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Linux Interface Specification Device Driver QoS

User's Manual: Software

R-Car H3/M3/M3N/E3/D3 Series

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Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
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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/M3/M3N/E3/D3 processor.

- **[Purpose]**

This manual is intended to give users an understanding of the functions of the R-Car H3/M3/M3N/E3/D3 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/M3/M3N/E3/D3

→ See the R-Car H3/M3/M3N/E3/D3 User's Manual.

— To know the electrical specifications of the multimedia processor for R-Car H3/M3/M3N/E3/D3

→ See the R-Car H3/M3/M3N/E3/D3 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

R-Car H3/M3/M3N/E3/D3 bus system controls bandwidth usage more effectively by setting QoS parameters along with Usecase.

QoS parameters are set by QoS Driver. This manual explains how to use QoS Driver.

1.2 Function

This module provides the function to update QoS parameters with csv file.

1.3 Reference

1.3.1 Related Documents

The following table shows the document related to this module.

Table 1-1 Related document (R-Car H3/M3/M3N/E3/D3)

Number	Issue	Title	Edition	Date
-	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-CarM3-SiP System Evaluation Board Salvator-X Hardware Manual RTP0RC7796SIPB0011S	Rev.0.04	Oct. 3.2016
-	Renesas Electronics	R-CarH3-SiP/M3-SiP/M3N-SiP System Evaluation Board Salvator-XS Hardware Manual	Rev.2.04	Jul. 17, 2018
-	Renesas Electronics	R-CarE3 System Evaluation Board Ebisu Hardware Manual RTP0RC77990SEB0010S	Rev.0.03	Apr. 11, 2018
-	Renesas Electronics	R-CarE3 System Evaluation Board Ebisu-4D (E3 board 4xDRAM) Hardware Manual	Rev.1.01	Jul. 19, 2018
-	Renesas Electronics	R-CarD3 System Evaluation Board Hardware Manual RTP0RC77995SEB0010S	Rev.1.20	Jul. 25, 2017

1.4 Notice

- None.

1.5 Terminology

The following table shows the terminology related to this module.

Table 1-2 Terminology

Terms	Explanation
QoS	Quality of Service

2. Operating Environment

2.1 Hardware Environment

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

Table 2-1 Hardware specification (R-Car H3/M3/M3N/E3/D3)

Name	Version	Manufacture
R-CarH3-SiP System Evaluation Board Salvator-X	-	Renesas Electronics
R-CarM3-SiP System Evaluation Board Salvator-X	-	Renesas Electronics
R-CarH3-SiP/M3-SiP/M3N-SiP System Evaluation Board Salvator-XS	-	Renesas Electronics
R-CarE3 System Evaluation Board Ebisu	-	Renesas Electronics
R-CarE3 System Evaluation Board Ebisu-4D	-	Renesas Electronics
R-CarD3 System Evaluation Board Draak	-	Renesas Electronics

Module Configuration

Figure 2-1 shows the software configuration in which this module is used.

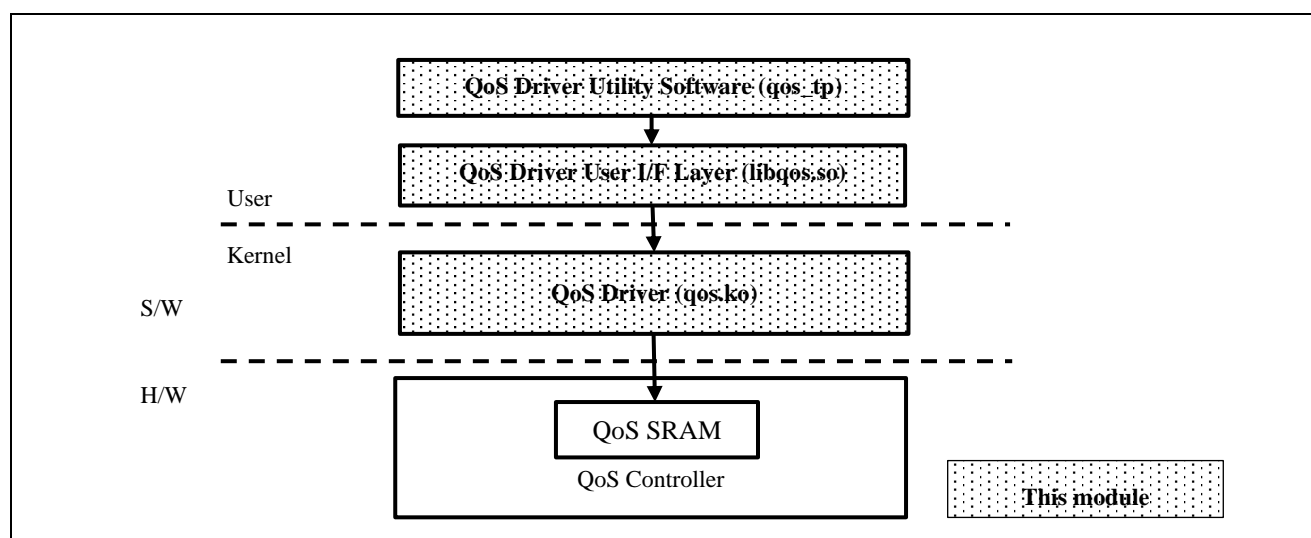


Figure 2-1 Software block diagram

3. Functions

3.1 Functional Overview

This module provides two functions. One is to store QoS parameters to QoS SRAM, another is to reflect QoS SRAM to QoS Controller. QoS Driver is kernel module and QoS Driver Utility Software is executable file.

3.2 Setup QoS Parameters

Step.1 Install QoS Driver

```
$ modprobe qos
```

Step.2 Change directory to csv path

```
$ cd /path_to_csv
```

Step.3 Store QoS parameters to QoS SRAM

```
$ qos_tp setall file.csv
```

Step.4 Reflect QoS SRAM to QoS controller

```
$ qos_tp switch
```

Note

- If user wants to change QoS parameters, re-execute from Step.2 to Step.4.
- Use qos_tp at one thread at the same time.

4. Integration

4.1 Directory Configuration

The QoS Driver's directory configuration is shown below.

The source files are built with Yocto and the binary files are installed in rootfs with Yocto.

[QoS Driver Utility Software]

qos_if-tp-user

└─files

└─qos_if

Makefile

qos_tp.c

qos_tp.h

[QoS Driver User I/F Layer]

qos_if-module

└─files

└─qos_if

└─if

Makefile

qos_api_local.h

qos_lib.c

└─include

qos_public.h

[QoS Driver]

qos-module

└─files

└─qos

└─drv

Makefile

qos.h

qos_core.c

qos_core.h

qos_drv.c

qos_public_common.h

qos_reg.h

Note : The above files are put on the following URL.

QoS Driver Utility Software and QoS Driver User I/F Layer

https://github.com/renesas-rcar/qos_lib

QoS Driver

https://github.com/renesas-rcar/qos_drv

Figure 4-1 Directory configuration (R-Car H3/M3/M3N/E3/D3)

5. Sample CSV File

Refer to the application note.

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REVISION HISTORY			Linux Interface Specification Device Driver QoS User's Manual: Software
Rev.	Date	Description	
		Page	Summary
0.1	May 13, 2016	—	New version
0.2	Jun. 16, 2016	4	Separate QoS parameters setup
	Jun. 16, 2016	4	Fix QoS parameters setup
0.3	Oct. 31, 2016	4	Add Note
		6	Add common header
1.00	Aug. 31, 2017	—	For final version release
1.01	Sep. 26, 2017	1, 3, 6	Add D3
1.02	Nov. 14, 2017	1, 3, 6	Add M3N
1.03	Dec. 22, 2017	1, 3, 6	Delete D3
1.04	Mar. 14, 2018	1, 3, 6	Add E3
2.00	Nov. 05, 2018	—	Change Address List
2.02	June. 24, 2019	—	Change Address List
2.50	Apr. 21, 2021	—	Add Kernel v5.10 support Add R-Car D3 support
3.00	Dec. 10, 2021	—	Add Kernel v5.10.41 support

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Renesas Electronics Corporation

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Renesas Electronics America Inc. Milpitas Campus

1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics America Inc. San Jose Campus

6024 Silver Creek Valley Road, San Jose, CA 95138, USA
Tel: +1-408-284-8200, Fax: +1-408-284-2775

Renesas Electronics Canada Limited

9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

Room 101-T01, Floor 1, Building 7, Yard No. 7, 8th Street, Shangdi, Haidian District, Beijing 100085, China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai 200333, China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited

Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

80 Bendemeer Road, #06-02 Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.

Unit No 3A-1 Level 3A Tower 8 UOA Business Park, No 1 Jalan Pengaturcara U1/51A, Seksyen U1, 40150 Shah Alam, Selangor, Malaysia
Tel: +60-3-5022-1288, Fax: +60-3-5022-1290

Renesas Electronics India Pvt. Ltd.

No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700

Renesas Electronics Korea Co., Ltd.

17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5338



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■営業お問合せ窓口

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