

# RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-SY*-A0070A/E	Rev.	1.00
Title	S5D3 MCU Group, S5D5 MCU Group, S5D9 MCU Group, enhancement of HOCO accuracy with FLL		Information Category	Technical Notification		
Applicable Product	Renesas Synergy™ S5D3 MCU Group Renesas Synergy™ S5D5 MCU Group Renesas Synergy™ S5D9 MCU Group	Lot No.	Reference Document	S5D3 Microcontroller Group User's Manual Rev.1.10 S5D5 Microcontroller Group User's Manual Rev.1.30 S5D9 Microcontroller Group User's Manual Rev.1.30		
		All				

HOCO accuracy with FLL in Electrical Characteristics is enhanced.

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## Electrical Characteristics

### AC Characteristics

#### Clock Timing

**Table** Clock timing except for sub-clock oscillator

Parameter		Symbol	Min	Typ	Max	Unit	Test conditions
HOCO clock oscillator oscillation frequency	Without FLL	$f_{\text{HOCO16}}$	15.78	16	16.22	MHz	$-20 \leq T_a \leq 105^\circ\text{C}$
		$f_{\text{HOCO18}}$	17.75	18	18.25		
		$f_{\text{HOCO20}}$	19.72	20	20.28		
		$f_{\text{HOCO16}}$	15.71	16	16.29		$-40 \leq T_a \leq -20^\circ\text{C}$
		$f_{\text{HOCO18}}$	17.68	18	18.32		
		$f_{\text{HOCO20}}$	19.64	20	20.36		
	With FLL	$f_{\text{HOCO16}}$	15.955	16	16.045		$-40 \leq T_a \leq 105^\circ\text{C}$ Sub-clock frequency accuracy is $\pm 50$ ppm.
		$f_{\text{HOCO18}}$	17.949	18	18.051		
		$f_{\text{HOCO20}}$	19.944	20	20.056		

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**Table** Clock timing except for sub-clock oscillator

Parameter		Symbol	Min	Typ	Max	Unit	Test conditions
HOCO clock oscillator oscillation frequency	Without FLL	f <sub>HOCO16</sub>	15.78	16	16.22	MHz	-20 ≤ Ta ≤ 105°C
		f <sub>HOCO18</sub>	17.75	18	18.25		
		f <sub>HOCO20</sub>	19.72	20	20.28		
		f <sub>HOCO16</sub>	15.71	16	16.29		-40 ≤ Ta ≤ -20°C
		f <sub>HOCO18</sub>	17.68	18	18.32		
		f <sub>HOCO20</sub>	19.64	20	20.36		
	With FLL	f <sub>HOCO16</sub>	15.960	16	16.040	-40 ≤ Ta ≤ 105°C Sub-clock frequency accuracy is ±50 ppm.	
		f <sub>HOCO18</sub>	17.955	18	18.045		
		f <sub>HOCO20</sub>	19.950	20	20.050		