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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 "<u>Embedded -</u> <u>Microcontrollers</u>"

Details

Product Status	Active
Core Processor	RX
Core Size	32-Bit Single-Core
Speed	32MHz
Connectivity	I ² C, SCI, SPI, USB
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	30
Program Memory Size	16KB (16K x 8)
Program Memory Type	FLASH
EEPROM Size	8K x 8
RAM Size	8K x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 3.6V
Data Converters	A/D 10x12b
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/r5f5111jadfl-3a

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

Classifications	Pin Name	I/O	Description							
Realtime clock	RTCOUT	Output	Output pin for the 1-Hz/64-Hz clock.							
Serial	Asynchronous mode/clock	synchron	ous mode							
communications	SCK1, SCK5	I/O Input/output pins for the clock.								
Interface (SCIe)	RXD1, RXD5	Input	Input pins for received data.							
	TXD1, TXD5	Output	Output pins for transmitted data.							
	CTS1#, CTS5#	Input	Input pins for controlling the start of transmission and reception.							
	RTS1#, RTS5#	Output	Output pins for controlling the start of transmission and reception.							
Serial	Simple I ² C mode									
communications	SSCL1, SSCL5	I/O	Input/output pins for the I ² C clock.							
	SSDA1, SSDA5	I/O	Input/output pins for the I ² C data.							
	Simple SPI mode									
	SCK1, SCK5	I/O	Input/output pins for the clock.							
	SMISO1, SMISO5	I/O	Input/output pins for slave transmit data.							
	SMOSI1, SMOSI5	I/O	Input/output pins for master transmit data.							
	SS1#, SS5#	Input	Chip-select input pins.							
Serial	Asynchronous mode/clock	synchron	ous mode							
communications	SCK12	I/O	Input/output pin for the clock.							
	RXD12	Input	Input pin for receiving data.							
	TXD12	Output	Output pin for transmitting data.							
	CTS12#	Input	Input pin for controlling the start of transmission and reception.							
	RTS12#	Output	Output pin for controlling the start of transmission and reception.							
	Simple I ² C mode									
	SSCL12	I/O	Input/output pin for the I ² C clock.							
	SSDA12	I/O	Input/output pin for the I ² C data.							
	Simple SPI mode									
	SCK12	I/O	Input/output pin for the clock.							
	SMISO12	I/O	Input/output pin for slave transmit data.							
	SMOSI12	I/O	Input/output pin for master transmit data.							
	SS12#	Input	Chip-select input pin.							
	Extended serial mode									
	RXDX12	Input	Input pin for data reception by SCIf.							
	TXDX12	Output	Output pin for data transmission by SCIf.							
	SIOX12	I/O	Input/output pin for data reception or transmission by SCIf.							
I ² C bus interface	SCL0	I/O	Input/output pin for I^2C bus interface clocks. Bus can be directly driven by the N-channel open drain output.							
	SDA0	I/O	Input/output pin for I^2C bus interface data. Bus can be directly driven by the N-channel open drain output.							
Serial peripheral	RSPCKA	I/O	Input/output pin for the RSPI clock.							
interface	MOSIA	I/O	Input/output pin for transmitting data from the RSPI master.							
	MISOA	I/O	Input/output pin for transmitting data from the RSPI slave.							
	SSLA0	I/O	Input/output pin to select the slave for the RSPI.							
	SSLA1 to SSLA3	Output	Output pins to select the slave for the RSPI.							

Table 1.4Pin Functions (2/3)

Table 1.4	Pin Functions	(3/3)
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Classifications	Pin Name	I/O	Description
USB 2.0 host/	USB0_DP	I/O	D+ I/O pin of the USB on-chip transceiver.
function module	USB0_DM	I/O	D- I/O pin of the USB on-chip transceiver.
	USB0_VBUS	Input	USB cable connection monitor pin.
	USB0_EXICEN	Output	Low-power control signal for the OTG chip.
	USB0_VBUSEN	Output	VBUS (5 V) supply enable signal for the OTG chip.
	USB0_OVRCURA, USB0_OVRCURB	Input	External overcurrent detection pins.
	USB0_ID	Input	Mini-AB connector ID input pin during operation in OTG mode.
12-bit A/D converter	AN000 to AN004, AN006, AN008 to AN015	Input	Input pins for the analog signals to be processed by the A/D converter.
	ADTRG0#	Input	Input pin 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 D/A converter.
I/O ports	P03, P05	I/O	2-bit input/output pins.
	P14 to P17	I/O	4-bit input/output pins.
	P26, P27	I/O	2-bit input/output pins.
	P30 to P32, P35	I/O	4-bit input/output pins (P35 input pin).
	P40 to P44, P46	I/O	6-bit input/output pins.
	P54, P55	I/O	2-bit input/output pins.
	PA0, PA1, PA3, PA4, PA6	I/O	5-bit input/output pins.
	PB0, PB1, PB3, PB5 to PB7	I/O	6-bit input/output pins.
	PC0 to PC7	I/O	8-bit input/output pins.
	PE0 to PE7	I/O	8-bit input/output pins.
	PH7	Input	1-bit input pin.
	PJ6, PJ7	I/O	2-bit input/output pins.

Note 1. For external clock input.



1.5 Pin Assignments

Figure 1.3 to Figure 1.7 show the pin assignments. Table 1.5 to Table 1.9 show the lists of pins and pin functions.



Figure 1.3 Pin Assignments of the 64-Pin LFQFP/LQFP



Pin No.	Power Supply, Clock, System Control	I/O Port	Timers (MTU, POE, RTC)	Communication (SCIe, SCIf, RSPI, RIIC, USB)	Others
1		P03			DA0
2		P27	MTIOC2B	SCK1/SCK12	IRQ3/CMPA2/ CACREF/ADTRG0#
3		P26	MTIOC2A	TXD1/SMOSI1/SSDA1/USB0_VBUSEN	
4		P30	MTIOC4B/POE8#	RXD1/SMISO1/SSCL1	IRQ0
5		P31	MTIOC4D	CTS1#/RTS1#/SS1#	IRQ1
6	MD				FINED
7	RES#				
8	XCOUT				
9	XCIN	PH7			
10	UPSEL	P35			NMI
11	XTAL				
12	EXTAL				
13	VCL				
14	VSS				
15	VCC				
16		P32	MTIOC0C/RTCOUT		IRQ2
17		P17	MTIOC0C/MTIOC3A/ MTIOC3B/POE8#	SCK1/MISOA/SDA0/RXD12/RXDX12/ SMISO12/SSCL12	IRQ7
18		P16	MTIOC3C/MTIOC3D/ RTCOUT	TXD1/SMOSI1/SSDA1/MOSIA/SCL0/ USB0_VBUS/USB0_VBUSEN/ USB0_OVRCURB	IRQ6/ADTRG0#
19		P15	MTIOC0B/MTCLKB	RXD1/SMISO1/SSCL1/RSPCKA	IRQ5/CLKOUT
20	UB#	P14	MTIOC0A/MTIOC3A/ MTCLKA	CTS1#/RTS1#/SS1#/SSLA0/TXD12/ TXDX12/SIOX12/SMOSI12/SSDA12/ USB0_OVRCURA	IRQ4
21	VCC_USB				
22				USB0_DM	
23				USB0_DP	
24	VSS_USB				
25		P55	MTIOC4D		
26		P54	MTIOC4B		
27		PC7	MTIOC3A/MTCLKB	TXD1/SMOSI1/SSDA1/MISOA/ USB0_OVRCURB	CACREF
28		PC6	MTIOC3C/MTCLKA	RXD1/SMISO1/SSCL1/MOSIA/ USB0_EXICEN	
29		PC5	MTIOC3B/MTCLKD	SCK1/RSPCKA/USB0_ID	
30		PC4	MTIOC3D/MTCLKC/POE0#	SCK5/SSLA0/USB0_VBUS*1/ USB0_VBUSEN	IRQ2/CLKOUT
31		PC3	MTIOC4D	TXD5/SMOSI5/SSDA5	
32		PC2	MTIOC4B	RXD5/SMISO5/SSCL5/SSLA3	
33		PB7/PC1	MTIOC3B		
34		PB6/PC0	MTIOC3D		
35		PB5	MTIOC2A/MTIOC1B/POE1#		
36		PB3	MTIOC0A/MTIOC3B/ MTIOC4A/POE3#	USB0_OVRCURA	
37		PB1	MTIOC0C/MTIOC4C		IRQ4
38	VCC				
39		PB0	MTIC5W/MTIOC0C/ RTCOUT	SCL0/RSPCKA	IRQ2/ADTRG0#
40	VSS				
41		PA6	MTIC5V/MTCLKB/MTIOC2A/ POE2#	CTS5#/RTS5#/SS5#/SDA0/MOSIA	IRQ3

 Table 1.5
 List of Pins and Pin Functions (64-Pin LFQFP/LQFP) (1/2)



IDEM / IDE IDE Action Endoe Registr 150 IDE CRAFLS I IDE Action 0005 7196 ID OTTO Action Endoe Register 131 IDTO ER153 ID	Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States
IDENT PROFINE IDE ADM PROF Provide Sequent 130 DECREMISM B 2 DLK 0000 71180 ID DTC Advision Frade Register 138 DTCER138 B B 2 LCK 0000 71180 ID DTC Advision Frade Register 138 DTCER138 B B 2 LCK 0000 71180 ID DTC Advision Frade Register 141 DTCER141 B B 2 DLK 0000 71100 ID DTC Advision Frade Register 141 DTCER21 B B 2 DLK 0000 7100 ID DTC Advision Frade Register 220 DTCER22 B B 2 DLK 0000 71100 ID DTC Advision Frade Register 220 DTCER22 B B 2 DLK 0000 71170 ID DTC Advision Frade Register 220 DTCER24 B B 2 DLK 0000 71170 ID DTC Advision Frade Register 240 DTCER24 B B 2 DLK 0000 71170 ID DTC Advision Frade Register 240 DTCER24 B B 2 DLK 0000 71200 ID <td>0008 7187h</td> <td>ICU</td> <td>DTC Activation Enable Register 135</td> <td>DTCER135</td> <td>8</td> <td>8</td> <td>2 ICLK</td>	0008 7187h	ICU	DTC Activation Enable Register 135	DTCER135	8	8	2 ICLK
0000 97 100 101 071 Controlment fragets Register 107 071 Controlment fragets Register 103 071 Controlment fragets Register 203 071 Controlment fraget Register 203 071 Controlment fragets Regist	0008 7188h	ICU	DTC Activation Enable Register 136	DTCER136	8	8	2 ICLK
0008 77:00 CO OTC Advances finable Register 138 DTCER130 8 8 2 CLK 0008 77:00 CO OTC Advances finable Register 141 DTCER144 8 8 2 ICLK 0008 77:00 ICU OTC Advances finable Register 241 DTCER213 8 8 2 ICLK 0008 77:00 ICU OTC Advances finable Register 223 DTCER223 8 8 2 ICLK 0008 77:07 ICU OTC Advances finable Register 223 DTCER224 8 8 2 ICLK 0008 77:07 ICU OTC Advances finable Register 223 DTCER224 8 8 2 ICLK 0008 77:07 ICU OTC Advances finable Register 234 DTCER247 8 8 2 ICLK 0008 77:07 ICU OTC Advances finable Register 244 DTCER247 8 8 2 ICLK 0008 77:07 ICU OTC Advances finable Register 247 DTCER247 8 8 2 ICLK 0008 77:07 ICU INTER Advances finable Register 247 DTCER247 8 8 <	0008 7189h	ICU	DTC Activation Enable Register 137	DTCER137	8	8	2 ICLK
0008 71E0. U.U. DTC Answine Enable Register 139 DTC ER140 B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 141 DTC ER141 B B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 141 DTC ER1270 B B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 220 DTCER220 B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 220 DTCER220 B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 220 DTCER220 B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 240 DTCER22 B B 2 CLK 0008 71E0. U.U. DTC Advance Enable Register 240 DTCER22 B B 2 CLK 0008 72D2. L.U. Interrupt Register 240 DTCER27 B B 2 CLK 0008 72D5. L.U. Interrupt Register 240 EER44 B B <	0008 718Ah	ICU	DTC Activation Enable Register 138	DTCER138	8	8	2 ICLK
0008 7008 EU. DTC Animites Fashis Register 141 DTC SER140 8 8 2 EUK 0008 7108 EU. DTC Activities Fashis Register 219 DTC SER140 8 8 2 EUK 0008 7108 EU. DTC Activities Fashis Register 220 DTC ER220 8 8 2 EUK 0008 7107 FU. DTC Activities Fashis Register 223 DTC ER223 8 8 2 EUK 0008 7107 FU. DTC Activities Fashis Register 230 DTC ER230 8 8 2 EUK 0008 7107 FU. DTC Activities Fashis Register 230 DTC ER240 8 8 2 EUK 0008 7107 FU. DTC Activities Fashis Register 240 DTC ER240 8 8 2 EUK 0008 7207 FU. DTC Activities Fashis Register 240 DTC ER240 8 8 2 EUK 0008 7207 FU. DTC Activities Fashis Register 240 EER43 8 8 2 EUK 0008 7207 FU. Itemary Register Eashis Register 24 EER44 8 2 EUK	0008 718Bh	ICU	DTC Activation Enable Register 139	DTCER139	8	8	2 ICLK
000 7100 ICU DTC Advance Enable Register 219 DTC ER219 8 4 2 CLK 000 71050 ICU DTC Advance Enable Register 220 DTCER220 8 4 2 ICLK 000 71050 ICU DTC Advance Enable Register 220 DTCER220 8 4 2 ICLK 000 7105 ICU DTC Advance Enable Register 220 DTCER220 8 4 2 ICLK 000 71750 ICU DTC Advance Enable Register 230 DTCER220 8 4 2 ICLK 000 71751 ICU DTC Advance Enable Register 247 DTCER247 8 4 2 ICLK 000 71751 ICU DTC Advance Enable Register 247 DTCER247 8 4 2 ICLK 000 71751 ICU Interrupt Request Enable Register 247 DTCER247 8 4 2 ICLK 000 71751 ICU Interrupt Request Enable Register 05 IER67 8 4 2 ICLK 000 72050 ICU Interrupt Request Enable Register 05 IER67 8 4 2 ICLK </td <td>0008 718Ch</td> <td>ICU</td> <td>DTC Activation Enable Register 140</td> <td>DTCER140</td> <td>8</td> <td>8</td> <td>2 ICLK</td>	0008 718Ch	ICU	DTC Activation Enable Register 140	DTCER140	8	8	2 ICLK
0008 /000 ICU DTC Activation Enable Register /20 DTC REV20 8 8 2 / DLK 0008 7100h ICU DTC Activation Enable Register /23 DTC REV23 8 8 2 / DLK 0008 7107h ICU DTC Activation Enable Register /23 DTC REV23 8 8 2 / DLK 0008 7107h ICU DTC Activation Enable Register /23 DTC REV20 8 8 2 / DLK 0008 717h ICU DTC Activation Enable Register /20 DTC REV20 8 8 2 / DLK 0008 717h ICU DTC Activation Enable Register /20 IER02 8 8 2 / DLK 0008 720h ICU Interrupt Request Enable Register /20 IER03 8 8 2 / DLK 0008 720h ICU Interrupt Request Enable Register /20 IER04 8 8 2 / DLK 0008 720h ICU Interrupt Request Enable Register /20 IER07 8 8 2 / DLK 0008 720h ICU Interrupt Request Enable Register /20 IER07 8 8	0008 718Dh	ICU	DTC Activation Enable Register 141	DTCER141	8	8	2 ICLK
D006 7100- CU DTC Advisation Enable Register 220 DTCER220 8 8 2 / CLK D006 7110F CU DTC Advisation Enable Register 224 DTCER220 8 8 2 / CLK D006 7110F CU DTC Advisation Enable Register 229 DTCER220 8 8 2 / CLK D006 7110F CU DTC Advisation Enable Register 230 DTCER240 8 8 2 / CLK D006 7175F CU DTC Advisation Enable Register 240 DTCER240 8 8 2 / CLK D006 7175F CU DTC Advisation Enable Register 240 DTCER240 8 8 2 / CLK D006 7203F CU Interrupt Request Enable Register 240 ER03 8 8 2 / CLK D006 7203F CU Interrupt Request Enable Register 65 ER07 8 8 2 / CLK D006 7203F CU Interrupt Request Enable Register 60 ER06 8 2 / CLK D006 7203F CU Interrupt Request Enable Register 60 ER06 8 2 / CLK	0008 71DBh	ICU	DTC Activation Enable Register 219	DTCER219	8	8	2 ICLK
IOOR 2700- IOU DTC Advision Fauble Register 23 DTC RE23 8 8 2 ICLK 0068 71E6h ICU DTC Advision Fauble Register 230 DTC RE240 8 8 2 ICLK 0068 71E7h ICU DTC Advision Fauble Register 240 DTC RE240 8 8 2 ICLK 0068 71F7h ICU DTC Advision Fauble Register 240 DTC RE240 8 8 2 ICLK 0068 71F7h ICU DTC Advision Fauble Register 240 DTC RE240 8 8 2 ICLK 0068 720h ICU Interrupt Request Enable Register 02 IER02 8 8 2 ICLK 0068 720h ICU Interrupt Request Enable Register 03 IER05 8 8 2 ICLK 0068 720h ICU Interrupt Request Enable Register 04 IER05 8 8 2 ICLK 0068 720h ICU Interrupt Request Enable Register 04 IER06 8 2 ICLK 0068 720h ICU Interrupt Request Enable Register 04 IER06 8 2 ICLK <t< td=""><td>0008 71DCh</td><td>ICU</td><td>DTC Activation Enable Register 220</td><td>DTCER220</td><td>8</td><td>8</td><td>2 ICLK</td></t<>	0008 71DCh	ICU	DTC Activation Enable Register 220	DTCER220	8	8	2 ICLK
0008 716h ICU DTC Advanton Enable Register 224 DTC RER244 8 8 2 ICLK 0008 717bh ICU DTC Advanton Enable Register 240 DTC RER247 8 8 2 ICLK 0008 717bh ICU DTC Advanton Enable Register 240 DTC RER244 8 8 2 ICLK 0008 717bh ICU DTC Advanton Enable Register 240 DTC RER244 8 8 2 ICLK 0008 712bh ICU Interrupt Request Enable Register 24 DTC RER244 8 8 2 ICLK 0008 712bh ICU Interrupt Request Enable Register 03 IER03 8 8 2 ICLK 0008 720bh ICU Interrupt Request Enable Register 05 IER05 8 8 2 ICLK 0008 720bh ICU Interrupt Request Enable Register 06 IER06 8 8 2 ICLK 0008 720bh ICU Interrupt Request Enable Register 06 IER06 8 2 ICLK 0008 720bh Interrupt Request Enable Register 07 IER06 8 2 ICLK 0008	0008 71DFh	ICU	DTC Activation Enable Register 223	DTCER223	8	8	2 ICLK
0008 71Fh ICU DTC Activation Enable Register 240 DTCER230 8 8 2 ICLK 0008 71Fh ICU DTC Activation Enable Register 240 DTCER240 8 8 2 ICLK 0008 71Fh ICU DTC Activation Enable Register 241 DTCER243 8 8 2 ICLK 0008 7125h ICU Interrupt Request Enable Register 241 DTCER243 8 8 2 ICLK 0008 7235h ICU Interrupt Request Enable Register 241 IER03 8 8 2 ICLK 0008 7235h ICU Interrupt Request Enable Register 04 IER04 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 04 IER04 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 04 IER06 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 04 IER04 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 04 IER04 8 2 ICLK <tr< td=""><td>0008 71E0h</td><td>ICU</td><td>DTC Activation Enable Register 224</td><td>DTCER224</td><td>8</td><td>8</td><td>2 ICLK</td></tr<>	0008 71E0h	ICU	DTC Activation Enable Register 224	DTCER224	8	8	2 ICLK
0008 71Fh ICU DTC Activation Enable Register 247 DTCER240 8 8 2 ICUK 0008 71Fb ICU DTC Activation Enable Register 247 DTCER247 8 8 2 ICUK 0008 712b ICU Interrupt Request Enable Register 70 IER02 8 8 2 ICUK 0008 7202h ICU Interrupt Request Enable Register 70 IER03 8 2 ICUK 0008 7204h ICU Interrupt Request Enable Register 05 IER03 8 2 ICUK 0008 7204h ICU Interrupt Request Enable Register 07 IER07 8 2 ICUK 0008 7204h ICU Interrupt Request Enable Register 07 IER07 8 2 ICUK 0008 7205h ICU Interrupt Request Enable Register 06 IER08 8 2 ICUK 0008 7205h ICU Interrupt Request Enable Register 07 IER07 8 2 ICUK 0008 7205h ICU Interrupt Request Enable Register 07 IER07 8 2 ICUK 0008 7205h ICU Interrupt Request Enable Register 05 </td <td>0008 71EFh</td> <td>ICU</td> <td>DTC Activation Enable Register 239</td> <td>DTCER239</td> <td>8</td> <td>8</td> <td>2 ICLK</td>	0008 71EFh	ICU	DTC Activation Enable Register 239	DTCER239	8	8	2 ICLK
0008 71Fm ICU DTC Activation Enable Register 247 DTCER247 8 8 2 ICUK 0008 71Fm ICU DTC Activation Enable Register 248 DTCER248 8 8 2 ICUK 0008 72207 ICU Interrupt Request Enable Register 03 IER03 8 8 2 ICUK 0008 72207 ICU Interrupt Request Enable Register 04 IER04 8 8 2 ICUK 0008 7207 ICU Interrupt Request Enable Register 05 IER05 8 8 2 ICUK 0008 7206 ICU Interrupt Request Enable Register 06 IER08 8 2 ICUK 0008 7206 ICU Interrupt Request Enable Register 00 IER00 8 8 2 ICUK 0008 7206 ICU Interrupt Request Enable Register 00 IER00 8 2 ICUK 0008 7206 ICU Interrupt Request Enable Register 00 IER01 8 2 ICUK 0008 7207 ICU Interrupt Request Enable Register 01 IER01 8 2 ICUK 0008 7207 ICU	0008 71F0h	ICU	DTC Activation Enable Register 240	DTCER240	8	8	2 ICLK
DOD TYEE ICU DTC Autovation Enable Register 02 IER02 8 8 2 ICLK DOD Interrupt Request Enable Register 02 IER02 8 8 2 ICLK DOD Total Interrupt Request Enable Register 04 IER03 8 8 2 ICLK DOD Total Interrupt Request Enable Register 05 IER03 8 8 2 ICLK DOD Total Interrupt Request Enable Register 07 IER03 8 8 2 ICLK DOD Total Interrupt Request Enable Register 08 IER08 8 2 ICLK DOD Total Interrupt Request Enable Register 00 IER08 8 2 ICLK DOD Totarrupt Request Enable Register 00 IER00 8 8 2 ICLK DOD Totarrupt Request Enable Register 00 IER00 8 8 2 ICLK DOS Totarrupt Request Enable Register 01 IER07 8 8 2 ICLK DOS Totarrupt Request Enable Register 01 IER07 8 8 2 ICLK DOS T	0008 71F7h	ICU	DTC Activation Enable Register 247	DTCER247	8	8	2 ICLK
0008 72027. ICU Interrupt Request Enable Registr 02 IER03 6 8 2 ICLK 0008 72027. ICU Interrupt Request Enable Registr 03 IER03 8 8 2 ICLK 0008 72037. ICU Interrupt Request Enable Registr 05 IER05 8 8 2 ICLK 0008 72037. ICU Interrupt Request Enable Registr 07 IER07 8 8 2 ICLK 0008 72037. ICU Interrupt Request Enable Registr 06 IER06 8 8 2 ICLK 0008 72037. ICU Interrupt Request Enable Registr 06 IER06 8 8 2 ICLK 0008 72047. ICU Interrupt Request Enable Registr 00 IER00 8 8 2 ICLK 0008 72047. ICU Interrupt Request Enable Registr 10 IER07 8 8 2 ICLK 0008 72047. ICU Interrupt Request Enable Registr 10 IER07 8 8 2 ICLK 0008 72147. ICU Interrupt Request Enable Registr 10 IER10 8 2 ICLK	0008 71F8h	ICU	DTC Activation Enable Register 248	DTCER248	8	8	2 ICLK
D008 72031 ICU Interrupt Request Enable Register 03 IER03 6 8 2 ICLK 0008 72031 ICU Interrupt Request Enable Register 04 IER04 8 8 2 ICLK 0008 72037 ICU Interrupt Request Enable Register 07 IER07 8 8 2 ICLK 0008 72037 ICU Interrupt Request Enable Register 08 IER08 8 8 2 ICLK 0008 72037 ICU Interrupt Request Enable Register 08 IER08 8 8 2 ICLK 0008 72037 ICU Interrupt Request Enable Register 02 IER07 8 8 2 ICLK 0008 72037 ICU Interrupt Request Enable Register 02 IER06 8 8 2 ICLK 0008 72047 ICU Interrupt Request Enable Register 02 IER07 8 8 2 ICLK 0008 72047 ICU Interrupt Request Enable Register 10 IER07 8 8 2 ICLK 0008 72167 ICU Interrupt Request Enable Register 11 IER16 8 2 ICLK	0008 7202h	ICU	Interrupt Request Enable Register 02	IER02	8	8	2 ICLK
0008 7204h ICU Interrupt Request Enable Register 04 IER04 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 05 IER05 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 06 IER08 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 06 IER08 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 00 IER00 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 00 IER00 8 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 0F IER07 8 8 2 ICLK 0008 7217h ICU Interrupt Request Enable Register 10 IER10 8 2 ICLK 0008 7217h ICU Interrupt Request Enable Register 15 IER15 8 2 ICLK 0008 7217h ICU Interrupt Request Enable Register 16 IER16 8 2 ICLK 0008 7217h	0008 7203h	ICU	Interrupt Request Enable Register 03	IER03	8	8	2 ICLK
D008 7295h ICU Interrupt Request Enable Register 05 IER05 8 8 2 ICLK 0008 7205h ICU Interrupt Request Enable Register 07 IER07 8 8 2 ICLK 0008 7205h ICU Interrupt Request Enable Register 06 IER08 8 8 2 ICLK 0008 7205h ICU Interrupt Request Enable Register 0C IER08 8 8 2 ICLK 0008 7205h ICU Interrupt Request Enable Register 0D IER00 8 8 2 ICLK 0008 7205h ICU Interrupt Request Enable Register 0D IER0E 8 2 ICLK 0008 7207h ICU Interrupt Request Enable Register 10 IER0F 8 2 ICLK 0008 7217h ICU Interrupt Request Enable Register 15 IER15 8 2 ICLK 0008 7217h ICU Interrupt Request Enable Register 10 IER15 8 2 ICLK 0008 7217h ICU Interrupt Request Enable Register 10 IER16 8 2 ICLK 0008 7217h ICU <td< td=""><td>0008 7204h</td><td>ICU</td><td>Interrupt Request Enable Register 04</td><td>IER04</td><td>8</td><td>8</td><td>2 ICLK</td></td<>	0008 7204h	ICU	Interrupt Request Enable Register 04	IER04	8	8	2 ICLK
008 7207h ICU Interrupt Request Enable Register 07 IER07 8 8 2 ICLK 008 7207h ICU Interrupt Request Enable Register 08 IER08 8 8 2 ICLK 008 7207h ICU Interrupt Request Enable Register 08 IER06 8 8 2 ICLK 008 7207h ICU Interrupt Request Enable Register 00 IER0C 8 8 2 ICLK 008 7207h ICU Interrupt Request Enable Register 00 IER0D 8 2 ICLK 008 7207h ICU Interrupt Request Enable Register 00 IER0F 8 2 ICLK 008 7207h ICU Interrupt Request Enable Register 10 IER0F 8 2 ICLK 008 7217h ICU Interrupt Request Enable Register 15 IER15 8 2 ICLK 008 7217h ICU Interrupt Request Enable Register 10 IER16 8 2 ICLK 008 7217h ICU Interrupt Request Enable Register 10 IER16 8 2 ICLK 008 7217h ICU Interrupt Request Enable Regi	0008 7205h	ICU	Interrupt Request Enable Register 05	IER05	8	8	2 ICLK
0008 7208h ICU Interrupt Request Enable Register 08 IER08 8 2 2 ICLK 0008 7208h ICU Interrupt Request Enable Register 00 IER0B 8 8 2 ICLK 0008 7208h ICU Interrupt Request Enable Register 00 IER0D 8 8 2 ICLK 0008 7208h ICU Interrupt Request Enable Register 00 IER0D 8 8 2 ICLK 0008 7201h ICU Interrupt Request Enable Register 01 IER0F 8 8 2 ICLK 0008 721h ICU Interrupt Request Enable Register 10 IER11 8 8 2 ICLK 0008 721h ICU Interrupt Request Enable Register 15 IER15 8 2 ICLK 0008 721h ICU Interrupt Request Enable Register 10 IER15 8 2 ICLK 0008 721h ICU Interrupt Request Enable Register 10 IER10 8 2 ICLK 0008 721h ICU Interrupt Reqest Reg	0008 7207h	ICU	Interrupt Request Enable Register 07	IER07	8	8	2 ICLK
0008 720Bh ICU Interrupt Request Enable Register 0B IER0B 8 2 2/CLK 0008 720Dh ICU Interrupt Request Enable Register 0C IER0C 8 8 2 ICLK 0008 720Dh ICU Interrupt Request Enable Register 0D IER0E 8 8 2 ICLK 0008 720Eh ICU Interrupt Request Enable Register 0D IER0F 8 8 2 ICLK 0008 720Eh ICU Interrupt Request Enable Register 10 IER0F 8 8 2 ICLK 0008 721Eh ICU Interrupt Request Enable Register 11 IER15 8 8 2 ICLK 0008 721Eh ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 721Eh ICU Interrupt Request Enable Register 10 IER15 8 2 ICLK 0008 721Eh ICU Interrupt Request Enable Register 10 IER15 8 2 ICLK 0008 721Eh ICU Interrupt Requ	0008 7208h	ICU	Interrupt Request Enable Register 08	IER08	8	8	2 ICLK
D008 720Ch ICU Interrupt Request Enable Register OC IEROC 8 8 2 ICLK D008 720Ch ICU Interrupt Request Enable Register OD IEROD 8 8 2 ICLK D008 720Ch ICU Interrupt Request Enable Register OE IEROE 8 8 2 ICLK D008 720Ch ICU Interrupt Request Enable Register OF IEROF 8 8 2 ICLK D008 720Ch ICU Interrupt Request Enable Register 10 IER15 8 8 2 ICLK D008 721Ch ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK D008 721Ch ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK D008 721Ch ICU Interrupt Request Enable Register 10 IER16 8 8 2 ICLK D008 721Ch ICU Interrupt Request Enable Register 10 IER16 8 2 ICLK D008 721Ch ICU Interrupt Request Enable Register 17 IER16 8 2 ICLK	0008 720Bh	ICU	Interrupt Request Enable Register 0B	IER0B	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 720Eh ICU Interrupt Request Enable Register 0F IER0F 8 8 2 ICLK 0008 721Dh ICU Interrupt Request Enable Register 10 IER10 8 8 2 ICLK 0008 721Dh ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 721Dh ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 721Dh ICU Interrupt Request Enable Register 10 IER16 8 2 ICLK 0008 721Dh ICU Interrupt Request Enable Register 17 IER15 8 8 2 ICLK 0008 721Dh ICU Interrupt Request Enable Register 17 IER16 8 2 ICLK 0008 721Dh ICU Interrupt Acquest Enable Register 17 IER17 8 2 ICLK 0008 7200h	0008 720Ch	ICU	Interrupt Request Enable Register 0C	IER0C	8	8	2 ICLK
0008 720Eh ICU Interrupt Request Enable Register 0F IER0F 8 2 ICLK 0008 720Fh ICU Interrupt Request Enable Register 0F IER0F 8 8 2 ICLK 0008 720Fh ICU Interrupt Request Enable Register 10 IER10 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 11 IER15 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 16 IER16 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 17 IER16 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 17 IER16 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 17 IER1F 8 2 ICLK 0008 7250h ICU Satimetrupt Activation Register SWINTR 8 2 ICLK 0008 7250h ICU </td <td>0008 720Dh</td> <td>ICU</td> <td>Interrupt Request Enable Register 0D</td> <td>IER0D</td> <td>8</td> <td>8</td> <td>2 ICLK</td>	0008 720Dh	ICU	Interrupt Request Enable Register 0D	IER0D	8	8	2 ICLK
0008 720Fh ICU Interrupt Request Enable Register 0 IER0F 8 8 2 ICLK 0008 7210h ICU Interrupt Request Enable Register 10 IER10 8 8 2 ICLK 0008 7210h ICU Interrupt Request Enable Register 11 IER11 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 7216h ICU Interrupt Request Enable Register 16 IER16 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 16 IER16 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 17 IER16 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 16 IER17 8 8 2 ICLK 0008 7206h ICU Satimerrupt Aclivation Register 00 IPR000 8 2 ICLK 0008 7303h </td <td>0008 720Eh</td> <td>ICU</td> <td>Interrupt Request Enable Register 0E</td> <td>IER0E</td> <td>8</td> <td>8</td> <td>2 ICLK</td>	0008 720Eh	ICU	Interrupt Request Enable Register 0E	IER0E	8	8	2 ICLK
0008 7210h ICU Interrupt Request Enable Register 10 IER10 8 8 2 ICLK 0008 7211h ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 10 IER10 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 10 IER10 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 11 IER10 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 11 IER15 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 11 IER15 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 11 IER15 8 8 2 ICLK 0008 7300h ICU Interrupt Request Enable Register 01 IER16 16 2 ICLK	0008 720Fh	ICU	Interrupt Request Enable Register 0F	IER0F	8	8	2 ICLK
0008 7211h ICU Interrupt Request Enable Register 11 IER11 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 10 IER1B 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 10 IER1D 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 10 IER1D 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 11 IER1F 8 8 2 ICLK 0008 7215h ICU Interrupt Request Enable Register 17 IER1F 8 8 2 ICLK 0008 7250h ICU Software Interrupt Activation Register SWINTR 8 8 2 ICLK 0008 7300h ICU Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 7304h ICU Interrupt Source Priority Register 033 IPR003 8 2 ICLK	0008 7210h	ICU	Interrupt Request Enable Register 10	IER10	8	8	2 ICLK
0008 7215h ICU Interrupt Request Enable Register 15 IER15 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 1B IER1B 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 1C IER1D 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 1D IER1D 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 1E IER1E 8 8 2 ICLK 0008 7216h ICU Interrupt Request Enable Register 1F IER1F 8 8 2 ICLK 0008 7206h ICU Software Interrupt Acquest Enable Register IFR 16 16 2 ICLK 0008 7206h ICU Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 7206h ICU Interrupt Source Priority Register 003 IPR003 8 8 2 ICLK 0008 7305h ICU Interrupt Source Priority Register 032 IPR033 8	0008 7211h	ICU	Interrupt Request Enable Register 11	IER11	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 720h ICU Software Interrupt Activation Register SWINTR 8 8 2 ICLK 0008 720h ICU Fast Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 730h ICU Interrupt Source Priority Register 003 IPR003 8 8 2 ICLK 0008 730h ICU Interrupt Source Priority Register 032 IPR05 8 8 2 ICLK 0008 730h ICU Interrupt Source Priority Register 032 IPR05 8 8<	0008 7215h	ICU	Interrupt Request Enable Register 15	IER15	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 721Eh ICU Interrupt Request Enable Register 1F IER1F 8 8 2 ICLK 0008 72E0h ICU Software Interrupt Activation Register SWINTR 8 8 2 ICLK 0008 72E0h ICU Fast Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 7300h ICU Interrupt Source Priority Register 003 IPR003 8 8 2 ICLK 0008 7304h ICU Interrupt Source Priority Register 003 IPR004 8 2 ICLK 0008 7305h ICU Interrupt Source Priority Register 032 IPR033 8 2 ICLK 0008 7305h ICU Interrupt Source Priority Register 033 IPR033 8 2 ICLK	0008 721Bh	ICU	Interrupt Request Enable Register 1B	IER1B	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 72E0h ICU Fast Interrupt Register FIR 16 16 2 ICLK 0008 7300h ICU Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 7303h ICU Interrupt Source Priority Register 003 IPR003 8 8 2 ICLK 0008 7304h ICU Interrupt Source Priority Register 005 IPR05 8 8 2 ICLK 0008 7320h ICU Interrupt Source Priority Register 033 IPR033 8 8 2 ICLK 0008 7321h ICU Interrupt Source Priority Register 034 IPR034 8 8	0008 721Ch	ICU	Interrupt Request Enable Register 1C	IER1C	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 72E0h ICU Fast Interrupt Activation Register FIR 16 16 2 ICLK 0008 7300h ICU Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 7303h ICU Interrupt Source Priority Register 003 IPR003 8 8 2 ICLK 0008 7304h ICU Interrupt Source Priority Register 005 IPR004 8 8 2 ICLK 0008 7305h ICU Interrupt Source Priority Register 032 IPR032 8 8 2 ICLK 0008 7320h ICU Interrupt Source Priority Register 033 IPR033 8 8 2 ICLK 0008 7322h ICU Interrupt Source Priority Register 036 IPR037 8	0008 721Dh	ICU	Interrupt Request Enable Register 1D	IER1D	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 Secre Priority Register FIR 16 16 2 ICLK 0008 7300h ICU Interrupt Source Priority Register 000 IPR000 8 8 2 ICLK 0008 7303h ICU Interrupt Source Priority Register 003 IPR003 8 8 2 ICLK 0008 7304h ICU Interrupt Source Priority Register 005 IPR004 8 8 2 ICLK 0008 7305h ICU Interrupt Source Priority Register 032 IPR032 8 8 2 ICLK 0008 7322h ICU Interrupt Source Priority Register 033 IPR033 8 8 2 ICLK 0008 7324h ICU Interrupt Source Priority Register 037 IPR034 8 8 2 ICLK 0008 7325h ICU Interrupt Source Priority Register 037 IPR037 8	0008 721Eh	ICU	Interrupt Request Enable Register 1E	IER1E	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 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 7302h ICU Interrupt Source Priority Register 032 IPR032 8 8 2 ICLK 0008 7322h ICU Interrupt Source Priority Register 033 IPR033 8 8 2 ICLK 0008 7324h ICU Interrupt Source Priority Register 037 IPR034 8 8 2 ICLK 0008 7325h ICU Interrupt Source Priority Register 037 IPR037 8 <	0008 721Fh	ICU	Interrupt Request Enable Register 1F	IER1F	8	8	2 ICLK
0008 72F0hICUFast Interrupt Set RegisterFIR16162 ICLK0008 7300hICUInterrupt Source Priority Register 000IPR000882 ICLK0008 7303hICUInterrupt Source Priority Register 003IPR003882 ICLK0008 7304hICUInterrupt Source Priority Register 004IPR004882 ICLK0008 7305hICUInterrupt Source Priority Register 005IPR005882 ICLK0008 7305hICUInterrupt Source Priority Register 032IPR032882 ICLK0008 7320hICUInterrupt Source Priority Register 033IPR033882 ICLK0008 7321hICUInterrupt Source Priority Register 033IPR033882 ICLK0008 7322hICUInterrupt Source Priority Register 034IPR034882 ICLK0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR03882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR036882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR03882 ICLK0008 7326hICUInterrupt Source Priority Register 057IPR05782 ICLK0008 7339h <t< td=""><td>0008 72E0h</td><td>ICU</td><td>Software Interrupt Activation Register</td><td>SWINTR</td><td>8</td><td>8</td><td>2 ICLK</td></t<>	0008 72E0h	ICU	Software Interrupt Activation Register	SWINTR	8	8	2 ICLK
0008 7300hICUInterrupt Source Priority Register 000IPR000882 ICLK0008 7303hICUInterrupt Source Priority Register 003IPR003882 ICLK0008 7304hICUInterrupt Source Priority Register 004IPR004882 ICLK0008 7305hICUInterrupt Source Priority Register 005IPR005882 ICLK0008 7305hICUInterrupt Source Priority Register 032IPR032882 ICLK0008 7320hICUInterrupt Source Priority Register 032IPR033882 ICLK0008 7321hICUInterrupt Source Priority Register 033IPR033882 ICLK0008 7322hICUInterrupt Source Priority Register 034IPR034882 ICLK0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 044IPR044882 ICLK0008 7336hICUInterrupt Source Priority Register 063IPR057882 ICLK0008 7336hICUInterrupt Source Priority Register 063IPR06388 <td< td=""><td>0008 72F0h</td><td>ICU</td><td>Fast Interrupt Set Register</td><td>FIR</td><td>16</td><td>16</td><td>2 ICLK</td></td<>	0008 72F0h	ICU	Fast Interrupt Set Register	FIR	16	16	2 ICLK
0008 7303hICUInterrupt Source Priority Register 003IPR003882ICLK0008 7304hICUInterrupt Source Priority Register 004IPR004882ICLK0008 7305hICUInterrupt Source Priority Register 005IPR005882ICLK0008 7320hICUInterrupt Source Priority Register 032IPR032882ICLK0008 7321hICUInterrupt Source Priority Register 033IPR033882ICLK0008 7322hICUInterrupt Source Priority Register 034IPR034882ICLK0008 7322hICUInterrupt Source Priority Register 036IPR036882ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882ICLK0008 7326hICUInterrupt Source Priority Register 038IPR037882ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882ICLK0008 7339hICUInterrupt Source Priority Register 057IPR057882ICLK0008 7340hICUInterrupt Source Priority Register 063IPR063882ICLK0008 7340hICUInterrupt Source Priority Register 065IPR065882ICLK <tr <tr=""></tr>	0008 7300h	ICU	Interrupt Source Priority Register 000	IPR000	8	8	2 ICLK
0008 7304hICUInterrupt Source Priority Register 004IPR004882 ICLK0008 7305hICUInterrupt Source Priority Register 005IPR005882 ICLK0008 7320hICUInterrupt Source Priority Register 032IPR032882 ICLK0008 7321hICUInterrupt Source Priority Register 033IPR033882 ICLK0008 7322hICUInterrupt Source Priority Register 034IPR034882 ICLK0008 7322hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 044IPR03882 ICLK0008 7326hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 7339hICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 065IPR065882 ICLK <td>0008 7303h</td> <td>ICU</td> <td>Interrupt Source Priority Register 003</td> <td>IPR003</td> <td>8</td> <td>8</td> <td>2 ICLK</td>	0008 7303h	ICU	Interrupt Source Priority Register 003	IPR003	8	8	2 ICLK
0008 7305hICUInterrupt Source Priority Register 005IPR005882 ICLK0008 7320hICUInterrupt Source Priority Register 032IPR032882 ICLK0008 7321hICUInterrupt Source Priority Register 033IPR033882 ICLK0008 7322hICUInterrupt Source Priority Register 034IPR034882 ICLK0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 044IPR044882 ICLK0008 7329hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 7339hICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882 ICLK0008 7340hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7341hICUInterrupt Source Priority Register 066IPR066882 ICLK	0008 7304h	ICU	Interrupt Source Priority Register 004	IPR004	8	8	2 ICLK
0008 7320hICUInterrupt Source Priority Register 032IPR032882 ICLK0008 7321hICUInterrupt Source Priority Register 033IPR033882 ICLK0008 7322hICUInterrupt Source Priority Register 034IPR034882 ICLK0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 037IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 044IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 7337hICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 063IPR064882 ICLK0008 7340hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 066IPR066882 ICLK	0008 7305h	ICU	Interrupt Source Priority Register 005	IPR005	8	8	2 ICLK
0008 7321hICUInterrupt Source Priority Register 033IPR0338821CLK0008 7322hICUInterrupt Source Priority Register 034IPR0348821CLK0008 7324hICUInterrupt Source Priority Register 036IPR0368821CLK0008 7325hICUInterrupt Source Priority Register 037IPR0378821CLK0008 7326hICUInterrupt Source Priority Register 037IPR0378821CLK0008 7326hICUInterrupt Source Priority Register 038IPR0388821CLK0008 7326hICUInterrupt Source Priority Register 044IPR0448821CLK0008 7339hICUInterrupt Source Priority Register 057IPR0578821CLK0008 7337hICUInterrupt Source Priority Register 063IPR0638821CLK0008 7340hICUInterrupt Source Priority Register 063IPR0648821CLK0008 7340hICUInterrupt Source Priority Register 065IPR0658821CLK0008 7341hICUInterrupt Source Priority Register 065IPR0658821CLK0008 7342hICUInterrupt Source Priority Register 066IPR0668821CLK	0008 7320h	ICU	Interrupt Source Priority Register 032	IPR032	8	8	2 ICLK
0008 7322hICUInterrupt Source Priority Register 034IPR034882 ICLK0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 044IPR044882 ICLK0008 7339hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 7337hICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 065IPR064882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 065IPR065882 ICLK	0008 7321h	ICU	Interrupt Source Priority Register 033	IPR033	8	8	2 ICLK
0008 7324hICUInterrupt Source Priority Register 036IPR036882 ICLK0008 7325hICUInterrupt Source Priority Register 037IPR037882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882 ICLK0008 7326hICUInterrupt Source Priority Register 044IPR044882 ICLK0008 7339hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 733FhICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 065IPR065882 ICLK	0008 7322h	ICU	Interrupt Source Priority Register 034	IPR034	8	8	2 ICLK
OOD 7325hICUInterrupt Source Priority Register 037IPR037882ICLK0008 7325hICUInterrupt Source Priority Register 038IPR038882ICLK0008 7326hICUInterrupt Source Priority Register 038IPR038882ICLK0008 7326hICUInterrupt Source Priority Register 044IPR044882ICLK0008 7339hICUInterrupt Source Priority Register 057IPR057882ICLK0008 7337hICUInterrupt Source Priority Register 063IPR063882ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882ICLK0008 7342hICUInterrupt Source Priority Register 066IPR065882ICLK	0008 7324h	ICU	Interrupt Source Priority Register 036	IPR036	8	8	2 ICLK
0008 7326hICUInterrupt Source Priority Register 038IPR0388821CLK0008 732ChICUInterrupt Source Priority Register 044IPR044882ICLK0008 7339hICUInterrupt Source Priority Register 057IPR057882ICLK0008 733FhICUInterrupt Source Priority Register 063IPR063882ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882ICLK0008 7342hICUInterrupt Source Priority Register 066IPR065882ICLK	0008 7325h	ICU	Interrupt Source Priority Register 037	IPR037	8	8	2 ICLK
0008 732ChICUInterrupt Source Priority Register 044IPR044882 ICLK0008 7339hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 733FhICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 065IPR065882 ICLK	0008 7326h	ICU	Interrupt Source Priority Register 038	IPR038	8	8	2 ICLK
0008 7339hICUInterrupt Source Priority Register 057IPR057882 ICLK0008 733FhICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 065IPR065882 ICLK	0008 732Ch	ICU	Interrupt Source Priority Register 044	IPR044	8	8	2 ICLK
0008 733FhICUInterrupt Source Priority Register 063IPR063882 ICLK0008 7340hICUInterrupt Source Priority Register 064IPR064882 ICLK0008 7341hICUInterrupt Source Priority Register 065IPR065882 ICLK0008 7342hICUInterrupt Source Priority Register 066IPR065882 ICLK	0008 7339h	ICU	Interrupt Source Priority Register 057	IPR057	8	8	2 ICLK
O008 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 733Fh	ICU	Interrupt Source Priority Register 063	IPR063	8	8	2 ICLK
O008 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 7340h	ICU	Interrupt Source Priority Register 064	IPR064	8	8	2 ICLK
0008 7342h ICU Interrupt Source Priority Register 066 IPR066 8 8 2 ICLK	0008 7341h	ICU	Interrupt Source Priority Register 065	IPR065	- 8	8	2 CLK
	0008 7342h	ICU	Interrupt Source Priority Register 066	IPR066	8	8	2 ICLK

Table 4.1 List of I/O Registers (Address Order) (4/16)



5. Electrical Characteristics

5.1 Absolute Maximum Ratings

Table 5.1 Absolute Maximum Ratings

Conditions: VSS = AVSS0 = VREFL0 = VSS_USB = 0 V

Item		Symbol	Value	Unit
Power supply voltage		VCC, VCC_USB	-0.3 to +4.6	V
Input voltage	Ports for 5 V tolerant*1	V _{in}	-0.3 to +6.5	V
	Ports P40 to P44, P46, ports PJ6, PJ7	V _{in}	-0.3 to AVCC0 +0.3	V
	Ports other than above	V _{in}	-0.3 to VCC +0.3	V
Reference power supply voltage		VREFH0	-0.3 to AVCC0 +0.3	V
Analog power supply voltage		AVCC0	-0.3 to +4.6	V
Analog input voltage		V _{AN}	-0.3 to AVCC0 + 0.3 (when AN000 to AN004 and AN006 used) -0.3 to VCC + 0.3 (when AN008 to AN015 used)	V
Operating temperature*2		T _{opr}	-40 to +85 -40 to +105	°C
Storage temperature		T _{stg}	–55 to +125	°C

Caution: Permanent damage to the MCU may result if absolute maximum ratings are exceeded.

To preclude any malfunctions due to noise interference, insert capacitors of high frequency characteristics between the VCC and VSS pins, between the AVCC0 and AVSS0 pins, between the VCC_USB and VSS_USB pins, and between the VREFH0 and VREFL0 pins. Place capacitors of about 0.1 μ F as close as possible to every power supply pin and use the shortest and heaviest possible traces. Also, connect capacitors as stabilization capacitance.

Connect the VCL pin to a VSS pin via a 4.7 µF capacitor. The capacitor must be placed close to the pin, refer to section 5.12.1, Connecting VCL Capacitor and Bypass Capacitors.

Do not input signals or an I/O pull-up power supply to ports other than 5-V tolerant ports while the device is not powered. The current injection that results from input of such a signal or I/O pull-up may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements.

If input voltage (within the specified range from -0.3 to + 6.5V) is applied to 5-V tolerant ports, it will not cause problems such as damage to the MCU.

Note 1. Ports P16, P17, PA6, and PB0 are 5 V tolerant. Note 2. The upper limit of operating temperature is 85°C or 105°C, depending on the product. For details, refer to 1.2 List of Products.

Table 5.2	Operating Conditions
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Item	Symbol	Conditions	Min.	Тур.	Max.	Unit
Power supply voltages	VCC*1	When USB not used	1.8	—	3.6	V
		When USB used	3.0	—	3.6	V
	VSS		—	0	—	V
USB power supply voltages	VCC_USB		—	VCC	—	V
	VSS_USB		—	0	—	V
Analog power supply voltages	AVCC0*1, *2		1.8	—	3.6	V
	AVSS0		—	0	—	V
	VREFH0		1.8	—	AVCC0	V
	VREFL0		—	0	—	V

Note 1. When powering on AVCC0 and VCC, power them on at the same time or VCC first.

Note 2. For details, refer to section 30.7.10, Voltage Range of Analog Power Supply Pins in the User's Manual: Hardware.





Figure 5.3 Voltage Dependency in Low-Speed Operating Mode (Reference Data)



Table 5.8DC Characteristics (6) (2/2)

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{ T}_a = -40 \text{ to } +105^{\circ}\text{C}$

			Item		Symbol	Тур *4	Max	Unit	Test Conditions
Supply current*1	Low-speed operating	Normal operating	No peripheral operation* ⁸	ICLK = 32.768 kHz	I _{CC}	4.3	_	μA	
	mode	mode	All peripheral operation: Normal* ^{9, *10}	ICLK = 32.768 kHz		14.7	-		
			All peripheral operation: Max.* ^{9, *10}	ICLK = 32.768kHz			60		
		Sleep mode	No peripheral operation* ⁸	ICLK = 32.768 kHz		2.2	_		
			All peripheral operation: Normal* ⁹	ICLK = 32.768 kHz		8.3			
		Deep sleep mode	No peripheral operation* ⁸	ICLK = 32.768 kHz		1.7	_		
			All peripheral operation: Normal* ⁹	ICLK = 32.768 kHz		6.7	_		

Note 1. Supply current values do not include output charge/discharge current from all pins. The values apply when internal pull-up MOSs are in the off state.

Note 2. Clock supply to the peripheral functions is stopped. This does not include BGO operation. The clock source is PLL. FCLK and PCLK are set to divided by 64.

Note 3. Clocks are supplied to the peripheral functions. This does not include BGO operation. The clock source is PLL. FCLK and PCLK are set to the same frequency as ICLK.

Note 4. Values when VCC = 3.3 V.

Note 5. This is the increase for programming or erasure of the ROM or E2 DataFlash during program execution.

Note 6. Clock supply to the peripheral functions is stopped. The clock source is PLL when ICLK = 12 MHz, and HOCO otherwise. FCLK and PCLK are set to divided by 64.

Note 7. Clocks are supplied to the peripheral functions. The clock source is PLL when ICLK = 12 MHz, and HOCO otherwise. FCLK and PCLK are set to the same frequency as ICLK.

Note 8. Clock supply to the peripheral functions is stopped. The clock source is the sub-clock oscillator. FCLK and PCLK are set to divided by 64.

Note 9. Clocks are supplied to the peripheral functions. The clock source is the sub-clock oscillator. FCLK and PCLK are set to the same frequency as ICLK.

Note 10. Values when the MSTPCRA.MSTPA17 bit (12-bit A/D converter module stop bit) is set to "transition to the module stop state is made".









Figure 5.6 Voltage Dependency in Low-Speed Operating Mode (Reference Data)

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Table 5.12 DC Characteristics (10)

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{ T}_a = -40 \text{ to } +105^{\circ}\text{C}$

Item			Min.	Typ.* ⁷	Max.	Unit	Test Conditions
Analog power	During A/D conversion (at high-speed conversion)	I _{AVCC}	_	0.7	1.2	mA	
supply current	Waiting for A/D (all units)		—	—	0.3	μA	
	During D/A conversion (per channel)*5			—	1.5	mA	
Reference	During A/D conversion (at high-speed conversion)	I _{REFH0}		25	52	μA	
power supply current	Waiting for A/D conversion (all units)		_	—	60	nA	
Temperature sensor* ⁶		I _{TEMP}	—	75	—	μA	
LDV1, 2	Per channel	I _{LVD}	—	0.15	—	μA	
USB operating current	 During USB communication operation under the following settings and conditions Host controller operation is set to full-speed mode Bulk OUT transfer (64 bytes) × 1, bulk IN transfer (64 bytes) × 1 Connect peripheral devices via a 1-meter USB cable from the USB port. 	I _{USBH} *2	_	4.3 (VCC) 0.9 (VCC_USB) *4		mA	
	 During USB communication operation under the following settings and conditions Function controller operation is set to full-speed mode Bulk OUT transfer (64 bytes) × 1, bulk IN transfer (64 bytes) × 1 Connect the host device via a 1-meter USB cable from the USB port. 	I _{USBF} *2	_	3.6 (VCC) 1.1 (VCC_USB) *4		mA	
	 During suspended state under the following setting and conditions Function controller operation is set to full-speed mode (pull up the USB0_DP pin) Software standby mode Connect the host device via a 1-meter USB cable from the USB port. 	I _{SUSP} *3		0.35 (VCC) 170 (VCC_USB) *4		μA	

Note 1. The reference power supply current is included in the power supply current value for D/A conversion.
Note 2. Current consumed only by the USB module.
Note 3. Includes the current supplied from the pull-up resistor of the USB0_DP pin to the pull-down resistor of the host device, in addition to the current consumed by this MCU during the suspended state.
Note 4. When VCC = VCC_USB = 3.3 V.
Note 5. The value of the current flowing to VCC.

Note 6. Current consumed by the power supply (VCC). Note 7. When VCC = AVCC0 = VCC_USB = 3.3 V.

Table 5.13DC Characteristics (11)

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{ T}_a = -40 \text{ to } +105^{\circ}\text{C}$

Item	Symbol	Min.	Тур.	Max.	Unit	Test Conditions
RAM standby voltage	V _{RAM}	1.8	—	-	V	

Table 5.18 Permissible Output Currents (2)

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}$, $1.8 \text{ V} \le \text{AVCC0} \le 3.6 \text{ V}$, $\text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}$, $T_a = -40 \text{ to } +105^{\circ}\text{C}$ (G version)

	Symbol	Max.	Unit	
Permissible output low current	Ports P40 to P44, P46, ports PJ6, PJ7	I _{OL}	0.4	mA
(average value per pin)	Ports other than above		8.0	
Permissible output low current	Ports P40 to P44, P46, ports PJ6, PJ7		0.4	
(maximum value per pin)	Ports other than above		8.0	
Permissible output low current	Total of ports P40 to P44, P46, ports PJ6, PJ7	Σl _{OL}	1.6	
	Total of ports P03, P05, ports P26, P27, ports P30, P31		20	
	Total of ports P14 to P17, port P32, ports P54, P55, ports PB0, PB1, PB3, PB5 to PB7, ports PC2 to PC7		20	
	Total of ports PA0, PA1, PA3, PA4, PA6, ports PE0 to PE7		20	
	Total of all output pins		40	
Permissible output high current	Ports P40 to P44, P46, ports PJ6, PJ7	I _{ОН}	-0.1	
(average value per pin)	Ports other than above		-4.0	
Permissible output high current	Ports P40 to P44, P46, ports PJ6, PJ7		-0.1	
(maximum value per pin)	Ports other than above		-4.0	
Permissible output high current	Total of ports P40 to P44, P46, ports PJ6, PJ7	ΣI_{OH}	-0.6	
	Total of ports P03, P05, ports P26, P27, ports P30, P31		-10	
	Total of ports P14 to P17, port P32, ports P54, P55, ports PB0, PB1, PB3, PB5 to PB7, ports PC2 to PC7		-15	
	Total of ports PA0, PA1, PA3, PA4, PA6, ports PE0 to PE7		-15	
	Total of all output pins		-40	

Note: Do not exceed the permissible total supply current.



Table 5.24 Clock Timing

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{ T}_a = -40 \text{ to } +105^{\circ}\text{C}$

Item			Min.	Тур.	Max.	Unit	Test Conditions
XTAL external clock input cycle time			50	_	_	ns	Figure 5.23
XTAL external clock input high pulse width		t _{XH}	20	—		ns	
XTAL external clock input low pulse width		t _{XL}	20	—		ns	
XTAL external clock rising time		t _{Xr}		—	5	ns	
XTAL external clock falling time		t _{Xf}	—	_	5	ns	
XTAL external clock input wait time*1		t _{EXWT}	0.5	—		μs	
Main clock oscillator oscillation frequency	2.4 ≤ VCC ≤ 3.6	f _{MAIN}	1	—	20	MHz	
	1.8 ≤ VCC < 2.4		1		8		
Main clock oscillation stabilization time (crystal)*	2	t _{MAINOSC}	_	3	-	ms	Figure 5.25
Main clock oscillation stabilization time (ceramic	t _{MAINOSC}	_	50		μs		
LOCO clock oscillation frequency		f _{LOCO}	3.44	4.0	4.56	MHz	
LOCO clock oscillation stabilization time		t _{LOCO}		_	0.5	μs	Figure 5.26
IWDT-dedicated clock oscillation frequency	f _{ILOCO}	12.75	15	17.25	kHz		
IWDT-dedicated clock oscillation stabilization tin	ne	t _{ILOCO}		_	50	μs	Figure 5.24
HOCO clock oscillation frequency		f _{HOCO}	31.52	32	32.48	MHz	Ta = -40 to 85°C
			31.68	32	32.32		Ta = -20 to 85°C
			31.36	32	32.64		Ta = -40 to 105°C
HOCO clock oscillation stabilization time		t _{HOCO2}	—	—	56	μs	Figure 5.28
PLL input frequency*3		f _{PLLIN}	4	_	8	MHz	
PLL circuit oscillation frequency*3	f _{PLL}	32	_	48	MHz		
PLL clock oscillation stabilization time	t _{PLL}		_	50	μs	Figure 5.29	
PLL free-running oscillation frequency				8		MHz	
Sub-clock oscillator oscillation frequency*5		f _{SUB}	—	32.768	—	kHz	
Sub-clock oscillation stabilization time*4			—	0.5	_	s	Figure 5.30

Note 1. Time until the clock can be used after the main clock oscillator stop bit (MOSCCR.MOSTP) is set to 0 (operating) when the external clock is stable.

Note 2. Reference values when an 8-MHz oscillator is used. When specifying the main clock oscillator stabilization time, set the MOSCWTCR register with a stabilization time value that is equal to or greater than the oscillator-manufacturer-recommended value. After changing the setting of the MOSCCR.MOSTP bit so that the main clock oscillator operates, read the OSCOVFSR.MOOVF flag to confirm that is has become 1, and then start using the main clock.

Note 3. The VCC range that the PLL can be used is 2.4 to 3.6 V.

Note 4. After changing the setting of the SOSCCR.SOSTP bit or RCR3.RTCEN bit so that the sub-clock oscillator operates, only start using the sub-clock after the sub-clock oscillation stabilization wait time that is equal to or greater than the oscillator-manufacturer-recommended value has elapsed. Reference value when a 32.768-kHz resonator is used.

Note 5. Only 32.768 kHz can be used.



5.3.2 Reset Timing

Table 5.25 Reset Timing

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{ T}_a = -40 \text{ to } +105^{\circ}\text{C}$

	Item	Symbol	Min.	Тур.	Max.	Unit	Test Conditions
RES# pulse width	At power-on	t _{RESWP}	3		_	ms	Figure 5.31
	Other than above	t _{RESW}	30	_	—	μs	Figure 5.32
Wait time after RES#	At normal startup*1	t _{RESWT}	—	8.5	—	ms	Figure 5.31
cancellation (at power-on)	During fast startup time*2	t _{RESWT}	—	560	—	μs	
Wait time after RES# cand (during powered-on state)	t _{RESWT}	—	114	—	μs	Figure 5.32	
Independent watchdog tin	t _{RESWIW}	—	1	—	IWDT clock cycle	Figure 5.33	
Software reset period	t _{RESWSW}	—	1	—	ICLK cycle		
Wait time after independent watchdog timer reset cancellation*3			_	300	_	μs]
Wait time after software re	eset cancellation	t _{RESW2}	_	168	—	μs	

Note 1. When OFS1.(STUPLVD1REN, FASTSTUP) = 11b. Note 2. When OFS1.(STUPLVD1REN, FASTSTUP) \neq 11b.

Note 3. When IWDTCR.CKS[3:0] = 0000b.



Figure 5.31 Reset Input Timing at Power-On



Figure 5.32 Reset Input Timing (1)



Table 5.27 Timing of Recovery from Low Power Consumption Modes (2)

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{ T}_a = -40 \text{ to } +105^{\circ}\text{C}$

Item					Min.	Тур.	Max.	Unit	Test Conditions
Recovery time from software	Middle-speed mode	Crystal connected to main clock oscillator	Main clock oscillator operating* ²	t _{SBYMC}	_	2	3	ms	Figure 5.34
standby mode*1			Main clock oscillator and PLL circuit operating* ³	t _{SBYPC}		2	3	ms	
		External clock input to main clock oscillator	Main clock oscillator operating*4	t _{SBYEX}	_	3	4	μs	
			Main clock oscillator and PLL circuit operating* ⁵	t _{SBYPE}	_	65	85	μs	
		Sub-clock oscillator operating		t _{SBYSC}	_	600	750	μs	
		HOCO clock oscillator operating*6		t _{SBYHO}		40	50	μs	
		LOCO clock oscill	t _{SBYLO}	_	4.8	7	μs		

Note: When the division ratios of PCLKB, PCLKD, FCLK, and ICLK are all set to 1.

Note 1. The recovery time varies depending on the state of each oscillator when the WAIT instruction is executed. The recovery time when multiple oscillators are operating varies depending on the operating state of the oscillators that are not selected as the system clock source. This applies when only the oscillator listed in each item is operating and the other oscillators are stopped.
 Note 2. When the frequency of the crystal is 12 MHz.

- When the main clock oscillator wait control register (MOSCWTCR) is set to 04h. Note 3. When the frequency of PLL is 12 MHz.
- When the main clock oscillator wait control register (MOSCWTCR) is set to 04h. Note 4. When the frequency of the external clock is 12 MHz.
- When the main clock oscillator wait control register (MOSCWTCR) is set to 00h. Note 5. When the frequency of PLL is 12 MHz.
- When the main clock oscillator wait control register (MOSCWTCR) is set to 00h. Note 6. When the frequency of HOCO is 8 MHz.
 - When the high-speed clock oscillator wait control register (HOCOWTCR) is set to 05h.

Table 5.28 Timing of Recovery from Low Power Consumption Modes (3)

Conditions: $1.8 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 1.8 \text{ V} \le \text{AVSS0} \le 3.6 \text{ V}, \text{VSS} = \text{AVSS0} = \text{VSS}_{USB} = 0 \text{ V}, \text{T}_a = -40 \text{ to } +105^{\circ}\text{C}$

Item			Symbol	Min.	Тур.	Max.	Unit	Test Conditions
Recovery time from software standby mode*1	Low-speed mode	Sub-clock oscillator operating	t _{SBYSC}	_	600	750	μs	Figure 5.34

Note: When the division ratios of PCLKB, PCLKD, FCLK, and ICLK are all set to 1.

Note 1. The sub-clock continues oscillating in software standby mode during low-speed mode.









Figure 5.49 RSPI Timing (Master, CPHA = 1) (Bit Rate: PCLKB Set to Division Ratio Other Than Divided by 2) and Simple SPI Timing (Master, CKPH = 0)





Figure 5.50 RSPI Timing (Master, CPHA = 1) (Bit Rate: PCLKB Set to Divided by 2)





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5.5 A/D Conversion Characteristics

Table 5.38 A/D Conversion Characteristics (1)

Conditions: $2.7 \text{ V} \le \text{VCC} = \text{VCC}_{USB} \le 3.6 \text{ V}, 2.7 \text{ V} \le \text{AVCCO} \le 3.6 \text{ V}, 2.7 \text{ V} \le \text{VREFH0} \le \text{AVCC0},$ VSS = AVSS0 = VREFL0 = VSS_USB = 0 V, T_a = -40 to +105°C

	Min.	Тур.	Max.	Unit	Test Conditions	
Frequency	4		32	MHz		
Resolution		—		12	Bit	
Conversion time*1 (Operation at PCLKD = 32 MHz)	Permissible signal source impedance (Max.) = 0.3 kΩ	1.031 (0.313)* ²	_	_	μs	High-precision channel ADCSR.ADHSC bit = 1 ADSSTRn.SST[7:0] bits = 09h
		1.375 (0.641)* ²	_	Ι		Normal-precision channel ADCSR.ADHSC bit = 1 ADSSTRn.SST[7:0] bits = 14h
Analog input effective	range	0	_	VREFH0	V	
Offset error	-	±0.5	±4.5	LSB	High-precision channel PJ6PFS.ASEL bit = 1 PJ7PFS.ASEL bit = 1	
				±6.0	LSB	Other than above
Full-scale error	-	±0.75	±4.5	LSB	High-precision channel PJ6PFS.ASEL bit = 1 PJ7PFS.ASEL bit = 1	
				±6.0	LSB	Other than above
Quantization error		—	±0.5	—	LSB	
Absolute accuracy	-	±1.25	±5.0	LSB	High-precision channel PJ6PFS.ASEL bit = 1 PJ7PFS.ASEL bit = 1	
				±8.0	LSB	Other than above
DNL differential nonli	—	±1.0	—	LSB		
INL integral nonlinear	—	±1.0	±3.0	LSB		

Note: • The characteristics apply when no pin functions other than A/D converter input are used. Absolute accuracy includes quantization errors. Offset error, full-scale error, DNL differential nonlinearity error, and INL integral nonlinearity error do not include quantization errors.

Note 1. The conversion time is the sum of the sampling time and the comparison time. As the test conditions, the number of sampling states is indicated.

Note 2. The value in parentheses indicates the sampling time.



Table 5.50 ROM (Flash Memory for Code Storage) Characteristics (3)

Middle-speed operating mode Conditions: 1.8 V ≤ VCC ≤ 3.6 V, 1.8 V ≤ AVSS0 ≤ 3.6 V, VSS = AVSS0 = VSS_USB = 0 V Temperature range for the programming/erasure operation: $T_a = -40$ to +85°C

Item		Symbol	FCLK = 1 MHz				Linit		
		Symbol	Min.	Тур.	Max.	Min.	Тур.	Max.	Onic
Programming time	4-byte	t _{P4}	—	143	1330	—	96.8	932	μs
Erasure time	1-Kbyte	t _{E1K}	_	8.3	269	—	5.85	219	ms
	256-Kbyte	t _{E256K}	_	407	928	—	93	520	ms
Blank check time	4-byte	t _{BC4}	_	_	78	—	_	50	μs
	1-Kbyte	t _{BC1K}	_		1.61	—		0.369	ms
Erase operation forcible s	top time	t _{SED}	_		33.6	—		25.6	μs
Start-up area switching setting time		t _{SAS}	_	13.2	549	—	7.6	445	ms
Access window time		t _{AWS}	_	13.2	549	—	7.6	445	ms
ROM mode transition wai	t _{DIS}	2			2		_	μs	
ROM mode transition wai	t _{MS}	3			3			μs	

Note: • Does not include the time until each operation of the flash memory is started after instructions are executed by software.

Note: • The lower-limit frequency of FCLK is 1 MHz during programming or erasing of the flash memory. When using FCLK at below 4 MHz, the frequency can be set to 1 MHz, 2 MHz, or 3 MHz. A non-integer frequency such as 1.5 MHz cannot be set.

Note: • The frequency accuracy of FCLK should be ±3.5%. Confirm the frequency accuracy of the clock source.



REVISION HISTORY

RX111 Group Datasheet

_	_		Description
Rev.	Date	Page	Summary
0.60	Apr 15, 2013	_	First edition, issued
0.90	May 15, 2013	Features	
		1	Changed
		1. Overviev	N
		2 to 4	Table 1.1 Outline of Specifications changed
		10 to 12	Table 1.4 Pin Functions changed
		13	Figure 1.3 Pin Assignments of the 64-Pin LQFP changed
		14	Figure 1.4 Pin Assignments of the 64-Pin WFLGA changed
		15	Figure 1.5 Pin Assignments of the 48-Pin LQFP/HWQFN changed
		18, 19	Table 1.5 List of Pins and Pin Functions (64-Pin LQFP) changed, Note 1 added
		20, 21	Table 1.6 List of Pins and Pin Functions (64-Pin WFLGA) changed, Note 1 added
		22, 23	Table 1.7 List of Pins and Pin Functions (48-Pin LQFP/HWQFN) changed, Note 1 added
		24, 25	Table 1.8 List of Pins and Pin Functions (40-Pin HWQFN) changed, Note 1 added
		26	Table 1.9 List of Pins and Pin Functions (36-Pin WFLGA) changed, Note 1 added
		4. I/O Regi	sters
		33 to 48	Table 5.1 List of I/O Registers (Address Order) changed
1.00	Jun 19, 2013	1. Overviev	N
		9	Figure 1.2 Block Diagram changed
		20, 21	Table 1.6 List of Pins and Pin Functions (64-Pin WFLGA) changed
		26	Table 1.9 List of Pins and Pin Functions (36-Pin WFLGA) changed
		4. I/O Regi	sters
		33 to 48	Table 4.1 List of I/O Registers (Address Order) changed
		5. Electrica	I Characteristics
		49 to 99	Added
1.20	Sep 29, 2014	1. Overviev	N
		2 to 4	Table 1.1 Outline of Specifications: ROM capacity and RAM capacity changed, Unique ID added
		6, 7	Table 1.3 List of Products, changed
		8	Figure 1.1 How to Read the Product Part No., Memory Capacity, and Package Type, changed
		9	Figure 1.2 Block Diagram changed
		10	Table 1.4 Pin Functions changed
		15	Figure 1.5 Pin Assignments of the 48-Pin LFQFP/HWQFN: Note added
		16	Figure 1.6 Pin Assignments of the 40-Pin HWQFN: Note added
		3. Address	Space
		30 4 1/0 Deci	Figure 3.1 Memory Map, changed
		4. I/O Regi	Stells Table 4.1 List of I/O Desisters (Address Order), shanced
		33 10 46	Table 4.1 List of I/O Registers (Address Order), changed
			Toble 5.1 Absolute Maximum Patings, Toble 5.2 Recommanded Operating Conditions, changed
		49 50	Table 5.2 DC Characteristics (1) and Table 5.4 DC Characteristics (2) changed
		51	Table 5.5 DC Characteristics (1) and Table 5.4 DC Characteristics (2), changed
		55 56	Table 5.8 DC Characteristics (6), changed
		56	Table 5.9 DC Characteristics (7), changed
		58	Table 5.10 DC Characteristics (8) added
		59	Table 5.13 DC Characteristics (1), changed
		61	Table 5 19 Output Values of Voltage (1) and Table 5 20 Output Values of Voltage (2) changed
		68	Table 5.22 Operation Frequency Value (Middle-Speed Operating Mode) changed
			Note 4 added
		69	Table 5.24 Clock Timing, changed
		78	Table 5.32 Timing of On-Chip Peripheral Modules (1) changed
		81	Table 5.35 Timing of On-Chip Peripheral Modules (4), changed
		82	Table 5.36 Timing of On-Chip Peripheral Modules (5): Note 2 deleted
		83	Figure 5.37 SCK Clock Input Timing changed
		84	Figure 5.38 SCI Input/Output Timing: Clock Synchronous Mode changed



Boy	Dete		Description						
Rev.	Date	Page	Summary						
1.20	Sep 29, 2014	85	Figure 5.41 RSPI Clock Timing and Simple SPI Clock Timing, Figure 5.42 RSPI Timing (Master, CPHA = 0) (Bit Rate: PCLKB Set to Division Ratio Other Than Divided by 2) and Simple SPI Timing (Master, CKPH = 1) changed						
		86	Figure 5.43 RSPI Timing (Master, CPHA = 0) (Bit Rate: PCLKB Set to Divided by 2) added, Figure 5.44 RSPI Timing (Master, CPHA = 1) (Bit Rate: PCLKB Set to Division Ratio Other Than Divided by 2) and Simple SPI Timing (Master, CKPH = 0) changed						
		87	Figure 5.45 RSPI Timing (Master, CPHA = 1) (Bit Rate: PCLKB Set to Divided by 2) added, Figure 5.46 RSPI Timing (Slave, CPHA = 0) and Simple SPI Timing (Slave, CKPH = 1) changed						
		88	Figure 5.47 RSPI Timing (Slave, CPHA = 1) and Simple SPI Timing (Slave, CKPH = 0) changed						
		89	Table 5.37 USB Characteristics (USB0_DP and USB0_DM Pin Characteristics) and Figure 5.49 USB0_DP and USB0_DM Output Timing, changed						
		90	Figure 5.50 Test Circuit, changed						
		91	Table 5.38 A/D Conversion Characteristics (1), Figure 5.51 AVCC0 to AVREFH0 Voltage Range, changed						
		92	Table 5.39 A/D Conversion Characteristics (2), Table 5.40 A/D Conversion Characteristics (3) changed						
		101	Table 5.49 ROM (Flash Memory for Code Storage) Characteristics (2) and Table 5.50 ROM (Flash Memory for Code Storage) Characteristics (3), changed						
		102	Table 5.52 E2 DataFlash Characteristics (2), Table 5.53 E2 DataFlash Characteristics (3) changed						
1.21	Dec 09, 2014	1. Overvie	w						
		2 to 4	Table 1.1 Outline of Specifications Unique ID, changed						
		5. Electrical Characteristics							
		51	Table 5.3 DC Characteristics (1) and Table 5.4 DC Characteristics (2), changed						
		61 Table 5.19 Output Voltage (1) and Table 5.20 Output Voltage (2), changed							
		102	Table 5.52 E2 DataFlash Characteristics (2): high-speed operating mode and Table 5.53 E2 DataFlash Characteristics (3): middle-speed operating mode, changed						

