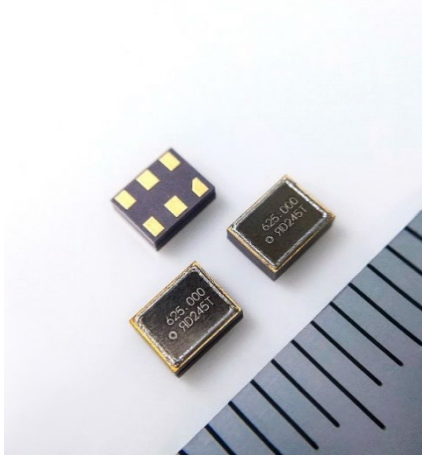


# PRESS RELEASE

Sample Shipment Begins for Innovative Single-chip Oscillator "KCRO-04"  
- Achieving 1GHz fundamental oscillation and future-leading RMS jitter of 20fs -



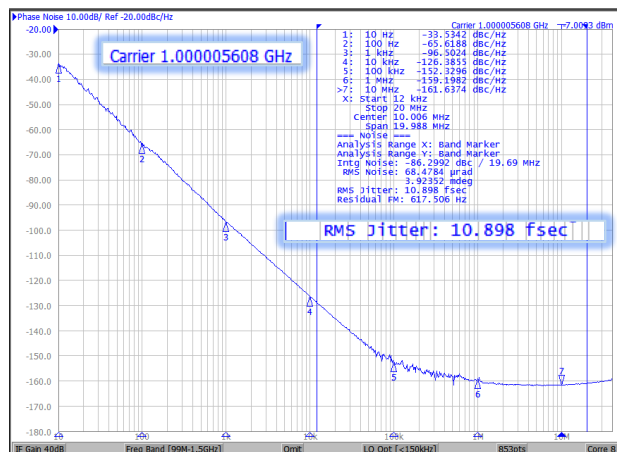
RIVER ELETEC Corporation (hereinafter referred to as "our company") is proud to announce the market introduction of KCRO-04, a fundamental product essential for accelerating the evolution of high-speed communication and next-generation computing. This product is the third in our series of innovative products utilizing our developed KoT cut and OPAW vibrational technology, with sample shipments having commenced in May 2024.

**Japan, June. 10, 2024:**

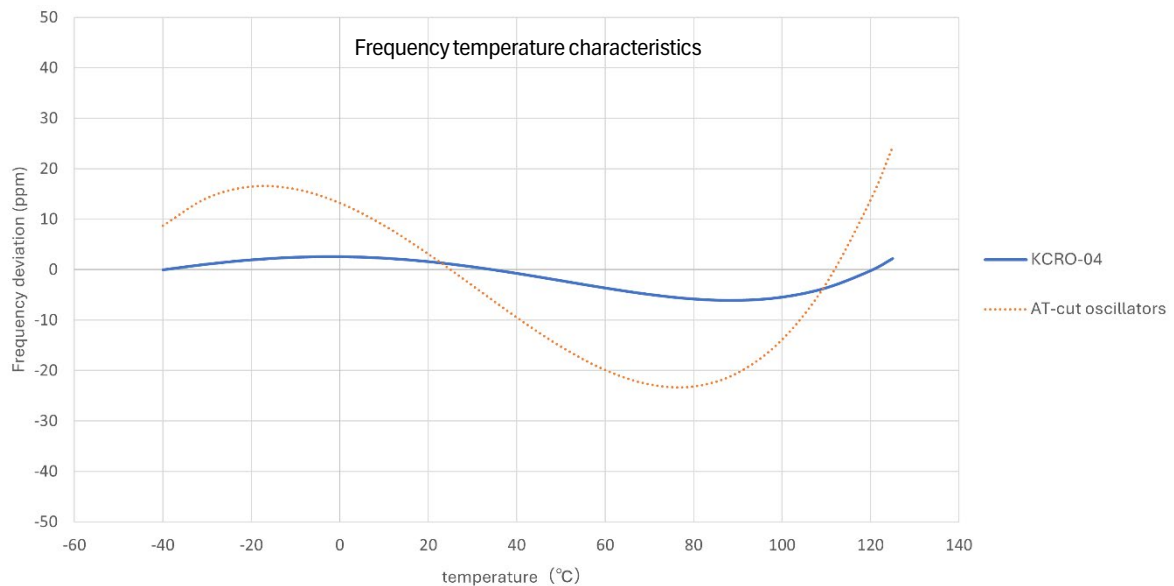
A particularly important note is the high-performance IC, developed independently by our company, which serves as the heart of KCRO-04. This proprietary oscillation IC is custom-designed to extract the performance of the KoT cut oscillator, enabling fundamental oscillation up to 1GHz while suppressing RMS jitter to less than 20fs. This results in unparalleled high-precision performance in the market, showcasing our technical prowess and uniqueness.

Despite its compact size (3.2mm x 2.5mm), KCRO-04 boasts superior performance and achieves the highest level of performance currently available. This outstanding performance allows KCRO-04 to meet the demands for high-precision, stable signals in high-speed communication and next-generation computing technologies that

Jitter and phase noise performance (LVDS, 1GHz) ▶



push the limits of computational power, establishing a new standard for technological innovation in these fields.



KCRO-04 supports LVDS and LVPECL outputs, offering excellent frequency temperature characteristics through KoT cut. This technology ensures stable operation over a wide temperature range, making it ideal for applications requiring high reliability. In addition, by not using a PLL, it achieves extremely low noise frequency output, significantly improving signal stability and information accuracy, particularly in applications requiring high-speed data transfer and precise calculations.

This revolutionary technology is expected to play a significant role in both communication and computing fields, greatly accelerating their technological evolution. From the construction of high-speed communication networks to high-performance computing in large data centers, and even as a foundation for cutting-edge technologies like artificial intelligence and machine learning, KCRO-04 is expected to find a broad range of applications.

We are committed to further developing KoT cut and OPAW vibration technologies and continuing to explore the future possibilities these technologies open. Through our KCR series of products, including KCRO-04, we will provide our customers with state-of-the-art technology solutions and contribute to the development of the industry. For more information about KCRO-04 or to request samples, please contact our sales department or visit our website. We, RIVER ELETEC, promise to forge a new horizon in future communication and computing together with our customers through this innovative product.

※1 OPAW : Orthogonal Plate Acoustic Waves  
 (Japan trademark registration application number 2020-131732 , pronounced Ohh-PAW)  
 KoT : Kerfed orthogonal plate waves for zero Temperature coefficient  
 (Japan trademark registration application number 2020-131727 , pronounced Koh'-Tee)

## Product Highlights

- OPAW oscillator using patented new cut angle 'KoT cut'
- Size: 3.2 mm× 2.5mm × 1.3 mm
- Output frequency: 100MHz ~ 1GHz
- Achieves higher frequency stability over a wide temperature range than AT cut
- Supports LVDS or LVPECL output
- RMS phase jitter: 20 femtoseconds (typ. / SPXO)
- Applications: Communication equipment, supercomputers, measuring instruments

## Standard Specifications

Item		Symbol	Specifications	Conditions / Remarks
Nominal frequency		fo	100MHz~1GHz	
Storage temperature		T_stg	-55~125°C	
Operating temperature		T_use	-55~125°C	
Frequency tolerance		f_tol	±20ppm MAX. (-40~+85°C)	High precision
(Includes initial accuracy, frequency versus temperature characteristics and aging over ten years.)			±30ppm MAX. (-40~+125°C)	High precision
			±50ppm MAX. (-40~+125°C)	Standard
LVDS	Supply voltage	Vcc	1.8V±0.09V, 2.5V±0.125V, 3.3V±0.165V	
	Current consumption	Icc	40mA MAX.	
	Output voltage	VOD	350mV TYP., 250mV MIN.	
	Offset voltage	VOS	1.25V TYP.	
	LVDS load condition	L_LVDS	100Ω	Between Outputs
	Rise time	tr	500ps MAX.	20% to 80%
	Fall time	tf	500ps MAX.	80% to 20%
	Symmetry	SYM	45~55%	
LVPECL	Supply voltage	Vcc	2.5V±0.125V, 3.3V±0.165V	
	Current consumption	Icc	80mA MAX.	
	Output voltage	VOH	Vcc-1.03V MIN.	
		VOL	Vcc-1.60V MAX.	
	ECL load condition	L_ECL	50Ω	Terminated to Vcc - 2V
	Rise time	tr	350ps MAX.	20% to 80%
	Fall time	tf	350ps MAX.	80% to 20%
	Symmetry	SYM	45~55%	
Input voltage	VIH	0.7Vcc MIN.	OE terminal	
	VIL	0.3Vcc MAX.	OE terminal	
Start-up time	t_str	10ms MAX.		
Phase jitter		30fs MAX.	12 kHz to 20 MHz offset	
g-sensitivity		2ppb/g MAX.		

The information in this document is subject to change without notice.

**Inquiries**

Region/Country	Company	Address	Tel	Fax
United States	River Electronics (Singapore) Pte. Ltd.	49 Jalan Pemimpin #04-03 Aps Industrial Building Singapore 577203	65-6258- 7874	65-6258- 7366
Europe				
Canada				
Latin America				
Middle East				
Oceania				
China & Hong Kong	Xi'an River Electronics Corporation	9F-B7, New Green Island Building, Nanshan Road, Shenzhen, China 518000	86-755- 86528590	86-755- 86528590
China & Hong Kong	Taiwan River Co., Ltd.	3F,NO,14 LANE128,SEC.1,JUNG SHING RD. WU-GU DIST.NEW TAIPEI CITY TAIWAN R.O.C.	886-2- 8988-2811	886-2- 2983-4785
Taiwan				
China	Xi'an River Electronics Corporation	1st Floor, No.7 Factory Building, Guanzhong Comprehensive Bonded Zone A, Fengcheng 12 Road, Xi'an, China 710018	86-29- 8665-8920	86-29- 8665-8922
Korea	RIVER ELETEC CORPORATION (Korea)	9F NamBu Bldg, 389 Shinwol-ro, YangChoen-gu, Seoul 08023, Korea	82-2-784- 3166	82-2-784- 4903
Japan	RIVER ELETEC CORPORATION (Tokyo)	4-40-14 Nishi Shinjuku, Shinjuku, Tokyo 160-0023, Japan	81-3-3377- 5444	81-3-3374- 2865
	RIVER ELETEC CORPORATION (Osaka)	Moriguchi-Fuji Bldg. 3F 1-3-2 Keihan- Hondoori Moriguchi- Shi Osaka 570-0083, Japan	81-6-6998- 4888	81-6-6998- 4899
Web	Inquiries <a href="https://www.river-ele.co.jp/ev/">https://www.river-ele.co.jp/ev/</a> Download pictures <a href="https://www.river-ele.co.jp/ja/products-post/kcro-04/kcro-04.jpg">https://www.river-ele.co.jp/ja/products-post/kcro-04/kcro-04.jpg</a>			