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# SH7137 Group

Hardware Manual

Renesas 32-Bit RISC Microcomputer  
SuperH™ RISC engine Family

SH7131	R5F7131
SH7132	R5F7132
SH7136	R5F7136
SH7137	R5F7137

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# General Precautions in the Handling of MPU/MCU Products

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

## 1. Handling of Unused Pins

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

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

## 2. Processing at Power-on

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

- The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.

In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

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

## 3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

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

## 4. Clock Signals

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

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

## 5. Differences between Products

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

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

# Configuration of This Manual

This manual comprises the following items:

1. General Precautions in the Handling of MPU/MCU Products
2. Configuration of This Manual
3. Preface
4. Contents
5. Overview
6. Description of Functional Modules
  - CPU and System-Control Modules
  - On-Chip Peripheral Modules

The configuration of the functional description of each module differs according to the module. However, the generic style includes the following items:

- i) Feature
- ii) Input/Output Pin
- iii) Register Description
- iv) Operation
- v) Usage Note

When designing an application system that includes this LSI, take notes into account. Each section includes notes in relation to the descriptions given, and usage notes are given, as required, as the final part of each section.

7. List of Registers
8. Electrical Characteristics
9. Appendix
10. Main Revisions for This Edition (only for revised versions)

The list of revisions is a summary of points that have been revised or added to earlier versions. This does not include all of the revised contents. For details, see the actual locations in this manual.

11. Index

# Preface

The SH7131, SH7132, SH7136, and SH7137 Group RISC (Reduced Instruction Set Computer) microcomputers include a Renesas Technology-original RISC CPU as its core, and the peripheral functions required to configure a system.

**Target Users:** This manual was written for users who will be using the SH7131, SH7132, SH7136, and SH7137 Group in the design of application systems. Target users are expected to understand the fundamentals of electrical circuits, logical circuits, and microcomputers.

**Objective:** This manual was written to explain the hardware functions and electrical characteristics of the SH7131, SH7132, SH7136, and SH7137 Group to the target users.  
Refer to the SH-1/SH-2/SH-DSP Software Manual for a detailed description of the instruction set.

Notes on reading this manual:

- In order to understand the overall functions of the chip  
Read the manual according to the contents. This manual can be roughly categorized into parts on the CPU, system control functions, peripheral functions and electrical characteristics.
- In order to understand the details of the CPU's functions  
Read the SH-1/SH-2/SH-DSP Software Manual.
- In order to understand the details of a register when its name is known  
Read the index that is the final part of the manual to find the page number of the entry on the register. The addresses, bits, and initial values of the registers are summarized in section 25, List of Registers.

**Examples:**

Register name:	The following notation is used for cases when the same or a similar function, e.g. serial communication interface, is implemented on more than one channel: XXX_N (XXX is the register name and N is the channel number)
Bit order:	The MSB is on the left and the LSB is on the right.
Number notation:	Binary is B'xxxx, hexadecimal is H'xxxx, decimal is xxxx.
Signal notation:	An overbar is added to a low-active signal: $\overline{\text{xxxx}}$



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SH7131, SH7132, SH7136, and SH7137 Group manuals:

<b>Document Title</b>	<b>Document No.</b>
SH7137 Group Hardware Manual	This manual
SH-1/SH-2/SH-DSP Software Manual	REJ09B0171

User's manuals for development tools:

<b>Document Title</b>	<b>Document No.</b>
SuperH™ RISC engine C/C++ Compiler, Assembler, Optimizing Linkage Editor Compiler Package V.9.00 User's Manual	REJ10B0152
SuperH™ RISC engine High-performance Embedded Workshop 3 User's Manual	REJ10B0025
SuperH RISC engine High-performance Embedded Workshop 3 Tutorial	REJ10B0023

Application note:

<b>Document Title</b>	<b>Document No.</b>
SuperH RISC engine C/C++ Compiler Package Application Note	REJ05B0463

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# Contents

Section 1	Overview	1
1.1	Features of SH7131, SH7132, SH7136, and SH7137	1
1.2	Block Diagram	7
1.3	Pin Assignments	8
1.4	Pin Functions	10
Section 2	CPU	17
2.1	Features	17
2.2	Register Configuration	18
2.2.1	General Registers (Rn)	19
2.2.2	Control Registers	19
2.2.3	System Registers	21
2.2.4	Initial Values of Registers	21
2.3	Data Formats	22
2.3.1	Register Data Format	22
2.3.2	Memory Data Formats	22
2.3.3	Immediate Data Formats	23
2.4	Features of Instructions	23
2.4.1	RISC Type	23
2.4.2	Addressing Modes	26
2.4.3	Instruction Formats	29
2.5	Instruction Set	33
2.5.1	Instruction Set by Type	33
2.5.2	Data Transfer Instructions	37
2.5.3	Arithmetic Operation Instructions	39
2.5.4	Logic Operation Instructions	41
2.5.5	Shift Instructions	42
2.5.6	Branch Instructions	43
2.5.7	System Control Instructions	44
2.6	Processing States	46
Section 3	MCU Operating Modes	49
3.1	Selection of Operating Modes	49
3.2	Input/Output Pins	50
3.3	Operating Modes	51
3.3.1	Mode 0 (MCU Extension Mode 0)	51
3.3.2	Mode 2 (MCU Extension Mode 2)	51

3.3.3	Mode 3 (Single Chip Mode) .....	51
3.4	Address Map .....	52
3.5	Initial State in This LSI .....	56
3.6	Note on Changing Operating Mode .....	56
<b>Section 4 Clock Pulse Generator (CPG) .....</b>		<b>57</b>
4.1	Features .....	57
4.2	Input/Output Pins .....	61
4.3	Clock Operating Mode .....	62
4.4	Register Descriptions .....	67
4.4.1	Frequency Control Register (FRQCR) .....	67
4.4.2	Oscillation Stop Detection Control Register (OSCCR) .....	70
4.5	Changing Frequency .....	71
4.6	Oscillator .....	72
4.6.1	Connecting Crystal Resonator .....	72
4.6.2	External Clock Input Method .....	73
4.7	Function for Detecting Oscillator Stop .....	74
4.8	Usage Notes .....	75
4.8.1	Note on Crystal Resonator .....	75
4.8.2	Notes on Board Design .....	75
<b>Section 5 Exception Handling .....</b>		<b>77</b>
5.1	Overview .....	77
5.1.1	Types of Exception Handling and Priority .....	77
5.1.2	Exception Handling Operations .....	78
5.1.3	Exception Handling Vector Table .....	79
5.2	Resets .....	81
5.2.1	Types of Resets .....	81
5.2.2	Power-On Reset .....	81
5.2.3	Manual Reset .....	82
5.3	Address Errors .....	83
5.3.1	Address Error Sources .....	83
5.3.2	Address Error Exception Source .....	84
5.4	Interrupts .....	85
5.4.1	Interrupt Sources .....	85
5.4.2	Interrupt Priority .....	86
5.4.3	Interrupt Exception Handling .....	86
5.5	Exceptions Triggered by Instructions .....	87
5.5.1	Types of Exceptions Triggered by Instructions .....	87
5.5.2	Trap Instructions .....	87

5.5.3	Illegal Slot Instructions .....	88
5.5.4	General Illegal Instructions.....	88
5.6	Cases when Exceptions are Accepted .....	89
5.7	Stack States after Exception Handling Ends .....	90
5.8	Usage Notes .....	92
5.8.1	Value of Stack Pointer (SP) .....	92
5.8.2	Value of Vector Base Register (VBR).....	92
5.8.3	Address Errors Caused by Stacking for Address Error Exception Handling .....	92
5.8.4	Notes on Slot Illegal Instruction Exception Handling .....	93
<b>Section 6 Interrupt Controller (INTC) .....</b>		<b>95</b>
6.1	Features .....	95
6.2	Input/Output Pins .....	97
6.3	Register Descriptions .....	98
6.3.1	Interrupt Control Register 0 (ICR0).....	99
6.3.2	IRQ Control Register (IRQCR) .....	100
6.3.3	IRQ Status register (IRQSR) .....	102
6.3.4	Interrupt Priority Registers A, D to F, and H to M (IPRA, IPRD to IPRF, and IPRH to IPRM) .....	105
6.4	Interrupt Sources .....	108
6.4.1	External Interrupts .....	108
6.4.2	On-Chip Peripheral Module Interrupts .....	109
6.4.3	User Break Interrupt (SH7136 and SH7137 only).....	109
6.5	Interrupt Exception Handling Vector Table.....	110
6.6	Interrupt Operation.....	114
6.6.1	Interrupt Sequence .....	114
6.6.2	Stack after Interrupt Exception Handling .....	117
6.7	Interrupt Response Time.....	117
6.8	Data Transfer with Interrupt Request Signals .....	119
6.8.1	Handling Interrupt Request Signals as Sources for DTC Activation and CPU Interrupts .....	120
6.8.2	Handling Interrupt Request Signals as Sources for DTC Activation, but Not CPU Interrupts .....	120
6.8.3	Handling Interrupt Request Signals as Sources for CPU Interrupts, but Not DTC Activation.....	121
6.9	Usage Note.....	121
<b>Section 7 User Break Controller (UBC) (SH7136 and SH7137 only) .....</b>		<b>123</b>
7.1	Features .....	123
7.2	Input/Output Pins .....	125

7.3	Register Descriptions .....	126
7.3.1	Break Address Register A (BARA) .....	127
7.3.2	Break Address Mask Register A (BAMRA).....	127
7.3.3	Break Bus Cycle Register A (BBRA).....	128
7.3.4	Break Data Register A (BDRA) .....	130
7.3.5	Break Data Mask Register A (BDMRA) .....	131
7.3.6	Break Address Register B (BARB) .....	132
7.3.7	Break Address Mask Register B (BAMRB).....	133
7.3.8	Break Data Register B (BDRB).....	134
7.3.9	Break Data Mask Register B (BDMRB).....	135
7.3.10	Break Bus Cycle Register B (BBRB) .....	136
7.3.11	Break Control Register (BRCR) .....	138
7.3.12	Execution Times Break Register (BETR).....	143
7.3.13	Branch Source Register (BRSR).....	144
7.3.14	Branch Destination Register (BRDR).....	145
7.4	Operation .....	146
7.4.1	Flow of the User Break Operation .....	146
7.4.2	User Break on Instruction Fetch Cycle.....	147
7.4.3	Break on Data Access Cycle.....	148
7.4.4	Sequential Break.....	149
7.4.5	Value of Saved Program Counter .....	149
7.4.6	PC Trace .....	150
7.4.7	Usage Examples.....	151
7.5	Usage Notes .....	156
Section 8 Data Transfer Controller (DTC).....		159
8.1	Features.....	159
8.2	Register Descriptions .....	161
8.2.1	DTC Mode Register A (MRA) .....	162
8.2.2	DTC Mode Register B (MRB).....	163
8.2.3	DTC Source Address Register (SAR).....	165
8.2.4	DTC Destination Address Register (DAR).....	165
8.2.5	DTC Transfer Count Register A (CRA) .....	166
8.2.6	DTC Transfer Count Register B (CRB).....	167
8.2.7	DTC Enable Registers A to E (DTCERA to DTCERE) .....	168
8.2.8	DTC Control Register (DTCCR).....	169
8.2.9	DTC Vector Base Register (DTCVBR).....	171
8.2.10	Bus Function Extending Register (BSCEHR) .....	171
8.3	Activation Sources.....	172
8.4	Location of Transfer Information and DTC Vector Table .....	172

8.5	Operation .....	177
8.5.1	Transfer Information Read Skip Function .....	182
8.5.2	Transfer Information Writeback Skip Function .....	183
8.5.3	Normal Transfer Mode .....	183
8.5.4	Repeat Transfer Mode.....	184
8.5.5	Block Transfer Mode .....	186
8.5.6	Chain Transfer .....	187
8.5.7	Operation Timing.....	189
8.5.8	Number of DTC Execution Cycles .....	192
8.5.9	DTC Bus Release Timing .....	194
8.5.10	DTC Activation Priority Order .....	197
8.6	DTC Activation by Interrupt.....	198
8.7	Examples of Use of the DTC .....	199
8.7.1	Normal Transfer Mode .....	199
8.7.2	Chain Transfer when Counter = 0.....	199
8.8	Interrupt Sources.....	201
8.9	Usage Notes .....	201
8.9.1	Module Standby Mode Setting .....	201
8.9.2	On-Chip RAM .....	201
8.9.3	DTCE Bit Setting.....	201
8.9.4	Chain Transfer .....	201
8.9.5	Transfer Information Start Address, Source Address, and Destination Address .....	201
8.9.6	Access to DTC Registers through DTC.....	202
8.9.7	Notes on IRQ Interrupt as DTC Activation Source .....	202
8.9.8	Notes on SCI as DTC Activation Sources .....	202
8.9.9	Clearing Interrupt Source Flag.....	202
8.9.10	Conflict between NMI Interrupt and DTC Activation.....	202
8.9.11	Operation When a DTC Activation Request is Cancelled While in Progress.....	202
<b>Section 9 Bus State Controller (BSC).....</b>		<b>203</b>
9.1	Features.....	203
9.2	Input/Output Pins .....	205
9.3	Area Overview .....	205
9.3.1	Area Division.....	205
9.3.2	Address Map .....	205
9.4	Register Descriptions .....	211
9.4.1	Common Control Register (CMNCR) .....	211
9.4.2	CSn Space Bus Control Register (CSnBCR) (n = 0 and 1).....	213
9.4.3	CSn Space Wait Control Register (CSnWCR) (n = 0 and 1).....	216

9.4.4	Bus Function Extending Register (BSCEHR) .....	218
9.5	Operation .....	222
9.5.1	Endian/Access Size and Data Alignment.....	222
9.5.2	Normal Space Interface .....	223
9.5.3	Access Wait Control .....	226
9.5.4	$\overline{CSn}$ Assert Period Extension.....	228
9.5.5	Wait between Access Cycles .....	229
9.5.6	Bus Arbitration .....	232
9.5.7	Others.....	236
9.5.8	Access to On-Chip FLASH and On-Chip RAM by CPU .....	237
9.5.9	Access to On-Chip Peripheral I/O Registers by CPU .....	237
9.5.10	Access to External Memory by CPU .....	239
Section 10 Multi-Function Timer Pulse Unit 2 (MTU2).....		241
10.1	Features.....	241
10.2	Input/Output Pins.....	247
10.3	Register Descriptions .....	248
10.3.1	Timer Control Register (TCR).....	252
10.3.2	Timer Mode Register (TMDR).....	256
10.3.3	Timer I/O Control Register (TIOR).....	259
10.3.4	Timer Compare Match Clear Register (TCNTCMPCLR).....	278
10.3.5	Timer Interrupt Enable Register (TIER).....	279
10.3.6	Timer Status Register (TSR).....	284
10.3.7	Timer Buffer Operation Transfer Mode Register (TBTM).....	292
10.3.8	Timer Input Capture Control Register (TICCR).....	293
10.3.9	Timer Synchronous Clear Register (TSYCR).....	295
10.3.10	Timer A/D Converter Start Request Control Register (TADCR) .....	297
10.3.11	Timer A/D Converter Start Request Cycle Set Registers (TADCORA_4 and TADCORB_4).....	300
10.3.12	Timer A/D Converter Start Request Cycle Set Buffer Registers (TADCOBRA_4 and TADCOBRB_4) .....	300
10.3.13	Timer Counter (TCNT).....	301
10.3.14	Timer General Register (TGR) .....	301
10.3.15	Timer Start Register (TSTR) .....	302
10.3.16	Timer Synchronous Register (TSYR).....	304
10.3.17	Timer Counter Synchronous Start Register (TCSYSTR) .....	306
10.3.18	Timer Read/Write Enable Register (TRWER) .....	309
10.3.19	Timer Output Master Enable Register (TOER) .....	310
10.3.20	Timer Output Control Register 1 (TOCR1).....	311
10.3.21	Timer Output Control Register 2 (TOCR2).....	314

10.3.22	Timer Output Level Buffer Register (TOLBR) .....	317
10.3.23	Timer Gate Control Register (TGCR) .....	318
10.3.24	Timer Subcounter (TCNTS) .....	320
10.3.25	Timer Dead Time Data Register (TDDR).....	321
10.3.26	Timer Cycle Data Register (TCDR) .....	321
10.3.27	Timer Cycle Buffer Register (TCBR).....	322
10.3.28	Timer Interrupt Skipping Set Register (TITCR).....	322
10.3.29	Timer Interrupt Skipping Counter (TITCNT).....	324
10.3.30	Timer Buffer Transfer Set Register (TBTER) .....	325
10.3.31	Timer Dead Time Enable Register (TDER).....	326
10.3.32	Timer Waveform Control Register (TWCR) .....	327
10.3.33	Bus Master Interface .....	329
10.4	Operation .....	330
10.4.1	Basic Functions.....	330
10.4.2	Synchronous Operation.....	336
10.4.3	Buffer Operation .....	338
10.4.4	Cascaded Operation .....	342
10.4.5	PWM Modes .....	347
10.4.6	Phase Counting Mode .....	352
10.4.7	Reset-Synchronized PWM Mode.....	359
10.4.8	Complementary PWM Mode .....	362
10.4.9	A/D Converter Start Request Delaying Function.....	406
10.4.10	MTU2–MTU2S Synchronous Operation.....	410
10.4.11	External Pulse Width Measurement.....	416
10.4.12	Dead Time Compensation.....	417
10.4.13	TCNT Capture at Crest and/or Trough in Complementary PWM Operation .....	419
10.5	Interrupt Sources.....	420
10.5.1	Interrupt Sources and Priorities.....	420
10.5.2	DTC Activation.....	422
10.5.3	A/D Converter Activation.....	423
10.6	Operation Timing.....	425
10.6.1	Input/Output Timing .....	425
10.6.2	Interrupt Signal Timing.....	432
10.7	Usage Notes .....	437
10.7.1	Module Standby Mode Setting .....	437
10.7.2	Input Clock Restrictions .....	437
10.7.3	Caution on Period Setting .....	438
10.7.4	Contention between TCNT Write and Clear Operations.....	438
10.7.5	Contention between TCNT Write and Increment Operations.....	439
10.7.6	Contention between TGR Write and Compare Match.....	440



10.7.7	Contention between Buffer Register Write and Compare Match .....	441
10.7.8	Contention between Buffer Register Write and TCNT Clear .....	442
10.7.9	Contention between TGR Read and Input Capture.....	443
10.7.10	Contention between TGR Write and Input Capture.....	444
10.7.11	Contention between Buffer Register Write and Input Capture .....	445
10.7.12	TCNT_2 Write and Overflow/Underflow Contention in Cascade Connection ...	445
10.7.13	Counter Value during Complementary PWM Mode Stop.....	447
10.7.14	Buffer Operation Setting in Complementary PWM Mode .....	447
10.7.15	Reset Sync PWM Mode Buffer Operation and Compare Match Flag .....	448
10.7.16	Overflow Flags in Reset Synchronous PWM Mode .....	449
10.7.17	Contention between Overflow/Underflow and Counter Clearing.....	450
10.7.18	Contention between TCNT Write and Overflow/Underflow.....	451
10.7.19	Cautions on Transition from Normal Operation or PWM Mode 1 to Reset-Synchronized PWM Mode .....	451
10.7.20	Output Level in Complementary PWM Mode and Reset-Synchronized PWM Mode .....	452
10.7.21	Interrupts in Module Standby Mode.....	452
10.7.22	Simultaneous Capture of TCNT_1 and TCNT_2 in Cascade Connection.....	452
10.7.23	Notes on Output Waveform Control During Synchronous Counter Clearing in Complementary PWM Mode .....	453
10.8	MTU2 Output Pin Initialization.....	455
10.8.1	Operating Modes .....	455
10.8.2	Reset Start Operation.....	455
10.8.3	Operation in Case of Re-Setting Due to Error During Operation, etc. ....	456
10.8.4	Overview of Initialization Procedures and Mode Transitions in Case of Error during Operation, etc.....	457
<b>Section 11 Multi-Function Timer Pulse Unit 2S (MTU2S) .....</b>		<b>487</b>
11.1	Input/Output Pins.....	491
11.2	Register Descriptions.....	492
<b>Section 12 Port Output Enable (POE).....</b>		<b>495</b>
12.1	Features.....	495
12.2	Input/Output Pins.....	497
12.3	Register Descriptions.....	499
12.3.1	Input Level Control/Status Register 1 (ICSR1) .....	500
12.3.2	Output Level Control/Status Register 1 (OCSR1).....	503
12.3.3	Input Level Control/Status Register 2 (ICSR2) .....	504
12.3.4	Output Level Control/Status Register 2 (OCSR2).....	507
12.3.5	Input Level Control/Status Register 3 (ICSR3) .....	509

12.3.6	Software Port Output Enable Register (SPOER)	511
12.3.7	Port Output Enable Control Register 1 (POECR1)	512
12.3.8	Port Output Enable Control Register 2 (POECR2)	514
12.4	Operation	517
12.4.1	Input Level Detection Operation	518
12.4.2	Output-Level Compare Operation	519
12.4.3	Release from High-Impedance State	520
12.5	Interrupts	521
12.6	Usage Note	521
12.6.1	Pin State when a Power-On Reset is Issued from the Watchdog Timer	521
<b>Section 13 Watchdog Timer (WDT)</b>		<b>523</b>
13.1	Features	523
13.2	Input/Output Pin for WDT	525
13.3	Register Descriptions	526
13.3.1	Watchdog Timer Counter (WTCNT)	526
13.3.2	Watchdog Timer Control/Status Register (WTCSR)	527
13.3.3	Notes on Register Access	529
13.4	Operation	530
13.4.1	Revoking Software Standbys	530
13.4.2	Using Watchdog Timer Mode	530
13.4.3	Using Interval Timer Mode	531
13.5	Interrupt Source	532
13.6	Usage Note	532
13.6.1	WTCNT Setting Value	532
<b>Section 14 Serial Communication Interface (SCI)</b>		<b>533</b>
14.1	Features	533
14.2	Input/Output Pins	535
14.3	Register Descriptions	536
14.3.1	Receive Shift Register (SCRSR)	537
14.3.2	Receive Data Register (SCRDR)	537
14.3.3	Transmit Shift Register (SCTSR)	537
14.3.4	Transmit Data Register (SCTDR)	538
14.3.5	Serial Mode Register (SCSMR)	538
14.3.6	Serial Control Register (SCSCR)	541
14.3.7	Serial Status Register (SCSSR)	544
14.3.8	Serial Port Register (SCSPTR)	550
14.3.9	Serial Direction Control Register (SCSDCR)	552
14.3.10	Bit Rate Register (SCBRR)	553

14.4	Operation .....	563
14.4.1	Overview .....	563
14.4.2	Operation in Asynchronous Mode .....	565
14.4.3	Clock Synchronous Mode.....	575
14.4.4	Multiprocessor Communication Function .....	584
14.4.5	Multiprocessor Serial Data Transmission .....	586
14.4.6	Multiprocessor Serial Data Reception .....	587
14.5	SCI Interrupt Sources and DTC .....	590
14.6	Serial Port Register (SCSPTR) and SCI Pins .....	591
14.7	Usage Notes .....	593
14.7.1	SCTDR Writing and TDRE Flag.....	593
14.7.2	Multiple Receive Error Occurrence .....	593
14.7.3	Break Detection and Processing .....	594
14.7.4	Sending a Break Signal.....	594
14.7.5	Receive Data Sampling Timing and Receive Margin (Asynchronous Mode).....	594
14.7.6	Note on Using DTC .....	596
14.7.7	Note on Using External Clock in Clock Synchronous Mode.....	596
14.7.8	Module Standby Mode Setting .....	596
Section 15 Synchronous Serial Communication Unit (SSU) .....		597
15.1	Features.....	597
15.2	Input/Output Pins .....	599
15.3	Register Descriptions .....	600
15.3.1	SS Control Register H (SSCRH) .....	601
15.3.2	SS Control Register L (SSCRL) .....	603
15.3.3	SS Mode Register (SSMR) .....	604
15.3.4	SS Enable Register (SSER) .....	606
15.3.5	SS Status Register (SSSR).....	607
15.3.6	SS Control Register 2 (SSCR2) .....	610
15.3.7	SS Transmit Data Registers 0 to 3 (SSTDR0 to SSTDR3).....	611
15.3.8	SS Receive Data Registers 0 to 3 (SSRDR0 to SSRDR3).....	612
15.3.9	SS Shift Register (SSTRSR).....	613
15.4	Operation .....	614
15.4.1	Transfer Clock .....	614
15.4.2	Relationship of Clock Phase, Polarity, and Data .....	614
15.4.3	Relationship between Data Input/Output Pins and Shift Register .....	615
15.4.4	Communication Modes and Pin Functions .....	617
15.4.5	SSU Mode.....	619
15.4.6	$\overline{\text{SCS}}$ Pin Control and Conflict Error.....	628
15.4.7	Clock Synchronous Communication Mode .....	630

15.5	SSU Interrupt Sources and DTC .....	636
15.6	Usage Notes .....	637
15.6.1	Module Standby Mode Setting .....	637
15.6.2	Access to SSTDR and SSRDR Registers.....	637
15.6.3	Continuous Transmission/Reception in SSU Slave Mode.....	637
15.6.4	Note for Reception Operations in SSU Slave Mode.....	637
15.6.5	Note on Master Transmission and Master Reception Operations in SSU Mode ..	638
15.6.6	Note on DTC Transfers.....	638
Section 16 I <sup>2</sup> C Bus Interface 2 (I <sup>2</sup> C2) .....		639
16.1	Features.....	639
16.2	Input/Output Pins.....	642
16.3	Register Descriptions .....	643
16.3.1	I <sup>2</sup> C Bus Control Register 1 (ICCR1).....	643
16.3.2	I <sup>2</sup> C Bus Control Register 2 (ICCR2).....	646
16.3.3	I <sup>2</sup> C Bus Mode Register (ICMR).....	648
16.3.4	I <sup>2</sup> C Bus Interrupt Enable Register (ICIER).....	650
16.3.5	I <sup>2</sup> C Bus Status Register (ICSR).....	652
16.3.6	I <sup>2</sup> C Bus Slave Address Register (SAR).....	655
16.3.7	I <sup>2</sup> C Bus Transmit Data Register (ICDRT).....	656
16.3.8	I <sup>2</sup> C Bus Receive Data Register (ICDRR).....	656
16.3.9	I <sup>2</sup> C Bus Shift Register (ICDRS).....	656
16.3.10	NF2CYC Register (NF2CYC).....	657
16.4	Operation .....	658
16.4.1	I <sup>2</sup> C Bus Format.....	658
16.4.2	Master Transmit Operation .....	659
16.4.3	Master Receive Operation.....	661
16.4.4	Slave Transmit Operation .....	664
16.4.5	Slave Receive Operation.....	667
16.4.6	Clock Synchronous Serial Format .....	668
16.4.7	Noise Filter .....	672
16.4.8	Example of Use.....	673
16.5	I <sup>2</sup> C2 Interrupt Sources .....	677
16.6	Operation Using the DTC .....	678
16.7	Bit Synchronous Circuit.....	679
16.8	Usage Note.....	681
16.8.1	Module Standby Mode Setting .....	681
16.8.2	Issuance of Stop Condition and Repeated Start Condition .....	681
16.8.3	Issuance of a Start Condition and Stop Condition in Sequence .....	681
16.8.4	Settings for Multi-Master Operation.....	682

16.8.5	Reading ICDRR in Master Receive Mode.....	682
16.8.6	Supported Emulator .....	682
<b>Section 17 A/D Converter (ADC) .....</b>		
17.1	Features.....	683
17.2	Input/Output Pins.....	686
17.3	Register Descriptions.....	687
17.3.1	A/D Control Registers_0 and _1 (ADCR_0 and ADCR_1) .....	688
17.3.2	A/D Status Registers_0 and _1 (ADSR_0 and ADSR_1).....	691
17.3.3	A/D Start Trigger Select Registers_0 and _1 (ADSTRGR_0 and ADSTRGR_1).....	692
17.3.4	A/D Analog Input Channel Select Registers_0 and _1 (ADANSR_0 and ADANSR_1) .....	694
17.3.5	A/D Data Registers 0 to 15 (ADDR0 to ADDR15).....	695
17.3.6	CPU Interface .....	696
17.4	Operation .....	697
17.4.1	Single-Cycle Scan Mode .....	697
17.4.2	Continuous Scan Mode.....	699
17.4.3	Input Sampling and A/D Conversion Time .....	701
17.4.4	A/D Converter Activation by MTU2 and MTU2S .....	703
17.4.5	External Trigger Input Timing.....	704
17.4.6	Example of ADDR Auto-Clear Function.....	704
17.5	Interrupt Sources and DTC Transfer Requests .....	706
17.6	Definitions of A/D Conversion Accuracy.....	707
17.7	Usage Notes .....	709
17.7.1	Analog Input Voltage Range .....	709
17.7.2	Relationship between AV <sub>cc</sub> , AV <sub>ss</sub> and V <sub>cc</sub> , V <sub>ss</sub> .....	709
17.7.3	Range of AV <sub>refh</sub> and AV <sub>refl</sub> Pin Settings.....	709
17.7.4	Notes on Board Design .....	709
17.7.5	Notes on Noise Countermeasures .....	710
17.7.6	Notes on Register Setting .....	710
<b>Section 18 Compare Match Timer (CMT) .....</b>		
18.1	Features.....	711
18.2	Register Descriptions .....	712
18.2.1	Compare Match Timer Start Register (CMSTR) .....	713
18.2.2	Compare Match Timer Control/Status Register (CMCSR) .....	713
18.2.3	Compare Match Counter (CMCNT).....	715
18.2.4	Compare Match Constant Register (CMCOR) .....	715
18.3	Operation .....	716

18.3.1	Interval Count Operation .....	716
18.3.2	CMCNT Count Timing.....	716
18.4	Interrupts.....	717
18.4.1	CMT Interrupt Sources and DTC Activation.....	717
18.4.2	Timing of Setting Compare Match Flag .....	718
18.4.3	Timing of Clearing Compare Match Flag.....	718
18.5	Usage Notes .....	719
18.5.1	Module Standby Mode Setting .....	719
18.5.2	Conflict between Write and Compare-Match Processes of CMCNT .....	719
18.5.3	Conflict between Word-Write and Count-Up Processes of CMCNT .....	720
18.5.4	Conflict between Byte-Write and Count-Up Processes of CMCNT.....	721
18.5.5	Compare Match between CMCNT and CMCOR.....	721
Section 19 Controller Area Network (RCAN-ET) .....		723
19.1	Summary.....	723
19.1.1	Overview.....	723
19.1.2	Scope.....	723
19.1.3	Audience .....	723
19.1.4	References.....	724
19.1.5	Features.....	724
19.2	Architecture .....	725
19.3	Programming Model – Overview.....	728
19.3.1	Memory Map .....	728
19.3.2	Mailbox Structure .....	729
19.3.3	RCAN-ET Control Registers .....	737
19.3.4	RCAN-ET Mailbox Registers.....	756
19.4	Application Note.....	766
19.4.1	Test Mode Settings .....	766
19.4.2	Configuration of RCAN-ET .....	767
19.4.3	Message Transmission Sequence.....	773
19.4.4	Message Receive Sequence .....	776
19.4.5	Reconfiguration of Mailbox.....	778
19.5	Interrupt Sources.....	780
19.6	DTC Interface .....	781
19.7	CAN Bus Interface.....	782
19.8	Usage Notes .....	783
19.8.1	Module Stop Mode .....	783
19.8.2	Reset .....	783
19.8.3	CAN Sleep Mode.....	783
19.8.4	Register Access.....	783

19.8.5	Interrupts.....	784
<b>Section 20</b>	<b>Pin Function Controller (PFC) .....</b>	<b>785</b>
20.1	Register Descriptions.....	803
20.1.1	Port A I/O Register L (PAIORL).....	804
20.1.2	Port A Control Registers L1 to L4 (PACRL1 to PACRL4).....	804
20.1.3	Port B I/O Register L (PBIORL).....	819
20.1.4	Port B Control Registers L1, L2 (PBCRL1, PBCRL2).....	819
20.1.5	Port D I/O Register L (PDIORL) (SH7132 and SH7137 only).....	827
20.1.6	Port D Control Registers L1 to L3 (PDCRL1 to PDCRL3) (SH7132 and SH7137 only).....	828
20.1.7	Port E I/O Registers L, H (PEIORL, PEIORH).....	833
20.1.8	Port E Control Registers L1 to L4, H1, H2 (PECRL1 to PECRL4, PECRH1, PECRH2).....	834
20.1.9	IRQOUT Function Control Register (IFCR).....	851
20.2	Usage Notes.....	852
<b>Section 21</b>	<b>I/O Ports.....</b>	<b>853</b>
21.1	Port A.....	854
21.1.1	Register Descriptions.....	856
21.1.2	Port A Data Register L (PADRL).....	856
21.1.3	Port A Port Register L (PAPRL).....	858
21.2	Port B.....	859
21.2.1	Register Descriptions.....	860
21.2.2	Port B Data Register L (PBDRL).....	860
21.2.3	Port B Port Register L (PBPRL).....	863
21.3	Port D (SH7132/SH7137 Only).....	865
21.3.1	Register Descriptions.....	865
21.3.2	Port D Data Register L (PDDRL).....	866
21.3.3	Port D Port Register L (PDPRL).....	867
21.4	Port E.....	869
21.4.1	Register Descriptions.....	871
21.4.2	Port E Data Registers H and L (PEDRH and PEDRL).....	871
21.4.3	Port E Port Registers H and L (PEPRH and PEPRL).....	874
21.5	Port F.....	876
21.5.1	Register Descriptions.....	877
21.5.2	Port F Data Register L (PFDRL).....	878
<b>Section 22</b>	<b>Flash Memory.....</b>	<b>881</b>
22.1	Features.....	881

22.2	Overview .....	883
22.2.1	Block Diagram.....	883
22.2.2	Operating Mode .....	884
22.2.3	Mode Comparison.....	886
22.2.4	Flash Memory Configuration.....	887
22.2.5	Block Division .....	888
22.2.6	Programming/Erasing Interface .....	888
22.3	Input/Output Pins .....	891
22.4	Register Descriptions .....	891
22.4.1	Registers .....	891
22.4.2	Programming/Erasing Interface Registers .....	894
22.4.3	Programming/Erasing Interface Parameters .....	901
22.4.4	RAM Emulation Register (RAMER).....	916
22.5	On-Board Programming Mode .....	918
22.5.1	Boot Mode .....	918
22.5.2	User Program Mode.....	922
22.5.3	User Boot Mode.....	932
22.6	Protection .....	937
22.6.1	Hardware Protection .....	937
22.6.2	Software Protection.....	938
22.6.3	Error Protection.....	938
22.7	Flash Memory Emulation in RAM .....	940
22.8	Usage Notes .....	943
22.8.1	Switching between User MAT and User Boot MAT .....	943
22.8.2	Interrupts during Programming/Erasing .....	944
22.8.3	Other Notes .....	947
22.9	Supplementary Information .....	949
22.9.1	Specifications of the Standard Serial Communications Interface in Boot Mode .....	949
22.9.2	Areas for Storage of the Procedural Program and Data for Programming.....	979
22.10	Programmer Mode .....	986
<b>Section 23</b>	<b>RAM .....</b>	<b>987</b>
23.1	Usage Notes .....	988
23.1.1	Module Standby Mode Setting .....	988
23.1.2	Address Error.....	988
23.1.3	Initial Values in RAM.....	988
<b>Section 24</b>	<b>Power-Down Modes .....</b>	<b>989</b>
24.1	Features.....	989



24.1.1	Types of Power-Down Modes .....	989
24.2	Input/Output Pins .....	991
24.3	Register Descriptions .....	992
24.3.1	Standby Control Register 1 (STBCR1).....	992
24.3.2	Standby Control Register 2 (STBCR2).....	993
24.3.3	Standby Control Register 3 (STBCR3).....	994
24.3.4	Standby Control Register 4 (STBCR4).....	996
24.3.5	Standby Control Register 5 (STBCR5).....	997
24.3.6	Standby Control Register 6 (STBCR6).....	998
24.3.7	RAM Control Register (RAMCR).....	999
24.4	Sleep Mode .....	1000
24.4.1	Transition to Sleep Mode.....	1000
24.4.2	Canceling Sleep Mode .....	1000
24.5	Software Standby Mode (SH7136 and SH7137 only) .....	1001
24.5.1	Transition to Software Standby Mode .....	1001
24.5.2	Canceling Software Standby Mode.....	1002
24.6	Deep Software Standby Mode (SH7136 and SH7137 only).....	1003
24.6.1	Transition to Deep Software Standby Mode.....	1003
24.6.2	Canceling Deep Software Standby Mode .....	1003
24.7	Module Standby Mode.....	1004
24.7.1	Transition to Module Standby Mode .....	1004
24.7.2	Canceling Module Standby Function.....	1004
24.8	Usage Note.....	1005
24.8.1	Current Consumption while Waiting for Oscillation to be Stabilized .....	1005
24.8.2	Executing the SLEEP Instruction .....	1005
<b>Section 25 List of Registers.....</b>		<b>1007</b>
25.1	Register Address Table (In the Order of Addresses) .....	1008
25.2	Register Bit List .....	1029
25.3	Register States in Each Operating Mode .....	1050
<b>Section 26 Electrical Characteristics .....</b>		<b>1063</b>
26.1	Absolute Maximum Ratings .....	1063
26.2	DC Characteristics .....	1064
26.3	AC Characteristics .....	1071
26.3.1	Clock Timing.....	1072
26.3.2	Control Signal Timing .....	1075
26.3.3	AC Bus Timing.....	1078
26.3.4	Multi Function Timer Pulse Unit 2 (MTU2) Timing.....	1085
26.3.5	Multi Function Timer Pulse Unit 2S (MTU2S) Timing .....	1087

26.3.6	I/O Port Timing.....	1088
26.3.7	Watchdog Timer (WDT) Timing.....	1089
26.3.8	Serial Communication Interface (SCI) Timing.....	1090
26.3.9	Synchronous Serial Communication Unit (SSU) Timing.....	1092
26.3.10	Controller Area Network (RCAN-ET) Timing.....	1095
26.3.11	Port Output Enable (POE) Timing.....	1096
26.3.12	I <sup>2</sup> C Bus Interface 2 (I <sup>2</sup> C2) Timing.....	1097
26.3.13	UBC Trigger Timing.....	1098
26.3.14	A/D Converter Timing.....	1099
26.3.15	AC Characteristics Measurement Conditions .....	1100
26.4	A/D Converter Characteristics .....	1101
26.5	Flash Memory Characteristics .....	1102
26.6	Usage Note.....	1103
26.6.1	Notes on Connecting V <sub>CL</sub> Capacitor .....	1103
Appendix .....		1105
A.	Pin States.....	1105
B.	Processing of Unused Pins.....	1111
C.	Pin States of Bus Related Signals .....	1112
D.	Product Code Lineup .....	1113
E.	Package Dimensions .....	1114
Main Revisions for This Edition.....		1117
Index .....		1147