

RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RX*-A0250A/E	Rev.	1.00
Title	RX65N Group and RX651 Group, Expansion of the Lower Limit of the Power Supply Voltage Supplied to the Battery Backup Power Supply Pin		Information Category	Technical Notification		
Applicable Product	RX65N Group, RX651 Group	Lot No.	Reference Document	RX65N Group, RX651 Group User's Manual: Hardware Rev.2.30 (R01UH0590EJ0230)		
		All				

This document describes an extension of the lower limit of the power supply voltage supplied to the battery backup power supply pin for the applicable products.

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The description for power supply voltage in Table 1.1, Outline of Specifications (10/10) is changed as follows.

Before correction

Table 1.1 Outline of Specifications (10/10)

Classification	Module/Function	Description
		Omitted.
Power supply voltage		VCC = AVCC0 = AVCC1 = VCC_USB = 2.7 to 3.6 V, $2.7 \leq V_{REFH0} \leq AVCC0$, V _{BATT} = 2.0 to 3.6 V
		Omitted.

After correction

Table 1.1 Outline of Specifications (10/10)

Classification	Module/Function	Description
		Omitted.
Power supply voltage		VCC = AVCC0 = AVCC1 = VCC_USB = 2.7 to 3.6 V, $2.7 \leq V_{REFH0} \leq AVCC0$, V _{BATT} = 1.62 to 3.6 V*6
		Omitted.
		Omitted.

Note 6. The low CL crystal unit cannot be used when the V_{BATT} voltage is less than 2.0 V.

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The specification for V_{BATT} power supply voltage and the description of Note 4 in Table 60.2, Recommended Operating Conditions are changed as follows.

Before correction

Table 60.2 Recommended Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit
Omitted.					
V_{BATT} power supply voltage	V_{BATT}	2.0	—	3.6	V
Omitted.					
Input voltage (5V tolerant ports 11 to 17, ports 20 and 21, ports 30 to 33, port 67, and ports C0 to C3)* ⁴	V_{in}	-0.3	—	VCC + 3.6 (up to 5.5)	V
Omitted.					

Note 4. For P32, P31, and P30, input as follows when the V_{BATT} power supply is selected.
 V_{in} Min. = -0.3, Max. = $V_{BATT} + 0.3$ ($V_{BATT} = 2.0$ to 3.6 V)

After correction

Table 60.2 Recommended Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit
Omitted.					
V_{BATT} power supply voltage	V_{BATT}	1.62* ²	—	3.6	V
Omitted.					
Input voltage (5V tolerant ports: P11 to P17, P20, P21, P30 to P33, P67, and PC0 to PC3)* ⁵	V_{in}	-0.3	—	VCC + 3.6 (up to 5.5)	V
Omitted.					

Note 2. The low CL crystal unit cannot be used when the V_{BATT} voltage is less than 2.0 V.

Note 5. For P32, P31, and P30, input as follows when the V_{BATT} power supply is selected.
 V_{in} Min. = -0.3, Max. = $V_{BATT} + 0.3$ ($V_{BATT} = 1.62$ to 3.6 V)

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The description of Note 3 in Table 60.3, DC Characteristics (1) is changed as follows.

Before correction

Note 3. For P32, P31, and P30, input as follows when the V_{BATT} power supply is selected.
 V_{IH} Min. = $V_{BATT} \times 0.8$, V_{IL} Max. = $V_{BATT} \times 0.2$ ($V_{BATT} = 2.0$ to 3.6 V)

After correction

Note 3. For P32, P31, and P30, input as follows when the V_{BATT} power supply is selected.
 V_{IH} Min. = $V_{BATT} \times 0.8$, V_{IL} Max. = $V_{BATT} \times 0.2$ ($V_{BATT} = 1.62$ to 3.6 V)

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The characteristics of RTC operating current when a standard CL crystal is in use under the condition of $V_{BATT} = 1.62\text{ V}$ are added to Table 60.5, DC Characteristics (3) (Products with 1 Mbyte of code flash memory or less) as follows.

Before correction

Table 60.5 DC Characteristics (3) (Products with 1 Mbyte of code flash memory or less)

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7\text{ to }3.6\text{ V}$, $2.7\text{ V} \leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0\text{ V}$,
 $T_a = T_{opr}$

Item	Symbol	D version		G version		Unit	Test Conditions
		Typ.	Max.	Typ.	Max.		
Supply current*1	Omitted.	Omitted.					
When the RTC is operating while VCC is not supplied (Only the RTC and sub-clock oscillator operate with the battery backup function)	When a low C_L crystal is in use	0.9	—	0.9	—	μA	$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$
		1.6	—	1.6	—		$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$
	When a standard C_L crystal is in use	1.7	—	1.7	—	$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$	
		3.3	—	3.3	—	$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$	
Omitted.							

After correction

Table 60.5 DC Characteristics (3) (Products with 1 Mbyte of code flash memory or less)

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7\text{ to }3.6\text{ V}$, $2.7\text{ V} \leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0\text{ V}$,
 $T_a = T_{opr}$

Item	Symbol	D version		G version		Unit	Test Conditions
		Typ.	Max.	Typ.	Max.		
Supply current*1	Omitted.	Omitted.					
When the RTC is operating while VCC is not supplied (Only the RTC and sub-clock oscillator operate with the battery backup function)	When a low C_L crystal is in use	0.9	—	0.9	—	μA	$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$
		1.6	—	1.6	—		$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$
	When a standard C_L crystal is in use	1.6	—	1.6	—	$V_{BATT} = 1.62\text{ V}$, $VCC = 0\text{ V}$	
		1.7	—	1.7	—	$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$	
		3.3	—	3.3	—	$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$	
Omitted.							

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The characteristics of RTC operating current when a standard CL crystal is in use under the condition of $V_{BATT} = 1.62\text{ V}$ are added to Table 60.6, DC Characteristics (3) (Products for products with at least 1.5 Mbytes of code flash memory) as follows.

Before correction

Table 60.6 DC Characteristics (3) (Products for products with at least 1.5 Mbytes of code flash memory)

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7\text{ to }3.6\text{ V}$, $2.7\text{ V} \leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0\text{ V}$,
 $T_a = T_{opr}$

Item	Symbol	D version		G version		Unit	Test Conditions	
		Typ.	Max.	Typ.	Max.			
Supply current*1	I_{CC}^{*3}	Omitted.						
When the RTC is operating while VCC is not supplied (Only the RTC and sub-clock oscillator operate with the battery backup function)		When a low C_L crystal is in use	0.9	—	0.9	—	μA	$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$
		When a standard C_L crystal is in use	1.6	—	1.6	—		$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$
			1.7	—	1.7	—		$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$
			3.3	—	3.3	—		$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$
Omitted.								

After correction

Table 60.6 DC Characteristics (3) (Products with at least 1.5 Mbytes of code flash memory)

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7\text{ to }3.6\text{ V}$, $2.7\text{ V} \leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0\text{ V}$,
 $T_a = T_{opr}$

Item	Symbol	D version		G version		Unit	Test Conditions	
		Typ.	Max.	Typ.	Max.			
Supply current*1	I_{CC}^{*3}	Omitted.						
When the RTC is operating while VCC is not supplied (Only the RTC and sub-clock oscillator operate with the battery backup function)		When a low C_L crystal is in use	0.9	—	0.9	—	μA	$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$
		When a standard C_L crystal is in use	1.6	—	1.6	—		$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$
			1.6	—	1.6	—		$V_{BATT} = 1.62\text{ V}$, $VCC = 0\text{ V}$
			1.7	—	1.7	—		$V_{BATT} = 2.0\text{ V}$, $VCC = 0\text{ V}$
3.3	—	3.3	—	$V_{BATT} = 3.3\text{ V}$, $VCC = 0\text{ V}$				
Omitted.								

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The V_{BATT} voltage in Conditions of Table 60.20, Sub-Clock Timing is changed as follows.

Before correction**Table 60.20 Sub-Clock Timing**

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7$ to 3.6 V, 2.7 V $\leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0$ V,
 $V_{BATT} = 2.0$ to 3.6 V, $T_a = T_{opr}$

After correction**Table 60.20 Sub-Clock Timing**

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7$ to 3.6 V, 2.7 V $\leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0$ V,
 $V_{BATT} = 1.62$ to 3.6 V, $T_a = T_{opr}$

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The V_{BATT} voltage in Conditions of Table 60.55, Battery Backup Function Characteristics is changed as follows.

Before correction**Table 60.55 Battery Backup Function Characteristics**

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7$ to 3.6 V, 2.7 V $\leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0$ V,
 $V_{BATT} = 2.0$ to 3.6 V, $T_a = T_{opr}$

After correction**Table 60.55 Battery Backup Function Characteristics**

Conditions: $VCC = AVCC0 = AVCC1 = VCC_USB = 2.7$ to 3.6 V, 2.7 V $\leq VREFH0 \leq AVCC0$,
 $VSS = AVSS0 = AVSS1 = VREFL0 = VSS_USB = 0$ V,
 $V_{BATT} = 1.62$ to 3.6 V, $T_a = T_{opr}$