



ABRACON PRODUCT GUIDE

ClearClock® Crystal Oscillators

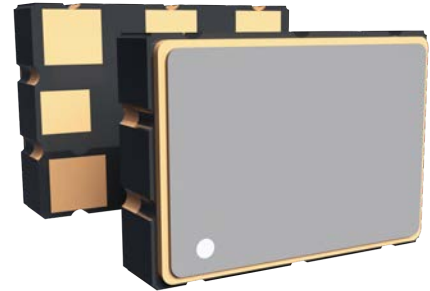
RMS Jitter Optimized, Miniature Solutions
for the Fastest Data Links



TIMING DEVICES

Overview

The ClearClock® family of crystal oscillators includes third overtone and phase locked loop solutions for a variety of design needs. The performance options support the next generation of bandwidth requirements for networking, optical transceivers, high-speed communication, cloud computing, storage, and RF applications. These compact devices offer industry-leading low power consumption and low jitter performance. They deliver phase noise and rms jitter performance that FPGAs and ASICs need for serial data rates at and beyond 400Gbps.



ClearClock®

- Lowest power consumption in its class
- Ultra-low rms phase jitter
- Small package sizes
- Third Overtone and Phase Locked Loop solutions
- Automotive grade AEC-Q200 Available

Third Overtone

- Ideal for carrier frequencies from 100MHz to 212.5MHz
- Optimized RMS jitter of 54fs (typ.) at 156.25MHz
- Select frequencies available up to 212.5MHz
- 50% lower power consumption compared to PLL-based solution
- Package sizes available: 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2 and 7.0 x 5.0 mm

Phase Locked Loop

- Ideal for carrier frequencies from 50MHz to 2,100MHz
- RMS jitter of 119fs (typ.) at 156.25 MHz
Any frequency available up to 2100MHz
- Lowest power consumption for PLL based solutions
- Package sizes available: 5.0 x 3.2 and 7.0 x 5.0 mm

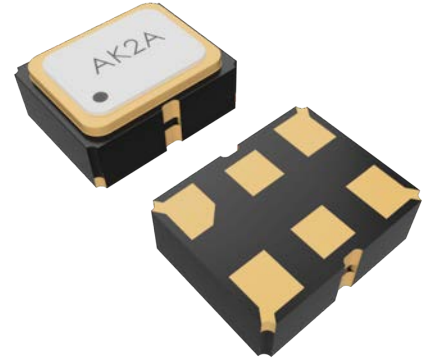


ClearClock® Third Overtone



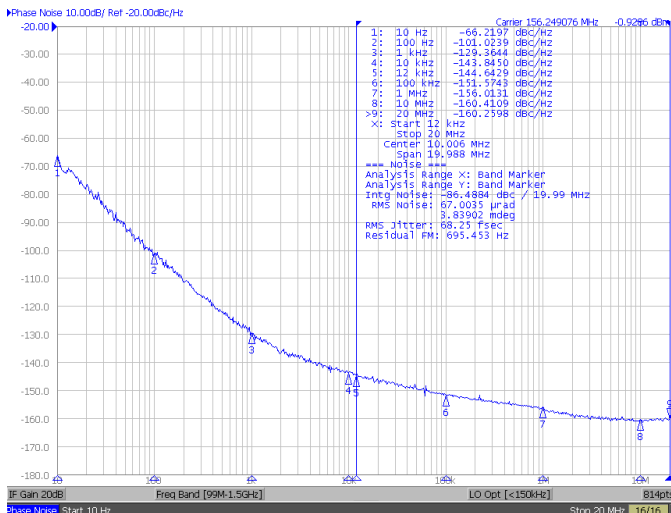
Third Overtone XOs

Abracon's third overtone ClearClock® AK2, AX3, AK5, AK7, AK2A, & AK3A series deliver industry-leading energy efficiency for low-noise, differential crystal oscillators. The oscillators' simplified architecture avoids PLL-based multiplication, thereby lowering overall power consumption while maintaining exceptional rms jitter performance. These XOs come in compact package sizes ideal for space-constrained designs, such as optical transceivers.



Features

- Frequency range from 100MHz to 212.5MHz
- RMS Jitter of 54fs typical (F=156.250MHz, AK2B and AK3B)
- Low power consumption 20mA max Idd (HCSL)
- Supports LVPECL, LVDS and HCSL output logic types
- Small package sizes as low as 2.5 x 2.0 mm
- OE Pin 1 & 2, Active High option available
- Superior all-inclusive frequency accuracy over 20-year product life



AK2A series | 156.25MHz

Applications



Optical Transceivers



Networking and Communications



Fibre Channel



ClearClock® Automotive Grade



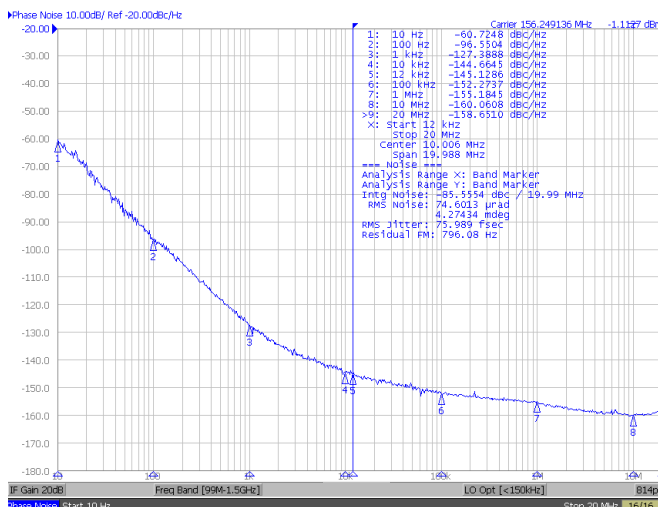
AEC-Q200 Qualified XOs

Abracon's latest release includes AK2AAIG/AK3AAIG, an automotive grade Crystal Oscillator with Ultra-Low Jitter. Designed for reliability and precision in the most challenging environments, this small oscillator delivers superior performance in a compact 2.5mm x 2.0mm package size. AEC-Q200 Qualified, ensuring seamless operation in extreme automotive applications needing an operating temperature range of 40°C to +125°C. This series maximizes the 3rd overtone technology to provide exceptional precision with an ultra-low RMS Jitter of just 64fs Typ (@ 156.25MHz) for stable and reliable data transmission.



Features

- AEC-Q200 Qualified: -40°C to +125°C Available
- Exceptionally Low RMS Jitter: 64fs Typ (@ 156.25MHz)
- Based on 3rd overtone, quartz crystal technology
- LVPECL, LVDS, HCSL differential output logic
- Small package sizes including 2.5 x 2.0 x 1.0 mm
- Industry standard frequencies between 100MHz and 200MHz



AK2AAIG series | 156.25MHz LVPECL 3.3V

Applications



Optical Transceivers



Automotive Networking



Industrial and FPGA applications

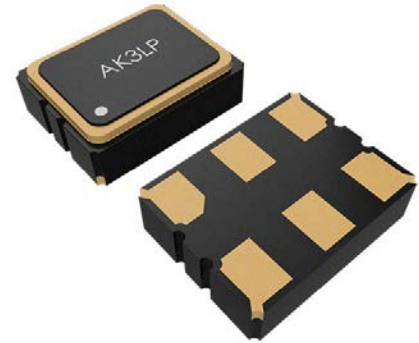


ClearClock® Low Power HCSL



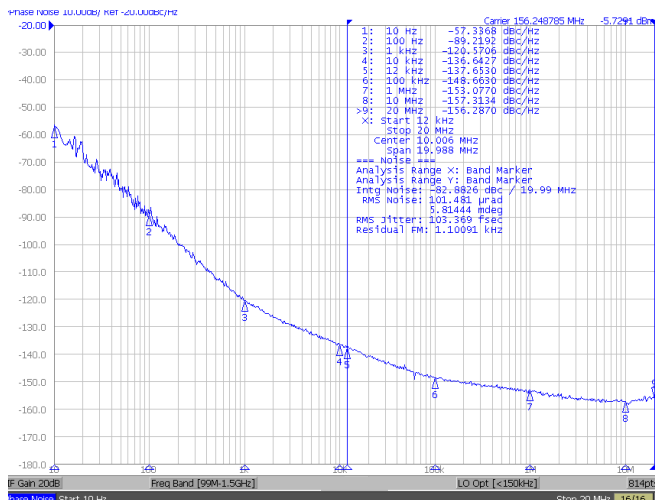
Low Power HCSL XOs

Introducing our latest low jitter crystal oscillator with Low Power HCSL output. Engineered for precision timing in modern electronics, this compact solution provides lower current consumption compared to traditional HCSL. The AK2LP/AK3LP oscillators ensure seamless performance in critical timing applications. Built on 3rd overtone quartz crystal technology, our oscillator combines proven reliability, ensuring long-term performance. This series also provides customizable Output Enable options (Pad 1 or Pad 2 Active High) to ensure compatibility with your system’s architecture.



Features

- Industry-standard frequencies between 100MHz and 156.25MHz
- Exceptionally Low RMS Jitter: 108fs Typ (@ 156.25MHz)
- Low power consumption 20mA max Idd
- ±25ppm stability over the industrial operating temperature (-40°C to +85°C)
- Multiple supply voltage options (1.8V, 2.5V, 3.3V, and 1.71V to 3.63V)
- Small package sizes including 2.5 x 2.0 x 1.0 mm



AK2LP series | 156.25MHz HCSL 3.3V

Applications



Optical Transceivers and Modules



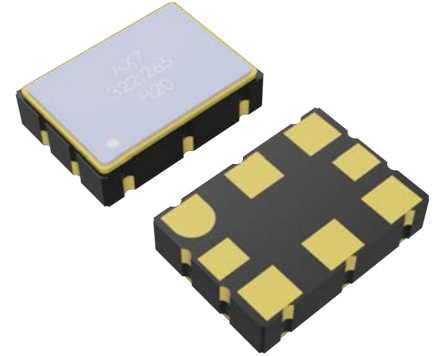
Data Centers



PCI Express (PCIe)

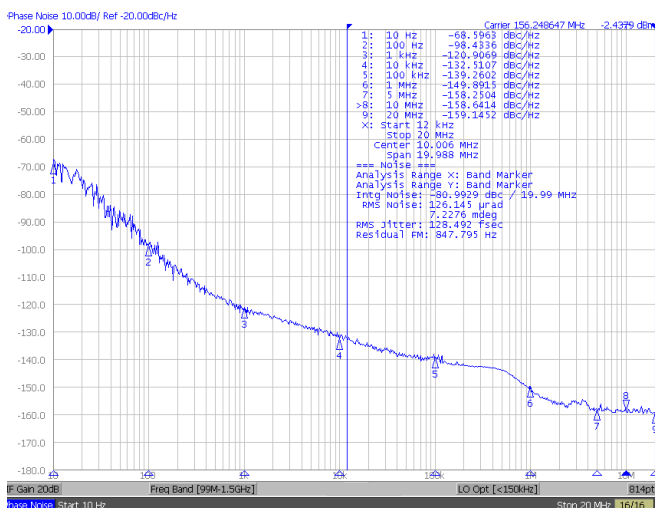
Phase Locked Loop Based XOs

Based on sophisticated PLL technology, the AX5 and AX7 devices yield superior rms jitter performance, typically better than 150fs, at any carrier frequency from 50MHz to 2,100MHz. These PLL-based solutions offer an industry-leading upper frequency limit, suited for applications that require greater than 200MHz clocking reference. These programmable XOs come in miniature package sizes.



Features

- Wide frequency range from 50MHz to 2,100MHz
- Programmable oscillator offers fast lead times for samples
- RMS jitter of 119fs typical (F=156.25MHz)
- Lowest power consumption in its class: 80mA max Idd (LVDS)
- Supports LVPECL, LVDS, HCSL and CML output logic types
- Package sizes as small as 5.0 x 3.2 mm
- OE Pin 1 & 2 and Active High & Low Logic options available
- Superior all-inclusive frequency accuracy over 20-year product life



AX5 | PLL | 156.25MHz | LVPECL | 3.3V | 132fsec

Applications



SONET/SDH



Test & Measurement



RF Systems

Third Overtone



2.5 x 2.0 x 1.0 mm



3.2 x 2.5 x 1.0 mm



5.0 x 3.2 x 1.3 mm



7.0 x 5.0 x 1.8 mm

Phase Locked Loop



5.0 x 3.2 x 1.4 mm



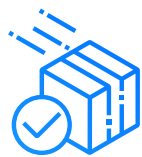
7.0 x 5.0 x 1.8 mm

ClearClock® Product Line Up



	SERIES	PACKAGE SIZE (mm)	FREQUENCY RANGE (MHz)	PHASE JITTER @ 156.25MHz (fs)	V _{DD} OPTIONS (V)	OUTPUT LOGIC TYPE	OPERATING TEMPERATURE	STABILITY (ppm)
NEW	AK2B	2.5 x 2.0	100 to 200	54	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
NEW	AK2A	2.5 x 2.0	100 to 200	64	2.5, 3.3	LVPECL **, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
NEW	AK2AAIG	2.5 x 2.0	100 to 200	64	2.5, 3.3	LVPECL **, LVDS, HCSL	-40°C to +85°C	+15+20, +25+50
NEW	AK2LP	2.5 x 2.0	100 to 156.25	108	1.8, 2.5, 3.3	HCSL	-40°C to +85°C	+15, +20, +25
	AK2	2.5 x 2.0	100 to 200	150	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL	-40°C to +85°C	+25, +30
NEW	AK3B	3.2 x 2.5	100 to 212.5	54	2.5, 3.3	LVPECL **, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
NEW	AK3A	3.2 x 2.5	100 to 212.5	64	2.5, 3.3	LVPECL **, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
NEW	AK3AAIG	3.2 x 2.5	100 to 200	64	2.5, 3.3	LVPECL **, LVDS, HCSL	-40°C to +85°C	+15+20, +25+50
NEW	AK3LP	3.2 x 2.5	100 to 156.25	117	1.8, 2.5, 3.3	HCSL	-40°C to +85°C	+15, +20, +25
	AX3	3.2 x 2.5	100 to 212.5	75	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
	AK5	5.0 x 3.2	100 to 212.5	75	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
	AX5	5.0 x 3.2	50 to 2100	130	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL, CML	-40°C to +85°C	+15, +20
	AK7	7.0 x 5.0	100 to 220	80	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL	-40°C to +85°C	+15, +20, +25
	AX7	7.0 x 5.0	50 to 2100	130	1.8, 2.5, 3.3	LVPECL *, LVDS, HCSL, CML	-40°C to +85°C	+25, +50

* LVPECL only available at 3.3 Vdd option ** Supply voltage (Vdd) = 2.5V and 2.375~3.63V options not available with LVPECL output



Check Inventory

For More Information

Visit our website now to learn more about
[Abracon's ClearClock® Oscillators](#)

Read ClearClock® Application Note

Download Whitepaper