

RA2E3 Group

RA2E1 to RA2E3 Migration Guide: Hardware

This application note explains the differences and points to note when migrating from RA2E1 group to RA2E3 group. For detailed information on each function and electrical characteristics, please refer to the latest User's Manual: Hardware.

Target Devices

RA2E1 Group, RA2E3 Group

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1. Differences between the RA2E1 Group and RA2E3 Group

Table 1 shows the functional comparison between RA2E1 group and RA2E3 group.

Table 1. Functional Comparison between RA2E1 Group and RA2E3 Group

Function Name	RA2E1	RA2E3
CPU	Arm Cortex-M23@48MHz	
Startup mode	○	
Address space	○	
Reset	○	
Option setting memory	○	
Low voltage detection circuit (LVD)	○	
Clock generation circuit	○	
Clock frequency accuracy measurement circuit (CAC)	○	
Low power consumption mode	○	
Register write protection	○	
Interrupt Controller Unit (ICU)	○	
Bus	○	
Memory Protection Unit (MPU)	○	
Data Transfer Controller (DTC)	○	
Event Link Controller (ELC)	○	
I/O Ports	○	
Key interrupt function (KINT)	○	
Port Output Enable for GPT (POEG)	○	
General-purpose PWM timer (GPT)	○	
Low-power asynchronous general-purpose timer (AGT)	○	
Real-time clock (RTC)	○	
Watchdog Timer (WDT)	○	
Independent Watchdog Timer (IWDT)	○	
Serial Communication Interface (SCI)	○	
I2C Bus Interface (IIC)	○	
Serial Peripheral Interface (SPI)	○	
Cyclic Redundancy Check (CRC)	○	
12-bit A/D converter (ADC12)	○	
Temperature Sensor Circuit (TSN)	○	
Low-power analog comparator (ACMPLP)	○	-
Capacitive sensing unit (CTS02)	○	-
Data Operation Circuit (DOC)	○	
SRAM (KB)	16	
Code flash memory (KB)	128/64/32	64/32

Function name	RA2E1	RA2E3
Data flash memory (KB)	4	2
AES engine	○	-
True random number generator (TRNG)	○	-
Internal voltage regulator	○	
Package	LQFP64/48/32	LQFP48/32
	BGA64	-
	HWQFN48/32	
	LGA36	-
	WLCSP25	-

Usage: ○ Same function built-in, ■ Specifications are different, □ Not available

2. Register Configuration

The ACMPLP, CTSU2, AES, and TRNG built into the RA2E1 group do not exist in the RA2E3 group, and therefore no registers exist. All other peripheral functions are identical, so the RA2E1 and RA2E3 group are highly compatible. For details, refer to the user's manual: hardware for each group.

3. Pin Assignment

A comparison of the pin assignments between the RA2E1 group and RA2E3 group is shown below. The difference in pin assignment specifications is that ACMPLP and CTSU2 are not present in the RA2E3 group the pins of these peripheral functions are not assigned. Therefore, only the pin assignments of ACMPLP and CTSU2 are compared below.

Since the other pin assignments are identical the RA2E1 group and RA2E3 group are highly pin compatible.

Table 2. Pin Assignment Comparison between RA2E1 and RA2E3 (ACMPLP, CTSU2 only)

LQFP/QFN 48 -pin	LQFP/QFN 32 -pin	I/O Ports	RA2E1		RA2E3	
			ACMPLP	CTSU	ACMPLP	CTSU
1	—	P400	—	—	—	—
2	—	P401	—	—	—	—
3	1	—	—	—	—	—
4	2	P215	—	—	—	—
5	3	P214	—	—	—	—
6	4	—	—	—	—	—
7	5	P213	—	—	—	—
8	6	P212	—	—	—	—
9	7	—	—	—	—	—
10	—	P409	—	TS5	—	—
11	—	P408	—	TS4	—	—
12	8	P407	—	—	—	—
13	—	P915	—	—	—	—
14	9	P914	—	—	—	—

LQFP/QFN 48 -pin	LQFP/QFN 32 -pin	I/O Ports	RA2E1		RA2E3	
			ACMPLP	CTSU	ACMPLP	CTSU
15	10	P913	—	—	—	—
16	11	P208	—	—	—	—
17	12	P207	—	—	—	—
18	—	P206	—	—	—	—
19	13	—	—	—	—	—
20	14	P201	—	—	—	—
21	15	P200	—	—	—	—
22	—	P302	—	TS8-CFC	—	—
23	—	P301	—	TS9-CFC	—	—
24	16	P300	—	—	—	—
25	17	P108	—	—	—	—
26	18	P109	—	TS10-CFC	—	—
27	19	P110	VCOU	TS11-CFC	—	—
28	—	P111	—	TS12-CFC	—	—
29	20	P112	—	TSCAP	—	—
30	—	—	—	—	—	—
31	—	—	—	—	—	—
32	—	P104	—	TS13-CFC	—	—
33	21	P103	CMPREF1	TS14-CFC	—	—
34	22	P102	CMPIN1	TS15-CFC	—	—
35	23	P101	CMPREF0	TS16-CFC	—	—
36	24	P100	CMPIN0	TS26-CFC	—	—
37	—	P500	—	—	—	—
38	25	P015	—	TS28-CFC	—	—
39	26	P014	—	—	—	—
40	27	P013	—	TS33-CFC	—	—
41	28	P012	—	TS32-CFC	—	—
42	29	—	—	—	—	—
43	30	—	—	—	—	—
44	31	P011	—	TS31-CFC	—	—
45	32	P010	—	TS30-CFC	—	—
46	—	P002	—	TS23	—	—
47	—	P001	—	TS22	—	—
48	—	P000	—	TS21	—	—

Legend: Signal name available: The signal is assigned —: The signal is not assigned

4. Notes

As shown in Table 1.1, some functions (ACMPLP, CTSU2) in the RA2E1 group have been removed in the RA2E3 group. These functions are not available in RA2E3 group.

5. References

The following documents were used in creating this Differences Guide. Visit [Renesas website](#) for the latest version of each of these documents.

Number	References	Document name
1	R01UH0852	Renesas RA2E1 Group, User's Manual: Hardware
2	R01UH0992	Renesas RA2E3 Group, User's Manual: Hardware

Website and Support

Please visit the following URLs for further details to learn about key elements of the RA family, download components and related documentation, and get support.

RA Product Information	www.renesas.com/ra
RA Product Support Forum	www.renesas.com/ra/forum
RA Flexible Software Package	www.renesas.com/FSP
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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Nov.27.23	—	Initial release
		—	

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