

# RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RX*-A084A/E	Rev.	1.00
Title	Usage Notes on 12-Bit A/D Converter		Information Category	Technical Notification		
Applicable Product	RX62T Group RX62G Group RX63T Group	Lot No.	Reference Document	RX62T Group User's Manual: Hardware Rev. 1.30 (R01UH0034EJ0130) RX62G Group User's Manual: Hardware Rev. 1.00 (R01UH0321EJ0100) RX63T Group User's Manual: Hardware Rev. 2.10 (R01UH0238EJ0210)		
		All lots				

Thank you for your valued patronage and best wishes for your continued success in business.

We would like to inform you of some limitations found in the 12-bit A/D converter of the RX62T, RX62G, and RX63T Group products, and some usage notes and countermeasures related to the limitations.

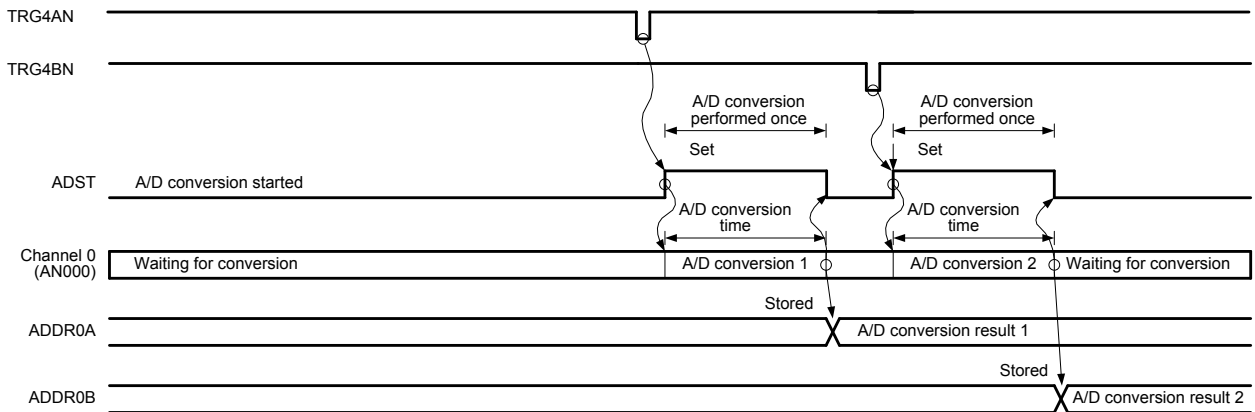
#### ■ Limitations (RX62T and RX62G Groups)

When the RX62T or RX62G Group product is used with the double data register function selected (ADSTRGR setting is 0Bh, 0Fh, 19h, 1Ah, 1Bh, or 1Ch), some conflicts of trigger generation timing cause a wrong data register within the same channel to be selected as the register in which data is stored.

(1) Data to be stored in ADDR0A is erroneously stored in ADDR0B if any of TRG4BN/TRG7BN/GTADTRBn (n = 0 to 3), regardless of whether or not it is selected as an A/D conversion start trigger, is generated simultaneously with any of TRG4AN/TRG7AN/GTADTRAn (n = 0 to 3) that is selected as an A/D conversion start trigger. Figure 1 shows the comparison of the normal and erroneous operation timing.

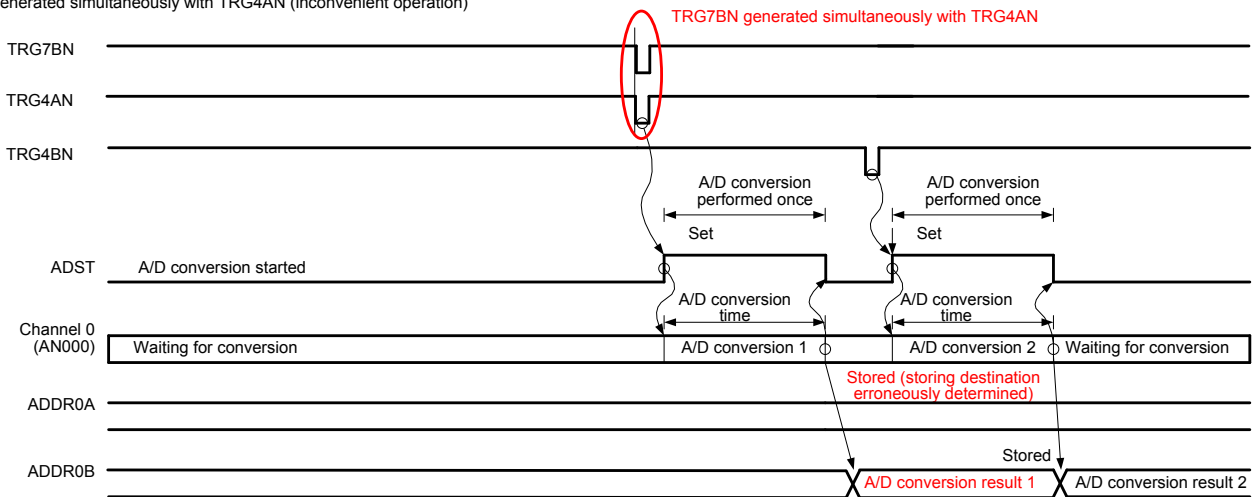
A/D conversion with ADSTRGR set to bh (TRG4AN or TRG4BN)

No trigger conflict (normal operation)



A/D conversion result of TRG4AN is stored in ADDR0A and A/D conversion result of TRG4BN is stored in ADDR0B.

TRG7BN generated simultaneously with TRG4AN (inconvenient operation)



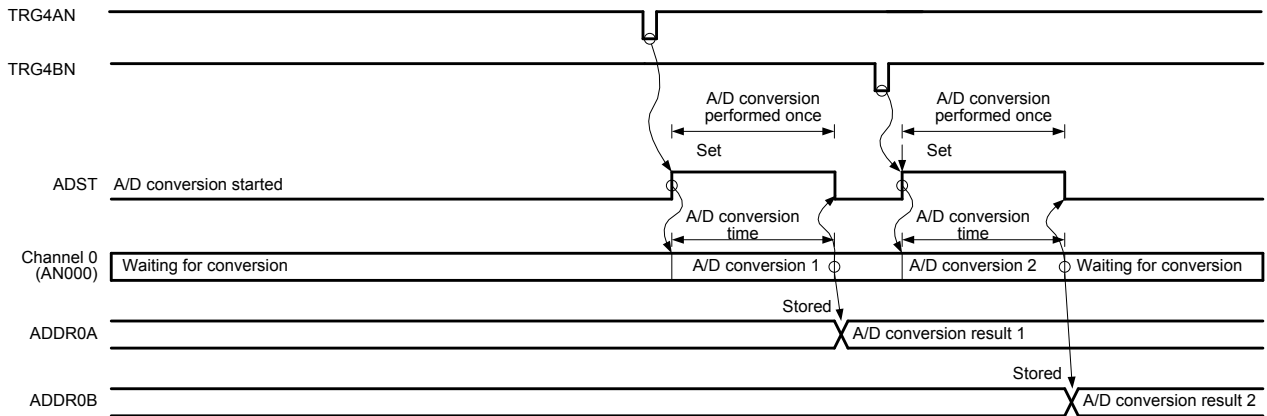
A/D conversion result of TRG4AN should be stored in ADDR0A, but is erroneously stored in ADDR0B.  
 A/D conversion result of TRG4BN is stored in ADDR0B.

Figure 1 Normal and Erroneous Double Data Register Operations 1

(2) Data to be stored in ADDR0B is erroneously stored in ADDR0A if any of TRG4BN/TRG7BN/GTADTRBnN (n = 0 to 3) that is not selected as an A/D conversion start trigger is generated 1 cycle before any of TRG4BN/TRG7BN/GTADTRBnN (n = 0 to 3) that is selected as an A/D conversion start trigger. Figure 2 shows the comparison of the normal and erroneous operation timing.

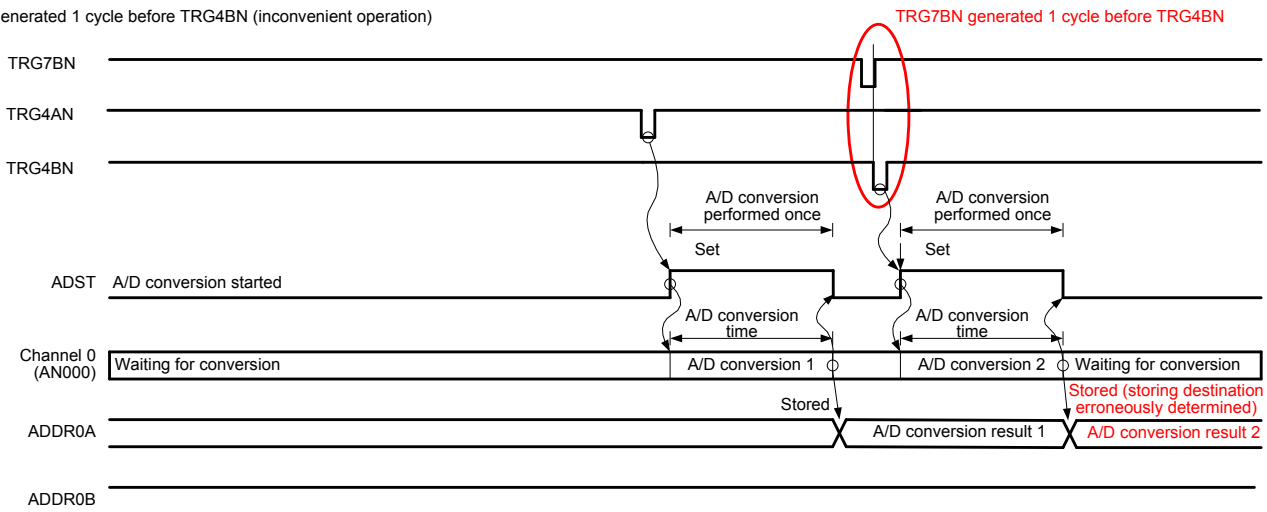
A/D conversion with ADSTRGR set to bh (TRG4AN or TRG4BN)

No trigger conflict (normal operation)



A/D conversion result of TRG4AN is stored in ADDR0A and A/D conversion result of TRG4BN is stored in ADDR0B.

TRG7BN generated 1 cycle before TRG4BN (inconvenient operation)



A/D conversion result of TRG4AN is stored in ADDR0A.  
 A/D conversion result of TRG4BN should be stored in ADDR0B, but is erroneously stored in ADDR0A.

Figure 2 Normal and Erroneous Double Data Register Operations 2

Table 1 shows the relationship between the generation timing of the trigger that conflicts with the trigger selected as an A/D conversion start trigger, conflicting triggers, and erroneous operation generation.

Table 1 Conditions of Erroneous Operation Generation

Conflicting Trigger Generation Timing with Respect to Selected Trigger Generation Timing	Conflicting Trigger	Selected Trigger			Operations
		TRGnBN (n = 4, 7) GTADTRGBmN (m = 0, 1, 2, 3)	TRGnAN (n = 4, 7) GTADTRGAmN (m = 0, 1, 2, 3)	Others	
Generated 2 or more cycles before the selected trigger	Any	—	—	—	Normal
Generated 1 cycle before the selected trigger	TRGnBN (n = 4, 7) GTADTRGBmN (m = 0, 1, 2, 3)	Error (except when the related triggers are identical)	—	—	Error: Erroneously stored in ADDR0A
	Others	—	—	—	Normal
Generated simultaneously	TRGnBN (n = 4, 7) GTADTRGBmN (m = 0, 1, 2, 3)	—	Error (except when the related triggers are identical)	—	Error: Erroneously stored in ADDR0B
	Others	—	—	—	Normal
Generated 1 or more cycles after the selected trigger	Any	—	—	—	Normal

■ Limitations (RX63T Group)

When the RX63T Group product is used with the extended double trigger mode selected (ADSTRGR setting is 0Bh, 0Fh, 19h, 1Ah, 1Bh, 1Ch, 25h, 26h, 27h, or 28h), some conflicts of trigger generation timing cause a wrong data register within the same channel to be selected as the register in which data is stored.

(1) Data to be stored in ADDR0A is erroneously stored in ADDR0B if any of TRG4BN/TRG7BN/GTADTRBnN (n = 0 to 7), regardless of whether or not it is selected as an A/D conversion start trigger, is generated simultaneously with any of TRG4AN/TRG7AN/GTADTRAnN (n = 0 to 7) that is selected as an A/D conversion start trigger. Figure 1 shows the comparison of the normal and erroneous operation timing.

The table below shows the relationship between the generation timing of the trigger that conflicts with the trigger selected as an A/D conversion start trigger, conflicting triggers, and erroneous operation generation.

Conflicting Trigger Generation Timing with Respect to Selected Trigger Generation Timing	Conflicting Trigger	Selected Trigger			Operations
		TRGnBN (n = 4, 7) GTADTRGBmN (m = 0 to 7)	TRGnAN (n = 4, 7) GTADTRGAmN (m = 0 to 7)	Others	
Generated 1 or more cycles before the selected trigger	Any	—	—	—	Normal
Generated simultaneously	TRGnBN (n = 4, 7) GTADTRGBmN (m = 0 to 7)	—	Error (except when the related triggers are identical)	—	Error: Erroneously stored in ADDR0B
	Others	—	—	—	Normal
Generated 1 or more cycles after the selected trigger	Any	—	—	—	Normal

■ Usage Notes

To prevent the erroneous operations, use the product under the following conditions.

- (1) Do not use the double data register function of the RX62T or RX62G Group product, or extended double trigger mode of the RX63T Group [144-, 120-, 112- and 100-pin versions] product.
- (2) When the double data register function of the RX62T or RX62G Group product is selected, do not allow generation of any of TRG4BN/TRG7BN/GTADTRBnN (n = 0 to 3) unless it is selected as an A/D conversion start trigger.
- (3) When extended double trigger mode of the RX63T Group [144-, 120-, 112- and 100-pin versions] product is selected, do not allow generation of any of TRG4BN/TRG7BN/GTADTRBnN (n = 0 to 7) unless it is selected as an A/D conversion start trigger.
- (4) When extended double trigger mode of the RX63T group [64- and 48-pin versions] product is selected, you can avoid the problem that you do not want to generate a trigger other than to be used as A / D conversion start trigger.

■ Permanent Measures

We are planning the revised version against the above restrictions of RX62T group, RX62G group and RX63T group [144-, 120-, 112- and 100-pin versions].

Please Contact Renesas sales office for more information on the revised version