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April 1st, 2010
Renesas Electronics Corporation

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1. Overview

The M32C/88 Group (M32C/88T) microcomputer is a single-chip control unit that utilizes high-performance silicon gate CMOS technology with the M32C/80 Series CPU core. The M32C/88 Group (M32C/88T) is available in 144-pin and 100-pin plastic molded LQFP packages.

With a 16-Mbyte address space, this microcomputer combines advanced instruction manipulation capabilities to process complex instructions by less bytes and execute instructions at higher speed.

It includes a multiplier and DMAC adequate for office automation, communication devices and industrial equipments, and other high-speed processing applications.

1.1 Applications

Automobiles, audio, cameras, office equipment, communications equipment, portable equipment, etc.

1.2 Performance Overview

Tables 1.1 and 1.2 list performance overview of the M32C/88 Group (M32C/88T).

Table 1.1 M32C/88 Group (M32C/88T) Performance (144-Pin Package)

	Characteristic	Performance
CPU	Basic Instructions	108 instructions
	Minimum Instruction Execution Time	31.3 ns (f(BCLK)=32 MHz, Vcc=4.2 V to 5.5 V)
	Operating Mode	Single-chip mode
	Address Space	16 Mbytes
	Memory Capacity	See Table 1.3
Peripheral Function	I/O Port	123 I/O pins and 1 input pin
	Multifunction Timer	Timer A: 16 bits x 5 channels, Timer B: 16 bits x 6 channels Three-phase motor control circuit
	Intelligent I/O	Time measurement function or Waveform generating function: 16 bits x 8 channels Communication function (Clock synchronous serial I/O, Clock asynchronous serial I/O, HDLC data processing)
	Serial I/O	5 Channels Clock synchronous serial I/O, Clock asynchronous serial I/O, IEBus ⁽¹⁾ , I ² C bus ⁽²⁾
	CAN Module	3 channels Supporting CAN 2.0B specification
	A/D Converter	10-bit A/D converter: 1 circuit, 34 channels
	D/A Converter	8 bits x 2 channels
	DMAC	4 channels
	DMAC II	Can be activated by all peripheral function interrupt sources Immediate transfer, Calculation transfer and Chain transfer functions
	CRC Calculation Circuit	CRC-CCITT
	X/Y Converter	16 bits x 16 bits
	Watchdog Timer	15 bits x 1 channel (with prescaler)
	Interrupt	40 internal and 8 external sources, 5 software sources Interrupt priority level: 7
	Clock Generation Circuit	4 circuits Main clock oscillation circuit(*), Sub clock oscillation circuit(*), On-chip oscillator, PLL frequency synthesizer (*)Equipped with a built-in feedback resistor. Ceramic resonator or crystal oscillator must be connected externally
	Oscillation Stop Detect Function	Main clock oscillation stop detect function
	Cold Start-up/Warm Start-up Determine Function	On-chip (option)
Electrical Characteristics	Supply Voltage	Vcc=4.2 V to 5.5 V, (f(BCLK)=32 MHz)
	Power Consumption	28 mA (Vcc=5 V, f(BCLK)=32 MHz) 10µA (Vcc=5 V, f(BCLK)=32 kHz, in wait mode)
Flash Memory	Program/Erase Supply Voltage	5.0 V ± 0.5 V
	Program and Erase Endurance	100 times (all space)
Operating Ambient Temperature		–40 to 85°C (T version) –40 to 105°C (U version)
Package		144-pin plastic molded LQFP

NOTES:

1. IEBus is a trademark of NEC Electronics Corporation.
2. I²C bus is a trademark of Koninklijke Philips Electronics N. V.

All options are on a request basis.

Table 1.2 M32C/88 Group (M32C/88T) Performance (100-Pin Package)

Characteristic		Performance
CPU	Basic Instructions	108 instructions
	Minimum Instruction Execution Time	31.3 ns (f(BCLK)=32 MHz, Vcc=4.2 V to 5.5 V)
Peripheral Function	Operating Mode	Single-chip mode
	Address Space	16 Mbytes
	Memory Capacity	See Table 1.3
	I/O Port	87 I/O pins and 1 input pin
	Multifunction Timer	Timer A: 16 bits x 5 channels, Timer B: 16 bits x 6 channels Three-phase motor control circuit
	Intelligent I/O	Time measurement function or Waveform generating function: 16 bits x 8 channels Communication function (Clock synchronous serial I/O, Clock asynchronous serial I/O, HDLC data processing)
	Serial I/O	5 Channels Clock synchronous serial I/O, Clock asynchronous serial I/O, IEBus ⁽¹⁾ , I ² C bus ⁽²⁾
	CAN Module	3 channels Supporting CAN 2.0B specification
	A/D Converter	10-bit A/D converter: 1 circuit, 34 channels
	D/A Converter	8 bits x 2 channels
	DMAC	4 channels
	DMAC II	Can be activated by all peripheral function interrupt sources Immediate transfer, Calculation transfer and Chain transfer functions
	CRC Calculation Circuit	CRC-CCITT
	X/Y Converter	16 bits x 16 bits
	Watchdog Timer	15 bits x 1 channel (with prescaler)
	Interrupt	40 internal and 8 external sources, 5 software sources Interrupt priority level: 7
	Clock Generation Circuit	4 circuits Main clock oscillation circuit(*), Sub clock oscillation circuit(*), On-chip oscillator, PLL frequency synthesizer (*)Equipped with a built-in feedback resistor. Ceramic resonator or crystal oscillator must be connected externally
	Oscillation Stop Detect Function	Main clock oscillation stop detect function
	Cold Start-up/Warm Start-up Determine Function	On-chip (option)
Electrical Characteristics	Supply Voltage	Vcc=4.2 V to 5.5 V, (f(BCLK)=32 MHz)
	Power Consumption	28 mA (Vcc=5 V, f(BCLK)=32 MHz) 10μA (Vcc=5 V, f(BCLK)=32 kHz, in wait mode)
Flash Memory	Program/Erase Supply Voltage	5.0 V ± 0.5 V
	Program and Erase Endurance	100 times (all space)
Operating Ambient Temperature		–40 to 85°C (T version) –40 to 105°C (U version)
Package		100-pin plastic molded LQFP

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All options are on a request basis.

1.3 Block Diagram

Figure 1.1 shows a block diagram of the M32C/88 Group (M32C/88T) microcomputer.

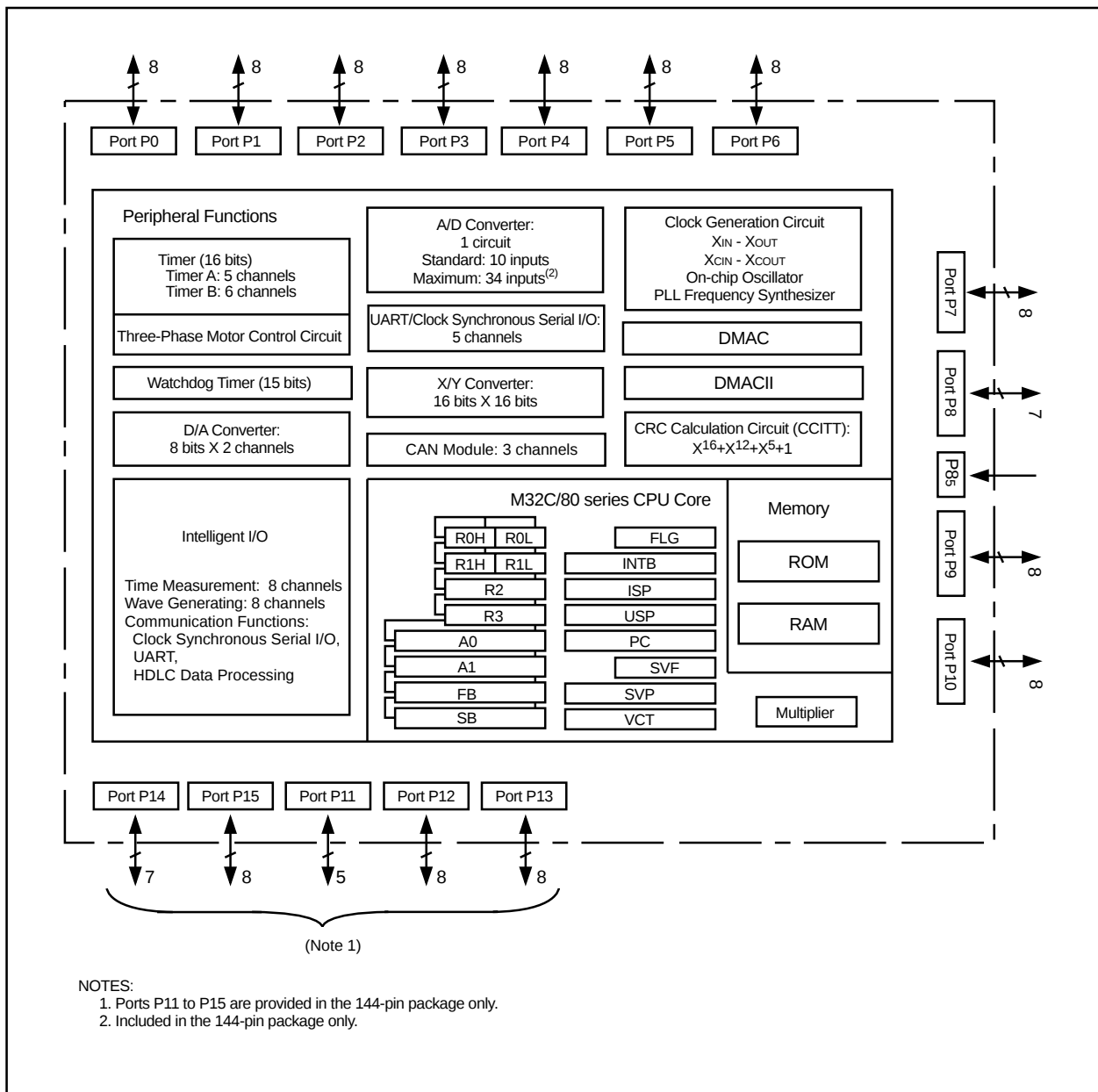


Figure 1.1 M32C/88 Group (M32C/88T) Block Diagram

1.4 Product Information

Table 1.3 lists the product information. Figure 1.2 shows the product numbering system.

Table 1.3 M32C/88 Group (1) (T version, M32C/88T)

As of October, 2005

Type Number	Package Type	ROM Capacity	RAM Capacity	Remarks
M30882FJTGP (D)	PLQP0144KA-A (144P6Q-A)	512K+4K	18K	Flash Memory T version (High-reliability 85° C)
M30880FJTGP (D)	PLQP0100KB-A (100P6Q-A)			
M30882FHTGP (D)	PLQP0144KA-A (144P6Q-A)	384K+4K		
M30880FHTGP (D)	PLQP0100KB-A (100P6Q-A)			
M30882FWTGP (D)	PLQP0144KA-A (144P6Q-A)	320K+4K		
M30880FWTGP (D)	PLQP0100KB-A (100P6Q-A)			

(D): Under development

Table 1.3 M32C/88 Group (2) (U version, M32C/88T)

As of October, 2005

Type Number	Package Type	ROM Capacity	RAM Capacity	Remarks
M30882FJUGP (D)	PLQP0144KA-A (144P6Q-A)	512K+4K	18K	Flash Memory U version (High-reliability 105° C)
M30880FJUGP (D)	PLQP0100KB-A (100P6Q-A)			
M30882FHUGP (D)	PLQP0144KA-A (144P6Q-A)	384K+4K		
M30880FHUGP (D)	PLQP0100KB-A (100P6Q-A)			
M30882FWUGP (D)	PLQP0144KA-A (144P6Q-A)	320K+4K		
M30880FWUGP (D)	PLQP0100KB-A (100P6Q-A)			

(D): Under development

NOTE:

Contact our sales office if you are interested in the V version.

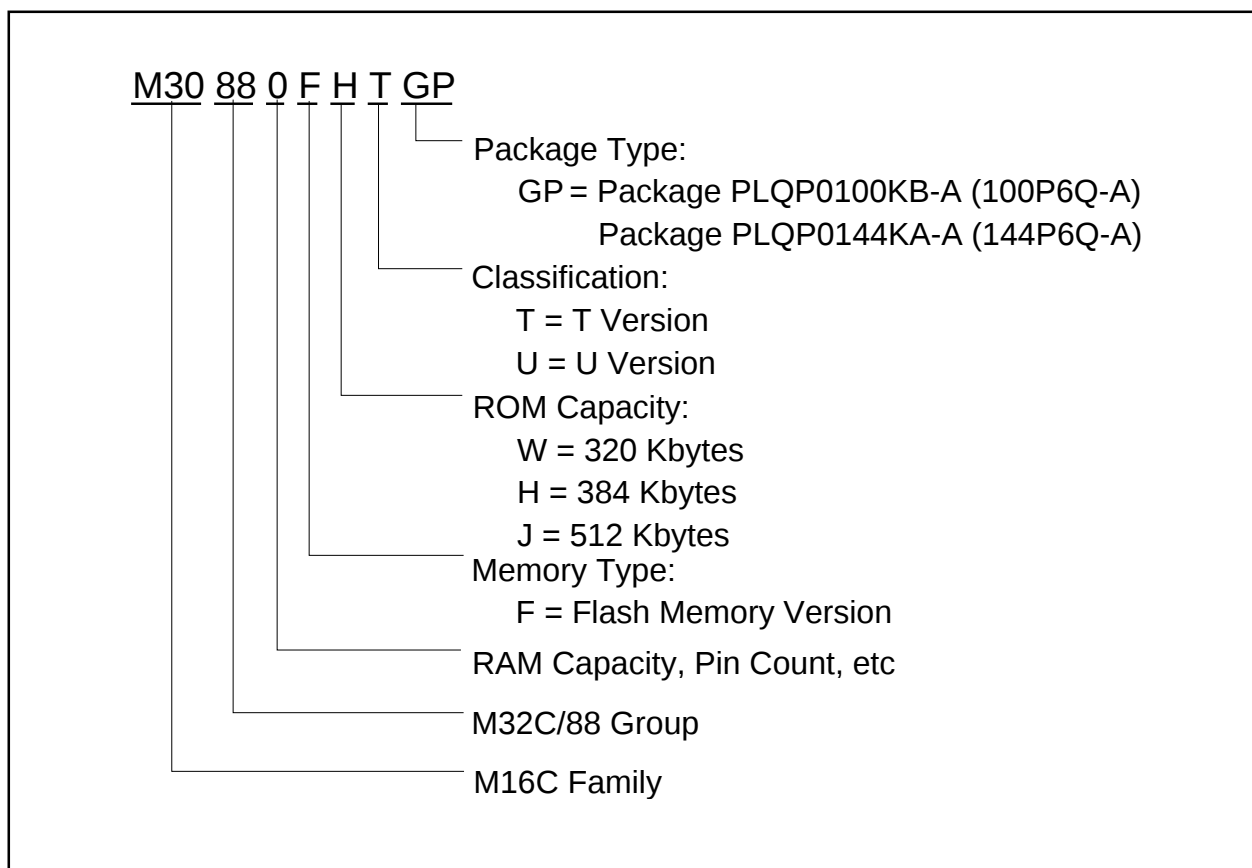


Figure 1.2 Product Numbering System

1.5 Pin Assignment

Figures 1.3 and 1.4 show pin assignments (top view).

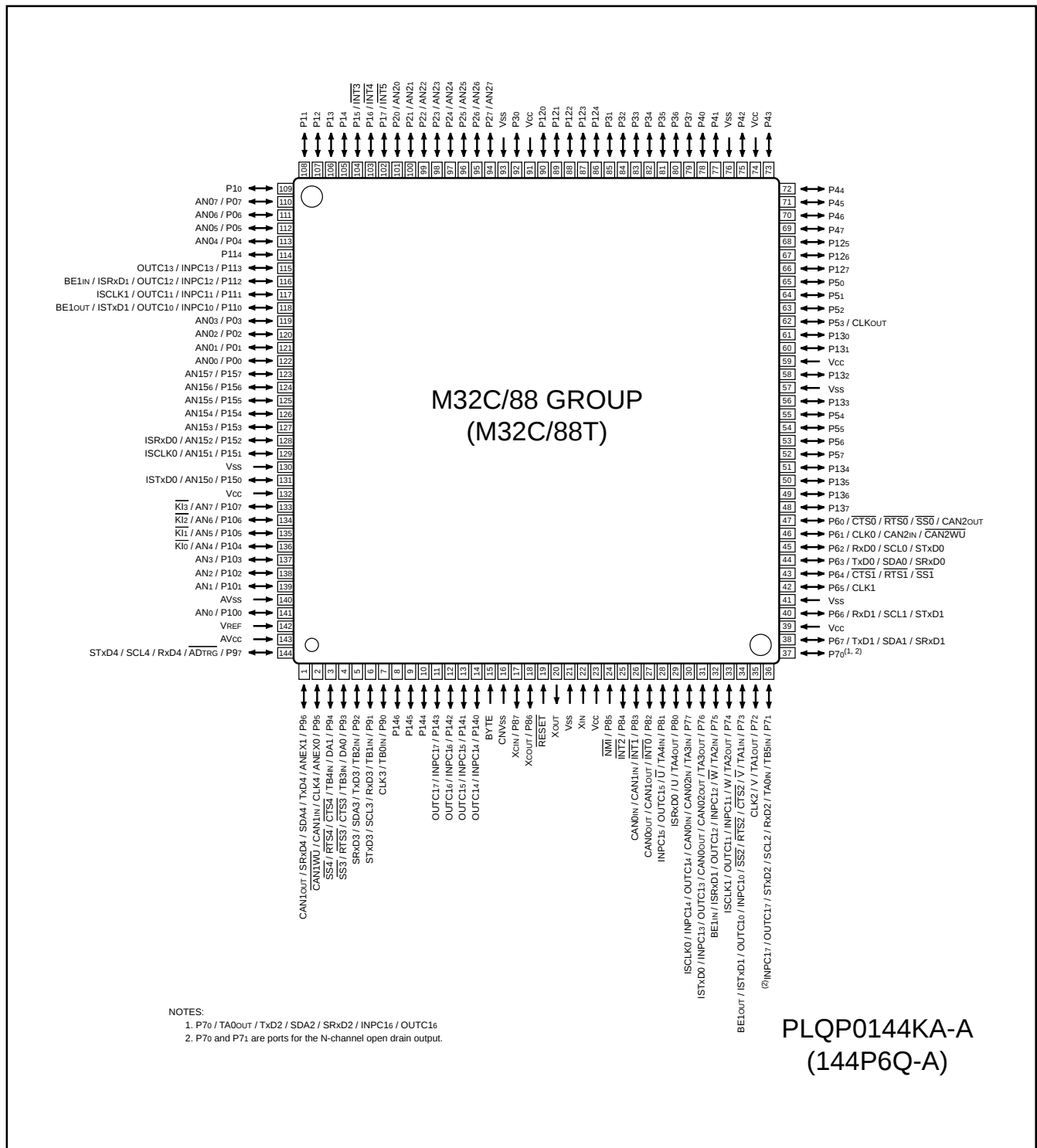


Figure 1.3 Pin Assignment for 144-Pin Package

Table 1.4 Pin Characteristics for 144-Pin Package

Pin No.	Control Pin	Port	Interrupt Pin	Timer Pin	UART/CAN Pin	Intelligent I/O Pin	Analog Pin
1		P96			TxD4/SDA4/SRx4/CAN1OUT		ANEX1
2		P95			CLK4/CAN1IN/CAN1WU		ANEX0
3		P94		TB4IN	CTS4/RTS4/SS4		DA1
4		P93		TB3IN	CTS3/RTS3/SS3		DA0
5		P92		TB2IN	TxD3/SDA3/SRx3		
6		P91		TB1IN	RxD3/SCL3/STxD3		
7		P90		TB0IN	CLK3		
8		P146					
9		P145					
10		P144					
11		P143				INPC17/OUTC17	
12		P142				INPC16/OUTC16	
13		P141				INPC15/OUTC15	
14		P140				INPC14/OUTC14	
15	BYTE						
16	CNVSS						
17	XCIN	P87					
18	XCOUT	P86					
19	RESET						
20	XOUT						
21	VSS						
22	XIN						
23	VCC						
24		P85	NMI				
25		P84	INT2				
26		P83	INT1		CAN0IN/CAN1IN		
27		P82	INT0		CAN0OUT/CAN1OUT		
28		P81		TA4IN/U		INPC15/OUTC15	
29		P80		TA4OUT/U		ISRxD0	
30		P77		TA3IN	CAN0IN/CAN02IN	INPC14/OUTC14/ISCLK0	
31		P76		TA3OUT	CAN0OUT/CAN02OUT	INPC13/OUTC13/ISTxD0	
32		P75		TA2IN/W		INPC12/OUTC12/ISRxD1/BE1IN	
33		P74		TA2OUT/W		INPC11/OUTC11/ISCLK1	
34		P73		TA1IN/V	CTS2/RTS2/SS2	INPC10/OUTC10/ISTxD1/BE1OUT	
35		P72		TA1OUT/V	CLK2		
36		P71		TB5IN/TA0IN	RxD2/SCL2/STxD2	INPC17/OUTC17	
37		P70		TA0OUT	TxD2/SDA2/SRx2	INPC16/OUTC16	
38	VCC	P67			TxD1/SDA1/SRx1		
39	VSS						
40		P66			RxD1/SCL1/STxD1		
41							
42		P65			CLK1		
43		P64			CTS1/RTS1/SS1		
44		P63			TxD0/SDA0/SRx0		
45		P62			RxD0/SCL0/STxD0		
46		P61			CLK0/CAN2IN/CAN2WU		
47		P60			CTS0/RTS0/SS0/CAN2OUT		
48		P137					

Table 1.4 Pin Characteristics for 144-Pin Package (Continued)

Pin No.	Control Pin	Port	Interrupt Pin	Timer Pin	UART/CAN Pin	Intelligent I/O Pin	Analog Pin
49		P136					
50		P135					
51		P134					
52		P57					
53		P56					
54		P55					
55		P54					
56		P133					
57	Vss						
58		P132					
59	Vcc						
60		P131					
61		P130					
62		P53					
63		P52					
64		P51					
65		P50					
66		P127					
67		P126					
68		P125					
69		P47					
70		P46					
71		P45					
72		P44					
73	Vcc	P43					
74							
75	Vss	P42					
76							
77		P41					
78		P40					
79		P37					
80		P36					
81		P35					
82		P34					
83		P33					
84		P32					
85		P31					
86		P124					
87		P123					
88		P122					
89		P121					
90	Vcc	P120					
91	Vss						
92		P30					
93							
94		P27					AN27
95		P26					AN26
96		P25					AN25

Table 1.4 Pin Characteristics for 144-Pin Package (Continued)

Pin No.	Control Pin	Port	Interrupt Pin	Timer Pin	UART/CAN Pin	Intelligent I/O Pin	Analog Pin
97		P24					AN24
98		P23					AN23
99		P22					AN22
100		P21					AN21
101		P20					AN20
102		P17	$\overline{\text{INT5}}$				
103		P16	$\overline{\text{INT4}}$				
104		P15	$\overline{\text{INT3}}$				
105		P14					
106		P13					
107		P12					
108		P11					
109		P10					
110		P07					AN07
111		P06					AN06
112		P05					AN05
113		P04					AN04
114		P114					
115		P113				INPC13/OUTC13	
116		P112				INPC12/OUTC12/ISRxD1/BE1IN	
117		P111				INPC11/OUTC11/ISCLK1	
118		P110				INPC10/OUTC10/ISTxD1/BE1OUT	
119		P03					AN03
120		P02					AN02
121		P01					AN01
122		P00					AN00
123		P157					AN157
124		P156					AN156
125		P155					AN155
126		P154					AN154
127		P153					AN153
128		P152				ISRxD0	AN152
129		P151				ISCLK0	AN151
130	Vss						
131		P150				ISTxD0	AN150
132	Vcc						
133		P107	$\overline{\text{KI3}}$				AN7
134		P106	$\overline{\text{KI2}}$				AN6
135		P105	$\overline{\text{KI1}}$				AN5
136		P104	$\overline{\text{KI0}}$				AN4
137		P103					AN3
138		P102					AN2
139		P101					AN1
140	AVss						
141		P100					AN0
142	VREF						
143	AVcc						
144		P97			RxD4/SCL4/STxD4		$\overline{\text{ADTRG}}$

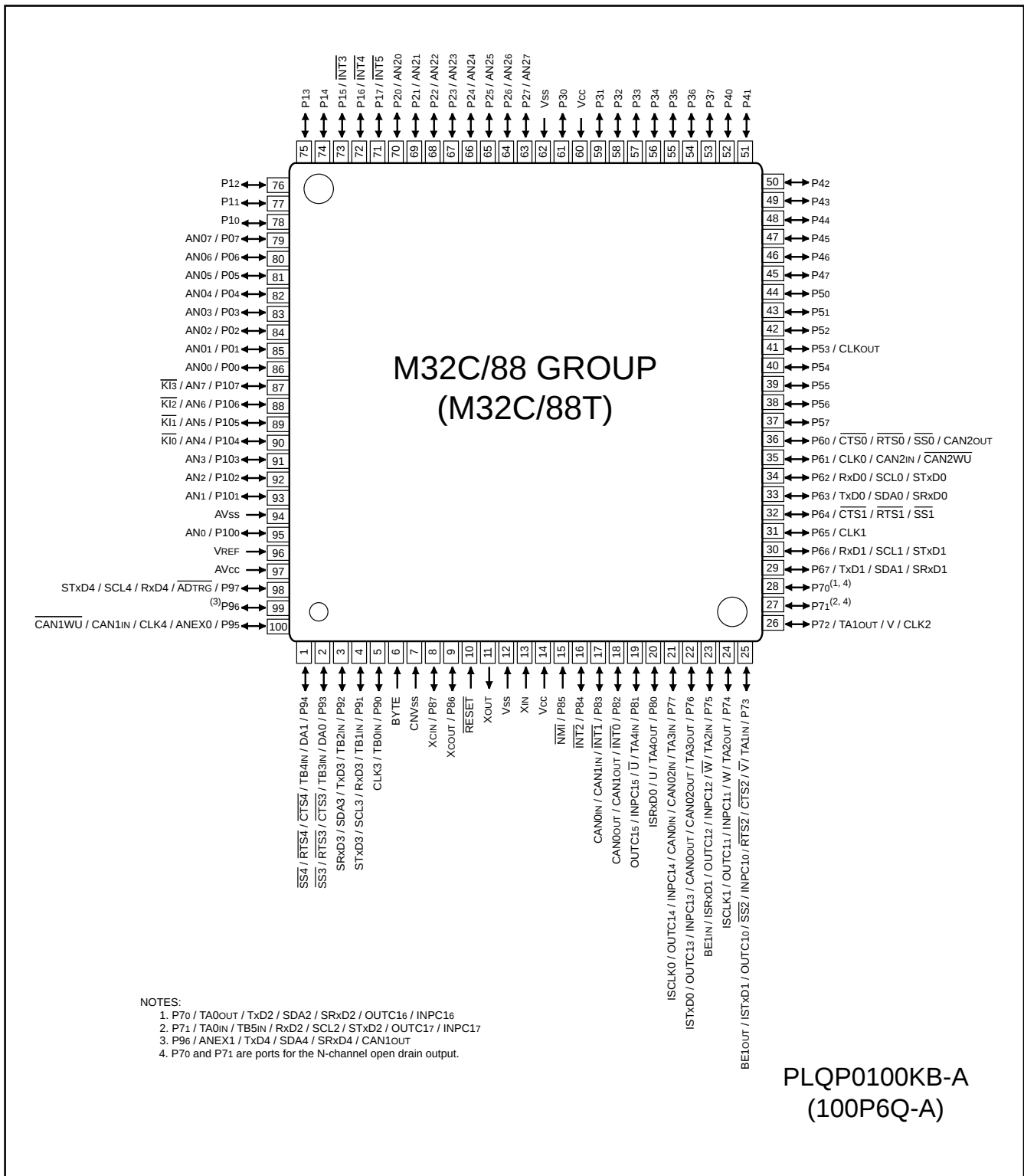


Figure 1.4 Pin Assignment for 100-Pin Package

Table 1.5 Pin Characteristics for 100-Pin Package

Pin No.	Control Pin	Port	Interrupt Pin	Timer Pin	UART/CAN Pin	Intelligent I/O Pin	Analog Pin
1		P94		TB4IN	$\overline{\text{CTS4}}/\overline{\text{RTS4}}/\overline{\text{SS4}}$		DA1
2		P93		TB3IN	$\overline{\text{CTS3}}/\overline{\text{RTS3}}/\overline{\text{SS3}}$		DA0
3		P92		TB2IN	TxD3/SDA3/SRxD3		
4		P91		TB1IN	RxD3/SCL3/STxD3		
5		P90		TB0IN	CLK3		
6	BYTE						
7	CNVss						
8	XCIN	P87					
9	XCOUT	P86					
10	$\overline{\text{RESET}}$						
11	XOUT						
12	Vss						
13	XIN						
14	Vcc						
15		P85	$\overline{\text{NMI}}$				
16		P84	$\overline{\text{INT2}}$				
17		P83	$\overline{\text{INT1}}$		CAN0IN/CAN1IN		
18		P82	$\overline{\text{INT0}}$		CAN0OUT/CAN1OUT		
19		P81		TA4IN/ $\overline{\text{U}}$		INPC15/OUTC15	
20		P80		TA4OUT/U		ISRxD0	
21		P77		TA3IN	CAN0IN/CAN02IN	INPC14/OUTC14/ISCLK0	
22		P76		TA3OUT	CAN0OUT/CAN02OUT	INPC13/OUTC13/ISTxD0	
23		P75		TA2IN/ $\overline{\text{W}}$		INPC12/OUTC12/ISRxD1/BE1IN	
24		P74		TA2OUT/W		INPC11/OUTC11/ISCLK1	
25		P73		TA1IN/ $\overline{\text{V}}$	$\overline{\text{CTS2}}/\overline{\text{RTS2}}/\overline{\text{SS2}}$	INPC10/OUTC10/ISTxD1/BE1OUT	
26		P72		TA1OUT/V	CLK2		
27		P71		TB5IN/TA0IN	RxD2/SCL2/STxD2	INPC17/OUTC17	
28		P70		TA0OUT	TxD2/SDA2/SRxD2	INPC16/OUTC16	
29		P67			TxD1/SDA1/SRxD1		
30		P66			RxD1/SCL1/STxD1		
31		P65			CLK1		
32		P64			$\overline{\text{CTS1}}/\overline{\text{RTS1}}/\overline{\text{SS1}}$		
33		P63			TxD0/SDA0/SRxD0		
34		P62			RxD0/SCL0/STxD0		
35		P61			CLK0/CAN2IN/CAN2WU		
36		P60			$\overline{\text{CTS0}}/\overline{\text{RTS0}}/\overline{\text{SS0}}/\text{CAN2OUT}$		
37		P57					
38		P56					
39		P55					
40		P54					
41		P53					
42		P52					
43		P51					
44		P50					
45		P47					
46		P46					
47		P45					
48		P44					
49		P43					
50		P42					

Table 1.5 Pin Characteristics for 100-Pin Package (Continued)

Pin No.	Control Pin	Port	Interrupt Pin	Timer Pin	UART/CAN Pin	Intelligent I/O Pin	Analog Pin
51		P41					
52		P40					
53		P37					
54		P36					
55		P35					
56		P34					
57		P33					
58		P32					
59		P31					
60	V _{CC}						
61		P30					
62	V _{SS}						
63		P27					AN27
64		P26					AN26
65		P25					AN25
66		P24					AN24
67		P23					AN23
68		P22					AN22
69		P21					AN21
70		P20					AN20
71		P17	$\overline{\text{INT5}}$				
72		P16	$\overline{\text{INT4}}$				
73		P15	$\overline{\text{INT3}}$				
74		P14					
75		P13					
76		P12					
77		P11					
78		P10					
79		P07					AN07
80		P06					AN06
81		P05					AN05
82		P04					AN04
83		P03					AN03
84		P02					AN02
85		P01					AN01
86		P00					AN00
87		P107	$\overline{\text{KI3}}$				AN7
88		P106	$\overline{\text{KI2}}$				AN6
89		P105	$\overline{\text{KI1}}$				AN5
90		P104	$\overline{\text{KI0}}$				AN4
91		P103					AN3
92		P102					AN2
93		P101					AN1
94	AV _{SS}						
95		P100					AN0
96	V _{REF}						
97	AV _{CC}						
98		P97			RxD4/SCL4/STxD4		$\overline{\text{ADTRG}}$
99		P96			TxD4/SDA4/SRxD4/CAN1 _{OUT}		ANEX1
100		P95			CLK4/CAN1IN/CAN1WU		ANEX0

1.6 Pin Description

Table 1.6 Pin Description (100-Pin and 144-Pin Packages)

Classification	Symbol	I/O Type	Function
Power Supply	Vcc Vss	I	Apply 4.2 to 5.5 V to both Vcc pins. Apply 0 V to the Vss pin
Analog Power Supply	AVcc AVss	I	Supplies power to the A/D converter. Connect the AVcc pin to Vcc and the AVss pin to Vss
Reset Input	RESET	I	The microcomputer is in a reset state when "L" is applied to the RESET pin
CNVss	CNVss	I	Switches processor mode. Connect the CNVss pin to Vss
Input to Switch External Data Bus Width	BYTE	I	Connect the BYTE pin to Vss
Main Clock Input	XIN	I	I/O pins for the main clock oscillation circuit. Connect a ceramic resonator or crystal oscillator between XIN and XOUT. To apply external clock, apply it to XIN and leave XOUT open.
Main Clock Output	XOUT	O	
Sub Clock Input	XCIN	I	I/O pins for the sub clock oscillation circuit. Connect a crystal oscillator between XCIN and Xcout. To apply external clock, apply it to XCIN and leave Xcout open
Sub Clock output	Xcout	O	
Clock Output	CLKOUT	O	Outputs the clock having the same frequency as fc, f8 or f32
INT Interrupt Input	INT0 to INT5	I	Input pins for the INT interrupt
NMI Interrupt Input	NMI	I	Input pin for the NMI interrupt
Key Input Interrupt	KI0 to KI3	I	Input pins for the key input interrupt
Timer A	TA0OUT to TA4OUT	I/O	I/O pins for the timer A0 to A4 (TA0OUT is a pin for the N-channel open drain output.)
	TA0IN to TA4IN	I	Input pins for Timer A0 to A4
Timer B	TB0IN to TB5IN	I	Input pins for Timer B0 to B5
Three-phase Motor Control Timer Output	U, $\bar{U}$, V, $\bar{V}$, W, $\bar{W}$	O	Output pins for the three-phase motor control timer
Serial I/O	CTS0 to CTS4	I	Input pins for data transmission control
	RTS0 to RTS4	O	Output pins for data reception control
	CLK0 to CLK4	I/O	Inputs and outputs the transfer clock
	RxD0 to RxD4	I	Inputs serial data
	TxD0 to TxD4	O	Outputs serial data (TxD2 is a pin for the N-channel open drain output.)
I ² C Mode	SDA0 to SDA4	I/O	Inputs and outputs serial data (SDA2 is a pin for the N-channel open drain output.)
	SCL0 to SCL4		Inputs and outputs the transfer clock (SCL2 is a pin for the N-channel open drain output.)
Serial I/O Special Function	STxD0 to STxD4	O	Outputs serial data when slave mode is selected (STxD2 is a pin for the N-channel open drain output.)
	SRxD0 to SRxD4	I	Inputs serial data when slave mode is selected
	SS0 to SS4	I	Input pins to control serial I/O special function

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

Table 1.6 Pin Description (100-Pin and 144-Pin Packages) (Continued)

Classification	Symbol	I/O Type	Function
Reference Voltage Input	VREF	I	Applies reference voltage to the A/D converter and D/A converter
A/D Converter	AN0 to AN7 AN00 to AN07 AN20 to AN27	I	Analog input pins for the A/D converter
	ADTRG	I	Input pin for an external A/D trigger
	ANEX0	I/O	Extended analog input pin for the A/D converter and output pin in external op-amp connection mode
	ANEX1	I	Extended analog input pin for the A/D converter
D/A Converter	DA0, DA1	O	Output pin for the D/A converter
Intelligent I/O	INPC10 to INPC17	I	Input pins for the time measurement function
	OUTC10 to OUTC17	O	Output pins for the waveform generating function (OUTC16 and OUTC17 assigned to P70 and P71 are pins for the N-channel open drain output.)
	ISCLK0 ISCLK1	I/O	Inputs and outputs the clock for the intelligent I/O communication function
	ISRXD0 ISRXD1	I	Inputs data for the intelligent I/O communication function
	ISTXD0 ISTXD1	O	Outputs data for the intelligent I/O communication function
	BE1IN	I	Inputs data for the intelligent I/O communication function
	BE1OUT	O	Outputs data for the intelligent I/O communication function
CAN	CAN0IN CAN02IN CAN1IN CAN2IN	I	Input pin for the CAN communication function
	CAN0OUT CAN02OUT CAN1OUT CAN2OUT	O	Output pin for the CAN communication function
	CAN1WU CAN2WU	I	Input pin for the CANi wake-up interrupt (i=1, 2)
I/O Ports	P00 to P07 P10 to P17 P20 to P27 P30 to P37 P40 to P47 P50 to P57	I/O	8-bit I/O ports for CMOS. Each port can be programmed for input or output under the control of the direction register. An input port can be set, by program, for a pull-up resistor available or for no pull-up resistor available in 4-bit units
	P60 to P67 P70 to P77 P90 to P97 P100 to P107	I/O	I/O ports having equivalent functions to P0 (P70 and P71 are ports for the N-channel open drain output.)
	P80 to P84 P86, P87	I/O	I/O ports having equivalent functions to P0
Input Port	P85	I	Shares a pin with NMI. NMI input state can be got by reading P85

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

Table 1.6 Pin Description (144-Pin Package Only) (Continued)

Classsification	Symbol	I/O Type	Function
A/D Converter	AN150 to AN157	I	Analog input pins for the A/D converter
I/O Ports	P110 to P114 P120 to P127 P130 to P137 P140 to P146 P150 to P157	I/O	I/O ports having equivalent functions to P0

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

2. Central Processing Unit (CPU)

Figure 2.1 shows the CPU registers.

The register bank is comprised of 8 registers (R0, R1, R2, R3, A0, A1, SB and FB) out of 28 CPU registers. Two sets of register banks are provided.

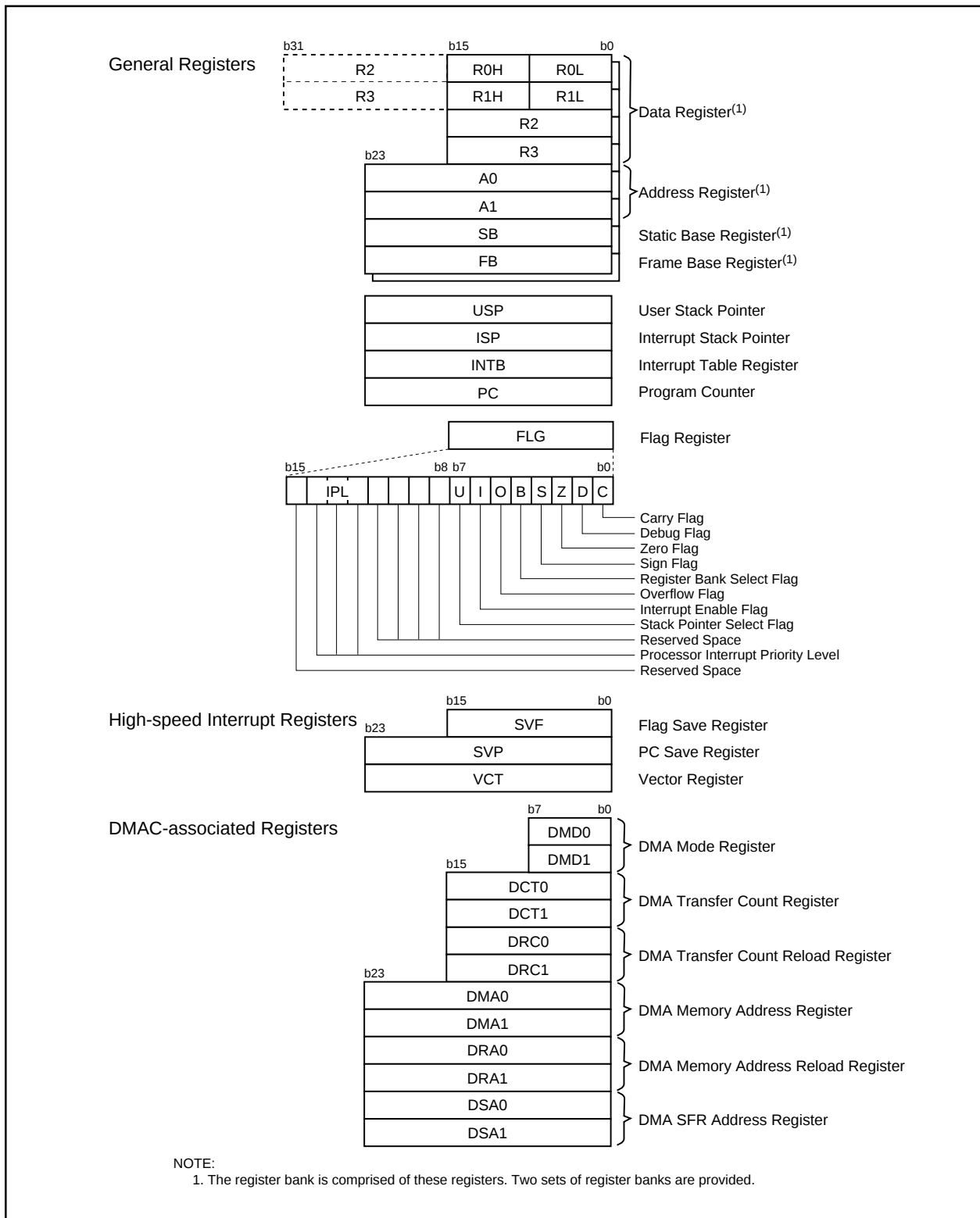


Figure 2.1 CPU Register

2.1 General Registers

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

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

2.1.2 Address Registers (A0 and A1)

A0 and A1 are 24-bit registers for A0-/A1-indirect addressing, A0-/A1-relative addressing, transfer, arithmetic and logic operations.

2.1.3 Static Base Register (SB)

SB is a 24-bit register for SB-relative addressing.

2.1.4 Frame Base Register (FB)

FB is a 24-bit register for FB-relative addressing.

2.1.5 Program Counter (PC)

PC, 24 bits wide, indicates the address of an instruction to be executed.

2.1.6 Interrupt Table Register (INTB)

INTB is a 24-bit register indicating the starting address of an relocatable interrupt vector table.

2.1.7 User Stack Pointer (USP), Interrupt Stack Pointer (ISP)

The stack pointers (SP), USP and ISP, are 24 bits wide each. The U flag is used to switch between USP and ISP. Refer to **2.1.8 Flag Register (FLG)** for details on the U flag. Set USP and ISP to even addresses to execute an interrupt sequence efficiently.

2.1.8 Flag Register (FLG)

FLG is a 16-bit register indicating a CPU state.

2.1.8.1 Carry Flag (C)

The C flag indicates whether carry or borrow has occurred after executing an instruction.

2.1.8.2 Debug Flag (D)

The D flag is for debug only. Set to "0".

2.1.8.3 Zero Flag (Z)

The Z flag is set to "1" when the value of zero is obtained from an arithmetic operation; otherwise "0".

2.1.8.4 Sign Flag (S)

The S flag is set to "1" when a negative value is obtained from an arithmetic operation; otherwise "0".

2.1.8.5 Register Bank Select Flag (B)

The register bank 0 is selected when the B flag is set to "0". The register bank 1 is selected when this flag is set to "1".

2.1.8.6 Overflow Flag (O)

The O flag is set to "1" when the result of an arithmetic operation overflows; otherwise "0".

2.1.8.7 Interrupt Enable Flag (I)

The I flag enables a maskable interrupt.

Interrupt is disabled when the I flag is set to "0" and enabled when the I flag is set to "1". The I flag is set to "0" when an interrupt is acknowledged.

2.1.8.8 Stack Pointer Select Flag (U)

ISP is selected when the U flag is set to "0". USP is selected when this flag is set to "1".

The U flag is set to "0" when a hardware interrupt is acknowledged or the INT instruction of software interrupt numbers 0 to 31 is executed.

2.1.8.9 Processor Interrupt Priority Level (IPL)

IPL, 3 bits wide, assigns processor interrupt priority levels from level 0 to level 7.

If a requested interrupt has greater priority than IPL, the interrupt is enabled.

2.1.8.10 Reserved Space

When writing to a reserved space, set to "0". When reading, its content is indeterminate.

2.2 High-Speed Interrupt Registers

Registers associated with the high-speed interrupt are as follows:

- Flag save register (SVF)
- PC save register (SVP)
- Vector register (VCT)

2.3 DMAC-Associated Registers

Registers associated with DMAC are as follows:

- DMA mode register (DMD0, DMD1)
- DMA transfer count register (DCT0, DCT1)
- DMA transfer count reload register (DRC0, DRC1)
- DMA memory address register (DMA0, DMA1)
- DMA SFR address register (DSA0, DSA1)
- DMA memory address reload register (DRA0, DRA1)

3. Memory

Figure 3.1 shows a memory map of the M32C/88 Group (M32C/88T).

The M32C/88 Group (M32C/88T) provides 16-Mbyte address space addressed from 000000₁₆ to FFFFFFF₁₆.

The internal ROM is allocated from address FFFFFFF₁₆ to lower. For example, a 64-Kbyte internal ROM is addressed from FF0000₁₆ to FFFFFFF₁₆.

The fixed interrupt vectors are allocated from address FFFFDC₁₆ to FFFFFFF₁₆. It stores the starting address of each interrupt routine.

The internal RAM is allocated from address 000400₁₆ to higher. For example, a 10-Kbyte internal RAM is allocated from address 000400₁₆ to 002BFF₁₆. Besides storing data, it becomes stacks when the subroutine is called or an interrupt is acknowledged.

SFRs, consisting of control registers for peripheral functions such as I/O port, A/D converter, serial I/O, timers, is allocated from address 000000₁₆ to 0003FF₁₆. All blank spaces within SFRs are reserved and cannot be accessed by users.

The special page vectors are addressed from FFFE00₁₆ to FFFFDB₁₆. It is used for the JMPS instruction and JSRS instruction. Refer to the Renesas publication **M32C/80 Series Software Manual** for details.

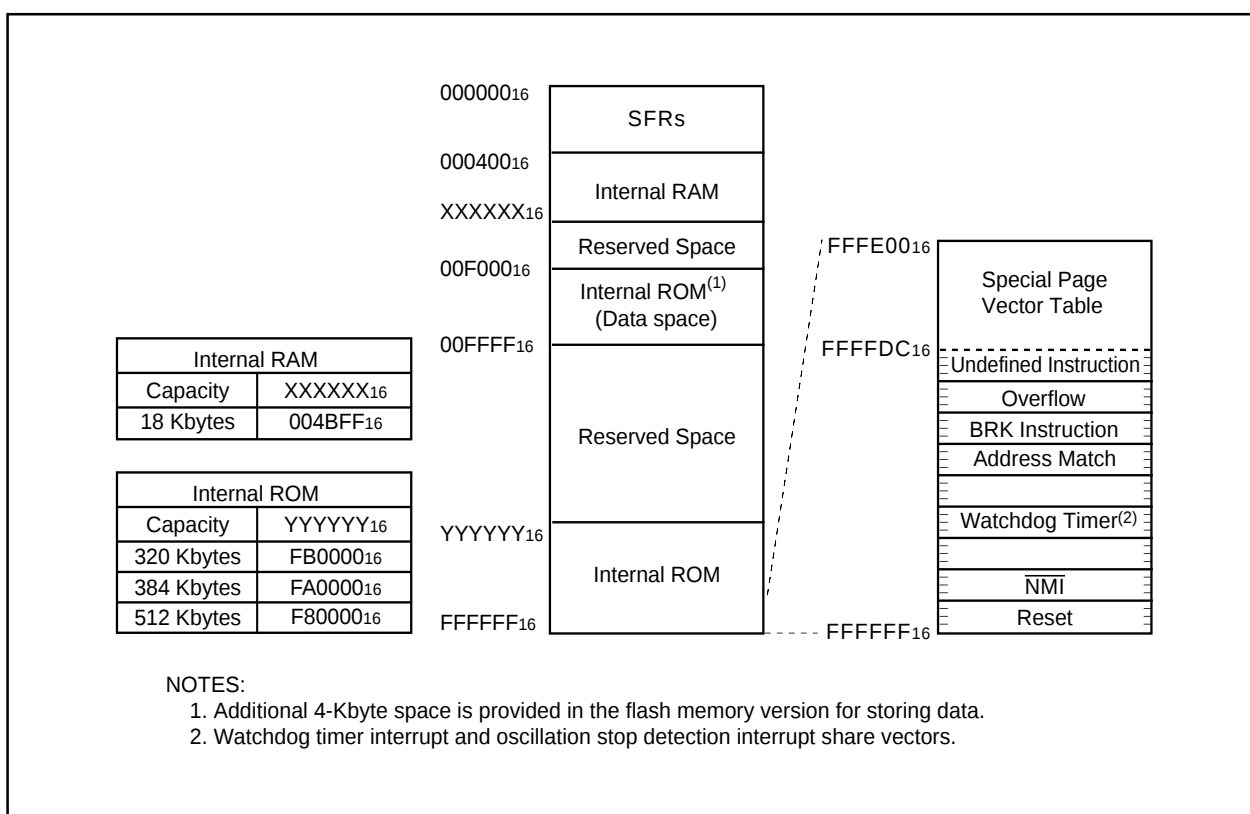


Figure 3.1 Memory Map

4. Special Function Registers (SFRs)

Address	Register	Symbol	Value after RESET
0000 ₁₆			
0001 ₁₆			
0002 ₁₆			
0003 ₁₆			
0004 ₁₆	Processor Mode Register ⁽¹⁾	PM0	1000 0000 ₂ (CNVss pin ="L")
0005 ₁₆	Processor Mode Register 1	PM1	00 ₁₆
0006 ₁₆	System Clock Control Register 0	CM0	0000 1000 ₂
0007 ₁₆	System Clock Control Register 1	CM1	0010 0000 ₂
0008 ₁₆			
0009 ₁₆	Address Match Interrupt Enable Register	AIER	00 ₁₆
000A ₁₆	Protect Register	PRCR	XXXX 0000 ₂
000B ₁₆			
000C ₁₆	Main Clock Division Register	MCD	XXX0 1000 ₂
000D ₁₆	Oscillation Stop Detection Register	CM2	00 ₁₆
000E ₁₆	Watchdog Timer Start Register	WDTS	XX ₁₆
000F ₁₆	Watchdog Timer Control Register	WDC	000X XXXX ₂
0010 ₁₆	Address Match Interrupt Register 0	RMAD0	000000 ₁₆
0011 ₁₆			
0012 ₁₆			
0013 ₁₆	Processor Mode Register 2	PM2	00 ₁₆
0014 ₁₆	Address Match Interrupt Register 1	RMAD1	000000 ₁₆
0015 ₁₆			
0016 ₁₆			
0017 ₁₆			
0018 ₁₆	Address Match Interrupt Register 2	RMAD2	000000 ₁₆
0019 ₁₆			
001A ₁₆			
001B ₁₆			
001C ₁₆	Address Match Interrupt Register 3	RMAD3	000000 ₁₆
001D ₁₆			
001E ₁₆			
001F ₁₆			
0020 ₁₆			
0021 ₁₆			
0022 ₁₆			
0023 ₁₆			
0024 ₁₆			
0025 ₁₆			
0026 ₁₆	PLL Control Register 0	PLC0	0001 X010 ₂
0027 ₁₆	PLL Control Register 1	PLC1	000X 0000 ₂
0028 ₁₆	Address Match Interrupt Register 4	RMAD4	000000 ₁₆
0029 ₁₆			
002A ₁₆			
002B ₁₆			
002C ₁₆	Address Match Interrupt Register 5	RMAD5	000000 ₁₆
002D ₁₆			
002E ₁₆			
002F ₁₆			

X: Indeterminate

Blank spaces are reserved. No access is allowed.

NOTE:

1. The PM01 and PM00 bits in the PM0 register maintain values set before reset, even after software reset or watchdog timer reset has been performed.

Address	Register	Symbol	Value after RESET
0060 ₁₆			
0030 ₁₆			
0031 ₁₆			
0032 ₁₆			
0033 ₁₆			
0034 ₁₆			
0035 ₁₆			
0036 ₁₆			
0037 ₁₆			
0038 ₁₆ 0039 ₁₆ 003A ₁₆	Address Match Interrupt Register 6	RMAD6	000000 ₁₆
003B ₁₆			
003C ₁₆ 003D ₁₆ 003E ₁₆	Address Match Interrupt Register 7	RMAD7	000000 ₁₆
003F ₁₆			
0040 ₁₆			
0041 ₁₆			
0042 ₁₆			
0043 ₁₆			
0044 ₁₆			
0045 ₁₆			
0046 ₁₆			
0047 ₁₆			
0048 ₁₆			
0049 ₁₆			
004A ₁₆			
004B ₁₆			
004C ₁₆			
004D ₁₆			
004E ₁₆			
004F ₁₆			
0050 ₁₆			
0051 ₁₆			
0052 ₁₆			
0053 ₁₆			
0054 ₁₆			
0055 ₁₆ 0056 ₁₆	Flash Memory Control Register 1	FMR1	0000 0101 ₂
0057 ₁₆ 0058 ₁₆	Flash Memory Control Register 0	FMR0	0000 0001 ₂
0059 ₁₆			
005A ₁₆			
005B ₁₆			
005C ₁₆			
005D ₁₆			
005E ₁₆			
005F ₁₆			

X: Indeterminate

Blank spaces are reserved. No access is allowed.

Address	Register	Symbol	Value after RESET
0060 ₁₆			
0061 ₁₆			
0062 ₁₆			
0063 ₁₆			
0064 ₁₆			
0065 ₁₆			
0066 ₁₆			
0067 ₁₆			
0068 ₁₆	DMA0 Interrupt Control Register	DM0IC	XXXX X000 ₂
0069 ₁₆	Timer B5 Interrupt Control Register	TB5IC	XXXX X000 ₂
006A ₁₆	DMA2 Interrupt Control Register	DM2IC	XXXX X000 ₂
006B ₁₆	UART2 Receive /ACK Interrupt Control Register	S2RIC	XXXX X000 ₂
006C ₁₆	Timer A0 Interrupt Control Register	TA0IC	XXXX X000 ₂
006D ₁₆	UART3 Receive /ACK Interrupt Control Register	S3RIC	XXXX X000 ₂
006E ₁₆	Timer A2 Interrupt Control Register	TA2IC	XXXX X000 ₂
006F ₁₆	UART4 Receive /ACK Interrupt Control Register	S4RIC	XXXX X000 ₂
0070 ₁₆	Timer A4 Interrupt Control Register	TA4IC	XXXX X000 ₂
0071 ₁₆	UART0/UART3 Bus Conflict Detect Interrupt Control Register	BCN0IC/BCN3IC	XXXX X000 ₂
0072 ₁₆	UART0 Receive/ACK Interrupt Control Register	S0RIC	XXXX X000 ₂
0073 ₁₆	A/D0 Conversion Interrupt Control Register	AD0IC	XXXX X000 ₂
0074 ₁₆	UART1 Receive/ACK Interrupt Control Register	S1RIC	XXXX X000 ₂
0075 ₁₆	Intelligent I/O Interrupt Control Register 0/ CAN Interrupt 3 Control Register	IIO0IC/ CAN3IC	XXXX X000 ₂
0076 ₁₆	Timer B1 Interrupt Control Register	TB1IC	XXXX X000 ₂
0077 ₁₆	Intelligent I/O Interrupt Control Register 2/ CAN Interrupt 6 Control Register	IIO2IC/ CAN6IC	XXXX X000 ₂
0078 ₁₆	Timer B3 Interrupt Control Register	TB3IC	XXXX X000 ₂
0079 ₁₆	Intelligent I/O Interrupt Control Register 4	IIO4IC	XXXX X000 ₂
007A ₁₆	INT5 Interrupt Control Register	INT5IC	XX00 X000 ₂
007B ₁₆	CAN Interrupt 8 Control Register	CAN8IC	XXXX X000 ₂
007C ₁₆	INT3 Interrupt Control Register	INT3IC	XX00 X000 ₂
007D ₁₆	Intelligent I/O Interrupt Control Register 8	IIO8IC	XXXX X000 ₂
007E ₁₆	INT1 Interrupt Control Register	INT1IC	XX00 X000 ₂
007F ₁₆	Intelligent I/O Interrupt Control Register 10/ CAN Interrupt 1 Control Register	IIO10IC/ CAN1IC	XXXX X000 ₂
0080 ₁₆			
0081 ₁₆	CAN Interrupt 2 Control Register	CAN2IC	XXXX X000 ₂
0082 ₁₆			
0083 ₁₆			
0084 ₁₆			
0085 ₁₆			
0086 ₁₆			
0087 ₁₆			
0088 ₁₆	DMA1 Interrupt Control Register	DM1IC	XXXX X000 ₂
0089 ₁₆	UART2 Transmit /NACK Interrupt Control Register	S2TIC	XXXX X000 ₂
008A ₁₆	DMA3 Interrupt Control Register	DM3IC	XXXX X000 ₂
008B ₁₆	UART3 Transmit /NACK Interrupt Control Register	S3TIC	XXXX X000 ₂
008C ₁₆	Timer A1 Interrupt Control Register	TA1IC	XXXX X000 ₂
008D ₁₆	UART4 Transmit /NACK Interrupt Control Register	S4TIC	XXXX X000 ₂
008E ₁₆	Timer A3 Interrupt Control Register	TA3IC	XXXX X000 ₂
008F ₁₆	UART2 Bus Conflict Detect Interrupt Control Register	BCN2IC	XXXX X000 ₂

X: Indeterminate

Blank spaces are reserved. No access is allowed.

Address	Register	Symbol	Value after RESET
0090 ₁₆	UART0 Transmit /NACK Interrupt Control Register	S0TIC	XXXX X000 ₂
0091 ₁₆	UART1/UART4 Bus Conflict Detect Interrupt Control Register	BCN1IC/BCN4IC	XXXX X000 ₂
0092 ₁₆	UART1 Transmit/NACK Interrupt Control Register	S1TIC	XXXX X000 ₂
0093 ₁₆	Key Input Interrupt Control Register	KUPIC	XXXX X000 ₂
0094 ₁₆	Timer B0 Interrupt Control Register	TB0IC	XXXX X000 ₂
0095 ₁₆	Intelligent I/O Interrupt Control Register 1/ CAN Interrupt 4 Control Register	IIO1IC/ CAN4IC	XXXX X000 ₂
0096 ₁₆	Timer B2 Interrupt Control Register	TB2IC	XXXX X000 ₂
0097 ₁₆	Intelligent I/O Interrupt Control Register 3/ CAN Interrupt 7 Control Register	IIO3IC/ CAN7IC	XXXX X000 ₂
0098 ₁₆	Timer B4 Interrupt Control Register	TB4IC	XXXX X000 ₂
0099 ₁₆	CAN Interrupt 5 Control Register	CAN5IC	XXXX X000 ₂
009A ₁₆	INT4 Interrupt Control Register	INT4IC	XX00 X000 ₂
009B ₁₆			
009C ₁₆	INT2 Interrupt Control Register	INT2IC	XX00 X000 ₂
009D ₁₆	Intelligent I/O Interrupt Control Register 9/ CAN Interrupt 0 Control Register	IIO9IC/ CAN0IC	XXXX X000 ₂
009E ₁₆	INT0 Interrupt Control Register	INT0IC	XX00 X000 ₂
009F ₁₆	Exit Priority Control Register	RLVL	XXXX 0000 ₂
00A0 ₁₆	Interrupt Request Register 0	IIO0IR	0000 000X ₂
00A1 ₁₆	Interrupt Request Register 1	IIO1IR	0000 000X ₂
00A2 ₁₆	Interrupt Request Register 2	IIO2IR	0000 000X ₂
00A3 ₁₆	Interrupt Request Register 3	IIO3IR	0000 000X ₂
00A4 ₁₆	Interrupt Request Register 4	IIO4IR	0000 000X ₂
00A5 ₁₆	Interrupt Request Register 5	IIO5IR	0000 000X ₂
00A6 ₁₆	Interrupt Request Register 6	IIO6IR	0000 000X ₂
00A7 ₁₆			
00A8 ₁₆	Interrupt Request Register 8	IIO8IR	0000 000X ₂
00A9 ₁₆	Interrupt Request Register 9	IIO9IR	0000 000X ₂
00AA ₁₆	Interrupt Request Register 10	IIO10IR	0000 000X ₂
00AB ₁₆	Interrupt Request Register 11	IIO11IR	0000 000X ₂
00AC ₁₆			
00AD ₁₆			
00AE ₁₆			
00AF ₁₆			
00B0 ₁₆	Interrupt Enable Register 0	IIO0IE	00 ₁₆
00B1 ₁₆	Interrupt Enable Register 1	IIO1IE	00 ₁₆
00B2 ₁₆	Interrupt Enable Register 2	IIO2IE	00 ₁₆
00B3 ₁₆	Interrupt Enable Register 3	IIO3IE	00 ₁₆
00B4 ₁₆	Interrupt Enable Register 4	IIO4IE	00 ₁₆
00B5 ₁₆	Interrupt Enable Register 5	IIO5IE	00 ₁₆
00B6 ₁₆	Interrupt Enable Register 6	IIO6IE	00 ₁₆
00B7 ₁₆			
00B8 ₁₆	Interrupt Enable Register 8	IIO8IE	00 ₁₆
00B9 ₁₆	Interrupt Enable Register 9	IIO9IE	00 ₁₆
00BA ₁₆	Interrupt Enable Register 10	IIO10IE	00 ₁₆
00BB ₁₆	Interrupt Enable Register 11	IIO11IE	00 ₁₆
00BC ₁₆			
00BD ₁₆			
00BE ₁₆			
00BF ₁₆			

X: Indeterminate

Blank spaces are reserved. No access is allowed.

Address	Register	Symbol	Value after RESET
00C0 ₁₆			
00C1 ₁₆			
00C2 ₁₆			
00C3 ₁₆			
00C4 ₁₆			
00C5 ₁₆			
00C6 ₁₆			
00C7 ₁₆			
00C8 ₁₆			
00C9 ₁₆			
00CA ₁₆			
00CB ₁₆			
00CC ₁₆			
00CD ₁₆			
00CE ₁₆			
00CF ₁₆			
00D0 ₁₆			
00D1 ₁₆			
00D2 ₁₆			
00D3 ₁₆			
00D4 ₁₆			
00D5 ₁₆			
00D6 ₁₆			
00D7 ₁₆			
00D8 ₁₆			
00D9 ₁₆			
00DA ₁₆			
00DB ₁₆			
00DC ₁₆			
00DD ₁₆			
00DE ₁₆			
00DF ₁₆			
00E0 ₁₆			
00E1 ₁₆			
00E2 ₁₆			
00E3 ₁₆			
00E4 ₁₆			
00E5 ₁₆			
00E6 ₁₆			
00E7 ₁₆			
00E8 ₁₆ 00E9 ₁₆	SI/O Receive Buffer Register 0	G0RB	XXXX XXXX ₂ XXX0 XXXX ₂
00EA ₁₆ 00EB ₁₆	Transmit Buffer/Receive Data Register 0	G0TB/G0DR	XX ₁₆
00EC ₁₆	Receive Input Register 0	G0RI	XX ₁₆
00ED ₁₆	SI/O Communication Mode Register 0	G0MR	00 ₁₆
00EE ₁₆	Transmit Output Register 0	G0TO	XX ₁₆
00EF ₁₆	SI/O Communication Control Register 0	G0CR	0000 X011 ₂

X: Indeterminate

Blank spaces are reserved. No access is allowed.

Address	Register	Symbol	Value after RESET
00F0 ₁₆	Data Compare Register 00	G0CMP0	XX ₁₆
00F1 ₁₆	Data Compare Register 01	G0CMP1	XX ₁₆
00F2 ₁₆	Data Compare Register 02	G0CMP2	XX ₁₆
00F3 ₁₆	Data Compare Register 03	G0CMP3	XX ₁₆
00F4 ₁₆	Data Mask Register 00	G0MSK0	XX ₁₆
00F5 ₁₆	Data Mask Register 01	G0MSK1	XX ₁₆
00F6 ₁₆	Communication Clock Select Register	CCS	XXXX 0000 ₂
00F7 ₁₆			
00F8 ₁₆	Receive CRC Code Register 0	G0RCRC	XX ₁₆
00F9 ₁₆			XX ₁₆
00FA ₁₆	Transmit CRC Code Register 0	G0TCRC	00 ₁₆
00FB ₁₆			00 ₁₆
00FC ₁₆	SI/O Extended Mode Register 0	G0EMR	00 ₁₆
00FD ₁₆	SI/O Extended Receive Control Register 0	G0ERC	00 ₁₆
00FE ₁₆	SI/O Special Communication Interrupt Detect Register 0	G0IRF	00 ₁₆
00FF ₁₆	SI/O Extended Transmit Control Register 0	G0ETC	0000 0XXX ₂
0100 ₁₆	Time Measurement/Waveform Generating Register 10	G1TM0/G1PO0	XX ₁₆
0101 ₁₆			XX ₁₆
0102 ₁₆	Time Measurement/Waveform Generating Register 11	G1TM1/G1PO1	XX ₁₆
0103 ₁₆			XX ₁₆
0104 ₁₆	Time Measurement/Waveform Generating Register 12	G1TM2/G1PO2	XX ₁₆
0105 ₁₆			XX ₁₆
0106 ₁₆	Time Measurement/Waveform Generating Register 13	G1TM3/G1PO3	XX ₁₆
0107 ₁₆			XX ₁₆
0108 ₁₆	Time Measurement/Waveform Generating Register 14	G1TM4/G1PO4	XX ₁₆
0109 ₁₆			XX ₁₆
010A ₁₆	Time Measurement/Waveform Generating Register 15	G1TM5/G1PO5	XX ₁₆
010B ₁₆			XX ₁₆
010C ₁₆	Time Measurement/Waveform Generating Register 16	G1TM6/G1PO6	XX ₁₆
010D ₁₆			XX ₁₆
010E ₁₆	Time Measurement/Waveform Generating Register 17	G1TM7/G1PO7	XX ₁₆
010F ₁₆			XX ₁₆
0110 ₁₆	Waveform Generating Control Register 10	G1POCR0	0000 X000 ₂
0111 ₁₆	Waveform Generating Control Register 11	G1POCR1	0X00 X000 ₂
0112 ₁₆	Waveform Generating Control Register 12	G1POCR2	0X00 X000 ₂
0113 ₁₆	Waveform Generating Control Register 13	G1POCR3	0X00 X000 ₂
0114 ₁₆	Waveform Generating Control Register 14	G1POCR4	0X00 X000 ₂
0115 ₁₆	Waveform Generating Control Register 15	G1POCR5	0X00 X000 ₂
0116 ₁₆	Waveform Generating Control Register 16	G1POCR6	0X00 X000 ₂
0117 ₁₆	Waveform Generating Control Register 17	G1POCR7	0X00 X000 ₂
0118 ₁₆	Time Measurement Control Register 10	G1TMCR0	00 ₁₆
0119 ₁₆	Time Measurement Control Register 11	G1TMCR1	00 ₁₆
011A ₁₆	Time Measurement Control Register 12	G1TMCR2	00 ₁₆
011B ₁₆	Time Measurement Control Register 13	G1TMCR3	00 ₁₆
011C ₁₆	Time Measurement Control Register 14	G1TMCR4	00 ₁₆
011D ₁₆	Time Measurement Control Register 15	G1TMCR5	00 ₁₆
011E ₁₆	Time Measurement Control Register 16	G1TMCR6	00 ₁₆
011F ₁₆	Time Measurement Control Register 17	G1TMCR7	00 ₁₆

X: Indeterminate

Blank spaces are reserved. No access is allowed.

Address	Register	Symbol	Value after RESET
0120 ₁₆ 0121 ₁₆	Base Timer Register 1	G1BT	XX ₁₆ XX ₁₆
0122 ₁₆	Base Timer Control Register 10	G1BCR0	00 ₁₆
0123 ₁₆	Base Timer Control Register 11	G1BCR1	X000 000X ₂
0124 ₁₆	Time Measurement Prescaler Register 16	G1TPR6	00 ₁₆
0125 ₁₆	Time Measurement Prescaler Register 17	G1TPR7	00 ₁₆
0126 ₁₆	Function Enable Register 1	G1FE	00 ₁₆
0127 ₁₆	Function Select Register 1	G1FS	00 ₁₆
0128 ₁₆ 0129 ₁₆	SI/O Receive Buffer Register 1	G1RB	XXXX XXXX ₂ X000 XXXX ₂
012A ₁₆ 012B ₁₆	Transmit Buffer/Receive Data Register 1	G1TB/G1DR	XX ₁₆
012C ₁₆	Receive Input Register 1	G1RI	XX ₁₆
012D ₁₆	SI/O Communication Mode Register 1	G1MR	00 ₁₆
012E ₁₆	Transmit Output Register 1	G1TO	XX ₁₆
012F ₁₆	SI/O Communication Control Register 1	G1CR	0000 X011 ₂
0130 ₁₆	Data Compare Register 10	G1CMP0	XX ₁₆
0131 ₁₆	Data Compare Register 11	G1CMP1	XX ₁₆
0132 ₁₆	Data Compare Register 12	G1CMP2	XX ₁₆
0133 ₁₆	Data Compare Register 13	G1CMP3	XX ₁₆
0134 ₁₆	Data Mask Register 10	G1MSK0	XX ₁₆
0135 ₁₆	Data Mask Register 11	G1MSK1	XX ₁₆
0136 ₁₆			
0137 ₁₆			
0138 ₁₆ 0139 ₁₆	Receive CRC Code Register 1	G1RCRC	XX ₁₆ XX ₁₆
013A ₁₆ 013B ₁₆	Transmit CRC Code Register 1	G1TCRC	00 ₁₆ 00 ₁₆
013C ₁₆	SI/O Extended Mode Register 1	G1EMR	00 ₁₆
013D ₁₆	SI/O Extended Receive Control Register 1	G1ERC	00 ₁₆
013E ₁₆	SI/O Special Communication Interrupt Detection Register 1	G1IRF	00 ₁₆
013F ₁₆	SI/O Extended Transmit Control Register 1	G1ETC	0000 0XXX ₂
0140 ₁₆			
0141 ₁₆			
0142 ₁₆			
0143 ₁₆			
0144 ₁₆			
0145 ₁₆			
0146 ₁₆			
0147 ₁₆			
0148 ₁₆			
0149 ₁₆			
014A ₁₆			
014B ₁₆			
014C ₁₆			
014D ₁₆ to 016F ₁₆			

X: Indeterminate

Blank spaces are reserved. No access is allowed.

Address	Register	Symbol	Value after RESET
0170 ₁₆	CAN2 Slot Buffer Select Register	C2SBS	00 ₁₆ ⁽¹⁾
0171 ₁₆	CAN2 Control Register 1	C2CTLR1	X000 00XX ₂ ⁽¹⁾
0172 ₁₆	CAN2 Sleep Control Register	C2SLPR	XXXX XXX0 ₂
0173 ₁₆			
0174 ₁₆	CAN2 Acceptance Filter Support Register	C2AFS	00 ₁₆ ⁽¹⁾
0175 ₁₆			01 ₁₆ ⁽¹⁾
0176 ₁₆			
0177 ₁₆			
0178 ₁₆	Input Function Select Register	IPS	00 ₁₆
0179 ₁₆	Input Function Select Register A	IPSA	00 ₁₆
017A ₁₆			
017B ₁₆			
017C ₁₆			
017D ₁₆			
017E ₁₆			
017F ₁₆			
0180 ₁₆	CAN2 Message Slot Buffer 0 Standard ID0	C2SLOT0_0	XX ₁₆
0181 ₁₆	CAN2 Message Slot Buffer 0 Standard ID1	C2SLOT0_1	XX ₁₆
0182 ₁₆	CAN2 Message Slot Buffer 0 Extended ID0	C2SLOT0_2	XX ₁₆
0183 ₁₆	CAN2 Message Slot Buffer 0 Extended ID1	C2SLOT0_3	XX ₁₆
0184 ₁₆	CAN2 Message Slot Buffer 0 Extended ID2	C2SLOT0_4	XX ₁₆
0185 ₁₆	CAN2 Message Slot Buffer 0 Data Length Code	C2SLOT0_5	XX ₁₆
0186 ₁₆	CAN2 Message Slot Buffer 0 Data 0	C2SLOT0_6	XX ₁₆
0187 ₁₆	CAN2 Message Slot Buffer 0 Data 1	C2SLOT0_7	XX ₁₆
0188 ₁₆	CAN2 Message Slot Buffer 0 Data 2	C2SLOT0_8	XX ₁₆
0189 ₁₆	CAN2 Message Slot Buffer 0 Data 3	C2SLOT0_9	XX ₁₆
018A ₁₆	CAN2 Message Slot Buffer 0 Data 4	C2SLOT0_10	XX ₁₆
018B ₁₆	CAN2 Message Slot Buffer 0 Data 5	C2SLOT0_11	XX ₁₆
018C ₁₆	CAN2 Message Slot Buffer 0 Data 6	C2SLOT0_12	XX ₁₆
018D ₁₆	CAN2 Message Slot Buffer 0 Data 7	C2SLOT0_13	XX ₁₆
018E ₁₆	CAN2 Message Slot Buffer 0 Time Stamp High-Order	C2SLOT0_14	XX ₁₆
018F ₁₆	CAN2 Message Slot Buffer 0 Time Stamp Low-Order	C2SLOT0_15	XX ₁₆
0190 ₁₆	CAN2 Message Slot Buffer 1 Standard ID0	C2SLOT1_0	XX ₁₆
0191 ₁₆	CAN2 Message Slot Buffer 1 Standard ID1	C2SLOT1_1	XX ₁₆
0192 ₁₆	CAN2 Message Slot Buffer 1 Extended ID0	C2SLOT1_2	XX ₁₆
0193 ₁₆	CAN2 Message Slot Buffer 1 Extended ID1	C2SLOT1_3	XX ₁₆
0194 ₁₆	CAN2 Message Slot Buffer 1 Extended ID2	C2SLOT1_4	XX ₁₆
0195 ₁₆	CAN2 Message Slot Buffer 1 Data Length Code	C2SLOT1_5	XX ₁₆
0196 ₁₆	CAN2 Message Slot Buffer 1 Data 0	C2SLOT1_6	XX ₁₆
0197 ₁₆	CAN2 Message Slot Buffer 1 Data 1	C2SLOT1_7	XX ₁₆
0198 ₁₆	CAN2 Message Slot Buffer 1 Data 2	C2SLOT1_8	XX ₁₆
0199 ₁₆	CAN2 Message Slot Buffer 1 Data 3	C2SLOT1_9	XX ₁₆
019A ₁₆	CAN2 Message Slot Buffer 1 Data 4	C2SLOT1_10	XX ₁₆
019B ₁₆	CAN2 Message Slot Buffer 1 Data 5	C2SLOT1_11	XX ₁₆
019C ₁₆	CAN2 Message Slot Buffer 1 Data 6	C2SLOT1_12	XX ₁₆
019D ₁₆	CAN2 Message Slot Buffer 1 Data 7	C2SLOT1_13	XX ₁₆
019E ₁₆	CAN2 Message Slot Buffer 1 Time Stamp High-Order	C2SLOT1_14	XX ₁₆
019F ₁₆	CAN2 Message Slot Buffer 1 Time Stamp Low-Order	C2SLOT1_15	XX ₁₆

X: Indeterminate

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NOTE:

1. Values are obtained by setting the SLEEP bit in the C2SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET
01A0 ₁₆ 01A1 ₁₆	CAN2 Control Register 0	C2CTLR0	XX01 0X01 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾
01A2 ₁₆ 01A3 ₁₆	CAN2 Status Register	C2STR	0000 0000 ₂ ⁽²⁾ X000 0X01 ₂ ⁽²⁾
01A4 ₁₆ 01A5 ₁₆	CAN2 Extended ID Register	C2IDR	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01A6 ₁₆ 01A7 ₁₆	CAN2 Configuration Register	C2CONR	0000 XXXX ₂ ⁽²⁾ 0000 0000 ₂ ⁽²⁾
01A8 ₁₆ 01A9 ₁₆	CAN2 Time Stamp Register	C2TSR	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01AA ₁₆	CAN2 Transmit Error Count Register	C2TEC	00 ₁₆ ⁽²⁾
01AB ₁₆	CAN2 Receive Error Count Register	C2REC	00 ₁₆ ⁽²⁾
01AC ₁₆ 01AD ₁₆	CAN2 Slot Interrupt Status Register	C2SISTR	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01AE ₁₆			
01AF ₁₆			
01B0 ₁₆ 01B1 ₁₆	CAN2 Slot Interrupt Mask Register	C2SIMKR	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01B2 ₁₆			
01B3 ₁₆			
01B4 ₁₆	CAN2 Error Interrupt Mask Register	C2EIMKR	XXXX X000 ₂ ⁽²⁾
01B5 ₁₆	CAN2 Error Interrupt Status Register	C2EISTR	XXXX X000 ₂ ⁽²⁾
01B6 ₁₆	CAN2 Error Cause Register	C2EFR	00 ₁₆ ⁽²⁾
01B7 ₁₆	CAN2 Baud Rate Prescaler	C2BRP	0000 0001 ₂ ⁽²⁾
01B8 ₁₆			
01B9 ₁₆	CAN2 Mode Register	C2MDR	XXXX XX00 ₂ ⁽²⁾
01BA ₁₆			
01BB ₁₆			
01BC ₁₆			
01BD ₁₆			
01BE ₁₆			
01BF ₁₆			
01C0 ₁₆ 01C1 ₁₆	CAN2 Single Shot Control Register	C2SSCTLR	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01C2 ₁₆			
01C3 ₁₆			
01C4 ₁₆ 01C5 ₁₆	CAN2 Single Shot Status Register	C2SSSTR	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01C6 ₁₆			
01C7 ₁₆			
01C8 ₁₆	CAN2 Global Mask Register Standard ID0	C2GMR0	XXX0 0000 ₂ ⁽²⁾
01C9 ₁₆	CAN2 Global Mask Register Standard ID1	C2GMR1	XX00 0000 ₂ ⁽²⁾
01CA ₁₆	CAN2 Global Mask Register Extended ID0	C2GMR2	XXXX 0000 ₂ ⁽²⁾
01CB ₁₆	CAN2 Global Mask Register Extended ID1	C2GMR3	00 ₁₆ ⁽²⁾
01CC ₁₆	CAN2 Global Mask Register Extended ID2	C2GMR4	XX00 0000 ₂ ⁽²⁾
01CD ₁₆			
01CE ₁₆			
01CF ₁₆			

(Note 1)

X: Indeterminate

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NOTES:

1. The BANKSEL bit in the C2CTLR1 register switches functions for addresses 01C0₁₆ to 01DF₁₆.
2. Values are obtained by setting the SLEEP bit in the C2SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET
01D0 ₁₆	CAN2 Message Slot 0 Control Register / CAN2 Local Mask Register A Standard ID0	C2MCTL0/ C2LMAR0	0000 0000 ₂ ⁽²⁾ XXX0 0000 ₂ ⁽²⁾
01D1 ₁₆	CAN2 Message Slot 1 Control Register / CAN2 Local Mask Register A Standard ID1	C2MCTL1/ C2LMAR1	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
01D2 ₁₆	CAN2 Message Slot 2 Control Register / CAN2 Local Mask Register A Extended ID0	C2MCTL2/ C2LMAR2	0000 0000 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾
01D3 ₁₆	CAN2 Message Slot 3 Control Register / CAN2 local Mask Register A Extended ID1	C2MCTL3/ C2LMAR3	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01D4 ₁₆	CAN2 Message Slot 4 Control Register / CAN2 Local Mask Register A Extended ID2	C2MCTL4/ C2LMAR4	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
01D5 ₁₆	CAN2 Message Slot 5 Control Register	C2MCTL5	00 ₁₆ ⁽²⁾
01D6 ₁₆	CAN2 Message Slot 6 Control Register	C2MCTL6	00 ₁₆ ⁽²⁾
01D7 ₁₆	CAN2 Message Slot 7 Control Register	C2MCTL7	00 ₁₆ ⁽²⁾
01D8 ₁₆	CAN2 Message Slot 8 Control Register / CAN2 Local Mask Register B Standard ID0	C2MCTL8/ C2LMBR0	0000 0000 ₂ ⁽²⁾ XXX0 0000 ₂ ⁽²⁾
01D9 ₁₆	CAN2 Message Slot 9 Control Register / CAN2 Local Mask Register B Standard ID1	C2MCTL9/ C2LMBR1	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
01DA ₁₆	CAN2 Message Slot 10 Control Register / CAN2 Local Mask Register B Extended ID2	C2MCTL10/ C2LMBR2	0000 0000 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾
01DB ₁₆	CAN2 Message Slot 11 Control Register / CAN2 Local Mask Register B Extended ID3	C2MCTL11/ C2LMBR3	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
01DC ₁₆	CAN2 Message Slot 12 Control Register / CAN2 Local Mask Register B Extended ID4	C2MCTL12/ C2LMBR4	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
01DD ₁₆	CAN2 Message Slot 13 Control Register	C2MCTL13	00 ₁₆ ⁽²⁾
01DE ₁₆	CAN2 Message Slot 14 Control Register	C2MCTL14	00 ₁₆ ⁽²⁾
01DF ₁₆	CAN2 Message Slot 15 Control Register	C2MCTL15	00 ₁₆ ⁽²⁾

(Note 1)

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NOTES:

1. The BANKSEL bit in the C2CTLR1 register switches functions for addresses 01C0₁₆ to 01DF₁₆.
2. Values are obtained by setting the SLEEP bit in the C2SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET
01E0 ₁₆	CAN0 Message Slot Buffer 0 Standard ID0	C0SLOT0_0	XX ₁₆
01E1 ₁₆	CAN0 Message Slot Buffer 0 Standard ID1	C0SLOT0_1	XX ₁₆
01E2 ₁₆	CAN0 Message Slot Buffer 0 Extended ID0	C0SLOT0_2	XX ₁₆
01E3 ₁₆	CAN0 Message Slot Buffer 0 Extended ID1	C0SLOT0_3	XX ₁₆
01E4 ₁₆	CAN0 Message Slot Buffer 0 Extended ID2	C0SLOT0_4	XX ₁₆
01E5 ₁₆	CAN0 Message Slot Buffer 0 Data Length Code	C0SLOT0_5	XX ₁₆
01E6 ₁₆	CAN0 Message Slot Buffer 0 Data 0	C0SLOT0_6	XX ₁₆
01E7 ₁₆	CAN0 Message Slot Buffer 0 Data 1	C0SLOT0_7	XX ₁₆
01E8 ₁₆	CAN0 Message Slot Buffer 0 Data 2	C0SLOT0_8	XX ₁₆
01E9 ₁₆	CAN0 Message Slot Buffer 0 Data 3	C0SLOT0_9	XX ₁₆
01EA ₁₆	CAN0 Message Slot Buffer 0 Data 4	C0SLOT0_10	XX ₁₆
01EB ₁₆	CAN0 Message Slot Buffer 0 Data 5	C0SLOT0_11	XX ₁₆
01EC ₁₆	CAN0 Message Slot Buffer 0 Data 6	C0SLOT0_12	XX ₁₆
01ED ₁₆	CAN0 Message Slot Buffer 0 Data 7	C0SLOT0_13	XX ₁₆
01EE ₁₆	CAN0 Message Slot Buffer 0 Time Stamp High-Order	C0SLOT0_14	XX ₁₆
01EF ₁₆	CAN0 Message Slot Buffer 0 Time Stamp Low-Order	C0SLOT0_15	XX ₁₆
01F0 ₁₆	CAN0 Message Slot Buffer 1 Standard ID0	C0SLOT1_0	XX ₁₆
01F1 ₁₆	CAN0 Message Slot Buffer 1 Standard ID1	C0SLOT1_1	XX ₁₆
01F2 ₁₆	CAN0 Message Slot Buffer 1 Extended ID0	C0SLOT1_2	XX ₁₆
01F3 ₁₆	CAN0 Message Slot Buffer 1 Extended ID1	C0SLOT1_3	XX ₁₆
01F4 ₁₆	CAN0 Message Slot Buffer 1 Extended ID2	C0SLOT1_4	XX ₁₆
01F5 ₁₆	CAN0 Message Slot Buffer 1 Data Length Code	C0SLOT1_5	XX ₁₆
01F6 ₁₆	CAN0 Message Slot Buffer 1 Data 0	C0SLOT1_6	XX ₁₆
01F7 ₁₆	CAN0 Message Slot Buffer 1 Data 1	C0SLOT1_7	XX ₁₆
01F8 ₁₆	CAN0 Message Slot Buffer 1 Data 2	C0SLOT1_8	XX ₁₆
01F9 ₁₆	CAN0 Message Slot Buffer 1 Data 3	C0SLOT1_9	XX ₁₆
01FA ₁₆	CAN0 Message Slot Buffer 1 Data 4	C0SLOT1_10	XX ₁₆
01FB ₁₆	CAN0 Message Slot Buffer 1 Data 5	C0SLOT1_11	XX ₁₆
01FC ₁₆	CAN0 Message Slot Buffer 1 Data 6	C0SLOT1_12	XX ₁₆
01FD ₁₆	CAN0 Message Slot Buffer 1 Data 7	C0SLOT1_13	XX ₁₆
01FE ₁₆	CAN0 Message Slot Buffer 1 Time Stamp High-Order	C0SLOT1_14	XX ₁₆
01FF ₁₆	CAN0 Message Slot Buffer 1 Time Stamp Low-Order	C0SLOT1_15	XX ₁₆
0200 ₁₆ 0201 ₁₆	CAN0 Control Register 0	C0CTRL0	XX01 0X01 ₂ ⁽¹⁾ XXXX 0000 ₂ ⁽¹⁾
0202 ₁₆ 0203 ₁₆	CAN0 Status Register	C0STR	0000 0000 ₂ ⁽¹⁾ X000 0X01 ₂ ⁽¹⁾
0204 ₁₆ 0205 ₁₆	CAN0 Extended ID Register	C0IDR	00 ₁₆ ⁽¹⁾ 00 ₁₆ ⁽¹⁾
0206 ₁₆ 0207 ₁₆	CAN0 Configuration Register	C0CONR	0000 XXXX ₂ ⁽¹⁾ 0000 0000 ₂ ⁽¹⁾
0208 ₁₆ 0209 ₁₆	CAN0 Time Stamp Register	C0TSR	00 ₁₆ ⁽¹⁾ 00 ₁₆ ⁽¹⁾
020A ₁₆	CAN0 Transmit Error Count Register	C0TEC	00 ₁₆ ⁽¹⁾
020B ₁₆	CAN0 Receive Error Count Register	C0REC	00 ₁₆ ⁽¹⁾
020C ₁₆ 020D ₁₆	CAN0 Slot Interrupt Status Register	C0SISTR	00 ₁₆ ⁽¹⁾ 00 ₁₆ ⁽¹⁾
020E ₁₆			
020F ₁₆			

X: Indeterminate

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NOTE:

1. Values are obtained by setting the SLEEP bit in the C0SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET
0210 ₁₆	CAN0 Slot Interrupt Mask Register	C0SIMKR	00 ₁₆ ⁽²⁾
0211 ₁₆			00 ₁₆ ⁽²⁾
0212 ₁₆			
0213 ₁₆			
0214 ₁₆	CAN0 Error Interrupt Mask Register	C0EIMKR	XXXX X000 ₂ ⁽²⁾
0215 ₁₆	CAN0 Error Interrupt Status Register	C0EISTR	XXXX X000 ₂ ⁽²⁾
0216 ₁₆	CAN0 Error Cause Register	C0EFR	00 ₁₆ ⁽²⁾
0217 ₁₆	CAN0 Baud Rate Prescaler	C0BRP	0000 0001 ₂ ⁽²⁾
0218 ₁₆			
0219 ₁₆	CAN0 Mode Register	C0MDR	XXXX XX00 ₂ ⁽²⁾
021A ₁₆			
021B ₁₆			
021C ₁₆			
021D ₁₆			
021E ₁₆			
021F ₁₆			
0220 ₁₆	CAN0 Single Shot Control Register	C0SSCTLR	00 ₁₆ ⁽²⁾
0221 ₁₆			00 ₁₆ ⁽²⁾
0222 ₁₆			
0223 ₁₆			
0224 ₁₆	CAN0 Single Shot Status Register	C0SSSTR	00 ₁₆ ⁽²⁾
0225 ₁₆			00 ₁₆ ⁽²⁾
0226 ₁₆			
0227 ₁₆			
0228 ₁₆	CAN0 Global Mask Register Standard ID0	C0GMR0	XXX0 0000 ₂ ⁽²⁾
0229 ₁₆	CAN0 Global Mask Register Standard ID1	C0GMR1	XX00 0000 ₂ ⁽²⁾
022A ₁₆	CAN0 Global Mask Register Extended ID0	C0GMR2	XXXX 0000 ₂ ⁽²⁾
022B ₁₆	CAN0 Global Mask Register Extended ID1	C0GMR3	00 ₁₆ ⁽²⁾
022C ₁₆	CAN0 Global Mask Register Extended ID2	C0GMR4	XX00 0000 ₂ ⁽²⁾
022D ₁₆			
022E ₁₆			
022F ₁₆			
0230 ₁₆	CAN0 Message Slot 0 Control Register / CAN0 Local Mask Register A Standard ID0	C0MCTL0/ C0LMAR0	0000 0000 ₂ ⁽²⁾ XXX0 0000 ₂ ⁽²⁾
0231 ₁₆	CAN0 Message Slot 1 Control Register / CAN0 Local Mask Register A Standard ID1	C0MCTL1/ C0LMAR1	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
0232 ₁₆	CAN0 Message Slot 2 Control Register / CAN0 Local Mask Register A Extended ID0	C0MCTL2/ C0LMAR2	0000 0000 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾
0233 ₁₆	CAN0 Message Slot 3 Control Register / CAN0 local Mask Register A Extended ID1	C0MCTL3/ C0LMAR3	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
0234 ₁₆	CAN0 Message Slot 4 Control Register / CAN0 Local Mask Register A Extended ID2	C0MCTL4/ C0LMAR4	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
0235 ₁₆	CAN0 Message Slot 5 Control Register	C0MCTL5	00 ₁₆ ⁽²⁾
0236 ₁₆	CAN0 Message Slot 6 Control Register	C0MCTL6	00 ₁₆ ⁽²⁾
0237 ₁₆	CAN0 Message Slot 7 Control Register	C0MCTL7	00 ₁₆ ⁽²⁾
0238 ₁₆	CAN0 Message Slot 8 Control Register / CAN0 Local Mask Register B Standard ID0	C0MCTL8/ C0LMBR0	0000 0000 ₂ ⁽²⁾ XXX0 0000 ₂ ⁽²⁾
0239 ₁₆	CAN0 Message Slot 9 Control Register / CAN0 Local Mask Register B Standard ID1	C0MCTL9/ C0LMBR1	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾

(Note 1)

X: Indeterminate

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NOTES:

1. The BANKSEL bit in the C0CTLR1 register switches functions for addresses 0220₁₆ to 023F₁₆.
2. Values are obtained by setting the SLEEP bit in the C0SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET	
023A ₁₆	CAN0 Message Slot 10 Control Register / CAN0 Local Mask Register B Extended ID0	C0MCTL10/ C0LMBR2	0000 0000 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾	↑ (Note 1) ↓
023B ₁₆	CAN0 Message Slot 11 Control Register / CAN0 Local Mask Register B Extended ID1	C0MCTL11/ C0LMBR3	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾	
023C ₁₆	CAN0 Message Slot 12 Control Register / CAN0 Local Mask Register B Extended ID2	C0MCTL12/ C0LMBR4	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾	
023D ₁₆	CAN0 Message Slot 13 Control Register	C0MCTL13	00 ₁₆ ⁽²⁾	
023E ₁₆	CAN0 Message Slot 14 Control Register	C0MCTL14	00 ₁₆ ⁽²⁾	
023F ₁₆	CAN0 Message Slot 15 Control Register	C0MCTL15	00 ₁₆ ⁽²⁾	
0240 ₁₆	CAN0 Slot Buffer Select Register	C0SBS	00 ₁₆ ⁽²⁾	
0241 ₁₆	CAN0 Control Register 1	C0CTLR1	X000 00XX ₂ ⁽²⁾	
0242 ₁₆	CAN0 Sleep Control Register	C0SLPR	XXXX XXX0 ₂	
0243 ₁₆				
0244 ₁₆ 0245 ₁₆	CAN0 Acceptance Filter Support Register	C0AFS	00 ₁₆ ⁽²⁾ 01 ₁₆ ⁽²⁾	
0246 ₁₆				
0247 ₁₆				
0248 ₁₆				
0249 ₁₆				
024A ₁₆				
024B ₁₆				
024C ₁₆				
024D ₁₆				
024E ₁₆				
024F ₁₆				
0250 ₁₆	CAN1 Slot Buffer Select Register	C1SBS	00 ₁₆ ⁽³⁾	
0251 ₁₆	CAN1 Control Register 1	C1CTLR1	X000 00XX ₂ ⁽³⁾	
0252 ₁₆	CAN1 Sleep Control Register	C1SLPR	XXXX XXX0 ₂ ⁽³⁾	
0253 ₁₆				
0254 ₁₆ 0255 ₁₆	CAN1 Acceptance Filter Support Register	C1AFS	00 ₁₆ ⁽³⁾ 01 ₁₆ ⁽³⁾	
0256 ₁₆				
0257 ₁₆				
0258 ₁₆				
0259 ₁₆				
025A ₁₆				
025B ₁₆				
025C ₁₆				
025D ₁₆				
025E ₁₆				
025F ₁₆				

X: Indeterminate

Blank spaces are reserved. No access is allowed.

NOTES:

1. The BANKSEL bit in the C0CTLR1 register switches functions for addresses 0220₁₆ to 023F₁₆.
2. Values are obtained by setting the SLEEP bit in the C0SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.
3. Values are obtained by setting the SLEEP bit in the C1SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET
0260 ₁₆	CAN1 Message Slot Buffer 0 Standard ID0	C1SLOT0_0	XX ₁₆
0261 ₁₆	CAN1 Message Slot Buffer 0 Standard ID1	C1SLOT0_1	XX ₁₆
0262 ₁₆	CAN1 Message Slot Buffer 0 Extended ID0	C1SLOT0_2	XX ₁₆
0263 ₁₆	CAN1 Message Slot Buffer 0 Extended ID1	C1SLOT0_3	XX ₁₆
0264 ₁₆	CAN1 Message Slot Buffer 0 Extended ID2	C1SLOT0_4	XX ₁₆
0265 ₁₆	CAN1 Message Slot Buffer 0 Data Length Code	C1SLOT0_5	XX ₁₆
0266 ₁₆	CAN1 Message Slot Buffer 0 Data 0	C1SLOT0_6	XX ₁₆
0267 ₁₆	CAN1 Message Slot Buffer 0 Data 1	C1SLOT0_7	XX ₁₆
0268 ₁₆	CAN1 Message Slot Buffer 0 Data 2	C1SLOT0_8	XX ₁₆
0269 ₁₆	CAN1 Message Slot Buffer 0 Data 3	C1SLOT0_9	XX ₁₆
026A ₁₆	CAN1 Message Slot Buffer 0 Data 4	C1SLOT0_10	XX ₁₆
026B ₁₆	CAN1 Message Slot Buffer 0 Data 5	C1SLOT0_11	XX ₁₆
026C ₁₆	CAN1 Message Slot Buffer 0 Data 6	C1SLOT0_12	XX ₁₆
026D ₁₆	CAN1 Message Slot Buffer 0 Data 7	C1SLOT0_13	XX ₁₆
026E ₁₆	CAN1 Message Slot Buffer 0 Time Stamp High-Order	C1SLOT0_14	XX ₁₆
026F ₁₆	CAN1 Message Slot Buffer 0 Time Stamp Low-Order	C1SLOT0_15	XX ₁₆
0270 ₁₆	CAN1 Message Slot Buffer 1 Standard ID0	C1SLOT1_0	XX ₁₆
0271 ₁₆	CAN1 Message Slot Buffer 1 Standard ID1	C1SLOT1_1	XX ₁₆
0272 ₁₆	CAN1 Message Slot Buffer 1 Extended ID0	C1SLOT1_2	XX ₁₆
0273 ₁₆	CAN1 Message Slot Buffer 1 Extended ID1	C1SLOT1_3	XX ₁₆
0274 ₁₆	CAN1 Message Slot Buffer 1 Extended ID2	C1SLOT1_4	XX ₁₆
0275 ₁₆	CAN1 Message Slot Buffer 1 Data Length Code	C1SLOT1_5	XX ₁₆
0276 ₁₆	CAN1 Message Slot Buffer 1 Data 0	C1SLOT1_6	XX ₁₆
0277 ₁₆	CAN1 Message Slot Buffer 1 Data 1	C1SLOT1_7	XX ₁₆
0278 ₁₆	CAN1 Message Slot Buffer 1 Data 2	C1SLOT1_8	XX ₁₆
0279 ₁₆	CAN1 Message Slot Buffer 1 Data 3	C1SLOT1_9	XX ₁₆
027A ₁₆	CAN1 Message Slot Buffer 1 Data 4	C1SLOT1_10	XX ₁₆
027B ₁₆	CAN1 Message Slot Buffer 1 Data 5	C1SLOT1_11	XX ₁₆
027C ₁₆	CAN1 Message Slot Buffer 1 Data 6	C1SLOT1_12	XX ₁₆
027D ₁₆	CAN1 Message Slot Buffer 1 Data 7	C1SLOT1_13	XX ₁₆
027E ₁₆	CAN1 Message Slot Buffer 1 Time Stamp High-Order	C1SLOT1_14	XX ₁₆
027F ₁₆	CAN1 Message Slot Buffer 1 Time Stamp Low-Order	C1SLOT1_15	XX ₁₆
0280 ₁₆ 0281 ₁₆	CAN1 Control Register 0	C1CTLR0	XX01 0X01 ₂ ⁽¹⁾ XXXX 0000 ₂ ⁽¹⁾
0282 ₁₆ 0283 ₁₆	CAN1 Status Register	C1STR	0000 0000 ₂ ⁽¹⁾ X000 0X01 ₂ ⁽¹⁾
0284 ₁₆ 0285 ₁₆	CAN1 Extended ID Register	C1IDR	00 ₁₆ ⁽¹⁾ 00 ₁₆ ⁽¹⁾
0286 ₁₆ 0287 ₁₆	CAN1 Configuration Register	C1CONR	0000 XXXX ₂ ⁽¹⁾ 0000 0000 ₂ ⁽¹⁾
0288 ₁₆ 0289 ₁₆	CAN1 Time Stamp Register	C1TSR	00 ₁₆ ⁽¹⁾ 00 ₁₆ ⁽¹⁾
028A ₁₆	CAN1 Transmit Error Count Register	C1TEC	00 ₁₆ ⁽¹⁾
028B ₁₆	CAN1 Receive Error Count Register	C1REC	00 ₁₆ ⁽¹⁾
028C ₁₆ 028D ₁₆	CAN1 Slot Interrupt Status Register	C1SISTR	00 ₁₆ ⁽¹⁾ 00 ₁₆ ⁽¹⁾
028E ₁₆			
028F ₁₆			

X: Indeterminate

Blank spaces are reserved. No access is allowed.

NOTE:

1. Values are obtained by setting the SLEEP bit in the C1SLPR register to "1" (sleep mode exited) after reset and supplying the clock to the CAN module.

Address	Register	Symbol	Value after RESET
0290 ₁₆	CAN1 Slot Interrupt Mask Register	C1SIMKR	00 ₁₆ ⁽²⁾
0291 ₁₆			00 ₁₆ ⁽²⁾
0292 ₁₆			
0293 ₁₆			
0294 ₁₆	CAN1 Error Interrupt Mask Register	C1EIMKR	XXXX X000 ₂ ⁽²⁾
0295 ₁₆	CAN1 Error Interrupt Status Register	C1EISTR	XXXX X000 ₂ ⁽²⁾
0296 ₁₆	CAN1 Error Factor Register	C1EFR	00 ₁₆ ⁽²⁾
0297 ₁₆	CAN1 Baud Rate Prescaler	C1BRP	0000 0001 ₂ ⁽²⁾
0298 ₁₆			
0299 ₁₆	CAN1 Mode Register	C1MDR	XXXX XX00 ₂ ⁽²⁾
029A ₁₆			
029B ₁₆			
029C ₁₆			
029D ₁₆			
029E ₁₆			
029F ₁₆			
02A0 ₁₆	CAN1 Single Shot Control Register	C1SSCTLR	00 ₁₆ ⁽²⁾
02A1 ₁₆			00 ₁₆ ⁽²⁾
02A2 ₁₆			
02A3 ₁₆			
02A4 ₁₆	CAN1 Single Shot Status Register	C1SSSTR	00 ₁₆ ⁽²⁾
02A5 ₁₆			00 ₁₆ ⁽²⁾
02A6 ₁₆			
02A7 ₁₆			
02A8 ₁₆	CAN1 Global Mask Register Standard ID0	C1GMR0	XXX0 0000 ₂ ⁽²⁾
02A9 ₁₆	CAN1 Global Mask Register Standard ID1	C1GMR1	XX00 0000 ₂ ⁽²⁾
02AA ₁₆	CAN1 Global Mask Register Extended ID0	C1GMR2	XXXX 0000 ₂ ⁽²⁾
02AB ₁₆	CAN1 Global Mask Register Extended ID1	C1GMR3	00 ₁₆ ⁽²⁾
02AC ₁₆	CAN1 Global Mask Register Extended ID2	C1GMR4	XX00 0000 ₂ ⁽²⁾
02AD ₁₆			
02AE ₁₆			
02AF ₁₆			
02B0 ₁₆	CAN1 Message Slot 0 Control Register / CAN1 Local Mask Register A Standard ID0	C1MCTL0/ C1LMAR0	0000 0000 ₂ ⁽²⁾ XXX0 0000 ₂ ⁽²⁾
02B1 ₁₆	CAN1 Message Slot 1 Control Register / CAN1 Local Mask Register A Standard ID1	C1MCTL1/ C1LMAR1	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
02B2 ₁₆	CAN1 Message Slot 2 Control Register / CAN1 Local Mask Register A Extended ID0	C1MCTL2/ C1LMAR2	0000 0000 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾
02B3 ₁₆	CAN1 Message Slot 3 Control Register / CAN1 Local Mask Register A Extended ID1	C1MCTL3/ C1LMAR3	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾
02B4 ₁₆	CAN1 Message Slot 4 Control Register / CAN1 Local Mask Register A Extended ID2	C1MCTL4/ C1LMAR4	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾
02B5 ₁₆	CAN1 Message Slot 5 Control Register	C1MCTL5	00 ₁₆ ⁽²⁾
02B6 ₁₆	CAN1 Message Slot 6 Control Register	C1MCTL6	00 ₁₆ ⁽²⁾
02B7 ₁₆	CAN1 Message Slot 7 Control Register	C1MCTL7	00 ₁₆ ⁽²⁾
02B8 ₁₆	CAN1 Message Slot 8 Control Register / CAN1 Local Mask Register B Standard ID0	C1MCTL8/ C1LMBR0	0000 0000 ₂ ⁽²⁾ XXX0 0000 ₂ ⁽²⁾
02B9 ₁₆	CAN1 Message Slot 9 Control Register / CAN1 Local Mask Register B Standard ID1	C1MCTL9/ C1LMBR1	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾

(Note 1)

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NOTES:

1. The BANKSEL bit in the C1CTLR1 register switches functions for addresses 02A0₁₆ to 02BF₁₆.
2. Values are obtained by setting the SLEEP bit in the C1SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET	
02BA ₁₆	CAN1 Message Slot 10 Control Register / CAN1 Local Mask Register B Extended ID0	C1MCTL10/ C1LMBR2	0000 0000 ₂ ⁽²⁾ XXXX 0000 ₂ ⁽²⁾	↑ (Note 1) ↓
02BB ₁₆	CAN1 Message Slot 11 Control Register / CAN1 Local Mask Register B Extended ID1	C1MCTL11/ C1LMBR3	00 ₁₆ ⁽²⁾ 00 ₁₆ ⁽²⁾	
02BC ₁₆	CAN1 Message Slot 12 Control Register / CAN1 Local Mask Register B Extended ID2	C1MCTL12/ C1LMBR4	0000 0000 ₂ ⁽²⁾ XX00 0000 ₂ ⁽²⁾	
02BD ₁₆	CAN1 Message Slot 13 Control Register	C1MCTL13	00 ₁₆ ⁽²⁾	
02BE ₁₆	CAN1 Message Slot 14 Control Register	C1MCTL14	00 ₁₆ ⁽²⁾	
02BF ₁₆	CAN1 Message Slot 15 Control Register	C1MCTL15	00 ₁₆ ⁽²⁾	
02C0 ₁₆ 02C1 ₁₆	X0 Register Y0 Register	X0R,Y0R	XX ₁₆ XX ₁₆	
02C2 ₁₆ 02C3 ₁₆	X1 Register Y1 Register	X1R,Y1R	XX ₁₆ XX ₁₆	
02C4 ₁₆ 02C5 ₁₆	X2 Register Y2 Register	X2R,Y2R	XX ₁₆ XX ₁₆	
02C6 ₁₆ 02C7 ₁₆	X3 Register Y3 Register	X3R,Y3R	XX ₁₆ XX ₁₆	
02C8 ₁₆ 02C9 ₁₆	X4 Register Y4 Register	X4R,Y4R	XX ₁₆ XX ₁₆	
02CA ₁₆ 02CB ₁₆	X5 Register Y5 Register	X5R,Y5R	XX ₁₆ XX ₁₆	
02CC ₁₆ 02CD ₁₆	X6 Register Y6 Register	X6R,Y6R	XX ₁₆ XX ₁₆	
02CE ₁₆ 02CF ₁₆	X7 Register Y7 Register	X7R,Y7R	XX ₁₆ XX ₁₆	
02D0 ₁₆ 02D1 ₁₆	X8 Register Y8 Register	X8R,Y8R	XX ₁₆ XX ₁₆	
02D2 ₁₆ 02D3 ₁₆	X9 Register Y9 Register	X9R,Y9R	XX ₁₆ XX ₁₆	
02D4 ₁₆ 02D5 ₁₆	X10 Register Y10 Register	X10R,Y10R	XX ₁₆ XX ₁₆	
02D6 ₁₆ 02D7 ₁₆	X11 Register Y11 Register	X11R,Y11R	XX ₁₆ XX ₁₆	
02D8 ₁₆ 02D9 ₁₆	X12 Register Y12 Register	X12R,Y12R	XX ₁₆ XX ₁₆	
02DA ₁₆ 02DB ₁₆	X13 Register Y13 Register	X13R,Y13R	XX ₁₆ XX ₁₆	
02DC ₁₆ 02DD ₁₆	X14 Register Y14 Register	X14R,Y14R	XX ₁₆ XX ₁₆	
02DE ₁₆ 02DF ₁₆	X15 Register Y15 Register	X15R,Y15R	XX ₁₆ XX ₁₆	

X: Indeterminate

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NOTES:

1. The BANKSEL bit in the C1CTLR1 register switches functions for addresses 02A0₁₆ to 02BF₁₆.
2. Values are obtained by setting the SLEEP bit in the C1SLPR register to "1" (sleep mode exited) after reset and supplying a clock to the CAN module.

Address	Register	Symbol	Value after RESET
02E0 ₁₆	X/Y Control Register	XYC	XXXX XX00 ₂
02E1 ₁₆			
02E2 ₁₆			
02E3 ₁₆			
02E4 ₁₆	UART1 Special Mode Register 4	U1SMR4	00 ₁₆
02E5 ₁₆	UART1 Special Mode Register 3	U1SMR3	00 ₁₆
02E6 ₁₆	UART1 Special Mode Register 2	U1SMR2	00 ₁₆
02E7 ₁₆	UART1 Special Mode Register	U1SMR	00 ₁₆
02E8 ₁₆	UART1 Transmit/Receive Mode Register	U1MR	00 ₁₆
02E9 ₁₆	UART1 Bit Rate Register	U1BRG	XX ₁₆
02EA ₁₆	UART1 Transmit Buffer Register	U1TB	XX ₁₆
02EB ₁₆			XX ₁₆
02EC ₁₆	UART1 Transmit/Receive Control Register 0	U1C0	0000 1000 ₂
02ED ₁₆	UART1 Transmit/Receive Control Register 1	U1C1	0000 0010 ₂
02EE ₁₆	UART1 Receive Buffer Register	U1RB	XX ₁₆
02EF ₁₆			XX ₁₆
02F0 ₁₆			
02F1 ₁₆			
02F2 ₁₆			
02F3 ₁₆			
02F4 ₁₆	UART4 Special Mode Register 4	U4SMR4	00 ₁₆
02F5 ₁₆	UART4 Special Mode Register 3	U4SMR3	00 ₁₆
02F6 ₁₆	UART4 Special Mode Register 2	U4SMR2	00 ₁₆
02F7 ₁₆	UART4 Special Mode Register	U4SMR	00 ₁₆
02F8 ₁₆	UART4 Transmit/Receive Mode Register	U4MR	00 ₁₆
02F9 ₁₆	UART4 Bit Rate Register	U4BRG	XX ₁₆
02FA ₁₆	UART4 Transmit Buffer Register	U4TB	XX ₁₆
02FB ₁₆			XX ₁₆
02FC ₁₆	UART4 Transmit/Receive Control Register 0	U4C0	0000 1000 ₂
02FD ₁₆	UART4 Transmit/Receive Control Register 1	U4C1	0000 0010 ₂
02FE ₁₆	UART4 Receive Buffer Register	U4RB	XX ₁₆
02FF ₁₆			XX ₁₆
0300 ₁₆	Timer B3, B4, B5 Count Start Flag	TBSR	000X XXXX ₂
0301 ₁₆			
0302 ₁₆	Timer A1-1 Register	TA11	XX ₁₆
0303 ₁₆			XX ₁₆
0304 ₁₆	Timer A2-1 Register	TA21	XX ₁₆
0305 ₁₆			XX ₁₆
0306 ₁₆	Timer A4-1 Register	TA41	XX ₁₆
0307 ₁₆			XX ₁₆
0308 ₁₆	Three-Phase PWM Control Register 0	INVC0	00 ₁₆
0309 ₁₆	Three-Phase PWM Control Register 1	INVC1	00 ₁₆
030A ₁₆	Three-Phase Output Buffer Register 0	IDB0	XX11 1111 ₂
030B ₁₆	Three-Phase Output Buffer Register 1	IDB1	XX11 1111 ₂
030C ₁₆	Dead Time Timer	DTT	XX ₁₆
030D ₁₆	Timer B2 Interrupt Generation Frequency Set Counter	ICTB2	XX ₁₆
030E ₁₆			
030F ₁₆			

X: Indeterminate

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Address	Register	Symbol	Value after RESET
0310 ₁₆	Timer B3 Register	TB3	XX ₁₆
0311 ₁₆			XX ₁₆
0312 ₁₆	Timer B4 Register	TB4	XX ₁₆
0313 ₁₆			XX ₁₆
0314 ₁₆	Timer B5 Register	TB5	XX ₁₆
0315 ₁₆			XX ₁₆
0316 ₁₆			
0317 ₁₆			
0318 ₁₆			
0319 ₁₆			
031A ₁₆			
031B ₁₆	Timer B3 Mode Register	TB3MR	00XX 0000 ₂
031C ₁₆	Timer B4 Mode Register	TB4MR	00XX 0000 ₂
031D ₁₆	Timer B5 Mode Register	TB5MR	00XX 0000 ₂
031E ₁₆			
031F ₁₆	External Interrupt Request Source Select Register	IFSR	00 ₁₆
0320 ₁₆			
0321 ₁₆			
0322 ₁₆			
0323 ₁₆			
0324 ₁₆	UART3 Special Mode Register 4	U3SMR4	00 ₁₆
0325 ₁₆	UART3 Special Mode Register 3	U3SMR3	00 ₁₆
0326 ₁₆	UART3 Special Mode Register 2	U3SMR2	00 ₁₆
0327 ₁₆	UART3 Special Mode Register	U3SMR	00 ₁₆
0328 ₁₆	UART3 Transmit/Receive Mode Register	U3MR	00 ₁₆
0329 ₁₆	UART3 Bit Rate Register	U3BRG	XX ₁₆
032A ₁₆	UART3 Transmit Buffer Register	U3TB	XX ₁₆
032B ₁₆			XX ₁₆
032C ₁₆	UART3 Transmit/Receive Control Register 0	U3C0	0000 1000 ₂
032D ₁₆	UART3 Transmit/Receive Control Register 1	U3C1	0000 0010 ₂
032E ₁₆	UART3 Receive Buffer Register	U3RB	XX ₁₆
032F ₁₆			XX ₁₆
0330 ₁₆			
0331 ₁₆			
0332 ₁₆			
0333 ₁₆			
0334 ₁₆	UART2 Special Mode Register 4	U2SMR4	00 ₁₆
0335 ₁₆	UART2 Special Mode Register 3	U2SMR3	00 ₁₆
0336 ₁₆	UART2 Special Mode Register 2	U2SMR2	00 ₁₆
0337 ₁₆	UART2 Special Mode Register	U2SMR	00 ₁₆
0338 ₁₆	UART2 Transmit/Receive Mode Register	U2MR	00 ₁₆
0339 ₁₆	UART2 Bit Rate Register	U2BRG	XX ₁₆
033A ₁₆	UART2 Transmit Buffer Register	U2TB	XX ₁₆
033B ₁₆			XX ₁₆
033C ₁₆	UART2 Transmit/Receive Control Register 0	U2C0	0000 1000 ₂
033D ₁₆	UART2 Transmit/Receive Control Register 1	U2C1	0000 0010 ₂
033E ₁₆	UART2 Receive Buffer Register	U2RB	XX ₁₆
033F ₁₆			XX ₁₆

X: Indeterminate

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Address	Register	Symbol	Value after RESET
0340 ₁₆	Count Start Flag	TABSR	00 ₁₆
0341 ₁₆	Clock Prescaler Reset Flag	CPSRF	0XXX XXXX ₂
0342 ₁₆	One-Shot Start Flag	ONSF	00 ₁₆
0343 ₁₆	Trigger Select Register	TRGSR	00 ₁₆
0344 ₁₆	Up/Down Flag	UDF	00 ₁₆
0345 ₁₆			
0346 ₁₆ 0347 ₁₆	Timer A0 Register	TA0	XX ₁₆ XX ₁₆
0348 ₁₆ 0349 ₁₆	Timer A1 Register	TA1	XX ₁₆ XX ₁₆
034A ₁₆ 034B ₁₆	Timer A2 Register	TA2	XX ₁₆ XX ₁₆
034C ₁₆ 034D ₁₆	Timer A3 Register	TA3	XX ₁₆ XX ₁₆
034E ₁₆ 034F ₁₆	Timer A4 Register	TA4	XX ₁₆ XX ₁₆
0350 ₁₆ 0351 ₁₆	Timer B0 Register	TB0	XX ₁₆ XX ₁₆
0352 ₁₆ 0353 ₁₆	Timer B1 Register	TB1	XX ₁₆ XX ₁₆
0354 ₁₆ 0355 ₁₆	Timer B2 Register	TB2	XX ₁₆ XX ₁₆
0356 ₁₆	Timer A0 Mode Register	TA0MR	00 ₁₆
0357 ₁₆	Timer A1 Mode Register	TA1MR	00 ₁₆
0358 ₁₆	Timer A2 Mode Register	TA2MR	00 ₁₆
0359 ₁₆	Timer A3 Mode Register	TA3MR	00 ₁₆
035A ₁₆	Timer A4 Mode Register	TA4MR	00 ₁₆
035B ₁₆	Timer B0 Mode Register	TB0MR	00XX 0000 ₂
035C ₁₆	Timer B1 Mode Register	TB1MR	00XX 0000 ₂
035D ₁₆	Timer B2 Mode Register	TB2MR	00XX 0000 ₂
035E ₁₆	Timer B2 Special Mode Register	TB2SC	XXXX XXX0 ₂
035F ₁₆	Count Source Prescaler Register ⁽¹⁾	TCSPR	0XXX 0000 ₂
0360 ₁₆			
0361 ₁₆			
0362 ₁₆			
0363 ₁₆			
0364 ₁₆	UART0 Special Mode Register 4	U0SMR4	00 ₁₆
0365 ₁₆	UART0 Special Mode Register 3	U0SMR3	00 ₁₆
0366 ₁₆	UART0 Special Mode Register 2	U0SMR2	00 ₁₆
0367 ₁₆	UART0 Special Mode Register	U0SMR	00 ₁₆
0368 ₁₆	UART0 Transmit/Receive Mode Register	U0MR	00 ₁₆
0369 ₁₆	UART0 Bit Rate Register	U0BRG	XX ₁₆
036A ₁₆ 036B ₁₆	UART0 Transmit Buffer Register	U0TB	XX ₁₆ XX ₁₆
036C ₁₆	UART0 Transmit/Receive Control Register 0	U0C0	0000 1000 ₂
036D ₁₆	UART0 Transmit/Receive Control Register 1	U0C1	0000 0010 ₂
036E ₁₆ 036F ₁₆	UART0 Receive Buffer Register	U0RB	XX ₁₆ XX ₁₆

X: Indeterminate

Blank spaces are reserved. No access is allowed.

NOTE:

1. The TCSPR register maintains values set before reset, even after software reset or watchdog timer reset has been performed.

Address	Register	Symbol	Value after RESET
0370 ₁₆			
0371 ₁₆			
0372 ₁₆			
0373 ₁₆			
0374 ₁₆			
0375 ₁₆			
0376 ₁₆			
0377 ₁₆			
0378 ₁₆	DMA0 Request Source Select Register	DM0SL	0X00 0000 ₂
0379 ₁₆	DMA1 Request Source Select Register	DM1SL	0X00 0000 ₂
037A ₁₆	DMA2 Request Source Select Register	DM2SL	0X00 0000 ₂
037B ₁₆	DMA3 Request Source Select Register	DM3SL	0X00 0000 ₂
037C ₁₆	CRC Data Register	CRCD	XX ₁₆
037D ₁₆			XX ₁₆
037E ₁₆	CRC Input Register	CRCIN	XX ₁₆
037F ₁₆			
0380 ₁₆	A/D0 Register 0	AD00	XXXX XXXX ₂
0381 ₁₆			0000 0000 ₂
0382 ₁₆	A/D0 Register 1	AD01	XX ₁₆
0383 ₁₆			XX ₁₆
0384 ₁₆	A/D0 Register 2	AD02	XX ₁₆
0385 ₁₆			XX ₁₆
0386 ₁₆	A/D0 Register 3	AD03	XX ₁₆
0387 ₁₆			XX ₁₆
0388 ₁₆	A/D0 Register 4	AD04	XX ₁₆
0389 ₁₆			XX ₁₆
038A ₁₆	A/D0 Register 5	AD05	XX ₁₆
038B ₁₆			XX ₁₆
038C ₁₆	A/D0 Register 6	AD06	XX ₁₆
038D ₁₆			XX ₁₆
038E ₁₆	A/D0 Register 7	AD07	XX ₁₆
038F ₁₆			XX ₁₆
0390 ₁₆			
0391 ₁₆			
0392 ₁₆	A/D0 Control Register 4	AD0CON4	XXXX 00XX ₂
0393 ₁₆			
0394 ₁₆	A/D0 Control Register 2	AD0CON2	XX0X X000 ₂
0395 ₁₆	A/D0 Control Register 3	AD0CON3	XXXX X000 ₂
0396 ₁₆	A/D0 Control Register 0	AD0CON0	00 ₁₆
0397 ₁₆	A/D0 Control Register 1	AD0CON1	00 ₁₆
0398 ₁₆	D/A Register 0	DA0	XX ₁₆
0399 ₁₆			
039A ₁₆	D/A Register 1	DA1	XX ₁₆
039B ₁₆			
039C ₁₆	D/A Control Register	DACON	XXXX XX00 ₂
039D ₁₆			
039E ₁₆			
039F ₁₆			

X: Indeterminate

Blank spaces are reserved. No access is allowed.

<144-pin package>

Address	Register	Symbol	Value after RESET
03A0 ₁₆	Function Select Register A8	PS8	X000 0000 ₂
03A1 ₁₆	Function Select Register A9	PS9	00 ₁₆
03A2 ₁₆			
03A3 ₁₆			
03A4 ₁₆			
03A5 ₁₆			
03A6 ₁₆			
03A7 ₁₆	Function Select Register D1	PSD1	X0XX XX00 ₂
03A8 ₁₆			
03A9 ₁₆			
03AA ₁₆			
03AB ₁₆			
03AC ₁₆	Function Select Register C2	PSC2	XXXX X00X ₂
03AD ₁₆	Function Select Register C3	PSC3	X0XX XXXX ₂
03AE ₁₆			
03AF ₁₆	Function Select Register C	PSC	00X0 0000 ₂
03B0 ₁₆	Function Select Register A0	PS0	00 ₁₆
03B1 ₁₆	Function Select Register A1	PS1	00 ₁₆
03B2 ₁₆	Function Select Register B0	PSL0	00 ₁₆
03B3 ₁₆	Function Select Register B1	PSL1	00 ₁₆
03B4 ₁₆	Function Select Register A2	PS2	00X0 0000 ₂
03B5 ₁₆	Function Select Register A3	PS3	00 ₁₆
03B6 ₁₆	Function Select Register B2	PSL2	00X0 0000 ₂
03B7 ₁₆	Function Select Register B3	PSL3	00 ₁₆
03B8 ₁₆			
03B9 ₁₆	Function Select Register A5	PS5	XXX0 0000 ₂
03BA ₁₆			
03BB ₁₆			
03BC ₁₆			
03BD ₁₆			
03BE ₁₆			
03BF ₁₆			
03C0 ₁₆	Port P6 Register	P6	XX ₁₆
03C1 ₁₆	Port P7 Register	P7	XX ₁₆
03C2 ₁₆	Port P6 Direction Register	PD6	00 ₁₆
03C3 ₁₆	Port P7 Direction Register	PD7	00 ₁₆
03C4 ₁₆	Port P8 Register	P8	XX ₁₆
03C5 ₁₆	Port P9 Register	P9	XX ₁₆
03C6 ₁₆	Port P8 Direction Register	PD8	00X0 0000 ₂
03C7 ₁₆	Port P9 Direction Register	PD9	00 ₁₆
03C8 ₁₆	Port P10 Register	P10	XX ₁₆
03C9 ₁₆	Port P11 Register	P11	XX ₁₆
03CA ₁₆	Port P10 Direction Register	PD10	00 ₁₆
03CB ₁₆	Port P11 Direction Register	PD11	XXX0 0000 ₂
03CC ₁₆	Port P12 Register	P12	XX ₁₆
03CD ₁₆	Port P13 Register	P13	XX ₁₆
03CE ₁₆	Port P12 Direction Register	PD12	00 ₁₆
03CF ₁₆	Port P13 Direction Register	PD13	00 ₁₆

X: Indeterminate

Blank spaces are reserved. No access is allowed.

<144-pin package>

Address	Register	Symbol	Value after RESET
03D0 ₁₆	Port P14 Register	P14	XX ₁₆
03D1 ₁₆	Port P15 Register	P15	XX ₁₆
03D2 ₁₆	Port P14 Direction Register	PD14	X000 0000 ₂
03D3 ₁₆	Port P15 Direction Register	PD15	00 ₁₆
03D4 ₁₆			
03D5 ₁₆			
03D6 ₁₆			
03D7 ₁₆			
03D8 ₁₆			
03D9 ₁₆			
03DA ₁₆	Pull-Up Control Register 2	PUR2	00 ₁₆
03DB ₁₆	Pull-Up Control Register 3	PUR3	00 ₁₆
03DC ₁₆	Pull-Up Control Register 4	PUR4	XXXX 0000 ₂
03DD ₁₆			
03DE ₁₆			
03DF ₁₆			
03E0 ₁₆	Port P0 Register	P0	XX ₁₆
03E1 ₁₆	Port P1 Register	P1	XX ₁₆
03E2 ₁₆	Port P0 Direction Register	PD0	00 ₁₆
03E3 ₁₆	Port P1 Direction Register	PD1	00 ₁₆
03E4 ₁₆	Port P2 Register	P2	XX ₁₆
03E5 ₁₆	Port P3 Register	P3	XX ₁₆
03E6 ₁₆	Port P2 Direction Register	PD2	00 ₁₆
03E7 ₁₆	Port P3 Direction Register	PD3	00 ₁₆
03E8 ₁₆	Port P4 Register	P4	XX ₁₆
03E9 ₁₆	Port P5 Register	P5	XX ₁₆
03EA ₁₆	Port P4 Direction Register	PD4	00 ₁₆
03EB ₁₆	Port P5 Direction Register	PD5	00 ₁₆
03EC ₁₆			
03ED ₁₆			
03EE ₁₆			
03EF ₁₆			
03F0 ₁₆	Pull-Up Control Register 0	PUR0	00 ₁₆
03F1 ₁₆	Pull-Up Control Register 1	PUR1	XXXX 0000 ₂
03F2 ₁₆			
03F3 ₁₆			
03F4 ₁₆			
03F5 ₁₆			
03F6 ₁₆			
03F7 ₁₆			
03F8 ₁₆			
03F9 ₁₆			
03FA ₁₆			
03FB ₁₆			
03FC ₁₆			
03FD ₁₆			
03FE ₁₆			
03FF ₁₆	Port Control Register	PCR	XXXX XXX0 ₂

X: Indeterminate

Blank spaces are reserved. No access is allowed.

<100-pin package>

Address	Register	Symbol	Value after RESET
03A0 ₁₆			
03A1 ₁₆			
03A2 ₁₆			
03A3 ₁₆			
03A4 ₁₆			
03A5 ₁₆			
03A6 ₁₆			
03A7 ₁₆	Function Select Register D1	PSD1	X0XX XX00 ₂
03A8 ₁₆			
03A9 ₁₆			
03AA ₁₆			
03AB ₁₆			
03AC ₁₆	Function Select Register C2	PSC2	XXXX X00X ₂
03AD ₁₆	Function Select Register C3	PSC3	X0XX XXXX ₂
03AE ₁₆			
03AF ₁₆	Function Select Register C	PSC	00X0 0000 ₂
03B0 ₁₆	Function Select Register A0	PS0	00 ₁₆
03B1 ₁₆	Function Select Register A1	PS1	00 ₁₆
03B2 ₁₆	Function Select Register B0	PSL0	00 ₁₆
03B3 ₁₆	Function Select Register B1	PSL1	00 ₁₆
03B4 ₁₆	Function Select Register A2	PS2	00X0 0000 ₂
03B5 ₁₆	Function Select Register A3	PS3	00 ₁₆
03B6 ₁₆	Function Select Register B2	PSL2	00X0 0000 ₂
03B7 ₁₆	Function Select Register B3	PSL3	00 ₁₆
03B8 ₁₆			
03B9 ₁₆			
03BA ₁₆			
03BB ₁₆			
03BC ₁₆			
03BD ₁₆			
03BE ₁₆			
03BF ₁₆			
03C0 ₁₆	Port P6 Register	P6	XX ₁₆
03C1 ₁₆	Port P7 Register	P7	XX ₁₆
03C2 ₁₆	Port P6 Direction Register	PD6	00 ₁₆
03C3 ₁₆	Port P7 Direction Register	PD7	00 ₁₆
03C4 ₁₆	Port P8 Register	P8	XX ₁₆
03C5 ₁₆	Port P9 Register	P9	XX ₁₆
03C6 ₁₆	Port P8 Direction Register	PD8	00X0 0000 ₂
03C7 ₁₆	Port P9 Direction Register	PD9	00 ₁₆
03C8 ₁₆	Port P10 Register	P10	XX ₁₆
03C9 ₁₆			
03CA ₁₆	Port P10 Direction Register	PD10	00 ₁₆
03CB ₁₆	Set default value to "FF ₁₆ "		
03CC ₁₆			
03CD ₁₆			
03CE ₁₆	Set default value to "FF ₁₆ "		
03CF ₁₆	Set default value to "FF ₁₆ "		

X: Indeterminate

Blank spaces are reserved. No access is allowed.

<100-pin package>

Address	Register	Symbol	Value after RESET
03D0 ₁₆			
03D1 ₁₆			
03D2 ₁₆	Set default value to "FF ₁₆ "		
03D3 ₁₆	Set default value to "FF ₁₆ "		
03D4 ₁₆			
03D5 ₁₆			
03D6 ₁₆			
03D7 ₁₆			
03D8 ₁₆			
03D9 ₁₆			
03DA ₁₆	Pull-Up Control Register 2	PUR2	00 ₁₆
03DB ₁₆	Pull-Up Control Register 3	PUR3	00 ₁₆
03DC ₁₆	Set default value to "00 ₁₆ "		
03DD ₁₆			
03DE ₁₆			
03DF ₁₆			
03E0 ₁₆	Port P0 Register	P0	XX ₁₆
03E1 ₁₆	Port P1 Register	P1	XX ₁₆
03E2 ₁₆	Port P0 Direction Register	PD0	00 ₁₆
03E3 ₁₆	Port P1 Direction Register	PD1	00 ₁₆
03E4 ₁₆	Port P2 Register	P2	XX ₁₆
03E5 ₁₆	Port P3 Register	P3	XX ₁₆
03E6 ₁₆	Port P2 Direction Register	PD2	00 ₁₆
03E7 ₁₆	Port P3 Direction Register	PD3	00 ₁₆
03E8 ₁₆	Port P4 Register	P4	XX ₁₆
03E9 ₁₆	Port P5 Register	P5	XX ₁₆
03EA ₁₆	Port P4 Direction Register	PD4	00 ₁₆
03EB ₁₆	Port P5 Direction Register	PD5	00 ₁₆
03EC ₁₆			
03ED ₁₆			
03EE ₁₆			
03EF ₁₆			
03F0 ₁₆	Pull-up Control Register 0	PUR0	00 ₁₆
03F1 ₁₆	Pull-up Control Register 1	PUR1	XXXX 0000 ₂
03F2 ₁₆			
03F3 ₁₆			
03F4 ₁₆			
03F5 ₁₆			
03F6 ₁₆			
03F7 ₁₆			
03F8 ₁₆			
03F9 ₁₆			
03FA ₁₆			
03FB ₁₆			
03FC ₁₆			
03FD ₁₆			
03FE ₁₆			
03FF ₁₆	Port Control Register	PCR	XXXX XXX0 ₂

X: Indeterminate

Blank spaces are reserved. No access is allowed.

5. Electrical Characteristics

Table 5.1 Absolute Maximum Ratings

Symbol	Parameter		Condition	Value	Unit
V _{CC}	Supply Voltage		V _{CC} =AV _{CC}	-0.3 to 6.0	V
AV _{CC}	Analog Supply Voltage		V _{CC} =AV _{CC}	-0.3 to 6.0	V
V _I	Input Voltage	RESET, CNV _{SS} , BYTE, P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾ , V _{REF} , X _{IN}		-0.3 to V _{CC} +0.3	V
		P70, P71		-0.3 to 6.0	
V _O	Output Voltage	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾ , X _{OUT}		-0.3 to V _{CC} +0.3	V
		P70, P71		-0.3 to 6.0	
P _d	Power Dissipation		T version	500	mW
			U version	400	
T _{opr}	Operating Ambient Temperature	during CPU operation	T version	-40 to 85	°C
			U version	-40 to 105	
		during flash memory program and erase operation		0 to 60	
T _{stg}	Storage Temperature			-65 to 150	°C

NOTE:

1. P11 to P15 are provided in the 144-pin package only.

Table 5.2 Recommended Operating Conditions

(V_{CC}=4.2 to 5.5V, V_{SS}=0V at T_{opr} = -40 to 85°C (T version)/-40 to 105°C (U version)
unless otherwise specified)

Symbol	Parameter		Standard			Unit
			Min.	Typ.	Max.	
V _{CC}	Supply Voltage		4.2	5.0	5.5	V
AV _{CC}	Analog Supply Voltage			V _{CC}		V
V _{SS}	Supply Voltage			0		V
AV _{SS}	Analog Supply Voltage			0		V
V _{IH}	Input High ("H") Voltage	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P87 ⁽³⁾ , P90-P97, P100-P107, P110-P114, P120-P127, P130-P137 ⁽⁴⁾ , P140-P146, P150-P157 ⁽⁴⁾ , X _{IN} , RESET, CNV _{SS} , BYTE	0.8V _{CC}		V _{CC}	V
		P70, P71	0.8V _{CC}		6.0	
V _{IL}	Input Low ("L") Voltage	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P87 ⁽³⁾ , P90-P97, P100-P107, P110-P114, P120-P127, P130-P137 ⁽⁴⁾ , P140-P146, P150-P157 ⁽⁴⁾ , X _{IN} , RESET, CNV _{SS} , BYTE	0		0.2V _{CC}	V
I _{OH(peak)}	Peak Output High ("H") Current ⁽²⁾	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽⁴⁾			-10.0	mA
I _{OH(avg)}	Average Output High ("H") Current ⁽¹⁾	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽⁴⁾			-5.0	mA
I _{OL(peak)}	Peak Output Low ("L") Current ⁽²⁾	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P70-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽⁴⁾			10.0	mA
I _{OL(avg)}	Average Output Low ("L") Current ⁽¹⁾	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P70-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽⁴⁾			5.0	mA

NOTES:

- Typical values when average output current is 100 ms.
- Total I_{OL(peak)} for P0, P1, P2, P86, P87, P9, P10, P11, P14 and P15 must be 80 mA or less.
Total I_{OL(peak)} for P3, P4, P5, P6, P7, P80 to P84, P12 and P13 must be 80 mA or less.
Total I_{OH(peak)} for P0, P1, P2, and P11 must be -40mA or less.
Total I_{OH(peak)} for P86, P87, P9, P10, P14 and P15 must be -40 mA or less.
Total I_{OH(peak)} for P3, P4, P5, P12 and P13 must be -40 mA or less.
Total I_{OH(peak)} for P6, P7, and P80 to P84 must be -40 mA or less.
- V_{IH} and V_{IL} reference for P87 applies when P87 is used as a programmable input port.
It does not apply when P87 is used as X_{CIN}.
- Ports P11 to P15 are provided in the 144-pin package only.

Table 5.3 Recommended Operating Conditions (Continued)

(V_{CC}=4.2 to 5.5V, V_{SS}=0V at T_{opr} = -40 to 85°C (T version)/-40 to 105°C (U version)
unless otherwise specified)

Symbol	Parameter		Standard			Unit
			Min.	Typ.	Max.	
f(BCLK)	CPU Operation Frequency	V _{CC} =4.2 to 5.5 V	0		32	MHz
f(XIN)	Main Clock Input Frequency	V _{CC} =4.2 to 5.5 V	0		24	MHz
f(XCIN)	Sub Clock Frequency			32.768	50	kHz
f(Ring)	On-chip Oscillator Frequency (V _{CC} =5.0V, T _{opr} =25° C)		0.5	1	2	MHz
f(PLL)	PLL Clock Frequency	V _{CC} =4.2 to 5.5 V	10		32	MHz
tsu(PLL)	Wait Time to Stabilize PLL Frequency Synthesizer	V _{CC} =5.0 V			5	ms

V_{CC}=5V**Table 5.4 Electrical Characteristics**

(V_{CC}=4.2 to 5.5V, V_{SS}=0V at T_{opr} = -40 to 85°C (T version)/-40 to 105°C (U version),
f(BCLK)=32MHz unless otherwise specified)

Symbol	Parameter		Condition	Standard			Unit
				Min.	Typ.	Max.	
V _{OH}	Output High ("H") Voltage	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾	I _{OH} =-5 mA	V _{CC} -2.0		V _{CC}	V
		P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾	I _{OH} =-200 μA	V _{CC} -0.3		V _{CC}	V
		X _{OUT}	I _{OH} =-1 mA	3.0			V
		X _{COUT}	High Power	No load applied	2.5		V
			Low Power	No load applied	1.6		V
V _{OL}	Output Low ("L") Voltage	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P70-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾	I _{OL} =5mA			2.0	V
		P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P70-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾	I _{OL} =200 μA			0.45	V
		X _{OUT}	I _{OL} =1 mA			2.0	V
		X _{COUT}	High Power	No load applied	0		V
			Low Power	No load applied	0		V
V _{T+} -V _{T-}	Hysteresis	HOLD, RDY, TA0 _{IN} -TA4 _{IN} , TB0 _{IN} -TB5 _{IN} , INT0-INT5, AD _{TRG} , CTS0-CTS4, CLK0-CLK4, TA0 _{OUT} -TA4 _{OUT} , NMI, K _{IO} -K _{I3} , RxD0-RxD4, SCL0-SCL4, SDA0-SDA4		0.2		1.0	V
		RESET		0.2		1.8	V
I _{IH}	Input High ("H") Current	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P70-P77, P80-P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾ , X _{IN} , RESET, CNV _{SS} , BYTE	V _I =5 V			5.0	μA
I _{IL}	Input Low ("L") Current	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P70-P77, P80-P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾ , X _{IN} , RESET, CNV _{SS} , BYTE	V _I =0 V			-5.0	μA
R _{PULLUP}	Pull-up Resistance	P00-P07, P10-P17, P20-P27, P30-P37, P40-P47, P50-P57, P60-P67, P72-P77, P80-P84, P86, P87, P90-P97, P100-P107, P110-P114, P120-P127, P130-P137, P140-P146, P150-P157 ⁽¹⁾	V _I =0 V	30	50	167	kΩ
R _{fXIN}	Feedback Resistance	X _{IN}			1.5		MΩ
R _{fXCIN}	Feedback Resistance	X _{CIN}			10		MΩ
V _{RAM}	RAM Standby Voltage	In stop mode		2.0			V

NOTE:

1. Ports P11 to P15 are provided in the 144-pin package only.

VCC=5V

Table 5.4 Electrical Characteristics (Continued)

(VCC=4.2 to 5.5V, VSS=0V at Topr = -40 to 85°C (T version)/-40 to 105°C (U version),
f(BCLK)=32MHz unless otherwise specified)

Symbol	Parameter	Measurement Condition	Standard			Unit
			Min.	Typ.	Max.	
Icc	Power Supply Current	In single-chip mode, output pins are left open and other pins are connected to Vss.		28	50	mA
				430		μA
				25		μA
				10		μA
				0.8	5	μA
					50	μA
					100	μA
					200	μA

NOTE:

1. Value is obtained when setting the FMSTP bit in the FMR0 register to "1" (flash memory stopped).

V_{CC}=5V**Table 5.5 A/D Conversion Characteristics**

(V_{CC}=4.2 to 5.5V, V_{SS}=0V at Topr = -40 to 85°C (T version)/-40 to 105°C (U version),
f(BCLK)=32MHz unless otherwise specified)

Symbol	Parameter	Measurement Condition	Standard			Unit
			Min.	Typ.	Max.	
-	Resolution	V _{REF} =V _{CC}			10	Bits
INL	Integral Nonlinearity Error	V _{REF} =V _{CC} =5V			±3	LSB
						LSB
		External op-amp connection mode			±7	LSB
DNL	Differential Nonlinearity Error				±1	LSB
-	Offset Error				±3	LSB
-	Gain Error				±3	LSB
RLADDER	Resistor Ladder	V _{REF} =V _{CC}	8		40	kΩ
t _{CONV}	10-bit Conversion Time ^(1, 2)		2.06			μs
t _{CONV}	8-bit Conversion Time ^(1, 2)		1.75			μs
t _{SAMP}	Sampling Time ⁽¹⁾		0.188			μs
V _{REF}	Reference Voltage		2		V _{CC}	V
V _{IA}	Analog Input Voltage		0		V _{REF}	V

NOTES:

1. Divide f(X_{IN}), if exceeding 16 MHz, to keep φ_{AD} frequency at 16 MHz or less.
2. With using the sample and hold function.

Table 5.6 D/A Conversion Characteristics

(V_{CC}=4.2 to 5.5V, V_{SS}=0V at Topr = -40 to 85°C (T version)/-40 to 105°C (U version),
f(BCLK)=32MHz unless otherwise specified)

Symbol	Parameter	Measurement Condition	Standard			Unit
			Min.	Typ.	Max.	
-	Resolution				8	Bits
-	Absolute Accuracy				1.0	%
t _{SU}	Setup Time				3	μs
R _O	Output Resistance		4	10	20	kΩ
I _{VREF}	Reference Power Supply Input Current	(Note 1)			1.5	mA

NOTE:

1. Measurement when using one D/A converter. The DAI register (i=0, 1) of the D/A converter, not being used, is set to "00₁₆". The resistor ladder in the A/D converter is excluded.
I_{VREF} flows even if the VCUT bit in the ADOCON1 register is set to "0" (no V_{REF} connection).

V_{CC}=5V

Table 5.7 Flash Memory Version Electrical Characteristics
(V_{CC}=4.5 to 5.5V at T_{opr}= 0 to 60°C unless otherwise specified)

Symbol	Parameter	Standard			Unit
		Min.	Typ.	Max.	
-	Program and Erase Endurance ⁽²⁾	100			cycles
-	Word Program Time (V _{CC} =5.0V, T _{opr} =25° C)		25	200	μs
-	Lock Bit Program Time		25	200	μs
-	Block Erase Time (V _{CC} =5.0V, T _{opr} =25° C)	4-Kbyte Block	0.3	4	s
		8-Kbyte Block	0.3	4	s
		32-Kbyte Block	0.5	4	s
		64-Kbyte Block	0.8	4	s
-	All-Unlocked-Block Erase Time ⁽¹⁾			4 x n	s
t _{PS}	Wait Time to Stabilize Flash Memory Circuit			15	μs
-	Data Hold Time (T _{opr} =-40 to 85 ° C)	10			years

NOTES:

1. *n* denotes the number of block to be erased.

2. Number of program-erase cycles per block.

If Program and Erase Endurance is *n* cycle (*n*=100), each block can be erased and programmed *n* cycles.

For example, if a 4-Kbyte block A is erased after programming a word data 2,048 times, each to a different address, this counts as one program and erase endurance. Data can not be programmed to the same address more than once without erasing the block. (rewrite prohibited).

Table 5.8 Power Supply Timing

Symbol	Parameter	Measurement Condition	Standard			Unit
			Min.	Typ.	Max.	
t _d (P-R)	Wait Time to Stabilize Internal Supply Voltage when Power-on	V _{CC} =4.2 to 5.5V			2	ms

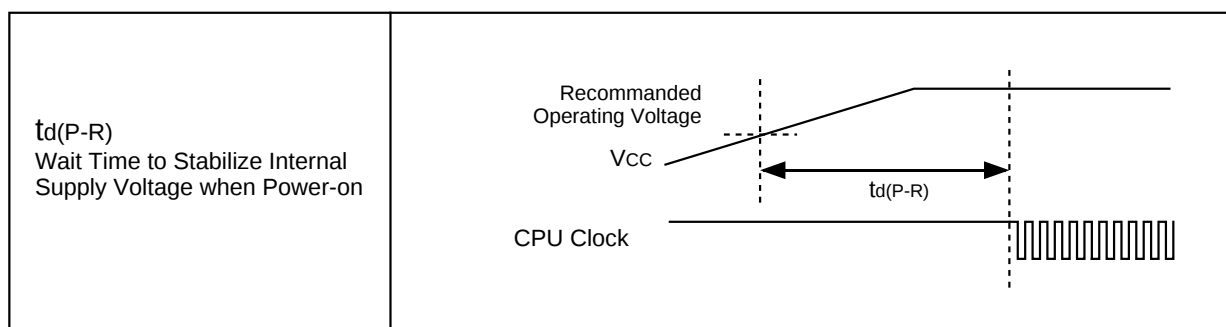


Figure 5.1 Power Supply Timing Diagram

VCC=5V

Timing Requirements

(VCC=4.2 to 5.5V, VSS=0V at Topr = -40 to 85°C (T version)/-40 to 105°C (U version) unless otherwise specified)

Table 5.9 External Clock Input

Symbol	Parameter	Standard		Unit
		Min.	Max.	
tc	External Clock Input Cycle Time	31.25		ns
tw(H)	External Clock Input High ("H") Width	13.75		ns
tw(L)	External Clock Input Low ("L") Width	13.75		ns
tr	External Clock Rise Time		5	ns
tf	External Clock Fall Time		5	ns

VCC=5V

Timing Requirements

(VCC=4.2 to 5.5V, VSS=0V at Topr = -40 to 85°C (T version)/-40 to 105°C (U version) unless otherwise specified)

Table 5.10 Timer A Input (Count Source Input in Event Counter Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
tc(TA)	TAiIN Input Cycle Time	100		ns
tw(TAH)	TAiIN Input High ("H") Width	40		ns
tw(TAL)	TAiIN Input Low ("L") Width	40		ns

Table 5.11 Timer A Input (Gate Input in Timer Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
tc(TA)	TAiIN Input Cycle Time	400		ns
tw(TAH)	TAiIN Input High ("H") Width	200		ns
tw(TAL)	TAiIN Input Low ("L") Width	200		ns

Table 5.12 Timer A Input (External Trigger Input in One-Shot Timer Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
tc(TA)	TAiIN Input Cycle Time	200		ns
tw(TAH)	TAiIN Input High ("H") Width	100		ns
tw(TAL)	TAiIN Input Low ("L") Width	100		ns

Table 5.13 Timer A Input (External Trigger Input in Pulse Width Modulation Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
tw(TAH)	TAiIN Input High ("H") Width	100		ns
tw(TAL)	TAiIN Input Low ("L") Width	100		ns

Table 5.14 Timer A Input (Counter Increment/Decrement Input in Event Counter Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
tc(UP)	TAiOUT Input Cycle Time	2000		ns
tw(UPH)	TAiOUT Input High ("H") Width	1000		ns
tw(UPL)	TAiOUT Input Low ("L") Width	1000		ns
tsu(UP-TIN)	TAiOUT Input Setup Time	400		ns
th(TIN-UP)	TAiOUT Input Hold Time	400		ns

V_{CC}=5V**Timing Requirements**(V_{CC}=4.2 to 5.5V, V_{SS}=0V at T_{opr} = -40 to 85°C (T version)/-40 to 105°C (U version) unless otherwise specified)**Table 5.15 Timer B Input (Count Source Input in Event Counter Mode)**

Symbol	Parameter	Standard		Unit
		Min.	Max.	
t _{C(TB)}	TB _{IIN} Input Cycle Time (counted on one edge)	100		ns
t _{w(TBH)}	TB _{IIN} Input High ("H") Width (counted on one edge)	40		ns
t _{w(TBL)}	TB _{IIN} Input Low ("L") Width (counted on one edge)	40		ns
t _{C(TB)}	TB _{IIN} Input Cycle Time (counted on both edges)	200		ns
t _{w(TBH)}	TB _{IIN} Input High ("H") Width (counted on both edges)	80		ns
t _{w(TBL)}	TB _{IIN} Input Low ("L") Width (counted on both edges)	80		ns

Table 5.16 Timer B Input (Pulse Period Measurement Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
t _{C(TB)}	TB _{IIN} Input Cycle Time	400		ns
t _{w(TBH)}	TB _{IIN} Input High ("H") Width	200		ns
t _{w(TBL)}	TB _{IIN} Input Low ("L") Width	200		ns

Table 5.17 Timer B Input (Pulse Width Measurement Mode)

Symbol	Parameter	Standard		Unit
		Min.	Max.	
t _{C(TB)}	TB _{IIN} Input Cycle Time	400		ns
t _{w(TBH)}	TB _{IIN} Input High ("H") Width	200		ns
t _{w(TBL)}	TB _{IIN} Input Low ("L") Width	200		ns

Table 5.18 A/D Trigger Input

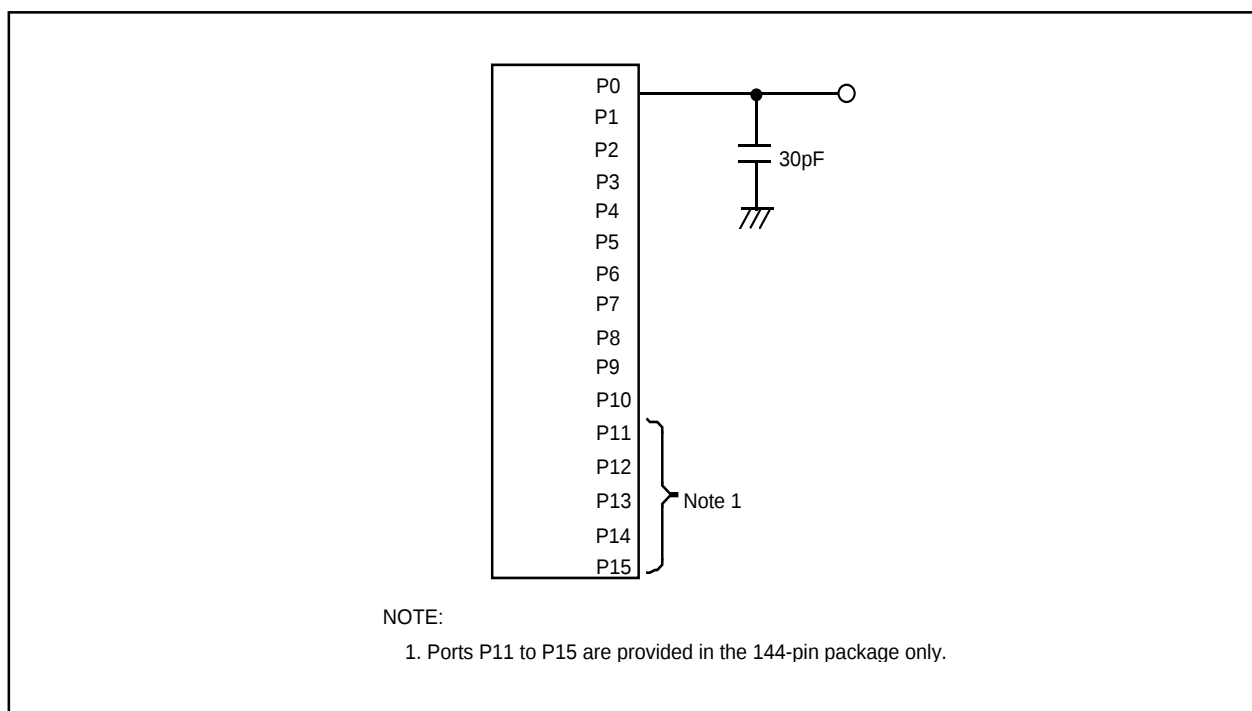
Symbol	Parameter	Standard		Unit
		Min.	Max.	
t _{C(AD)}	AD _{TRG} Input Cycle Time (required for trigger)	1000		ns
t _{w(ADL)}	AD _{TRG} Input Low ("L") Pulse Width	125		ns

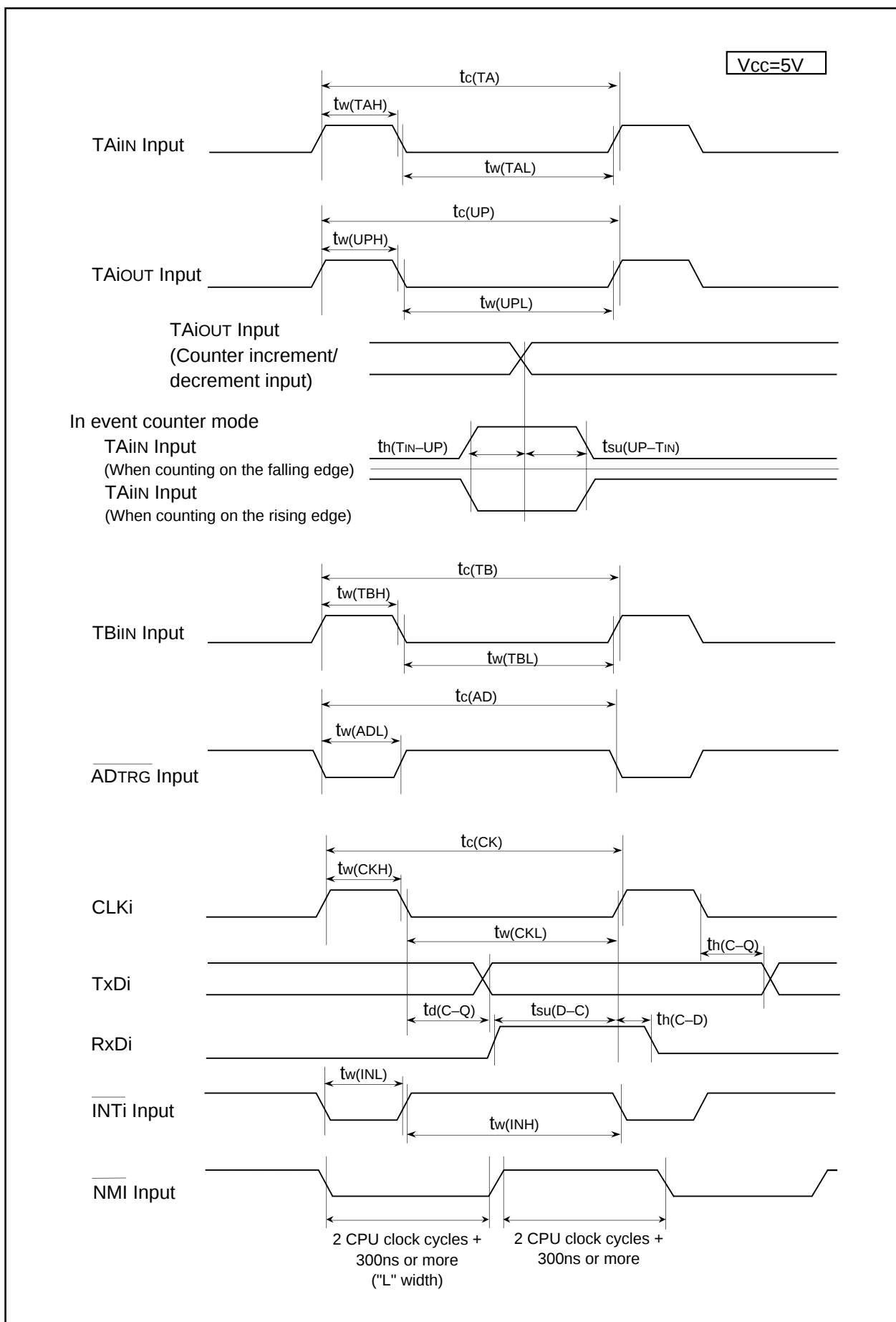
Table 5.19 Serial I/O

Symbol	Parameter	Standard		Unit
		Min.	Max.	
t _{C(CK)}	CLK _I Input Cycle Time	200		ns
t _{w(CKH)}	CLK _I Input High ("H") Width	100		ns
t _{w(CKL)}	CLK _I Input Low ("L") Width	100		ns
t _{d(C-Q)}	TxD _I Output Delay Time		80	ns
t _{h(C-Q)}	TxD _I Hold Time	0		ns
t _{su(D-C)}	RxD _I Input Setup Time	30		ns
t _{h(C-Q)}	RxD _I Input Hold Time	90		ns

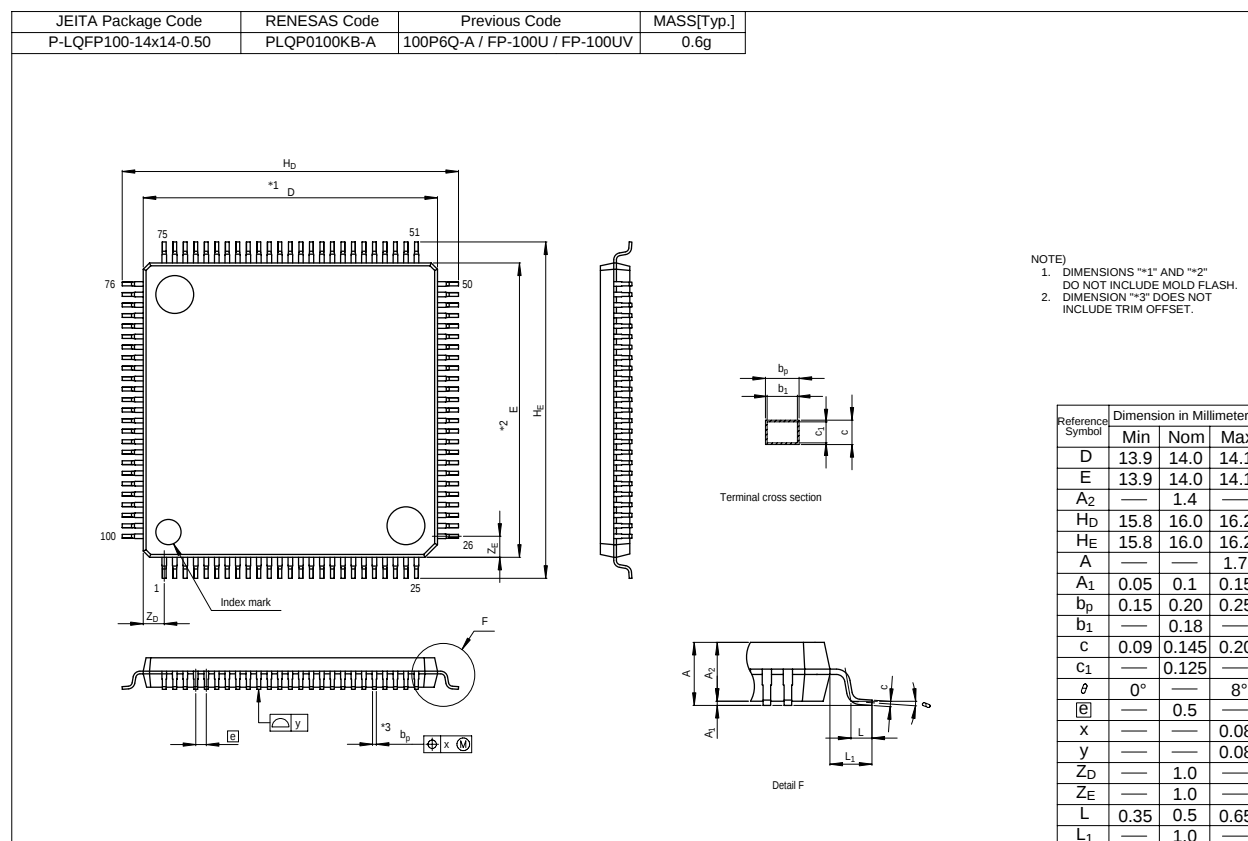
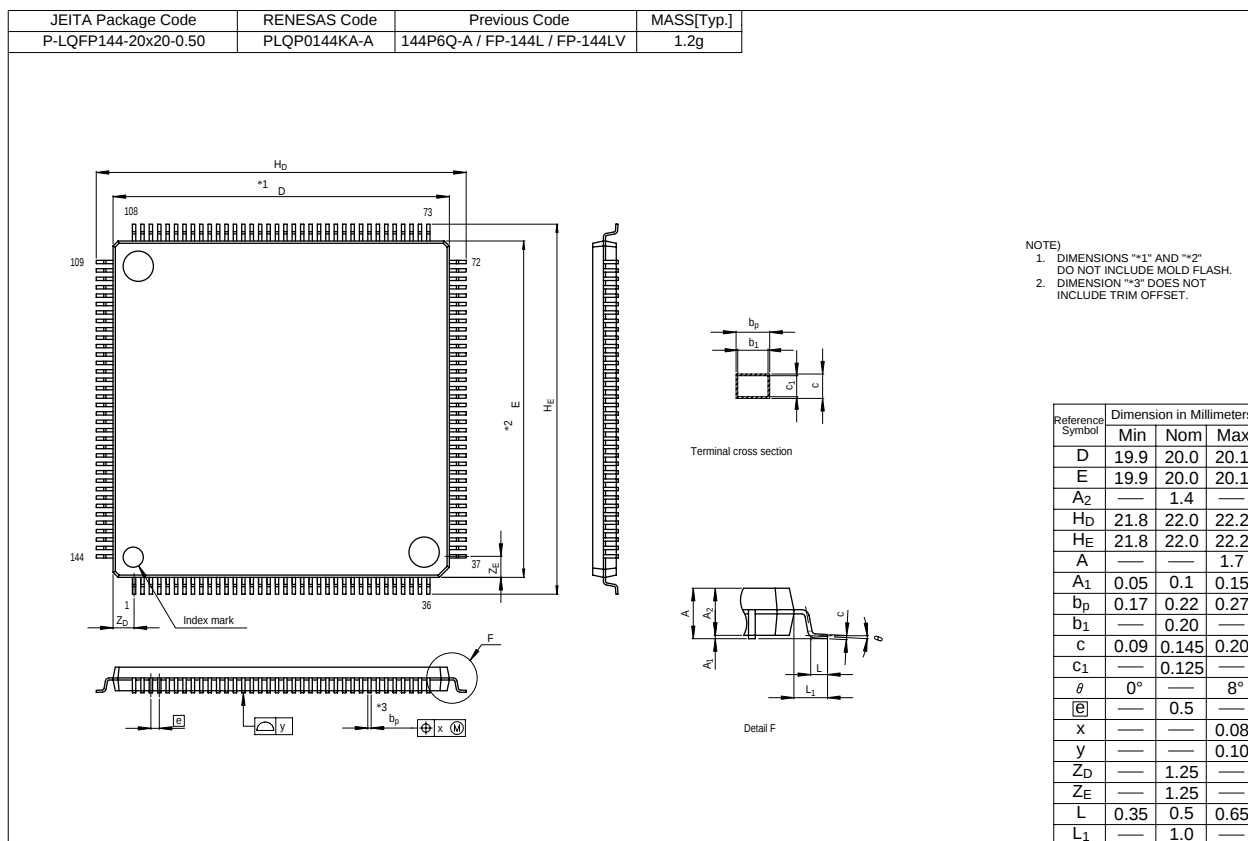
Table 5.20 External Interrupt INT_I Input

Symbol	Parameter	Standard		Unit
		Min.	Max.	
t _{w(INH)}	INT _I Input High ("H") Width	250		ns
t _{w(INL)}	INT _I Input Low ("L") Width	250		ns

**Figure 5.2 P0 to P15 Measurement Circuit**

Figure 5.3 $V_{CC}=5V$ Timing Diagram

Package Dimensions



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