User's Manual

RENESAS

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Linux Interface Specification Device Driver GPIO

User's Manual: Software

R-Car H3/M3/M3N/D3/E3/V3U/V3H 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/M3/M3N/D3/E3/V3U/V3H processor.

- **[Purpose]**
  This manual is intended to give users an understanding of the functions of the R-Car H3/M3/M3N/D3/E3/V3U/V3H 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/D3/E3/V3U/V3H
  → See the R-Car H3/M3/M3N/D3/E3/V3U/V3H User's Manual.
  — To know the electrical specifications of the multimedia processor for R-Car H3/M3/M3N/D3/E3/V3U/V3H
  → See the R-Car H3/M3/M3N/D3/E3/V3U/V3H 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 ... ××××, 0b××××, or ××××B
  Decimal ... ××××
  Hexadecimal ... 0x×××× or ××××H
  Data type: Double word … 64 bits
  Word … 32 bits
  Half word ... 16 bits
  Byte ... 8 bits

Table of Contents

1. Overview

1.1 Overview

This manual explains the driver module (this module) that controls the GPIO on R-Car H3/M3/M3N/D3/E3/V3U/V3H.

1.2 Function

This module controls GPIO on R-Car H3/M3/M3N/D3/E3/V3U/V3H, Support following function.

- Support selection of input/output in GPIO pin.
- Support reading state of high/low in Input pin.
- Support setting high/low value in Output pin.
- Support detection of interrupt (high level, low level, rising edge, falling edge, both edge).

1.2.1 Supported pin

GPIO supported pin on R-Car H3/M3/M3N/E3/V3U device are shown in Table 1-1, and R-Car V3H/D3 device is shown in Table 1-2.

Table 1-1 GPIO supported pin (R-Car H3/M3/M3N/E3/V3U)

	R-Car H3 Ver.2.0/ Ver.3.0 [Total: 156 pins]		R-Car M3/M3N [Total: 156 pins]		R-Car E3 [Total: 132 pins]		R-Car V3U [Total: 233 pins]	
GPIO bank	Number of bank	Pin range	Number of bank	Pin range	Number of bank	Pin range	Number of bank	Pin range
GPIO-0	16	GP-0-0 … GP-0-15	16	GP-0-0 … GP-0-15	18	GP-0-0 … GP-0-17	28	GP-0-0 … GP-0-27
GPIO-1	29	GP-1-0 … GP-1-28	29	GP-1-0 … GP-1-28	23	GP-1-0 … GP-1-22	31	GP-1-0 … GP-1-30
GPIO-2	15	GP-2-0 … GP-2-14	15	GP-2-0 … GP-2-14	26	GP-2-0 … GP-2-25	25	GP-2-0 … GP-2-24
GPIO-3	16	GP-3-0 … GP-3-15	16	GP-3-0 … GP-3-15	16	GP-3-0 … GP-3-15	17	GP-3-0 … GP-3-16
GPIO-4	18	GP-4-0 … GP-4-17	18	GP-4-0 … GP-4-17	11	GP-4-0 … GP-4-10	27	GP-4-0 … GP-4-26
GPIO-5	26	GP-5-0 … GP-5-26	26	GP-5-0 … GP-5-26	20	GP-5-0 … GP-5-19	21	GP-5-0 … GP-5-20
GPIO-6	32	GP-6-0 … GP-6-31	32	GP-6-0 … GP-6-31	18	GP-6-0 … GP-6-17	21	GP-6-0 … GP-6-20
GPIO-7	4	GP-7-0 … GP-7-3	4	GP-7-0 … GP-7-3	-	-	21	GP-7-0 … GP-7-20

Table 1-1 GPIO supported pin (R-Car H3/M3/M3N/E3/V3U) (cont.)

	R-Car H3 Ver.2.0/ Ver.3.0		R-Car M3/M3N		R-Car E3		R-Car V3U	
GPIO bank	Number of bank	Pin range	Number of bank	Pin range	Number of bank	Pin range	Number of bank	Pin range
GPIO-8	-	-	-	-	-	-	21	GP-8-0 … GP-8-20
GPIO-9	-	-	-	-	-	-	21	GP-9-0 … GP-9-20

Table 1-2 GPIO supported pin (R-Car V3H/D3)

	R-Car V3H [Total: 137 pins]		R-Car D3 [Total: 150 pins]	
GPIO bank	number of bank	Pin range	number of bank	Pin range
GPIO-0	22	GP-0-0 … GP-0-21	9	GP-0-0 … GP-0-8
GPIO-1	28	GP-1-0 … GP-1-27	32	GP-1-0 … GP-1-31
GPIO-2	30	GP-2-0 … GP-2-29	32	GP-2-0 … GP-2-31
GPIO-3	17	GP-3-0 … GP-3-16	10	GP-3-0 … GP-3-9
GPIO-4	25	GP-4-0 … GP-4-24	32	GP-4-0 … GP-4-31
GPIO-5	15	GP-5-0 … GP-5-14	21	GP-5-0 … GP-5-20
GPIO-6	-	-	14	GP-6-0 … GP-6-13

1.2.2 Connected device

GPIO connected device on R-Car H3/M3/M3N/D3/E3/V3U/V3H System Evaluation Board are shown in below tables.

Table 1-3 GPIO connected device (R-Car H3/M3/M3N)

GPIO pin	device/method
GP-5-23 GP-5-22 GP-5-20 GP-5-17	Software Switches
GP-6-13 GP-6-12 GP-6-11	Tact Switches or LEDs (Tactile Switches are shared with LEDs)

Table 1-4 GPIO connected device (R-Car E3)

GPIO pin	device/method
GP-5-13 GP-5-12 GP-5-11 GP-5-10	Software Switches
GP-5-05 GP-5-06 GP-5-19	Tact Switches or LEDs (Tactile Switches are shared with LEDs)

Table 1-5 GPIO connected device (R-Car V3U)

GPIO pin	device/method
GP-6-18 GP-6-19 GP-6-20	Push Switches
GP-4-18 GP-4-19 GP-4-20	LEDs

Table 1-6 GPIO Connected device (R-Car V3H)

GPIO pin	device/method
GP-2-08 GP-2-06 GP-2-02 GP-2-01	Software Switches (4 bits of software switch SW2)
GP-5-14 GP-5-13 GP-5-12	Push Switches or LEDs (Push Switches are shared with LEDs)

Table 1-7 GPIO Connected device (R-Car D3)

GPIO pin	device/method
GP-4-15 GP-4-14 GP-4-13 GP-4-12	Software Switches
GP-4-25 GP-4-07 GP-1-30	Tact Switches or LEDs (Tactile Switches are shared with LEDs)

1.3 Reference

1.3.1 Standard

There is no supported standard in this module.

1.3.2 Related document

The related document to this module are shown in Table 1-7.

Table 1-7 Reference document (R-Car H3/M3/M3N/D3/E3/V3U/V3H)

Number	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 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-Car V3U Series User's Manual	Rev.0.5	Jul. 31, 2020
-	Renesas Electronics	R-CarV3U System Evaluation Board Falcon Hardware Manual	Rev.0.01	Sep. 11, 2020
-	Renesas Electronics	R-Car V3H_2, Additional Document for User's Manual: Hardware	Rev.0.50	Jul. 31, 2020
-	Renesas Electronics	R-CarV3H System Evaluation Board Condor-I Hardware Manual	Rev.0.02	Nov. 11, 2019
-	Renesas Electronics	R-CarD3 System Evaluation Board Hardware Manual RTP0RC77995SEB0010S	Rev.1.20	Jul. 25, 2017

1.4 Restrictions

There is no restriction in this module.

2. Terminology

The following table shows the terminology related to this module.

Table 2-1 Terminology

Terms	Explanation
GPIO	General Purpose Input/Output interface

3. Operating Environment

3.1 Hardware Environment

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

Table 3-1 Hardware specification (R-Car H3/M3/M3N/D3/E3/V3U/V3H)

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-CarV3U System Evaluation Board Falcon	-	Renesas Electronics
R-CarV3H System Evaluation Board Condor-I	-	Renesas Electronics
R-CarD3 System Evaluation Board Draak	-	Renesas Electronics

3.2 Module Configuration

The following figure shows the configuration of this module.

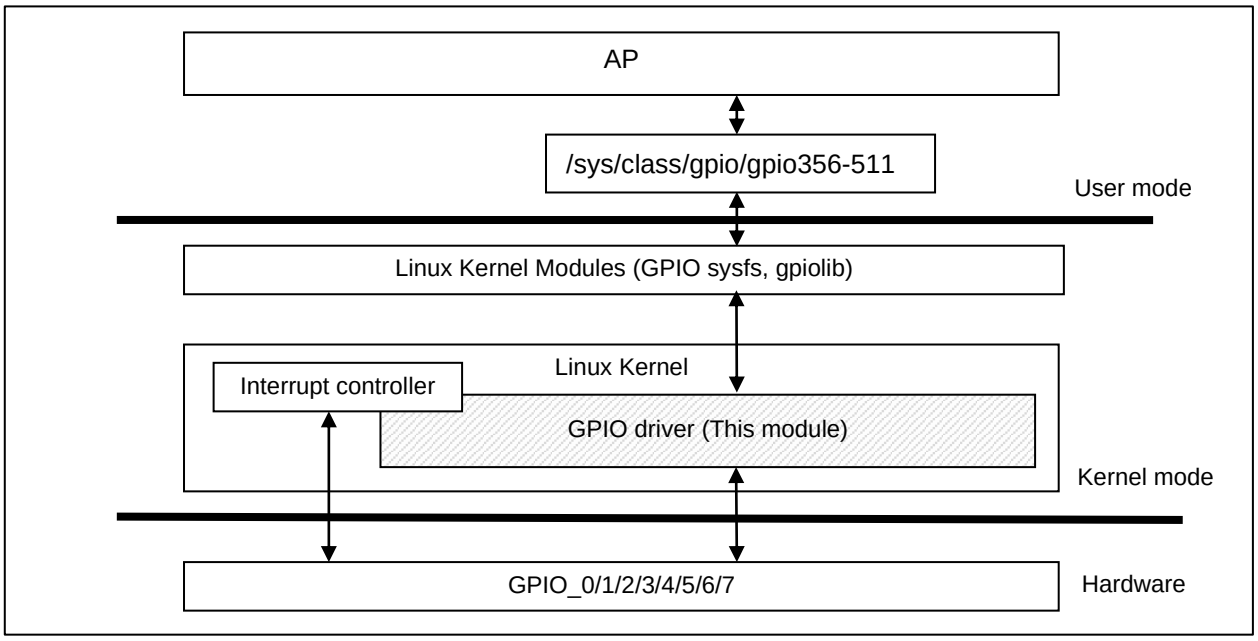

Figure 3-1 Module configuration (R-Car H3 / M3 / M3N)

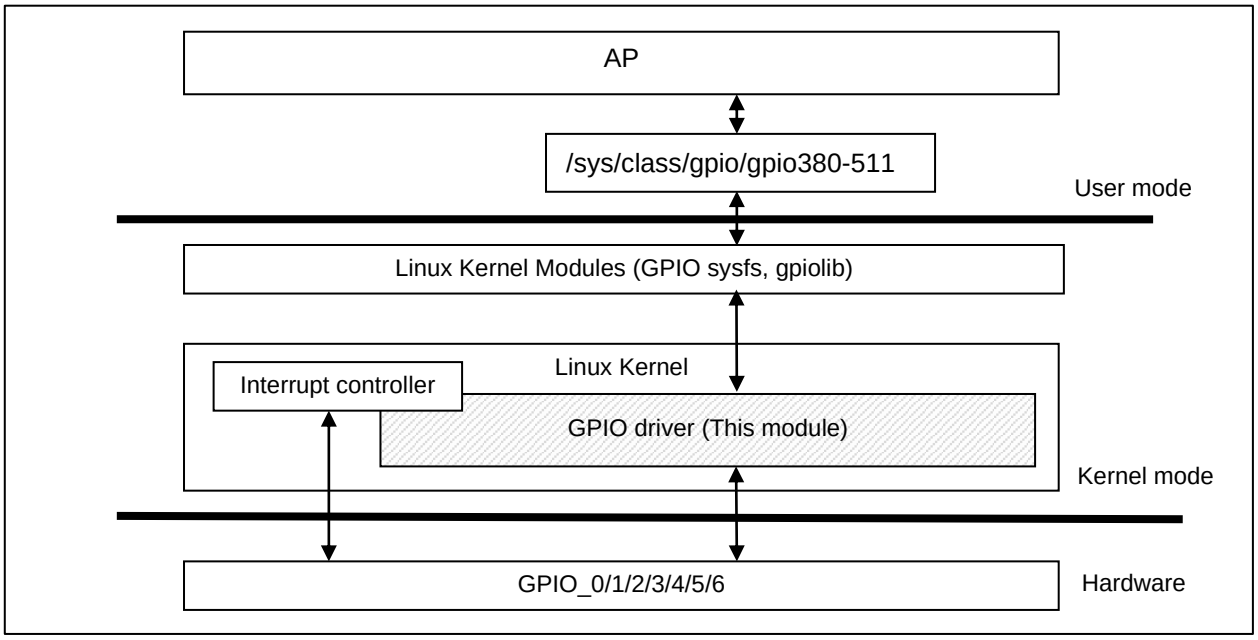

Figure 3-2 Module configuration (R-Car E3)

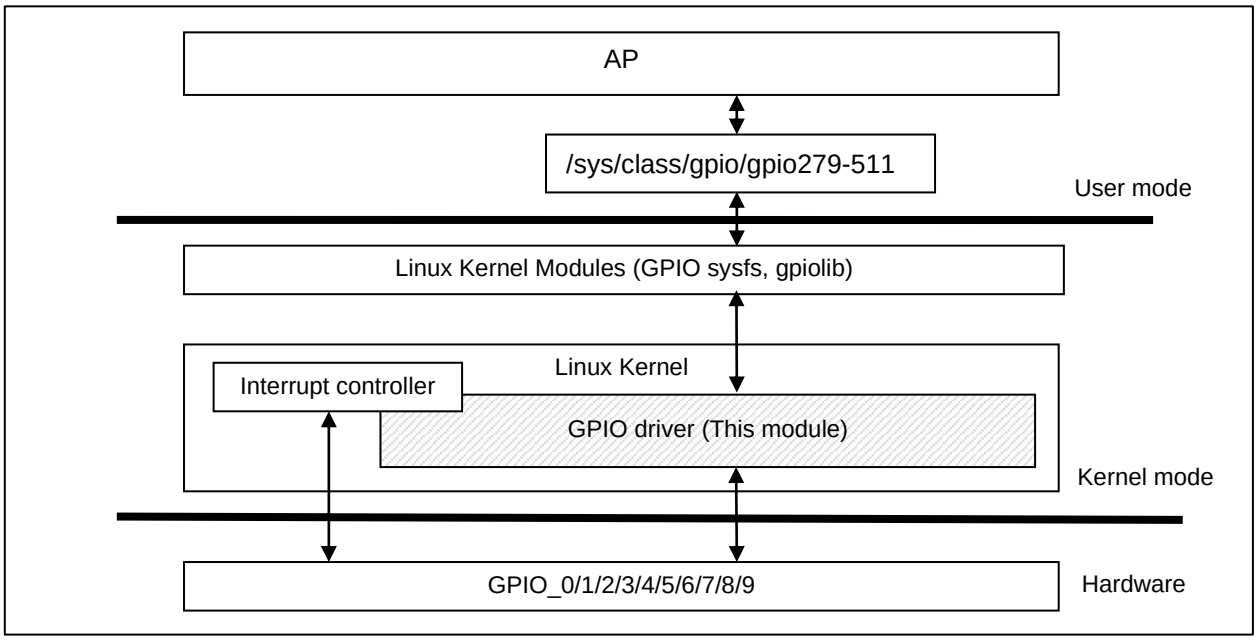

Figure 3-3 Module configuration (R-Car V3U)

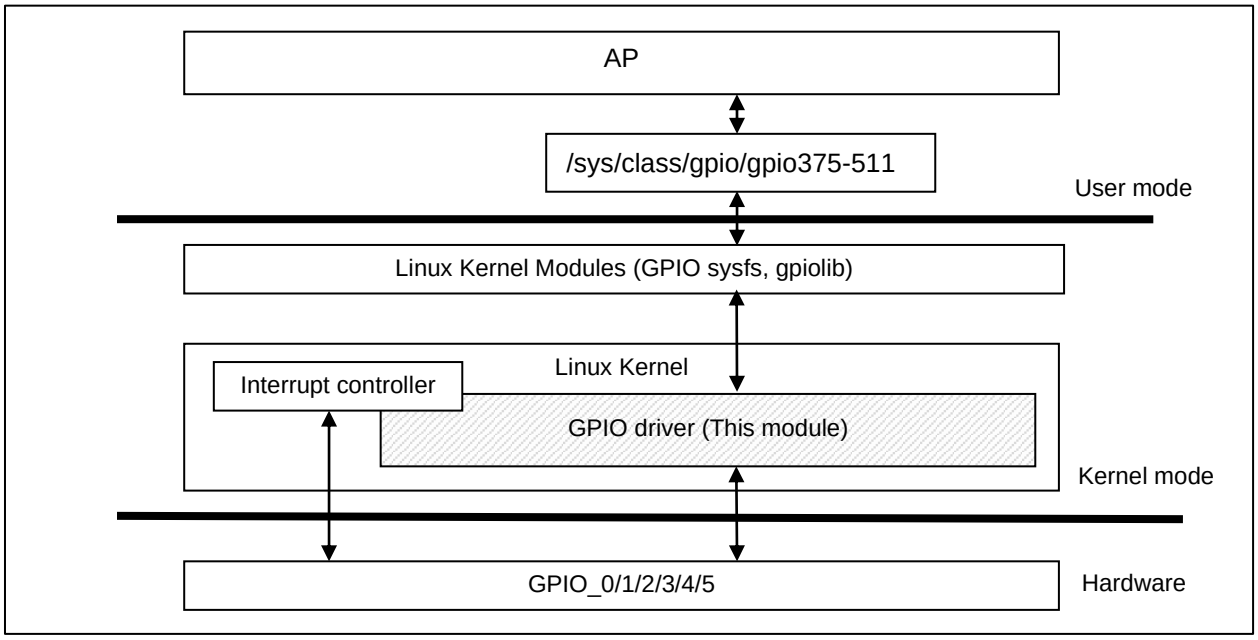

Figure 3-4 Module configuration (R-Car V3H)

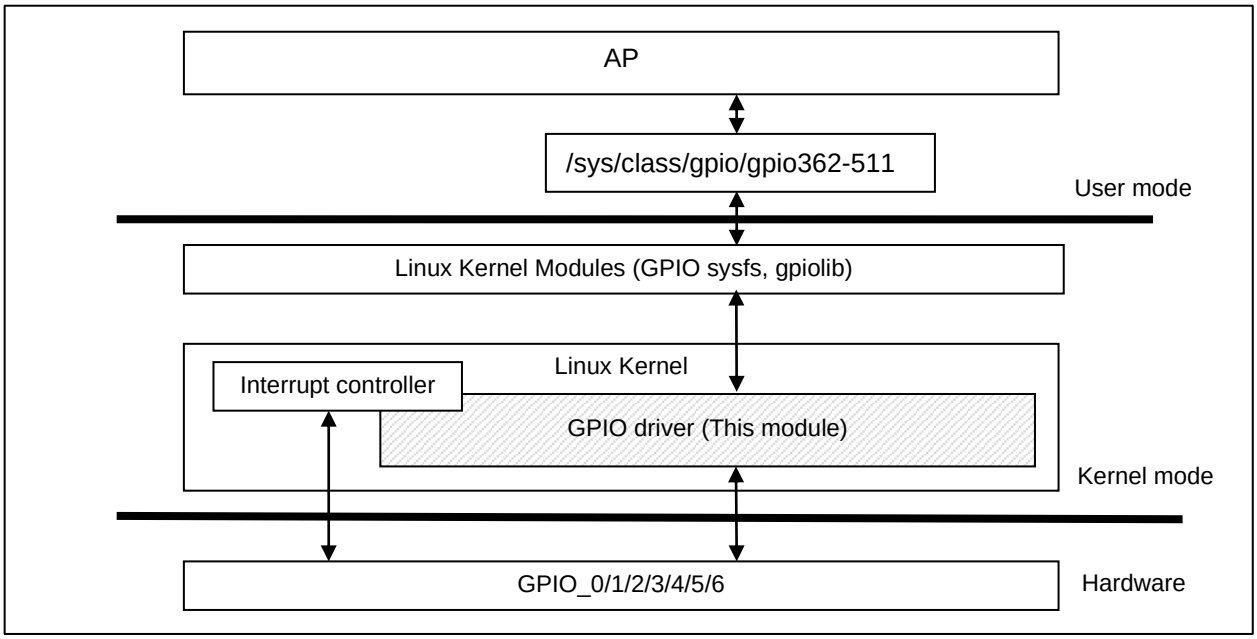

Figure 3-5 Module configuration (R-Car D3)

3.3 State Transition Diagram

There is no state transition diagram for this module.

4. External Interface

4.1 sysfs interface

The external interface of this module is based on Linux. The interface for operating GPIO pin from a userland is GPIO sysfs. Device node of this module is shown below.

Table 4-1 GPIO device node (R-Car H3 Ver.2.0/H3 Ver3.0/M3/M3N)

GPIO bank	Name of pin	device node
GPIO-0	GP-0-0 : GP-0-15	/sys/class/gpio/gpio496 : /sys/class/gpio/gpio511
GPIO-1	GP-1-0 : GP-1-28	/sys/class/gpio/gpio467 : /sys/class/gpio/gpio495
GPIO-2	GP-2-0 : GP-2-14	/sys/class/gpio/gpio452 : /sys/class/gpio/gpio466
GPIO-3	GP-3-0 : GP-3-15	/sys/class/gpio/gpio436 : /sys/class/gpio/gpio451
GPIO-4	GP-4-0 : GP-4-17	/sys/class/gpio/gpio418 : /sys/class/gpio/gpio435
GPIO-5	GP-5-0 : GP-5-25	/sys/class/gpio/gpio392 : /sys/class/gpio/gpio417
GPIO-6	GP-6-0 : GP-6-31	/sys/class/gpio/gpio360 : /sys/class/gpio/gpio391
GPIO-7	GP-7-0 : GP-7-3	/sys/class/gpio/gpio356 : /sys/class/gpio/gpio359

Table 4-2 GPIO device node (R-Car E3)

GPIO bank	Name of pin	device node
GPIO-0	GP-0-0 : GP-0-17	/sys/class/gpio/gpio494 : /sys/class/gpio/gpio511
GPIO-1	GP-1-0 : GP-1-22	/sys/class/gpio/gpio471 : /sys/class/gpio/gpio493
GPIO-2	GP-2-0 : GP-2-25	/sys/class/gpio/gpio445 : /sys/class/gpio/gpio470
GPIO-3	GP-3-0 : GP-3-15	/sys/class/gpio/gpio429 : /sys/class/gpio/gpio444
GPIO-4	GP-4-0 : GP-4-10	/sys/class/gpio/gpio418 : /sys/class/gpio/gpio428
GPIO-5	GP-5-0 : GP-5-19	/sys/class/gpio/gpio398 : /sys/class/gpio/gpio417
GPIO-6	GP-6-0 : GP-6-17	/sys/class/gpio/gpio380 : /sys/class/gpio/gpio397

Table 4-3 GPIO device node (R-Car V3U)

GPIO bank	Name of pin	device node
GPIO-1	GP-1-0 : GP-1-30	/sys/class/gpio/gpio481 : /sys/class/gpio/gpio511
GPIO-2	GP-2-0 : GP-2-24	/sys/class/gpio/gpio456 : /sys/class/gpio/gpio480
GPIO-0	GP-0-0 : GP-0-27	/sys/class/gpio/gpio428 : /sys/class/gpio/gpio455
GPIO-3	GP-3-0 : GP-3-16	/sys/class/gpio/gpio411 : /sys/class/gpio/gpio427
GPIO-4	GP-4-0 : GP-4-26	/sys/class/gpio/gpio384 : /sys/class/gpio/gpio410
GPIO-5	GP-5-0 : GP-5-20	/sys/class/gpio/gpio363 : /sys/class/gpio/gpio383
GPIO-6	GP-6-0 : GP-6-20	/sys/class/gpio/gpio342 : /sys/class/gpio/gpio362
GPIO-7	GP-7-0 : GP-7-20	/sys/class/gpio/gpio321 : /sys/class/gpio/gpio341
GPIO-8	GP-8-0 : GP-8-20	/sys/class/gpio/gpio300 : /sys/class/gpio/gpio320
GPIO-9	GP-9-0 : GP-9-20	/sys/class/gpio/gpio279 : /sys/class/gpio/gpio299

Table 4-4 GPIO device node (R-Car V3H)

GPIO bank	Name of pin	device node
GPIO-0	GP-0-0 : GP-0-21	/sys/class/gpio/gpio490 : /sys/class/gpio/gpio511
GPIO-1	GP-1-0 : GP-1-27	/sys/class/gpio/gpio462 : /sys/class/gpio/gpio489
GPIO-2	GP-2-0 : GP-2-29	/sys/class/gpio/gpio432 : /sys/class/gpio/gpio461
GPIO-3	GP-3-0 : GP-3-16	/sys/class/gpio/gpio415 : /sys/class/gpio/gpio431
GPIO-4	GP-4-0 : GP-4-24	/sys/class/gpio/gpio390 : /sys/class/gpio/gpio414
GPIO-5	GP-5-0 : GP-5-14	/sys/class/gpio/gpio375 : /sys/class/gpio/gpio389

Table 4-5 GPIO device node (R-Car D3)

GPIO bank	Name of pin	device node
GPIO-0	GP-0-0 : GP-0-8	/sys/class/gpio/gpio503 : /sys/class/gpio/gpio511
GPIO-1	GP-1-0 : GP-1-31	/sys/class/gpio/gpio471 : /sys/class/gpio/gpio502
GPIO-2	GP-2-0 : GP-2-31	/sys/class/gpio/gpio439 : /sys/class/gpio/gpio470
GPIO-3	GP-3-0 : GP-3-9	/sys/class/gpio/gpio429 : /sys/class/gpio/gpio438
GPIO-4	GP-4-0 : GP-4-31	/sys/class/gpio/gpio397 : /sys/class/gpio/gpio428
GPIO-5	GP-5-0 : GP-5-20	/sys/class/gpio/gpio376 : /sys/class/gpio/gpio396
GPIO-6	GP-6-0 : GP-6-13	/sys/class/gpio/gpio362 : /sys/class/gpio/gpio375

4.2 Interface specification

This section explains in the following format about the functions this module supplies.

[Overview] Presents an overview of a function.

[Function Name] Explains the name of the function.

[Calling format] Explains the format for calling the function.

[Argument] Explains the argument(s) of the function.

[Return value] Explains the return value(s) of the function.

[Feature] Explains the features of the function.

[Remark] Explains points to be noted when using the function.

Table 4-6 List of interface specification

Chapter	Function Name	Description
4.2.1	gpio_request	Setting GPIO pin.
4.2.2	gpio_direction_input	GPIO pin is set as input pin
4.2.3	gpio_direction_output	GPIO pin is set as output pin
4.2.4	gpio_get_value	The state of GPIO pin get high or low.
4.2.5	gpio_set_value	The state of GPIO pin is set as high or low.
4.2.6	gpio_to_irq	Get number of irq in GPIO pin

Please include the following headers, when you use these functions.

```
#include <linux/gpio.h>
```

4.2.1 Setting GPIO pin

[Overview] Setting GPIO pin

[Function Name] gpio_request

[Calling format] int gpio_request(unsigned gpio, const char *label);

[Argument] gpio: Set GPIO pin number (refer to 4.3 Definitions)
label: Set NULL

[Return value] 0 : success
-EPROBE_DEFER : Driver requests probe retry
-EINVAL : Invalid argument

[Feature] GPIO pin specified by gpio of the first argument is set up.

[Remark]

4.2.2 GPIO pin is set as input pin

[Overview] GPIO pin is set as input pin

[Function Name] gpio_direction_input

[Calling format] int gpio_direction_input(unsigned gpio)

[Argument] gpio: Set GPIO pin number(refer to 4.3 Definitions)

[Return value] 0 : success

[Feature] Specified GPIO pin is set as the input pin.

[Remark]

4.2.3 GPIO pin is set as output pin

[Overview] GPIO pin is set as output pin

[Function Name] gpio_direction_output

[Calling format] int gpio_direction_output(unsigned gpio, int value);

[Argument] gpio: Set GPIO pin number(refer to 4.3 Definitions)
value: Output value of specified GPIO pin(0 or 1)

[Return value] 0 : success

[Feature] Specified GPIO pin is set as the output pin, and output setting of value

[Remark]

4.2.4 The state of GPIO pin get high or low

[Overview] The state of GPIO pin get high or low

[Function Name] gpio_get_value

[Calling format] int gpio_get_value(unsigned gpio)

[Argument] gpio: Set GPIO pin number(refer to 4.3 Definitions)

[Return value] 0 : state of GPIO pin is low
non-zero : state of GPIO pin is high

[Feature] The state of GPIO pin get high or low.

[Remark]

4.2.5 The state of GPIO pin is set as high or low

[Overview] The state of GPIO pin is set as high or low

[Function Name] gpio_set_value

[Calling format] void gpio_set_value(unsigned gpio, int value)

[Argument] gpio: Set GPIO pin number(refer to 4.3 Definitions)
value: Output value of specified GPIO pin(0 or 1)

[Return value] None.

[Feature] The state of GPIO pin is set as high or low

[Remark]

4.2.6 Get number of irq in GPIO pin

[Overview] Get number of irq in GPIO pin

[Function Name] gpio_to_irq

[Calling format] int gpio_to_irq(unsigned gpio)

[Argument] gpio: Set GPIO pin number(refer to 4.3 Definitions)

[Return value] integer value : number of irq
-ENXIO : No such device or address

[Feature] Get number of irq in GPIO pin

[Remark]

4.3 Definitions

A definitions of the GPIO Pins is described on device tree. The example of device tree is as follows.

4.3.1 Definitions of the GPIO Pins (R-Car H3/M3/M3N)

```
gpio-ports {
        gpios = <&gpio5 23 0>,    /* SOFTSW3 */
                <&gpio5 22 0>,    /* SOFTSW2 */
                <&gpio5 20 0>,    /* SOFTSW1 */
                <&gpio5 17 0>,    /* SOFTSW0 */
                <&gpio6 13 0>,    /* LED6 / TactSW23 */
                <&gpio6 12 0>,    /* LED5 / TactSW22 */
                <&gpio6 11 0>;    /* LED4 / TactSW21 */
};
```

4.3.2 Definitions of the GPIO Pins (R-Car E3)

```
gpio-ports {
        gpios = <&gpio5 13 0>,    /* SOFTSW3 */
                <&gpio5 12 0>,    /* SOFTSW2 */
                <&gpio5 11 0>,    /* SOFTSW1 */
                <&gpio5 10 0>,    /* SOFTSW0 */
                <&gpio5 05 0>,    /* LED4 / TactSW20 */
                <&gpio5 06 0>,    /* LED5 / TactSW21 */
                <&gpio5 19 0>;    /* LED6 / TactSW22 */
};
```

4.3.3 Definitions of the GPIO Pins (R-Car V3U)

```
gpio-ports {
        gpios = <&gpio6 18 0>,    /* PUSH SW1 */
                <&gpio6 19 0>,    /* PUSH SW2 */
                <&gpio6 20 0>,    /* PUSH SW3 */
                <&gpio4 18 0>,    /* LED1 */
                <&gpio4 19 0>,    /* LED2 */
                <&gpio4 20 0>;    /* LED3 */
};
```

4.3.4 Definitions of the GPIO Pins (R-Car V3H)

```
gpio-ports {
        gpios = <&gpio2 08 0>,   /* SOFTSW2 (Bit4) */
                <&gpio2 06 0>,   /* SOFTSW2 (Bit3) */
                <&gpio2 02 0>,   /* SOFTSW2 (Bit2) */
                <&gpio2 01 0>,   /* SOFTSW2 (Bit1) */
                <&gpio5 14 0>,   /* LED5 / Push SW17 (Bit2) */
                <&gpio5 13 0>,   /* LED4 / Push SW16 (Bit1) */
                <&gpio5 12 0>;   /* LED3 / Push SW15 (Bit0) */
};
```

4.3.5 Definitions of the GPIO Pins (R-Car D3)

```
gpio-ports {
        gpios = <&gpio4 15 0>,   /* SOFTSW56 (Bit4) */
                <&gpio4 14 0>,   /* SOFTSW56 (Bit3) */
                <&gpio4 13 0>,   /* SOFTSW56 (Bit2) */
                <&gpio4 12 0>,   /* SOFTSW56 (Bit1) */
                <&gpio4 25 0>,   /* LED14 / TactSW57 (Bit2) */
                <&gpio4 07 0>,   /* LED13 / TactSW59 (Bit1) */
                <&gpio1 30 0>;   /* LED12 / TactSW58 (Bit0) */
};
```

The format of a "gpios" property is as follows.

The 1st cell is a node or label of GPIO device to be used.
The 2nd cell contains the identifying number for the GPIO Pin in the node.
The 3rd cell is the flags, encoded as follows:
0 (GPIO_ACTIVE_HIGH) = active high level-sensitive
1 (GPIO_ACTIVE_LOW) = active low level-sensitive

4.3.6 Get definitions of the GPIO Pins

```
struct device_node *np;
int port;

np = of_find_node_by_path("/gpio-ports");
port = of_get_gpio(np, 2);
```

5. Integration

5.1 Directory Configuration

The directory configuration is shown below.

```
drivers/gpio/  ──── gpio-rcar.c : source file (device dependence)
include/linux/ ──── gpio.h      : header file
```

5.2 Integration Procedure

5.2.1 Kernel configuration

To enable the function of this module, make the following setting with Kernel Configuration.

```
-*- GPIO Support  --->
    Memory mapped GPIO drivers  --->
        <*> Renesas R-Car GPIO
```

When using GPIO sysfs, make the following setting with Kernel Configuration.

```
-*- GPIO Support  --->
    [*]   /sys/class/gpio/... (sysfs interface)
```

5.3 Option Setting

5.3.1 Module parameters

There are no module parameters.

5.3.2 Kernel parameters

There are no kernel parameters.

REVISION HISTORY		Linux Interface Specification Device Driver GPIO User's Manual: Software	
Rev.	**Date**	**Description**	
		Page	**Summary**
0.1	Sep. 25, 2015	—	New creation.
0.2	Apr. 15, 2016	All	Add R-Car M3 support
		1	1.2.1 Supported pin Add Table 1-1 of GPIO pin supported for R-Car H3/M3.
		3	1.3.2 Related document Update Table 1-3 of Hardware User's Manual and System Evaluation Board Salvator-X Hardware Manual.
		7	4.1 sysfs interface Replace Table 4-1 of device node for R-Car H3
0.3	Aug. 5, 2016	1	1.3.2 Related document Update Table 1-3 of Hardware User's Manual and System Evaluation Board Salvator-X Hardware Manual
		3	3.1 Hardware Environment Update Table 3-1 of Hardware evaluation
0.4	Mar. 15, 2017	3	1.3.2 Related document Update Table 1-3 of Hardware User's Manual and System Evaluation Board Salvator-XS Hardware Manual.
		4	3.1 Hardware Environment Update Table 3-1 of Hardware evaluation.
		7, 8	4.1 sysfs interface Fix Table 4-1 error to the relation of pin name and device node to GPIO-0 Bank.
0.5	Jun. 14, 2017	1	1.2.1 Supported pin Add Table 1-1 of GPIO pin supported for R-Car H3 Ver.2.0.
		3	1.3.2 Related document Update Table 1-1 of Hardware User's Manual.
		7	4.1 sysfs interface Change to Table 4-1 of device node for R-Car H3 Ver.1.x.
		8	4.1 sysfs interface Change to Table 4-2 of device node for R-Car H3 Ver.2.0 and M3.
1.00	Aug. 8, 2017	All	Update document format.
1.01	Oct. 24, 2017	All	Add R-Car M3N support.
1.50	Jan. 29, 2018	1	1.2.1 Supported pin Delete GPIO pin for R-Car H3 Ver.1.x.
		3	1.3.2 Related document Update Table 1-1 of Hardware User's Manual.
		6	3.2 Module Configuration Delete Module Configuration for R-Car H3 Ver.1.x.
		7	4.1 sysfs interface Delete device node for R-Car H3 Ver.1.x.
1.51	Mar. 28, 2018	All	Add R-Car E3 support.
1.52	Oct. 22, 2018	3	Table 1-3 Reference document (R-Car H3/M3/M3N/E3) Update Related Documents
1.53	Oct. 29, 2018	1	Table 1-1 GPIO supported pin Add description of ver3 of H3

		6	Figure 3-1 Module configuration Delete description of ver3 of H3
		7	Table 4-1 GPIO device node Add description of ver3 of H3
2.00	Dec. 25, 2018	-	Update AddressList
		3	Table 1-3 Reference document Update reference documents
		5	Table 3-1 Hardware specification Update board name
2.01	Apr. 17, 2019	-	Update AddressList
		3	Table 1-3 Reference document (R-Car H3/M3/M3N/E3) Update reference manual
2.50	Jul. 31, 2020	All	Add R-Car V3U support
2.51	Dec. 1, 2020	3	Update related documents of R-Car V3U
		10	Update device nodes of R-Car V3U
2.52	Jan. 29, 2021	All	Add R-Car V3H support
2.53	Apr. 21, 2021	-	Add R-Car D3 support
		-	Add Kernel v5.10 support
3.00	Dec. 10, 2021	-	Add Kernel v5.10.41 support

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Device Driver GPIO

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