mode register	TMDR	8	8	2, 3 PCLKB	2 ICLK	
0008 8702h	MTU0	Timer I/O control register H	TIORH	8	8	2, 3 PCLKB	2 ICLK	
0008 8703h	MTU0	Timer I/O control register L	TIORL	8	8	2, 3 PCLKB	2 ICLK	
0008 8704h	MTU0	Timer interrupt enable register	TIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8705h	MTU0	Timer status register	TSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8706h	MTU0	Timer counter	TCNT	16	16	2, 3 PCLKB	2 ICLK	
0008 8708h	MTU0	Timer general register A	TGRA	16	16	2, 3 PCLKB	2 ICLK	
0008 870Ah	MTU0	Timer general register B	TGRB	16	16	2, 3 PCLKB	2 ICLK	
0008 870Ch	MTU0	Timer general register C	TGRC	16	16	2, 3 PCLKB	2 ICLK	
0008 870Eh	MTU0	Timer general register D	TGRD	16	16	2, 3 PCLKB	2 ICLK	
0008 8720h	MTU0	Timer general register E	TGRE	16	16	2, 3 PCLKB	2 ICLK	
0008 8722h	MTU0	Timer general register F	TGRF	16	16	2, 3 PCLKB	2 ICLK	
0008 8724h	MTU0	Timer interrupt enable register2	TIER2	8	8	2, 3 PCLKB	2 ICLK	
0008 8726h	MTU0	Timer buffer operation transfer mode register	TBTM	8	8	2, 3 PCLKB	2 ICLK	
0008 8780h	MTU1	Timer control register	TCR	8	8	2, 3 PCLKB	2 ICLK	
0008 8781h	MTU1	Timer mode register	TMDR	8	8	2, 3 PCLKB	2 ICLK	
0008 8782h	MTU1	Timer I/O control register	TIOR	8	8	2, 3 PCLKB	2 ICLK	
0008 8784h	MTU1	Timer interrupt enable register	TIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8785h	MTU1	Timer status register	TSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8786h	MTU1	Timer counter	TCNT	16	16	2, 3 PCLKB	2 ICLK	
0008 8788h	MTU1	Timer general register A	TGRA	16	16	2, 3 PCLKB	2 ICLK	
0008 878Ah	MTU1	Timer general register B	TGRB	16	16	2, 3 PCLKB	2 ICLK	
0008 8790h	MTU1	Timer input capture control register	TICCR	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (31/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 C095h	PORTA	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	I/O Ports
0008 C096h	PORTB	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C097h	PORTB	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C098h	PORTC	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C099h	PORTC	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C09Ah	PORTD	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C09Bh	PORTD	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C09Ch	PORTE	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C09Dh	PORTE	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C09Eh	PORTF	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C09Fh	PORTF	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C0A0h	PORTG	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C0A1h	PORTG	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C0A4h	PORTJ	Open drain control register 0	ODR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C0A5h	PORTJ	Open drain control register 1	ODR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C0C0h	PORT0	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C1h	PORT1	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C2h	PORT2	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C3h	PORT3	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C4h	PORT4	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C5h	PORT5	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C6h	PORT6	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C7h	PORT7	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C8h	PORT8	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0C9h	PORT9	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0CAh	PORTA	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0CBh	PORTB	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0CCh	PORTC	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0CDh	PORTD	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0CEh	PORTE	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0CFh	PORTF	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0D0h	PORTG	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0D2h	PORTJ	Pull-up control register	PCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0E0h	PORT0	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0E2h	PORT2	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0E5h	PORT5	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0E9h	PORT9	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0EAh	PORTA	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	MPC
0008 C0EBh	PORTB	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0ECh	PORTC	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0EDh	PORTD	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0EEh	PORTE	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C0F0h	PORTG	Drive ability control register	DSCR	8	8	2, 3 PCLKB	2 ICLK	
0008 C100h	MPC	CS output enable register	PFCSE	8	8	2, 3 PCLKB	2 ICLK	
0008 C102h	MPC	CS output pin select register 0	PFCSS0	8	8	2, 3 PCLKB	2 ICLK	
0008 C103h	MPC	CS output pin select register 1	PFCSS1	8	8	2, 3 PCLKB	2 ICLK	
0008 C104h	MPC	Address output enable register 0	PFAOE0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C105h	MPC	Address output enable register 1	PFAOE1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C106h	MPC	External bus control register 0	PFBCR0	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C107h	MPC	External bus control register 1	PFBCR1	8	8, 16	2, 3 PCLKB	2 ICLK	
0008 C10Eh	MPC	Ethernet control register 1	PFENET	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (32/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 C114h	MPC	USB0 control register	PFUSB0	8	8	2, 3 PCLKB	2 ICLK	MPC
0008 C115h	MPC	USB1 control register	PFUSB1	8	8	2, 3 PCLKB	2 ICLK	
0008 C11Fh	MPC	Write-protect register	PWPR	8	8	2, 3 PCLKB	2 ICLK	
0008 C120h	PORT	Port switching register B	PSRB	8	8	2, 3 PCLKB	2 ICLK	I/O Ports
0008 C121h	PORT	Port switching register A	PSRA	8	8	2, 3 PCLKB	2 ICLK	
0008 C140h	MPC	P00 pin function control register	P00PFS	8	8	2, 3 PCLKB	2 ICLK	MPC
0008 C141h	MPC	P01 pin function control register	P01PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C142h	MPC	P02 pin function control register	P02PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C143h	MPC	P03 pin function control register	P03PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C145h	MPC	P05 pin function control register	P05PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C147h	MPC	P07 pin function control register	P07PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C148h	MPC	P10 pin function control register	P10PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C149h	MPC	P11 pin function control register	P11PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C14Ah	MPC	P12 pin function control register	P12PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C14Bh	MPC	P13 pin function control register	P13PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C14Ch	MPC	P14 pin function control register	P14PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C14Dh	MPC	P15 pin function control register	P15PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C14Eh	MPC	P16 pin function control register	P16PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C14Fh	MPC	P17 pin function control register	P17PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C150h	MPC	P20 pin function control register	P20PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C151h	MPC	P21 pin function control register	P21PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C152h	MPC	P22 pin function control register	P22PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C153h	MPC	P23 pin function control register	P23PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C154h	MPC	P24 pin function control register	P24PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C155h	MPC	P25 pin function control register	P25PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C156h	MPC	P26 pin function control register	P26PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C157h	MPC	P27 pin function control register	P27PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C158h	MPC	P30 pin function control register	P30PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C159h	MPC	P31 pin function control register	P31PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C15Ah	MPC	P32 pin function control register	P32PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C15Bh	MPC	P33 pin function control register	P33PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C15Ch	MPC	P34 pin function control register	P34PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C160h	MPC	P40 pin function control register	P40PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C161h	MPC	P41 pin function control register	P41PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C162h	MPC	P42 pin function control register	P42PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C163h	MPC	P43 pin function control register	P43PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C164h	MPC	P44 pin function control register	P44PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C165h	MPC	P45 pin function control register	P45PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C166h	MPC	P46 pin function control register	P46PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C167h	MPC	P47 pin function control register	P47PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C168h	MPC	P50 pin function control register	P50PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C169h	MPC	P51 pin function control register	P51PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C16Ah	MPC	P52 pin function control register	P52PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C16Ch	MPC	P54 pin function control register	P54PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C16Dh	MPC	P55 pin function control register	P55PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C16Eh	MPC	P56 pin function control register	P56PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C16Fh	MPC	P57 pin function control register	P57PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C170h	MPC	P60 pin function control register	P60PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C171h	MPC	P61 pin function control register	P61PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C176h	MPC	P66 pin function control register	P66PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C177h	MPC	P67 pin function control register	P67PFS	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (33/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 C178h	MPC	P70 pin function control register	P70PFS	8	8	2, 3 PCLKB	2 ICLK	MPC
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 C17Fh	MPC	P77 pin function control register	P77PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C180h	MPC	P80 pin function control register	P80PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C181h	MPC	P81 pin function control register	P81PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C182h	MPC	P82 pin function control register	P82PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C183h	MPC	P83 pin function control register	P83PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C186h	MPC	P86 pin function control register	P86PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C187h	MPC	P87 pin function control register	P87PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C188h	MPC	P90 pin function control register	P90PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C189h	MPC	P91 pin function control register	P91PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C18Ah	MPC	P92 pin function control register	P92PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C18Bh	MPC	P93 pin function control register	P93PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C190h	MPC	PA0 pin function control register	PA0PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C191h	MPC	PA1 pin function control register	PA1PFS	8	8	2, 3 PCLKB	2 ICLK	
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	
0008 C195h	MPC	PA5 pin function control register	PA5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C196h	MPC	PA6 pin function control register	PA6PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C197h	MPC	PA7 pin function control register	PA7PFS	8	8	2, 3 PCLKB	2 ICLK	
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	
0008 C1A0h	MPC	PC0 pin function control register	PC0PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A1h	MPC	PC1 pin function control register	PC1PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A2h	MPC	PC2 pin function control register	PC2PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A3h	MPC	PC3 pin function control register	PC3PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A4h	MPC	PC4 pin function control register	PC4PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A5h	MPC	PC5 pin function control register	PC5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A6h	MPC	PC6 pin function control register	PC6PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A7h	MPC	PC7 pin function control register	PC7PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A8h	MPC	PD0 pin function control register	PD0PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1A9h	MPC	PD1 pin function control register	PD1PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1AAh	MPC	PD2 pin function control register	PD2PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1ABh	MPC	PD3 pin function control register	PD3PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1ACh	MPC	PD4 pin function control register	PD4PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1ADh	MPC	PD5 pin function control register	PD5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1AEh	MPC	PD6 pin function control register	PD6PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1AFh	MPC	PD7 pin function control register	PD7PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B0h	MPC	PE0 pin function control register	PE0PFS	8	8	2, 3 PCLKB	2 ICLK	

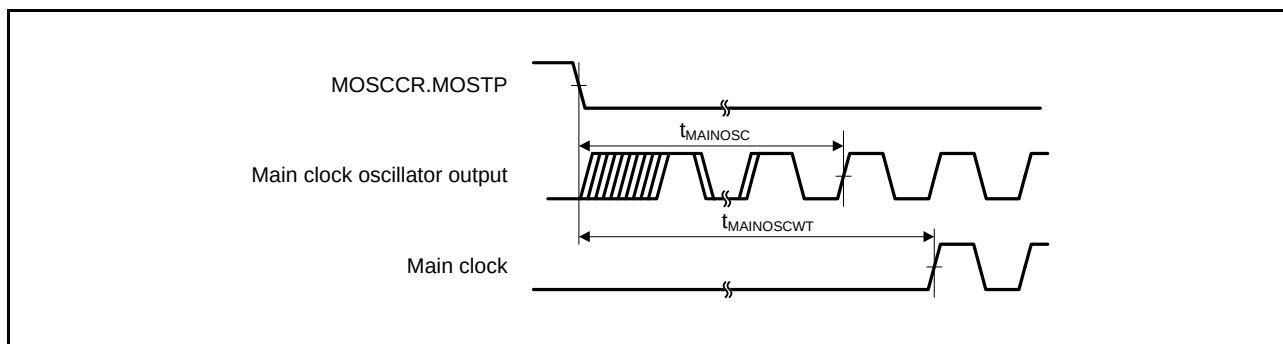


Figure 5.5 Main Clock Oscillation Start Timing

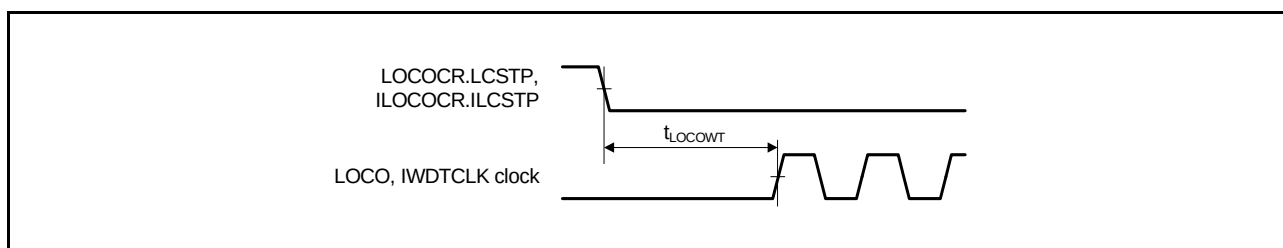


Figure 5.6 LOCO, IWDTCCLK Oscillation Start Timing

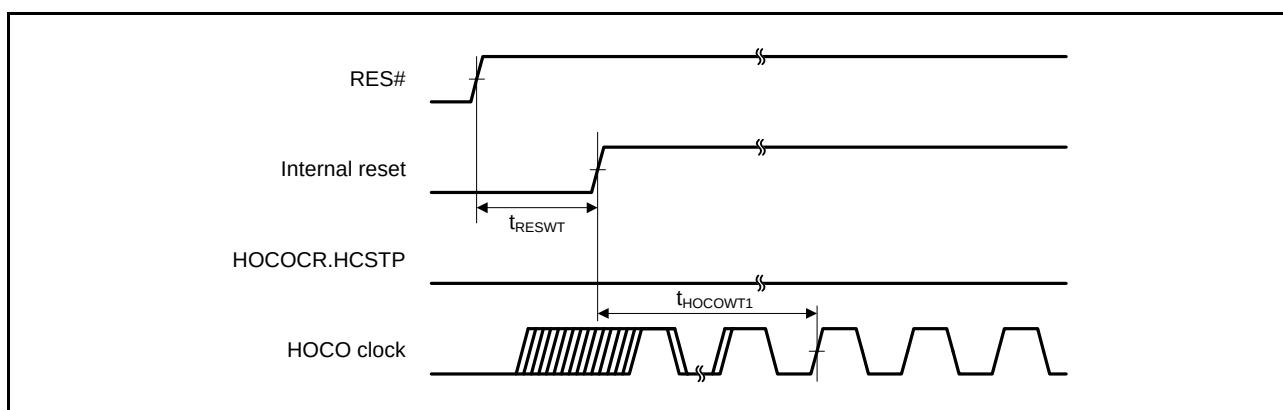


Figure 5.7 HOCO Oscillation Start Timing (After Reset is Canceled by Setting the OFS1.HOCOEN Bit to 0)

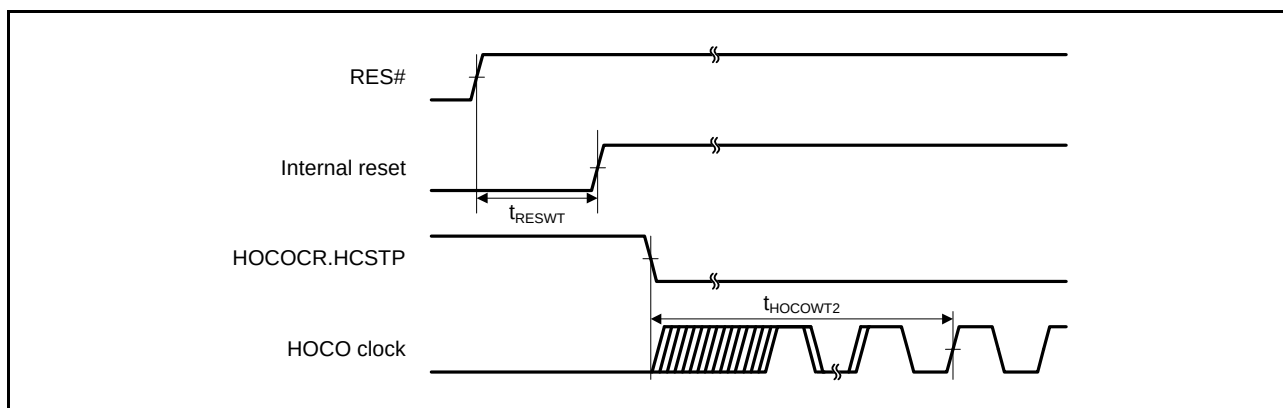


Figure 5.8 HOCO Clock Oscillation Start Timing (Oscillation is Started by Setting the HOCOEN.HCSTP Bit)

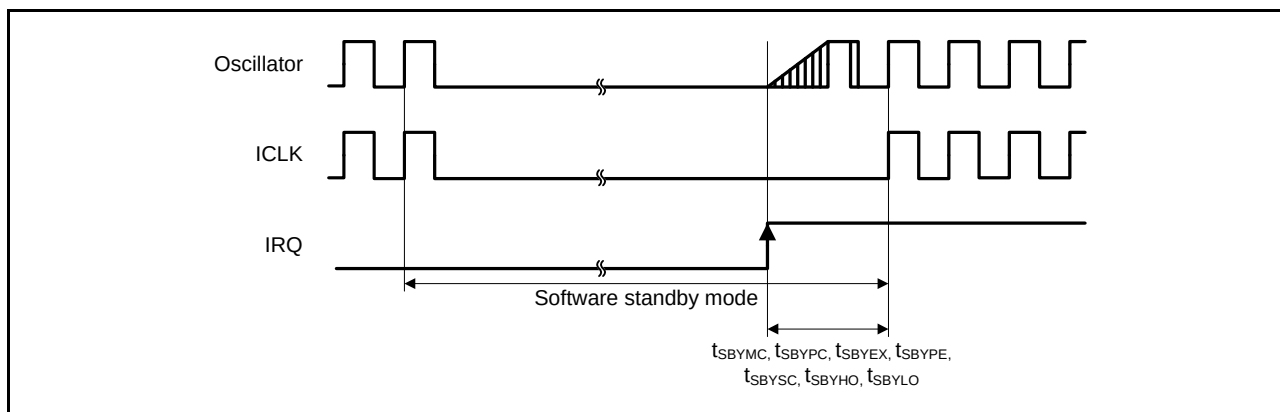


Figure 5.13 Software Standby Mode Cancellation Timing

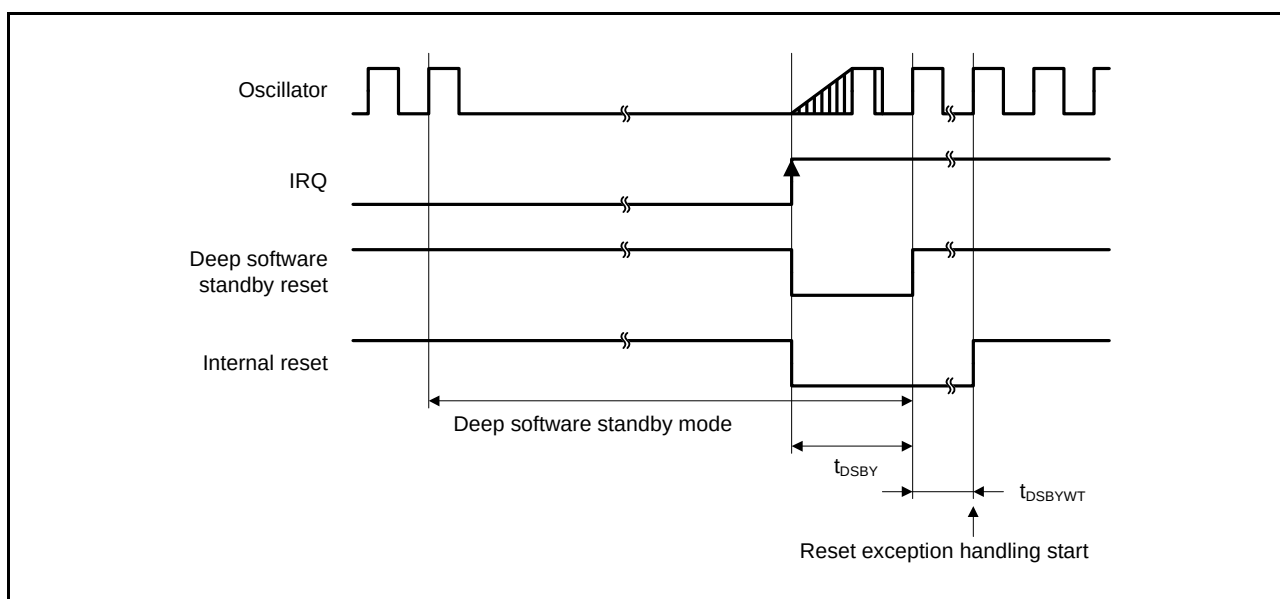


Figure 5.14 Deep Software Standby Mode Cancellation Timing

5.3.4 Control Signal Timing

Table 5.15 Control Signal Timing

Conditions: $V_{CC} = AVCC0 = VREFH = V_{CC_USB} = V_{BATT} = 2.7$ to 3.6 V, $VREFH0 = 2.7$ V to $AVCC0$,
 $VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V, $T_a = T_{opr}$

Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
NMI pulse width	t_{NMIW}	200	—	—	ns	$t_c (PCLK) \times 2 \leq 200$ ns Figure 5.15
		$t_c (PCLK) \times 2$				$t_c (PCLK) \times 2 > 200$ ns Figure 5.15
IRQ pulse width	t_{IRQW}	200	—	—	ns	$t_c (PCLK) \times 2 \leq 200$ ns Figure 5.16
		$t_c (PCLK) \times 2$				$t_c (PCLK) \times 2 > 200$ ns Figure 5.16

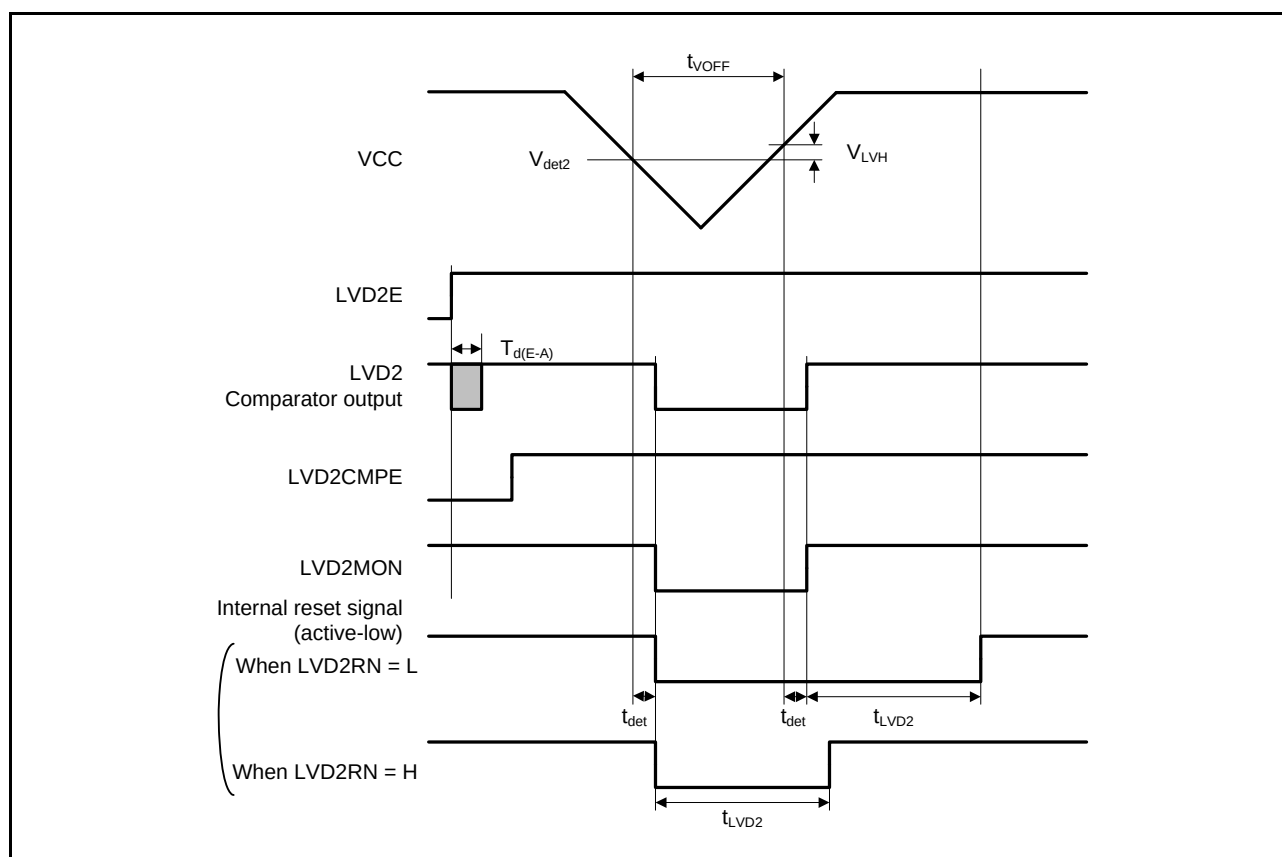


Figure 5.66 Voltage Detection Circuit Timing (V_{det2})