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# Linux Interface Specification Device Driver SATA

User's Manual: Software

R-Car H3/M3N Series

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# How to Use This Manual

- **[Readers]**

This manual is intended for engineers who develop products which use the R-Car H3/M3N processor.

- **[Purpose]**

This manual is intended to give users an understanding of the functions of the R-Car H3/M3N processor device driver and to serve as a reference for developing hardware and software for systems that use this driver.

- **[How to Read This Manual]**

It is assumed that the readers of this manual have general knowledge in the fields of electrical

— Engineering, logic circuits, microcontrollers, and Linux.

→ Read this manual in the order of the CONTENTS.

— To understand the functions of a multimedia processor for R-Car H3/M3N

→ See the R-Car H3/M3N User's Manual.

— To know the electrical specifications of the multimedia processor for R-Car H3/M3N

→ See the R-Car H3/M3N Data Sheet.

- **[Conventions]**

The following symbols are used in this manual.

Data significance: Higher digits on the left and lower digits on the right

**Note:** Footnote for item marked with Note in the text

**Caution:** Information requiring particular attention

**Remark:** Supplementary information

Numeric representation: Binary ... xxxx, 0bxxxx, or xxxxB

Decimal ... xxxx

Hexadecimal ... 0xxxxx or xxxxH

Data type: Double word ... 64 bits

Word ... 32 bits

Half word ... 16 bits

Byte ... 8 bits

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# 1. Overview

## 1.1 Overview

This manual explains the driver module (this module) that controls the Serial ATA(SATA) Interface on R-Car H3/M3N.

## 1.2 Function

This module controls the SATA on R-Car H3/M3N, transmits/receives data to/from SATA Device on the R-CarH3-SiP/R-CarM3N-SiP System Evaluation Board. The following table lists the function of this module.

**Table 1.1 Driver Function (R-Car H3/M3N)**

function	Support status
transfer rate	6.0 Gbps (third generation) and 3.0 Gbps (second generation) and 1.5 Gbps (first generation)
Mode	Only master mode
NCQ	not support
AHCI	not support
Hot Plug	not support
Device Sleep Mode (Low Power Consumption Mode)	not support

## 1.3 Connected Port

This module supports SATA ports on R-CarH3-SiP/R-CarM3N-SiP System Evaluation Board.

**Table 1.2 Connected Port (R-Car H3/M3N)**

channel	Connected to	Support status	Remark
SATA0	CN8	Yes	-

## 1.4 Reference

### 1.4.1 Standard

The following table describes the standard that this module corresponds.

**Table 1.3 Standard (R-Car H3/M3N)**

Reference No.	Issue	Title	Edition	Data
-	Serial ATA International Organization	Serial ATA Revision 3.2	Rev.3.2	Aug. 7, 2013

### 1.4.2 Related Documents

The following table describes the document related to this module.

**Table 1.4 Related Documents (R-Car H3/M3N)**

Reference No.	Issue	Title	Edition	Data
-	Renesas Electronics	R-Car Series, 3rd Generation User's Manual: Hardware	Rev.2.20	Jun. 30, 2020
-	Renesas Electronics	R-CarH3-SiP System Evaluation Board Salvator-X Hardware Manual RTP0RC7795SIPB0011S	Rev.1.09	May. 11, 2017
-	Renesas Electronics	R-CarH3-SiP/M3-SiP/M3N-SiP System Evaluation Board Salvator-XS Hardware Manual	Rev.2.04	Jul. 17, 2018

## 1.5 Restrictions

There is no restriction in this module.

## 1.6 Notice

None.

## 2. Terminology

The following table describes the terminology related to this module.

**Table 2.1 Terminology**

Terms	Explanation
ATA	Advanced Technology Attachment
SATA	Serial Advanced Technology Attachment
DMA	Direct Memory Access
DMAC	DMA Controller
NCQ	Native Command Queuing
AHCI	Advanced Host Controller Interface



## 3. Operating Environment

### 3.1 Hardware Environment

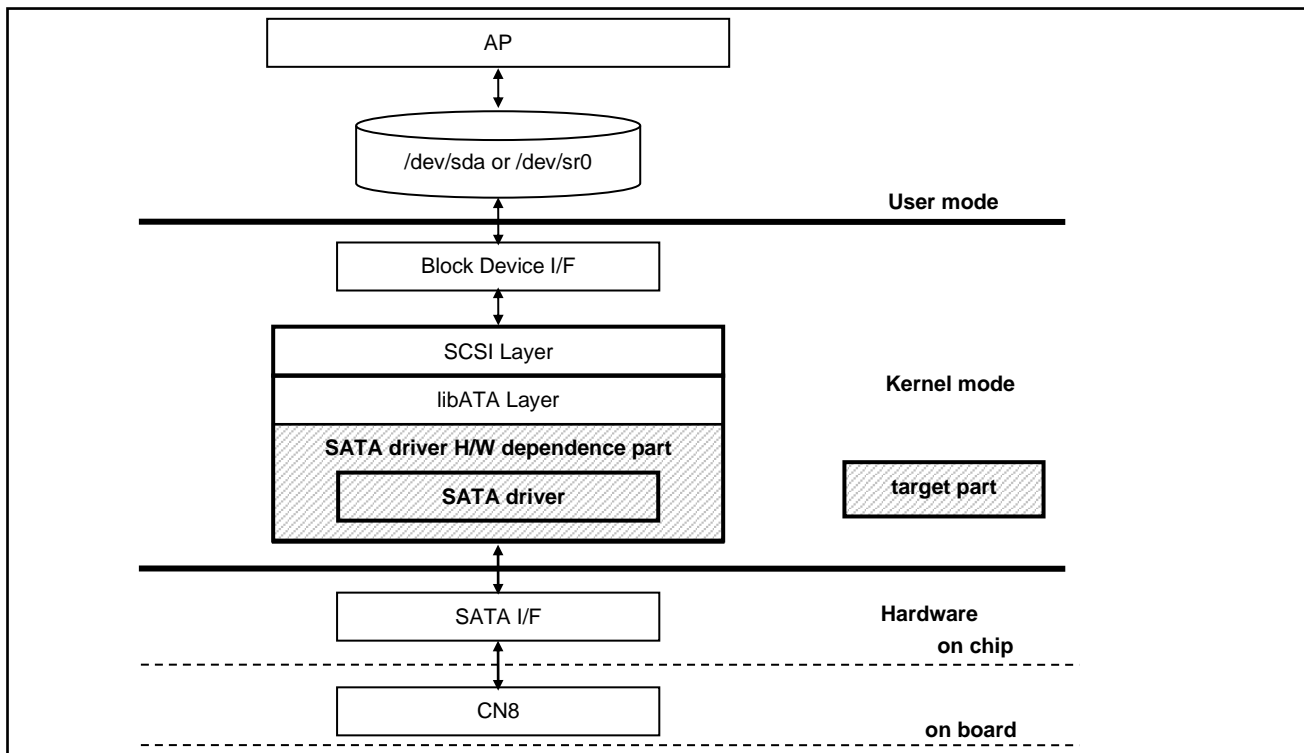
The following table describes the hardware needed to use this module.

**Table 3.1 Hardware Environment (R-Car H3/M3N)**

Name	Version	Manufacture
R-CarH3-SiP System Evaluation Board Salvator-X	-	Renesas Electronics
R-CarH3-SiP/M3-SiP/M3N-SiP System Evaluation Board Salvator-XS	-	Renesas Electronics

### 3.2 Module Configuration

The following figure describes the configuration of this module.



**Figure 3.1 Module Configuration (R-Car H3/M3N)**

### 3.3 State Transition Diagram

There is no state transition diagram for this module.

## 4. External Interface

Detailed explanation is skipped because the external interface of this module is based on Linux.

### 4.1 Device Node

Device node of this module is described below.

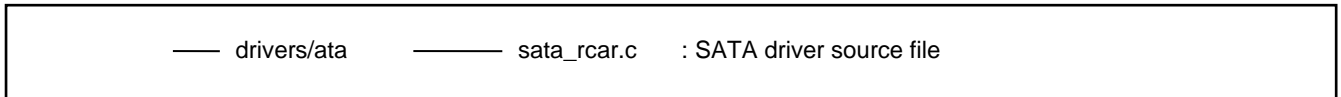
**Table 4.1 Device Node (R-Car H3/M3N)**

Connected Device	Channel	Device node	Major number	Minor number
HDD	SATA0	/dev/sda	8	0
DVD	SATA0	/dev/sr0	11	0

## 5. Integration

### 5.1 Directory Configuration

This directory configuration is described below.



**Figure 5.1 Directory Configuration (R-Car H3/M3N)**

### 5.2 Integration Procedure

To enable the function of this module, make the following setting with kernel configuration.

```
Device Drivers --->
  SCSI device support --->
    <*> SCSI disk support
  <*> Serial ATA and Parallel ATA drivers (libata) --->
    <*> Renesas R-Car SATA support
```

When using the CD-ROM, make the following setting with kernel configuration.

```
Device Drivers --->
  SCSI device support --->
    <*> SCSI CDROM support
File systems --->
  CD-ROM/DVD Filesystems --->
    <*> ISO 9660 CDROM file system support
    [*] Microsoft Joliet CDROM extensions
# “*” is enable
```

### 5.3 Option Setting

#### 5.3.1 Module Parameters

There are no module parameters.

#### 5.3.2 Kernel Parameters

There are no kernel parameters.

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REVISION HISTORY	Linux Interface Specification Device Driver SATA User's Manual: Software
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Rev.	Date	Description	
		Page	Summary
0.1	Sep. 25, 2015	—	New creation.
0.2	Nov. 20, 2015	2	Change standard.
0.3	Apr. 15, 2016	All	Add R-Car M3 support.
		2	Change Related Documents.
0.4	Aug. 5, 2016	2	Table 1.4 Related documents(R-Car H3) - H3 Document Update.
		6	Add "4.2 IPMMU Setting".
		7	Change the setting when using the CD-ROM.
0.5	Dec. 16, 2016	6	Change the device tree file name.
0.6	Mar. 15, 2017	2	Table 1.4 Related documents(R-Car H3) Add User's Manual: Hardware Rev0.53.
		2, 4	Add Salvator-XS support.
		6	Add R-Car H3 WS2.0 support.
0.7	Jun. 14, 2017	2	Update User's Manual: Hardware Rev0.53 to Rev0.54.
		6	Unify notation of chip version.
1.00	Aug. 8, 2017	All	Update document format.
1.01	Oct. 24, 2017	1, 2, 4-6, 8	Add R-Car M3N support.
		2	Update User's Manual: Hardware Rev0.54 to Rev0.55.
1.50	Jan 29, 2018	2	Update User's Manual: Hardware Rev0.55 to Rev0.80, and delete Rev0.51.
		6	Delete IPMMU setting.
1.51	Oct 22, 2018	2	Update User's Manual: Hardware Rev0.80 to Rev1.00.
2.00	Dec 25, 2018	2	Update Salvator-X Hardware Manual: Rev1.03 to Rev1.09 Update Salvator-XS Hardware Manual: Rev2.00 to Rev2.04
		4	Update Salvator-XS Name: R-CarH3-SiP/M3-SiP to R-CarH3-SiP/M3-SiP/M3N-SiP
		-	Update AddressList
2.01	Apr 17, 2019	2	Update User's Manual: Hardware Rev1.00 to Rev1.50.
		-	Update AddressList
2.50	Apr 21, 2021	2	Update User's Manual: Hardware Rev1.50 to Rev2.20.
		-	Update AddressList
3.00	Dec 10, 2021	-	Update Notice

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