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RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RX*-A0217A/E	Rev.	1.00
Title	Improvement of Oscillation Frequency Accuracy for Hi-speed On-chip Oscillator (HOCO) on RX130 Group, RX230 Group, and RX231 Group		Information Category	Technical Notification		
Applicable Product	RX130 Group RX230 Group, RX231 Group,	Lot No. All	Reference Document	RX130 Group User's Manual: Hardware Rev.3.00 (R01UH0560EJ0300) RX230 Group, RX231 Group User's Manual: Hardware Rev.1.20 (R01UH0496EJ0120)		

This document describes an improvement of the accuracy for the HOCO oscillation frequency in the "Electrical Characteristics" section of the User's Manual: Hardware for the applicable products stated above.

• Page 1327 of 1384

Descriptions of the test conditions and presentation of the HOCO specifications in Table 40.25, Clock Timing are modified as follows.

Before modification

Table 40.25 Clock Timing

Conditions: 1.8 V ≤ VCC = AVCC0 < 2.0 V, 2.0 V ≤ VCC ≤ 5.5 V, 2.0 V ≤ AVCC0 ≤ 5.5 V, VSS = AVSS0 = 0 V, Ta = –40 to +105°C

Item	Symbol	Min	Typ	Max	Unit	Test Condition
(Omitted)						
HOCO clock oscillation frequency	f_{HOCO} (32MHz)	31.52	32	32.48	MHz	T_a = –40 to +85°C
		31.68	32	32.32		T_a = 0 to +55°C
		31.36	32	32.64		T_a = –40 to +105°C
(Omitted)						

After modification

Table 40.25 Clock Timing

Conditions: 1.8 V ≤ VCC ≤ 5.5 V, AVCC0 = VCC (VCC <2.0V), 1.8 V ≤ AVCC0 ≤ 5.5 V (VCC ≥ 2.0V), VSS = AVSS0 = 0 V, Ta = –40 to +105°C

Item	Symbol	Min	Typ	Max	Unit	Test Condition
(Omitted)						
HOCO oscillation frequency	f_{HOCO}	—	32	—	MHz	
HOCO oscillation frequency error	Δf_{HOCO}	—	—	±1.5	%	T_a = –40 to –20°C
		—	—	±1.0		T_a = –20 to +85°C
		—	—	±2.0		T_a = +85 to +105°C
(Omitted)						

• Page 1890 of 1966

Descriptions of the test conditions and presentation of the HOCO specifications in Table 50.26, Clock Timing are modified as follows.

Before modification

Table 50.26 Clock Timing

Conditions: 1.8 V ≤ VCC = VCC_USB = AVCC0 ≤ 5.5 V, VSS = AVSS0 = VREFL0 = VSS_USB = 0 V, Ta = –40 to +105°C

Item	Symbol	Min	Typ	Max	Unit	Test Condition
(Omitted)						
HOCO clock oscillation frequency	f_{HOCO} (32MHz)	31.52	32	32.48	MHz	T_a = –40 to +85°C
		31.68	32	32.32		T_a = 0 to +55°C
		31.36	32	32.64		T_a = –40 to +105°C
	f_{HOCO} (54MHz)	53.19	54	54.81	MHz	T_a = –40 to +85°C
		53.46	54	54.54		T_a = 0 to +55°C
		52.92	54	55.08		T_a = –40 to +105°C
(Omitted)						

After modification

Table 50.26 Clock Timing

Conditions: 1.8 V ≤ VCC = VCC_USB = AVCC0 ≤ 5.5 V, VSS = AVSS0 = VREFL0 = VSS_USB = 0 V, Ta = –40 to +105°C

Item		Symbol	Min	Typ	Max	Unit	Test Condition
(Omitted)							
HOCO oscillation frequency	32-MHz setting	f_{HOCO}	—	32	—	MHz	
	54-MHz setting		—	54	—		
HOCO oscillation frequency error		Δf_{HOCO}	—	—	±1.5	%	T_a = –40 to –20°C
			—	—	±1.0		T_a = –20 to +85°C
			—	—	±2.0		T_a = +85 to +105°C
(Omitted)							