# [Notes] e<sup>2</sup> studio Smart Configurator Plug-in,

R20TS0920ES0100 Rev.1.00 Feb.01, 2023

# Smart Configurator for RX

#### Outline

When using the products in the title, note the following points.

- 1. When using DA component to provide reference input voltage for Comparator component
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- 1.1 Applicable Products
  - > e<sup>2</sup> studio 7.2 (Smart Configurator Plug-in V1.5.0) or later
  - Smart Configurator for RX V1.5.0 or later

#### 1.2 Applicable Devices

RX family: RX13T, RX23T, RX24T(U), RX66T, RX72T

#### 1.3 Details

When using DA component to provide the reference voltage for Comparator component, there is a possibility that the Comparator output result is wrong at the beginning (use case as **Figure 1.1**) due to the two problems as below:

(1) The Comparator operation is enabled before DA converter starts the conversion.

(Comparator operation should be enabled after DA converter starts the conversion.)

(2) There is not enough waiting time for the DA conversion before enabling the Comparator output.

```
void main(void)
{
     R_Config_DA0_Start();
     R_Config_CMPC0_Start();
}
```

Figure 1.1: Use case for using DA0 output as the reference voltage for Comparator 0

#### 1.4 Condition

Below are the steps to reproduce the issue:

- (1) Creating Smart configurator project on the affected device (e.g., R5F566TAAxFF).
- (2) Add DA component from the software component page.
- (3) Configure the DA0 as the reference voltage for Comparator (see Figure 1.2).

Components ≧ ⊿ ↓ª ⊂ 🕀 🛱	✓ Configure			
type filter text	D/A converter operation setting Independent mode	○ Synchronize DA0 and DA1		
✓ ➢ Startup ✓ ➢ Generic Ør hsp.	D/A data format setting	○ Left alignment		
V 🗁 Drivers	D/A channel0 setting			
✓ → D/A converter	Use DA0			
💣 Config_DA	Enable DA0 pin output	Use DA0 analog voltage as a reference voltage for comparator C		
✓ ← Comparator ← Config_CMPC0	D/A channel1 setting ☑ Use DA1 ☑ Enable DA1 pin output	Use DA1 analog voltage as a reference voltage for comparator C		
	D/A-A/D synchronous setting Select S12AD2 as synchronous unit			
Dverview Board Clocks System Components Pins Interrupts				

Figure 1.2: Configuring the DA0 voltage as the reference voltage for Comparator on DA GUI

- (4) Add Comparator component (channel 0) from the software component page.
- (5) Set the "Reference input voltage select" setting to "On-chip D/A converter 0" (see Figure 1.3).

Components 🛛 🖄 🖾 🖡 🗧 🕀 🚔 🔻	Configure			
type filter text ✓ ➢ Startup ✓ ➢ Generic ὦ r_bsp	Input setting Comparator input select	СМРС00	✓ (Please set S12AD0)	
	Reference voltage setting Reference input voltage select	On-chip D/A converter 0	✓ (Please set DA0)	
<ul> <li>✓ Drivers</li> <li>✓ D/A converter</li> <li>✓ Config_DA</li> <li>✓ Comparator</li> </ul>	Digital filter setting Enable digital filter Sampling dock	PCLK/8	> 5000.000 (kHz)	
Config_CMPC0	Output setting Senable output (COMP0) Output polarity	Not inverted	~	
~	Interrupt setting		_	
Overview Board Clocks System Components Pins Interrupts				

Figure 1.3: Configuring reference input voltage to "On-chip D/A converter 0" on Comparator GUI

- (6) Click "Generate Code" button to generate codes for DA component and Comparator component configuration.
- (7) Observe the generated code in "R\_Config\_CMPC0\_Create()" API in the file "Config\_CMPC.c" file. The Comparator operation is enabled in this initialization API instead of the "R\_Config\_CMPC0\_Start()" API (see Figure 1.4).



Figure 1.4: Comparator operation enable setting in the initialization API

(8) Observe the generated code in "R\_Config\_DA\_Start()", there is no waiting time after starting the DA operation (**Figure 1.5**) when configuring DA output voltage as the Comparator reference voltage.



Figure 1.5: DA start operation setting in "R\_Config\_DA\_Start()" API

## 1.5 Workaround

Please add waiting time (minimum 3  $\mu$ s) after calling DA start API and before calling the Comparator start API as below. The 3  $\mu$ s setting value is counted out based on default ICLK frequency (160 MHz) for RX66T, please re-calculate when other ICLK frequency is used.

```
void main(void)
{
    uint16_t w_count;
    R_Config_DA0_Start();
    /* Waiting for DA0 conversion completion, 3 µs */
    for (w_count = 0U; w_count < 0x63; w_count++)
    {
        nop();
    }
    R_Config_CMPC0_Start();
}</pre>
```

## 1.6 Schedule for Fixing the Problem

This problem will be fixed in the following versions.

- e<sup>2</sup> studio 2023-04
- Smart Configurator for RX V2.17.0 (April 2023)

#### **Revision History**

		Description	
Rev.	Date	Page	Summary
1.00	Feb.01.23	-	First edition issued

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