

**Achievement of super low power consumption by using a Renesas microcontroller with SII low CL resonators !!**

The collaboration between the Renesas R8C/Lx series and Seiko Instruments low CL resonators is intended to achieve the lowest possible power consumption. In addition, the XCIN clock oscillation circuit can operate stably at low amplification and has a superior low power circuit configuration.

**Renesas microcontroller R8C/Lx series**



- R8C/L35A group    R8C/L35B group
- R8C/L36A group    R8C/L36B group
- R8C/L38A group    R8C/L38B group
- R8C/L3AA group    R8C/L3AB group



**SII low CL tuning fork resonators**

**SSP-T7-FL**

Frequency: 32.768kHz  
CL value: 6pF,4.4pF,3.7pF  
Frequency tolerance:  $\pm 20$ ppm  
Size: 7.0x1.5x1.4mm



**VT-200-FL**

Frequency: 32.768kHz  
CL value: 6pF,4.4pF,3.7pF  
Frequency tolerance:  $\pm 20$ ppm  
Size:  $\phi 2.0 \times 6.0$ mm



First, check out the Renesas starter kit.

**Microcontroller features**

- The R8C/Lx series of super low power microcontrollers is ideal for reducing standby power consumption in the clock mode or increasing the life of batteries.

**Resonator features**

- Our originally developed series of low CL resonator products, which have low load capacitance, maximize the XCIN oscillation performance.
- We also provide a 4.4 pF product, which uses half the power to oscillate and starts up twice as fast.

Recommended constants based on our measurement data (for measurement using R5F2L3ACANFP)

CL(pF)	Rf(kΩ)	Cg(pF)	Cd(pF)	Id (Cd Charge Current)	Oscillation allowance	Oscillation startup time
6.0	0	5	5	180nA type(3.3V)	16times	0.80sec
4.4	330	2	3	100nA type(3.3V)	21times	0.45sec

Note: The above recommended constants are for reference only. Please determine the best values for your board.

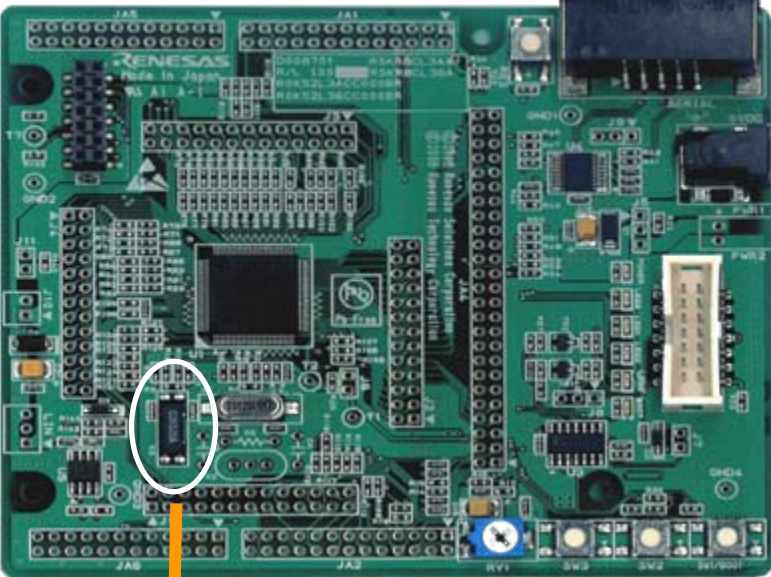
Use the matching reports available on the Seiko Instruments website when designing your oscillation circuit.

<http://www.sii-crystal.com>

# Renesas starter kit

## Please read this

The SSP-T7-FL (SMD type) and VT-200-FL (cylinder type) tuning fork resonators were developed for super low power microcontrollers, and they achieve stable oscillation for the R8C/Lx series. Use a CL of 4.4 pF if you want super low power consumption or a CL of 6.0 pF if you want low power consumption. Also note that better optimization is possible for the tuning fork resonator mounted in the R8C/Lx series Renesas starter kit, so disconnect the resonator indicated by the arrow shown at the left, connect the VT-200-FL tuning fork resonator (cylinder type), and then evaluate the result. We recommend using SSP-T7-FL (SMD type) or VT-200-FL (cylinder type) when designing products to achieve optimal performance and avoid oscillation problems.



### Attaching a tuning fork resonator

Disconnect the mounted tuning fork crystal shown at the left, and then attach the VT-200-FL tuning fork oscillator as shown in the photo



(VT-200-FL tuning fork resonator)

**Note:** When designing a circuit board, position the microcontroller and tuning fork resonator as close to each other as possible.

### Load capacitance of the XCIN clock oscillation circuit and tuning fork resonator

Crystal resonator	Vcc	Recommended circuit constants and resonator load capacitance			
		Rd=330kΩ Cg=2pF, Cd=3pF	Rd=0Ω Cg=5pF, Cd=5pF	Rd=0Ω Cg=7pF, Cd=7pF	Rd=0Ω Cg=10pF, Cd=10pF
SSP-T7-FL VT-200-FL (Low CL tuning fork resonators)	5.0V	CL=4.4pF	CL=6.0pF	---	---
		Id <sup>*1</sup> =120nA typ	Id <sup>*1</sup> =210nA typ		
	3.3V	CL=4.4pF	CL=6.0pF	---	---
		Id <sup>*1</sup> =100nA typ	Id <sup>*1</sup> =180nA typ		
SSP-T7-F VT-200-F (Existing products)	5.0V	---	---	CL=7.0pF	CL=9.0pF
				Id <sup>*1</sup> =245nA typ	Id <sup>*1</sup> =290nA typ
				RL <sup>*2</sup> =-660kΩ	RL <sup>*2</sup> =-400kΩ
	3.3V	---	---	CL=7.0pF	CL=9.0pF
				Id <sup>*1</sup> =215nA typ	Id <sup>*1</sup> =245nA typ
				RL <sup>*2</sup> =-570kΩ	RL <sup>*2</sup> =-340kΩ
		TS <sup>*3</sup> =0.95sec typ	TS <sup>*3</sup> =1.40sec typ		

\*1. Id: Cd Chage current, \*2. RL: Negative resistance, \*3. Ts: Oscillation start-up time