



ABRACON

Innovation For Tomorrow's Designs®

 Ecliptek


FOX

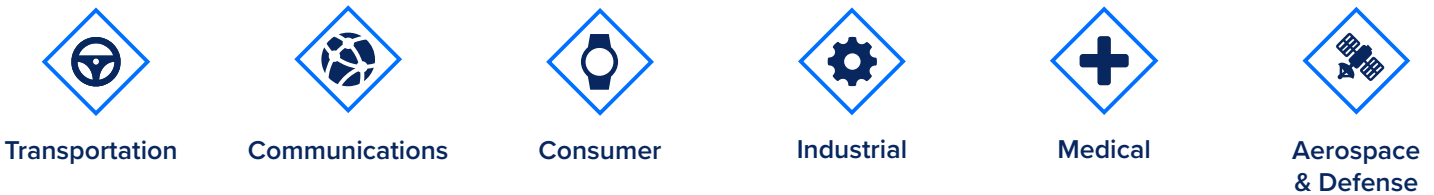


Timing Catalog

Frequency Control and Timing Devices

With service, quality and technical expertise at Abracon's core, our brands enable innovative, connected IoT solutions. Abracon powers the Ecliptek and Fox brands, providing the latest technical design support and global supply chain flexibility to solve customers' unique challenges of today. Our frequency control and timing devices include crystals and oscillators designed to meet automotive, IoT, and precision timing design requirements. The collection includes compact size, low phase noise, and wide operating temperature range solutions.

KEY MARKET SEGMENTS AND APPLICATIONS



PRODUCT TYPE BY BRAND

	QUARTZ CRYSTALS	CRYSTAL OSCILLATORS	MEMS	OCXO	TCXO	VCXO	REAL TIME CLOCKS (RTC)	PROGRAMMABLE XO/VCXO TCXO/VCTCXO	RESONATORS
ABRACON	●	●	●	●	●	●	●	●	●
ECLIPTEK	●	●						●	
FOX	●	●			●	●			

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About Abracon

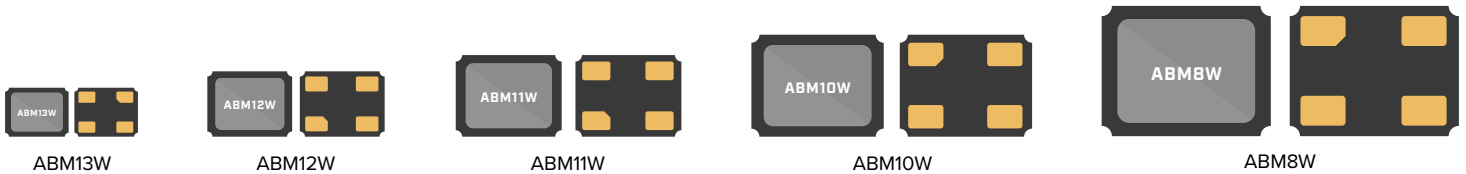
Abracon is an industry leader in passive components, providing frequency control & timing devices, RF & antenna products, and inductor & connectivity solutions. With service and quality at the company's core, Abracon enables innovative IoT solutions. Abracon powers the Ecliptek, Fox, ILSI, MMD, Oscilent, and AEL brands, delivering the latest technical design support and global supply chain flexibility to solve customers' unique challenges.



Abracon W Series Crystals

What makes the IoT tick? Abracon's W Series crystals offer low ESR and Co specifications in combination with low CL options to address energy-saving MCU and portable communication chipset market trends. In the race to decrease power consumption, many on-chip oscillators are starved of output drive and often cannot sustain oscillation using standard quartz crystals with higher ESR, Co, and CL specifications. Abracon's W Series of quartz crystals engineered for micro power applications overcome these challenges.

ABMxW Series MHz Quartz Crystals



BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	CL, PLATING LOAD (pF)	ESR MAX* (Ω)	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE	TOLERANCE OPTIONS (±ppm)	STABILITY OPTIONS (±ppm)	CO, SHUNT MAX (pF)
		L	W							
Abracon	ABM13W	1.2	1.0	32 to 80	5 to 8	50-100		7/10/15/20	10/15/20/30/50	1.0
Abracon	ABM12W	1.6	1.2	24 to 52	4 to 8	40-200	-40°C to +125°C	10/15/20 25/30/50	10/15/20 25/30/35 50/100	2.0
Abracon	ABM11W	2.0	1.6	16 to 50		40-200				
Abracon	ABM10W	2.5	2.0	16 to 50		30-100				
Abracon	ABM8W	3.2	2.5	10 to 54		30-200				

*ESR Maximum specifications dependent upon carrier frequency and load (CL)

ABS0xW Series 32.768kHz Tuning Fork Quartz Crystals



BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (kHz)	CL, PLATING LOAD (pF)	ESR MAX (kΩ)	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE	TOLERANCE OPTIONS (±ppm)	CO, SHUNT MAX (pF)
		L	W						
Abracon	ABS04W	1.2	1.0	32.768	4 to 12.5	130	-40°C to +85°C	20	2.0
Abracon	ABS05W	1.6	1.0		4	85	-40°C to +125°C	20	2.0

Standard SMD MHz Quartz Crystals

BRAND	SERIES	PACKAGE SIZE (mm)		PADS	FREQUENCY (MHz)	CL, PLATING LOAD (pF)	ESR MAX* (Ω)	TOLERANCE OPTIONS (±ppm)	STABILITY OPTIONS (±ppm)	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W							
Abracon	ABM13	1.2	1.0	4	36 to 80	5 to 7	200	10/20/30	10/15/20	-40°C to +85°C
Fox	FCABS	1.2	1.0	4	32 to 80	6 to 12	60	10/15/20/25	10/15/20/25	-40°C to +85°C
Ecliptek	EA1012	1.2	1.0	4	36 to 80	5 to 7	200	10/20/30	10/15/20	-40°C to +85°C
Abracon	ABM12	1.6	1.2	4	24 to 80	5 to 8	200	15/20/30	15/20/30	-40°C to +85°C
Fox	FCOBS	1.6	1.2	4	23.9 to 80	4 to 20	100	10/15/20/25/30/50	10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA1216	1.6	1.2	4	24 to 80	5 to 8	200	15/20/30	15/20/30	-40°C to +85°C
Abracon	ABM11	2.0	1.6	4	16 to 50	6 to 20	120	10/15/20	10/15/20	-40°C to +85°C
Fox	FC1BS	2.0	1.6	4	16 to 200	7 to 20	60	10/15/20/25/30/50	10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA1620	2.0	1.6	4	16 to 54	8 to 32	120	10/15/30/50	10/15/20/30/50/100	-40°C to +85°C
Abracon	ABM10	2.5	2.0	4	12 to 55	7 to 20	100	10/15/25	10/15/20	-40°C to +125°C
Fox	FC2BS	2.5	2.0	4	12 to 200	8 to 20	40	10/15/20/25/30/50	10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA2025	2.5	2.0	4	12 to 54	8 to 30	80	10/15/30/50	10/15/20/30/50/100	-40°C to +85°C
Abracon	ABM8	3.2	2.5	4	10 to 125	6 to 20	50	10/15/30/50	10/15/20	-40°C to +125°C
Fox	FC3BS	3.2	2.5	4	8 to 200	7 to 20	30	10/15/20/25/30/50	5/10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA2532	3.2	2.5	4	10 to 54	8 to 30	60	10/15/30/50	10/15/20/30/50/100	-40°C to +125°C
Abracon	ABM8G	3.2	2.5	4	12 to 50	7 to 20	80	10/15/20	10/15/20	-40°C to +85°C
Abracon	ABM3	5.0	3.2	2	8 to 80	7 to 32	30	15/20/25	10/15/20	-40°C to +125°C
Abracon	ABM3B	5.0	3.2	4	8 to 125	6 to 32	50	10/20/20	10/15/20	-55°C to +125°C
Fox	FC5BS	5.0	3.2	4	8 to 200	10 to 20	20	10/15/20/25/30/50	5/10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA3250	5.0	3.2	4	8 to 48	8 to 32	50	10/15/30/50	15/20/30/50/100	-40°C to +85°C
Abracon	ABM7	6.0	3.5	2	8 to 50	8 to 33	50	10/15/20	10/15/20	-55°C to +125°C
Fox	FC6AS	6.0	3.5	2	8 to 67	10 to 20	40	20/25/30/50	20/25/30/50/100	-40°C to +85°C
Abracon	ABMM2	6.0	3.5	4	7.3728 to 110	8 to 33	50	10/15	10/20/30	-40°C to +125°C
Fox	FC6BS	6.0	3.5	4	7.3728 to 133	10 to 20	20	10/15/20/25/30/50	5/10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA3560	6.0	3.5	4	10 to 48	10 to 50	50	10/15/30/50	15/20/30/50/100	-40°C to +85°C
Abracon	ABMM	7.0	5.0	4	6 to 125	8 to 33	50	10/15/20	10/15/20	-40°C to +85°C
Abracon	ABMM1	7.0	5.0	4	6 to 125	8 to 33	50	10/15/20	10/15/20	-40°C to +125°C
Fox	FC7AS	7.0	5.0	2	6 to 160	10 to 20	40	20/25/30/50	15/20/25/30/50/100	-40°C to +85°C
Fox	FC7BS	7.0	5.0	4	6 to 312	10 to 20	20	10/15/20/25/30/50	5/10/15/20/25/30/50/100	-55°C to +125°C
Ecliptek	EA5070	7.0	5.0	4	6 to 66	12 to 50	30	10/15/30/50	15/20/30/50/100	-40°C to +85°C
Abracon	ABM2	8.0	4.5	2	8 to 100	8 to 33	50	10/15/20	10/15/20	-40°C to +125°C
Fox	FC8AQ	10.0	4.5	2	3.2 to 7	10 to 20	150	20/25/30/50	20/25/30/50/100	-40°C to +85°C
Abracon	ABLS7M	7.0	4.1	2	12 to 40	8 to 33	40	10/15/20	10/15/20	-40°C to +125°C
Abracon	ABLS7M2	7.0	4.1	2	12 to 40	8 to 33	40	10/15/20	10/15/20	-40°C to +125°C
Abracon	ABLS	11.4	4.7	2	3.579545 to 75	8 to 33	40	5/10/15	10/15/20	-40°C to +125°C
Abracon	ABLS2	11.4	4.7	2	3.579545 to 70	10 to 33	40	5/10/15	10/15/20	-40°C to +125°C
Abracon	ABLS3	11.4	4.7	2	6 to 70	10 to 33	40	5/10/15	10/15/20	-40°C to +125°C
Fox	FC4SD	11.4	4.7	2	3.2 to 80	10 to 50	30	10/15/20/25/30/50	10/15/20/25/30/50/100	-55°C to +125°C
Fox	FC9SD	11.4	4.7	2	4 to 80	10 to 50	30	10/15/20/25/30/50	10/15/20/25/30/50/100	-40°C to +85°C
Ecliptek	EIS	11.4	4.7	2	3.579545 to 50	10 to 50	50	10/15/30/50	15/20/30/50/100	-55°C to +125°C

*Referenced @ F=20.000MHz over widest available Operating Temperature Range

ABS05 Tuning Fork Crystal

32.768KHZ TIMING COMPONENTS

32.768KHZ SMD LOW PROFILE CRYSTAL

Our high-demand ABS05 series of tuning fork crystals are low in power consumption, preserving battery life in a wide range of applications. This series offers 32.768kHz operation in a low profile SMD package and is ideal for high density circuit boards. The product's seam sealed ceramic package offers excellent environmental and heat resistance and is applicable for wide range in communication & measuring equipment. Other applications include commercial & industrial applications, wireless communications, PDA, and smartphones.



Standard SMD 32.768kHz Tuning Fork Quartz Crystals

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (kHz)	CL, PLATING LOAD (pF)	ESR MAX* (kΩ)	TOLERANCE OPTIONS (± ppm)	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W					
Fox	FK121	1.2	1.0	32.768	7, 9, 12.5	90	20	-40°C to +85°C
Fox	FK124	1.2	1.0		4, 6, 7, 9, 12.5	90	20	-40°C to +105°C
Abrakon	ABS05	1.6	1.0		4, 6, 7, 9, 12.5	90	10/20/30	-40°C to +85°C
Fox	FK161	1.6	1.0		6, 7, 9, 12.5	90	20	-40°C to +85°C
Ecliptek	E4WS	1.6	1.0		9, 12.5	90	10/20/30	-40°C to +85°C
Abrakon	ABS06	2.0	1.2		4, 6, 7, 9, 12.5	110	10/20/30	-55°C to +125°C
Abrakon	ABS06-107	2.0	1.2		4	80	20	-40°C to +85°C
Fox	FK122	2.0	1.2		4, 6, 7, 9, 12.5	70	10/20	-40°C to +85°C
Fox	FK125	2.0	1.2		4, 6, 7, 9, 12.5	75	20	-40°C to +85°C
Ecliptek	E3WS	2.0	1.2		4, 6, 7, 9, 12.5	110	10/20/30	-55°C to +125°C
Abrakon	ABS07	3.2	1.5		4, 6, 7, 9, 12.5	70	10/20/30	-55°C to +125°C
Fox	FK135	3.2	1.5		6, 7, 9, 12.5	70	5/10/20	-40°C to +85°C
Ecliptek	E8WS	3.2	1.5		6, 7, 9, 12.5	70	10/20	-40°C to +85°C
Abrakon	ABS07-LR	3.2	1.5		6	50	10/20	-40°C to +85°C
Fox	FK13L	3.2	1.5		6, 12.5	50	10/20	-40°C to +85°C
Abrakon	ABS07L	3.2	1.5		7, 9, 12.5	80	20/30	-40°C to +85°C
Abrakon	ABS07-120	3.2	1.5		6	60	20	-40°C to +85°C
Fox	FK145	4.1	1.5		6, 7, 9, 12.5	70	10/20	-40°C to +85°C
Abrakon	ABS13	6.9	1.4		7, 12.5	65	20/30	-40°C to +85°C
Fox	FKFSX	6.9	1.4		7, 12.5	65	20	-40°C to +85°C
Abrakon	ABS25	8.0	3.8	6, 12.5	50	10/15/20	-40°C to +85°C	
Ecliptek	E1WS	8.0	3.8	6, 12.5	50	10/15/20	-40°C to +85°C	
Fox	FKFSR	8.7	3.7	6, 12.5	50	20	-40°C to +85°C	

*Over widest available Operating Temperature Range

Precision Timing Oscillator Solutions (XO/VCXO/TCXO/VCTCXO/OCXO/Stratum III)

Low RMS Phase Jitter Clock Oscillator Solutions and Precision TCXO/VCTCXO/OCXO/Stratum III options available for communications, RF, radar, 5G, instrumentation and data center/server applications.

Precision Timing XO

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W				
Abracon	AK2	2.5	2.0	100 to 200	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL	-40°C to +85°C
Abracon	ASG2-D	2.5	2.0	8 to 1500	2.5, 3.3	LVDS	-40°C to +85°C
Abracon	ASG2-P	2.5	2.0	8 to 1500	2.5, 3.3	LVPECL	-40°C to +85°C
Abracon	AX3	3.2	2.5	100 to 212.5	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL	-40°C to +85°C
Ecliptek	EQRD32	3.2	2.5	62.5 to 164	2.5	LVPECL	-40°C to +85°C
Ecliptek	EQRD33	3.2	2.5	62.5 to 164	3.3	LVPECL	-40°C to +85°C
Ecliptek	EQRE32	3.2	2.5	62.5 to 164	2.5	LVDS	-40°C to +85°C
Ecliptek	EQRE33	3.2	2.5	62.5 to 164	3.3	LVDS	-40°C to +85°C
Ecliptek	EQRG32	3.2	2.5	62.5 to 164	2.5	HCSL	-40°C to +85°C
Ecliptek	EQRG33	3.2	2.5	62.5 to 164	3.3	HCSL	-40°C to +85°C
Fox	FO3PS	3.2	2.5	13.5 to 250	2.5, 3.3	LVPECL	-40°C to +85°C
Fox	FO3SL	3.2	2.5	13.5 to 160	3.3	HCSL	-40°C to +85°C
Fox	FO3LS	3.2	2.5	13.5 to 250	2.5, 3.3	LVDS	-40°C to +85°C
Abracon	AK5	5.0	3.2	100 to 200	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL	-40°C to +85°C
Abracon	AX5	5.0	3.2	50 to 2100	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL, CML	-40°C to +85°C
Ecliptek	EQRD22	5.0	3.2	20 to 200	2.5	LVPECL	-40°C to +85°C
Ecliptek	EQRD23	5.0	3.2	20 to 200	3.3	LVPECL	-40°C to +85°C
Ecliptek	EQRE22	5.0	3.2	20 to 200	2.5	LVDS	-40°C to +85°C
Ecliptek	EQRE23	5.0	3.2	20 to 200	3.3	LVDS	-40°C to +85°C
Ecliptek	EQRG22	5.0	3.2	20 to 200	2.5	HCSL	-40°C to +85°C
Ecliptek	EQRG23	5.0	3.2	20 to 200	3.3	HCSL	-40°C to +85°C
Fox	FO5PU	5.0	3.2	50 to 320	2.5, 3.3	LVPECL	-40°C to +85°C
Fox	FO5PS	5.0	3.2	13.5 to 250	2.5, 3.3	LVPECL	-40°C to +85°C
Ecliptek	E15C5	5.0	3.2	62.5 to 162	2.5	LVPECL	-40°C to +85°C
Ecliptek	E13C5	5.0	3.2	62.5 to 162	3.3	LVPECL	-40°C to +85°C
Fox	FO5LS	5.0	3.2	13.5 to 250	2.5, 3.3	LVDS	-40°C to +85°C
Ecliptek	EL15C5	5.0	3.2	80 to 162	2.5	LVDS	-40°C to +85°C
Ecliptek	EL13C5	5.0	3.2	80 to 162	3.3	LVDS	-40°C to +85°C
Fox	FO5SL	5.0	3.2	13.5 to 160	3.3	HCSL	-40°C to +85°C
Ecliptek	EN15C5	5.0	3.2	100 to 125	2.5	HCSL	-40°C to +85°C
Ecliptek	EN13C5	5.0	3.2	100 to 125	3.3	HCSL	-40°C to +85°C
Abracon	AK7	7.0	5.0	100 to 220	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL	-40°C to +85°C
Fox	FO7PU	7.0	5.0	70 to 170	2.5, 3.3	LVPECL	-40°C to +85°C
Abracon	AX7	7.0	5.0	50 to 2100	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL, CML	-40°C to +85°C
Ecliptek	EQRD12	7.0	5.0	10 to 200	2.5	LVPECL	-40°C to +85°C
Ecliptek	EQRD13	7.0	5.0	10 to 200	3.3	LVPECL	-40°C to +85°C
Ecliptek	EQRE12	7.0	5.0	10 to 200	2.5	LVDS	-40°C to +85°C
Ecliptek	EQRE13	7.0	5.0	10 to 200	3.3	LVDS	-40°C to +85°C
Ecliptek	EQRG12	7.0	5.0	10 to 200	2.5	HCSL	-40°C to +85°C
Ecliptek	EQRG13	7.0	5.0	10 to 200	3.3	HCSL	-40°C to +85°C

Precision Timing XO

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W				
Abrakon	ASVMX	7.0	5.0	25 to 860	2.375 ~ 3.63	CMOS, LVPECL, LVDS, HCSL	-40°C to +85°C
Fox	FO7PS	7.0	5.0	40 to 325	2.5, 3.3	LVPECL	-40°C to +85°C
Fox	FO7PD	7.0	5.0	40 to 325	2.5, 3.3	LVPECL	-40°C to +85°C
Ecliptek	E13C7	7.0	5.0	62.5 to 162	3.3	LVPECL	-40°C to +85°C
Ecliptek	E15C7	7.0	5.0	62.5 to 162	2.5	LVPECL	-40°C to +85°C
Abrakon	ABNM	7.0	5.0	1 to 160	2.5, 3.3	CMOS, LVDS, LVPECL	-40°C to +85°C
Abrakon	ABFM	7.0	5.0	30 to 280	2.5, 3.3	CMOS, LVDS, LVPECL	-40°C to +85°C
Fox	FO7LS	7.0	5.0	25 to 400	2.5, 3.3	LVDS	-40°C to +85°C
Fox	FO7LD	7.0	5.0	25 to 400	2.5, 3.3	LVDS	-40°C to +85°C
Ecliptek	EL13C7	7.0	5.0	62 to 250	3.3	LVDS	-40°C to +85°C
Ecliptek	EL15C7	7.0	5.0	80 to 250	2.5	LVDS	-40°C to +85°C
Fox	FO7SL	7.0	5.0	15 to 160	2.5, 3.3	HCSL	-40°C to +85°C
Ecliptek	EN13C7	7.0	5.0	100 to 125	3.3	HCSL	-40°C to +85°C
Ecliptek	EN15C7	7.0	5.0	100 to 125	2.5	HCSL	-40°C to +85°C
Abrakon	ABLJO	14.3	8.7	80 to 200	3.3	CMOS	-40°C to +85°C
Abrakon	ABLNO	14.3	8.7	50 to 156.25	3.3	CMOS	-40°C to +85°C

Precision Timing VCXO

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W				
Abrakon	ASFLV	5	3.2	0.32 to 133	1.8, 2.5, 3.3	CMOS	-40°C to +85°C
Abrakon	ASFV	5	3.2	1.5 to 50	5	CMOS	-40°C to +85°C
Fox	FY5C	5	3.2	1 to 125	3.3	CMOS	-40°C to +85°C
Abrakon	ASVV	7	5.0	0.31 to 200	1.8, 2.5, 3.3	CMOS	-40°C to +85°C
Abrakon	ALVD	7	5.0	0.75 to 800	2.5, 3.3	CMOS, LVDS, LVPECL	-40°C to +85°C
Abrakon	ASLV	7	5.0	1 to 125	5	CMOS	-40°C to +85°C
Fox	FY7H	7	5.0	1 to 96	3.3, 5	CMOS	-40°C to +85°C
Ecliptek	EV32C6	7	5.0	1.544 to 77.760	3.3	CMOS	-40°C to +85°C
Abrakon	ABLJO	14.3	8.7	80 to 200	3.3	CMOS	-40°C to +85°C
Abrakon	ABLNO	14.3	8.7	50 to 156.25	3.3	CMOS	-40°C to +85°C

Precision Timing OCXO

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	TIGHTEST STABILITY	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W					
Abrakon	AOC1409	14.9	9.7	20	3.3	CMOS	10 ppb	-40°C to +85°C
Abrakon	AOC2012	20.3	12.7	10 to 25	3.3	CMOS	10 ppb	-20°C to +70°C
Abrakon	AOCJY	25.4	22.1	10 to 100	3.3, 5.0	CMOS, Clipped Sine	5 ppb	-40°C to +75°C
Abrakon	AOCJY7TQ	25.5	25.5	100	12	Clipped Sine	50 ppb	-40°C to +85°C
Abrakon	AOCTQ5	36.1	27.1	10	5	CMOS, Sinewave	3 ppb	-55°C to +85°C

Precision Timing TCXO-VCTCXO

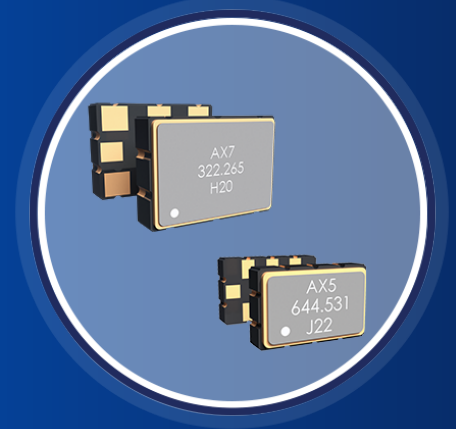
BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	TIGHTEST STABILITY	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W					
Abracon	ATX-13	2.0	1.6	10 to 52	1.68 ~ 3.63	Clipped Sine	0.5 ppm	-40°C to +85°C
Abracon	ATX-H13	2.0	1.6	9.6 to 60	1.68 ~ 3.63	CMOS	2.5 ppm	-40°C to +85°C
Abracon	AVTX-13	2.0	1.6	10 to 52	1.8, 2.5, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-40°C to +85°C
Abracon	AS(V)TX-13	2.0	1.6	10 to 52	1.8, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-40°C to +85°C
Fox	FT1GN	2.0	1.6	8 to 52	1.8, 3.0	Clipped Sine	0.5 ppm	-30°C to +85°C
Fox	FT1GV	2.0	1.6	8 to 52	1.8, 3.0	Clipped Sine	0.5 ppm	-30°C to +85°C
Fox	FT1CN	2.0	1.6	8 to 52	1.8, 3.0	Clipped Sine	2 ppm	-30°C to +85°C
Fox	FT1CV	2.0	1.6	8 to 52	1.8, 3.0	Clipped Sine	2 ppm	-30°C to +85°C
Abracon	ATX-12	2.5	2.0	10 to 52	1.68 ~ 3.63	Clipped Sine	0.5 ppm	-40°C to +85°C
Abracon	AVTX-12	2.5	2.0	10 to 52	1.8, 2.5, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-40°C to +85°C
Abracon	ATX-H12	2.5	2.0	9.6 to 60	1.68 ~ 3.63	CMOS	2.5 ppm	-40°C to +85°C
Abracon	AS(V)TX-12	2.5	2.0	10 to 52	1.8, 2.5, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-40°C to +85°C
Fox	FT2GN	2.5	2.0	8 to 52	1.8, 3.0	Clipped Sine	0.5 ppm	-30°C to +85°C
Fox	FT2GV	2.5	2.0	8 to 52	1.8, 3.0	Clipped Sine	0.5 ppm	-30°C to +85°C
Fox	FT2CN	2.5	2.0	8 to 52	1.8, 2.5, 2.7, 2.8, 3.0, 3.3	Clipped Sine	1 ppm	-30°C to +85°C
Fox	FT2CV	2.5	2.0	8 to 52	1.8, 3.0	Clipped Sine	1 ppm	-30°C to +85°C
Abracon	ASTX-H12	2.5	2.0	3.2 to 55	2.5, 2.8, 3.3	CMOS	2.5 ppm	-40°C to +85°C
Abracon	ATX-11	3.2	2.5	10 to 52	1.68 ~ 3.63	Clipped Sine	0.5 ppm	-40°C to +85°C
Abracon	ATX-H11	3.2	2.5	9.6 to 60	1.68 ~ 3.63	CMOS	2.5 ppm	-40°C to +85°C
Abracon	AVTX-11	3.2	2.5	10 to 52	1.8, 2.5, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-40°C to +85°C
Abracon	AS(V)TX-11	3.2	2.5	10 to 40	2.5, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-40°C to +85°C
Fox	FT3GN	3.2	2.5	16 to 52	1.8, 2.5, 2.7, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-30°C to +85°C
Fox	FT3GV	3.2	2.5	16 to 52	1.8, 2.5, 2.7, 2.8, 3.0, 3.3	Clipped Sine	0.5 ppm	-30°C to +85°C
Fox	FT3CN	3.2	2.5	8 to 40	2.5, 2.7, 2.8, 3, 3.3	Clipped Sine	1 ppm	-40°C to +105°C
Fox	FT3CV	3.2	2.5	8 to 40	2.5, 2.7, 2.8, 3, 3.3	Clipped Sine	1 ppm	-40°C to +105°C
Fox	FT3HN	3.2	2.5	8 to 40	3.3	CMOS	1 ppm	-40°C to +105°C
Fox	FT3HV	3.2	2.5	8 to 40	3.3	CMOS	1 ppm	-40°C to +105°C
Abracon	ASTX-H11	3.2	2.5	2.5 to 55	2.5, 2.8, 3.3	CMOS	2.5 ppm	-40°C to +85°C
Fox	FT5CN	5.0	3.2	8 to 40	3	Clipped Sine	1 ppm	-40°C to +85°C
Fox	FT5CV	5.0	3.2	8 to 40	3	Clipped Sine	1 ppm	-40°C to +85°C
Fox	FT5HN	5.0	3.2	8 to 40	3.3	CMOS	1 ppm	-40°C to +85°C
Fox	FT5HV	5.0	3.2	8 to 40	3.3	CMOS	1 ppm	-40°C to +85°C
Abracon	ASGTX5	5.0	3.2	15 to 2100	1.8, 2.5, 3.3	LVPECL, LVDS, HCSL, CML	2.5 ppm	-40°C to +85°C
Abracon	ASGTX	9.0	7.0	10 to 1500	3.3	CMOS, LVPECL, LVDS	1 ppm	-40°C to +85°C
Fox	FT9CN	11.4	9.6	9.6 to 50	3.0, 3.3, 5	Clipped Sine	2.5 ppm	-40°C to +85°C
Fox	FT9CV	11.4	9.6	9.6 to 50	3.0, 3.3, 5	Clipped Sine	2.5 ppm	-40°C to +85°C
Fox	FT9HV	11.4	9.6	9.6 to 50	3.0, 3.3, 5	CMOS	2.5 ppm	-40°C to +85°C
Abracon	AST3TQ53	5.0	3.2	10 to 51.2	3.3	CMOS, Clipped Sine	50 ppb	-40°C to +85°C
Fox	FT5SN	5.0	3.2	10 to 52	3.3	CMOS	100 ppb	-40°C to +85°C
Fox	FT5SV	5.0	3.2	10 to 52	3.3	CMOS	100 ppb	-40°C to +85°C
Abracon	AST3TDA53	5.0	3.2	10 to 50	3.3	CMOS, Clipped Sine	280 ppb	-40°C to +105°C
Abracon	AST3TDA	7.0	5.0	10 to 50	3.3	CMOS, Clipped Sine	50 ppb	-40°C to +105°C
Abracon	AST3TQ	7.0	5.0	10 to 40	3.3	CMOS	100 ppb	-55°C to +95°C
Fox	FT7SN	7.0	5.0	10 to 40	3.3	CMOS	280 ppb	-40°C to +85°C
Fox	FT7SV	7.0	5.0	10 to 40	3.3	CMOS	280 ppb	-40°C to +85°C

ABRACON CLEARCLOCK

AX5 AND AX7 SERIES CRYSTAL OSCILLATORS

PHASE LOCKED LOOP BASED XO

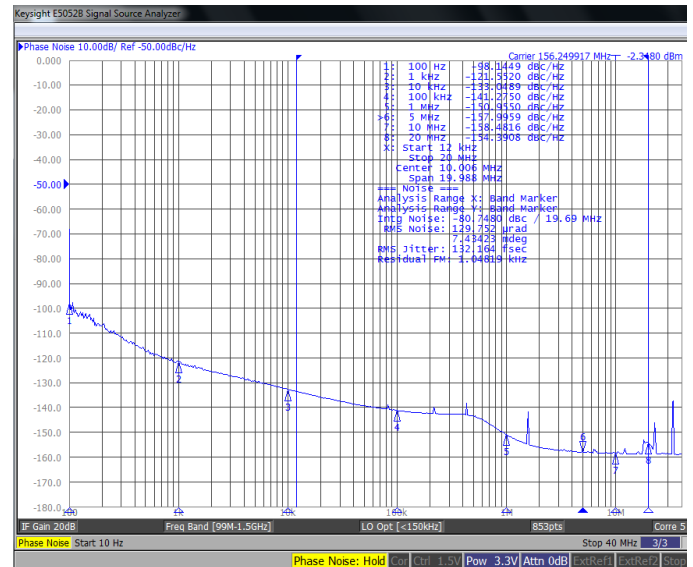
Based on sophisticated PLL technology, the AX5 and AX7 devices yield superior RMS jitter performance, typically better than 150fs, at any carrier frequency from 50MHz to 2,100MHz. These PLL-based solutions offer an industry-leading upper frequency limit, suited for applications that require greater than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



FEATURES

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

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



APPLICATIONS



SONET/SDH



Test & Measurement



RF Systems

ABRACON CLEARCLOCK

AK2, AX3, AK5 AND AK7 SERIES CRYSTAL OSCILLATORS

THIRD OVERTONE BASED XO

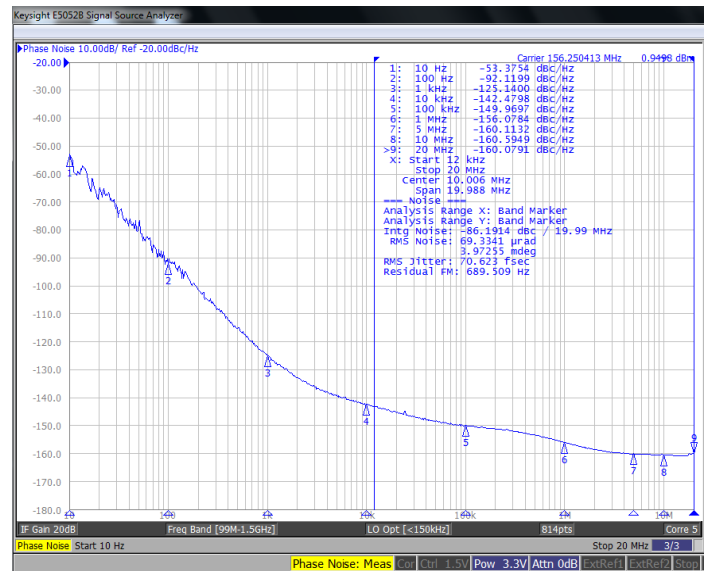
Abrakon's third overtone ClearClock solutions deliver industry-leading energy efficiency for low-noise, differential crystal oscillators. The AK2, AX3, AK5 and AK7 series oscillators' simplified architecture avoids PLL-based multiplication, thereby lowering overall power consumption while maintaining 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 220MHz.
- RMS jitter of 75fs typical (F=156.25MHz).
- Low power consumption 27mA max Idd (LVDS).
- Supports LVPECL, LVDS and HCSL output logic types.
- Small package sizes as low as 2.5 x 2.0 mm.
- OE Pin 1 and 2, Active High option available.
- Superior all-inclusive frequency accuracy over 20-year product life.

ClearClock AK5 | Third Overtone | 156.25MHz | LVPECL | 3.3V | 70fsec



APPLICATIONS



Optical Transceivers



Networking & Communications

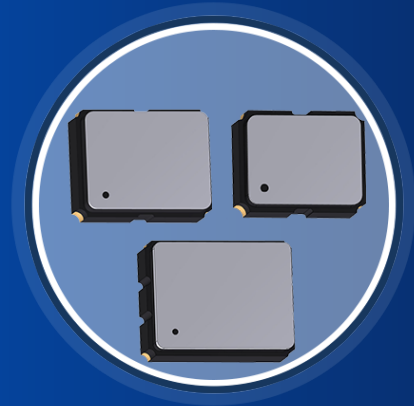


Fibre Channel

CONTINUOUS VOLTAGE

SPXOS AND TCXOS FOR LOW POWER APPLICATIONS

Designers seeking to utilize a common local oscillator across a varying bias voltage scheme in their system will benefit from Abracon's Continuous Voltage oscillator families. These SPXO and TCXO devices are designed to support low power and battery-powered designs requiring reduced overall system power budget. The series features the most common operating temperatures and stability options.



SPXO Series

The MHz and kHz SPXO series are designed for simplicity and low RMS jitter performance while exhibiting continuous voltage operation. The oscillators can drive multiple loads and typically exhibit better EMI performance compared to commodity crystal oscillator solutions.

TCXO Series

Abracon's three new temperature-compensated oscillator (TCXO) series are particularly suited for space-constrained and power-constrained devices with Wi-Fi, GPS and Bluetooth services that require a precision timing solution for functions such as telecommunications, navigation, and positioning.

FEATURES

- Continuous Vdd operation (1.6V ~ 3.63V).
- Optimized for low current consumption.
- Package sizes as small as as 2.0 x 1.6 x 0.8mm.
- Hermetically seam sealed ceramic package.

SPXO	
MHz	kHz
ASADV	ASAKDV
ASDDV	ASDKDV
ASEDV	ASEKDV

TCXO
CSW MHz
ATX-11
ATX-12
ATX-13

TCXO
CMOS MHz
ATX-H11
ATX-H12
ATX-H13

APPLICATIONS



Mobile
Communication



IoT



Consumer
Electronics



Wearables



Smart
Metering



Industrial
Automation

General Purpose MHz Quartz Crystal Oscillators

Fixed frequency quartz crystal oscillators are available with a variety of temperature stability options. Contact Abracon for additional information.

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE	PACKAGE TYPE
		L	W					
Abracon	ASCO	1.6	1.2	7 to 80	1.8, 2.5, 3.3	CMOS	-40°C to +85°C	SMD
Fox	FO8HS	1.6	1.2	1 to 80	1.8, 2.5, 3.3	CMOS	-40°C to +85°C	SMD
Abracon	ASA	2.0	1.6	1 to 80	1.8, 2.5, 3.3	CMOS	-40°C to +85°C	SMD
Abracon	ASADV	2.0	1.6	1.25 to 100	1.6 to 3.6	CMOS	-40°C to +125°C	SMD
Fox	FO1HS	2.0	1.6	0.75 to 170	1.8, 2.5, 3.3, 1.6~3.63	CMOS	-40°C to +125°C	SMD
Abracon	ASD	2.5	2.0	0.75 to 60	1.0, 1.8, 2.5, 3.0, 3.3	CMOS	-40°C to +125°C	SMD
Abracon	ASDDV	2.5	2.0	1.0 to 160	1.6 to 3.6	CMOS	-40°C to +125°C	SMD
Fox	FO2HS	2.5	2.0	0.75 to 170	1.0, 1.8, 2.5, 3.3, 1.6~3.63	CMOS	-40°C to +125°C	SMD
Ecliptek	EC59	2.5	2.0	1 to 50	1.8	CMOS	-40°C to +85°C	SMD
Ecliptek	EC57	2.5	2.0	1 to 50	2.5	CMOS	-40°C to +85°C	SMD
Ecliptek	EC56	2.5	2.0	1 to 51	3.3	CMOS	-40°C to +85°C	SMD
Abracon	ASEDV	3.2	2.5	1.0 to 160	1.6 to 3.6	CMOS	-40°C to +125°C	SMD
Fox	FO3HS	3.2	2.5	0.625-170	1.0, 1.8, 2.5, 3.3, 1.6~3.63	CMOS	-40°C to +125°C	SMD
Ecliptek	EB18E2	3.2	2.5	1 to 50	1.0	CMOS	-40°C to +85°C	SMD
Ecliptek	EB17E2	3.2	2.5	1 to 50	1.2	CMOS	-40°C to +85°C	SMD
Ecliptek	EB16E2	3.2	2.5	1 to 50	1.8	CMOS	-40°C to +85°C	SMD
Ecliptek	EB15E2	3.2	2.5	1 to 50	2.5	CMOS	-40°C to +85°C	SMD
Ecliptek	EB13E2	3.2	2.5	1 to 66.666	3.3	CMOS	-40°C to +85°C	SMD
Ecliptek	EB19E2	3.2	2.5	1 to 50	1.62 to 3.63	CMOS	-40°C to +85°C	SMD
Abracon	ASFLDV	5.0	3.2	1.0 to 160	1.6 to 3.63	CMOS	-40°C to +125°C	SMD
Fox	FO5HS	5.0	3.2	1 to 170	1.8, 2.5, 3.3, 5.0	CMOS	-40°C to +125°C	SMD
Ecliptek	EC39	5.0	3.2	1 to 135	1.8	CMOS	-40°C to +85°C	SMD
Ecliptek	EC37	5.0	3.2	1 to 135	2.5	CMOS	-40°C to +85°C	SMD
Ecliptek	EC36	5.0	3.2	1 to 170	3.3	CMOS	-40°C to +85°C	SMD
Fox	FO6HS	6.0	3.5	1.544 to 50	3.3	CMOS	-40°C to +125°C	SMD
Abracon	ASVDV	7.0	5.0	1.0 to 160	1.6 to 3.63	CMOS	-40°C to +125°C	SMD
Fox	FO7HS	7.0	5.0	0.012 to 170	1.8, 2.5, 3.3	CMOS	-40°C to +85°C	SMD
Ecliptek	EC26	7.0	5.0	1.544 to 200	3.3	CMOS	-40°C to +85°C	SMD
Ecliptek	EC27	7.0	5.0	1.544 to 200	2.5	CMOS	-40°C to +85°C	SMD
Ecliptek	EC29	7.0	5.0	1 to 125	1.8	CMOS	-40°C to +85°C	SMD
Fox	FO7HH	7.0	5.0	1 to 125	5	CMOS	-40°C to +85°C	SMD

Automotive Grade Quartz Crystals and Oscillators

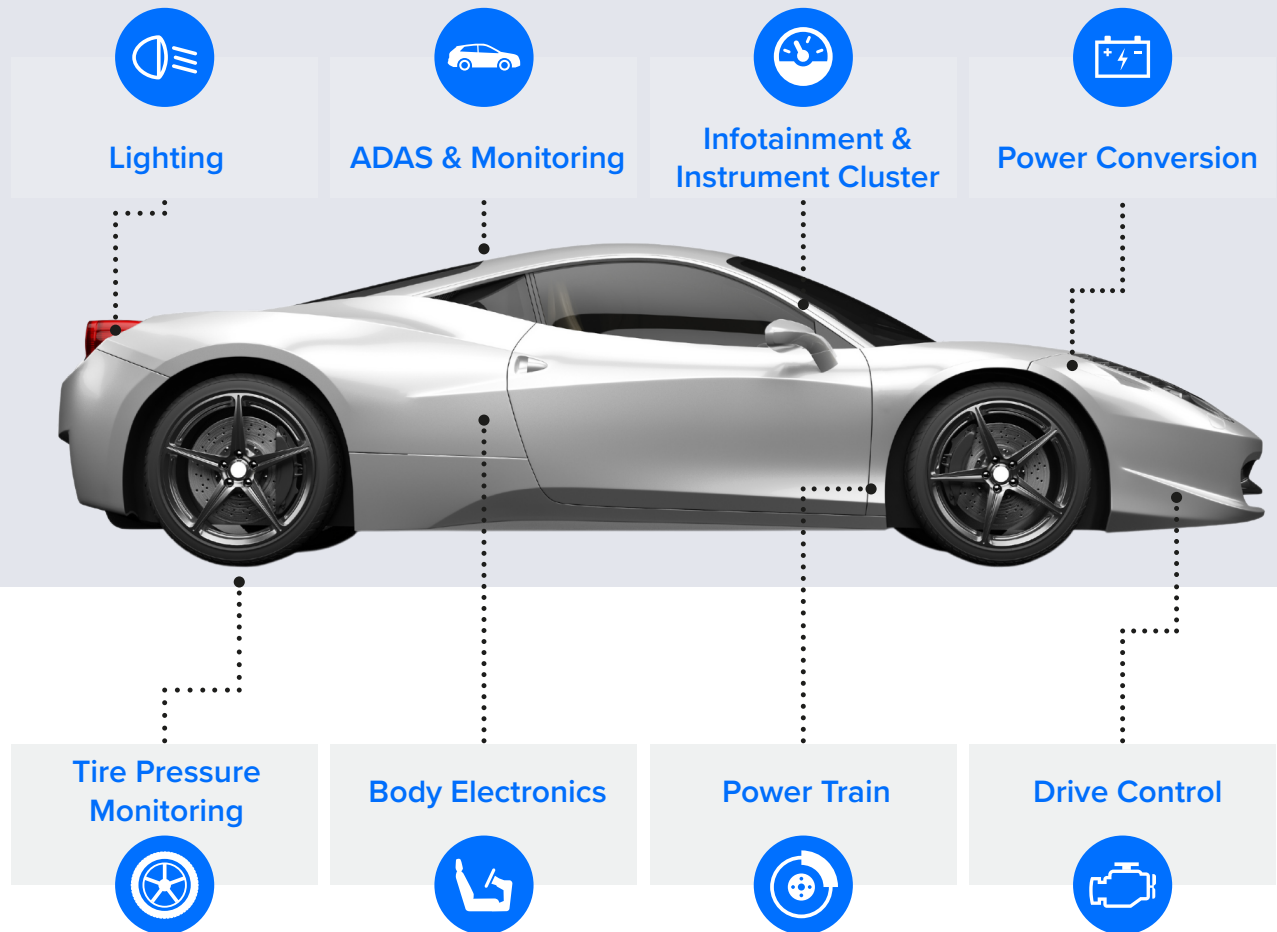
Applications requiring the highest levels of quality and reliability benefit from our certified IATF 16949 production lines and AEC-Q200 qualified crystals and oscillators. PPAP available upon request.

BRAND	SERIES	TYPE	PACKAGE SIZE (mm)		FREQUENCY	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
			L	W		
AUTOMOTIVE GRADE QUARTZ CRYSTALS						
Fox	FK12A	XTAL	2.0	1.2	32.768 kHz	-40°C to +125°C
Abracon	ABS07AIG	XTAL	3.2	1.5	32.768 kHz	-40°C to +125°C
Fox	FK13A	XTAL	3.2	1.5	32.768 kHz	-40°C to +125°C
Ecliptek	EB8WS	XTAL	3.2	1.5	32.768 kHz	-40°C to +125°C
Abracon	ABM12AIG	XTAL	1.6	1.2	24 to 60 MHz	-40°C to +150°C
Ecliptek	EB1216	XTAL	1.6	1.2	24 to 50 MHz	-40°C to +125°C
Abracon	ABM11AIG	XTAL	2.0	1.6	16 to 60 MHz	-40°C to +150°C
Fox	FC1BA	XTAL	2.0	1.6	16 to 54 MHz	-55°C to +150°C
Ecliptek	EB1620	XTAL	2.0	1.6	16 to 54 MHz	-40°C to +125°C
Abracon	ABM10AIG	XTAL	2.5	2.0	12 to 62.5 MHz	-40°C to +150°C
Fox	FC2BA	XTAL	2.5	2.0	12 to 54 MHz	-55°C to +125°C
Ecliptek	EB2025	XTAL	2.5	2.0	12 to 54 MHz	-40°C to +125°C
Abracon	ABM8AIG	XTAL	3.2	2.5	8 to 54 MHz	-40°C to +150°C
Abracon	ABM8GAIG	XTAL	3.2	2.5	10 to 54 MHz	-40°C to +125°C
Fox	FC3BA	XTAL	3.2	2.5	8 to 150 MHz	-55°C to +125°C
Ecliptek	EB2532	XTAL	3.2	2.5	8 to 66 MHz	-40°C to +125°C
Abracon	ABM3AIG	XTAL	5.0	3.2	8 to 50 MHz	-40°C to +125°C
Abracon	ABM3BAIG	XTAL	5.0	3.2	8 to 54 MHz	-40°C to +125°C
Fox	FC5BA	XTAL	5.0	3.2	8 to 133 MHz	-55°C to +125°C
Ecliptek	EB3250A	XTAL	5.0	3.2	7.6 to 54 MHz	-40°C to +125°C
Ecliptek	EB3250	XTAL	5.0	3.2	7.6 to 54 MHz	-40°C to +125°C
Fox	FC7BA	XTAL	7.0	5.0	6 to 133 MHz	-55°C to +125°C
AUTOMOTIVE GRADE QUARTZ CRYSTAL OSCILLATORS						
Abracon	ASAKDVAIG	XO	2.0	1.6	32.768 kHz	-40°C to +125°C
Ecliptek	EBCA56	XO	2.0	1.6	32.768 kHz	-40°C to +125°C
Abracon	ASDKDVAIG	XO	2.5	2.0	32.768 kHz	-40°C to +125°C
Ecliptek	EBCA46	XO	2.5	2.0	32.768 kHz	-40°C to +125°C
Abracon	ASEKDVAIG	XO	3.2	2.5	32.768 kHz	-40°C to +125°C
Ecliptek	EBCA36	XO	3.2	2.5	32.768 kHz	-40°C to +125°C
Abracon	ASAAIG	XO	2.0	1.6	1.25 to 100 MHz	-40°C to +125°C
Fox	FO1HA	XO	2.0	1.6	1.25 to 135 MHz	-40°C to +125°C
Ecliptek	EBRA51	XO	2.0	1.6	2.5 to 60 MHz	-40°C to +125°C
Ecliptek	EBRA52	XO	2.0	1.6	2.5 to 60 MHz	-40°C to +125°C
Ecliptek	EBRA53	XO	2.0	1.6	2.5 to 60 MHz	-40°C to +125°C
Abracon	ASDAIG	XO	2.5	2.0	1.25 to 156.25 MHz	-40°C to +125°C
Fox	FO2HA	XO	2.5	2.0	1.25 to 160 MHz	-40°C to +125°C
Ecliptek	EBRA41	XO	2.5	2.0	1 to 60 MHz	-40°C to +125°C
Ecliptek	EBRA43	XO	2.5	2.0	1 to 60 MHz	-40°C to +125°C
Abracon	ASEAIG	XO	3.2	2.5	1.25 to 156.25 MHz	-40°C to +125°C
Fox	FO3HA	XO	3.2	2.5	1.25 to 160 MHz	-40°C to +125°C
Ecliptek	EBRA31	XO	3.2	2.5	1 to 156.25 MHz	-40°C to +125°C
Ecliptek	EBRA33	XO	3.2	2.5	1 to 156.25 MHz	-40°C to +125°C

AUTOMOTIVE APPLICATIONS

AEC-Q200 QUALIFIED & IATF 16949 CERTIFIED PRODUCTION

Vehicles demand components and products with enhanced efficiency, durability, performance, and quality. To satisfy these requirements, Abracon's automotive solutions are AEC-Q200 qualified and are manufactured on fully certified IATF 16949 production lines. Our automotive grade products offer efficient performance at wide operating temperature ranges to support the design requirements for a wide array of applications, from in-cabin passenger comfort and entertainment features, to traditional under the hood systems.



Power Optimized Quartz Crystal Oscillators

Power optimized quartz crystal oscillators are ideal for compact, portable, and battery power applications. These 32.768kHz devices are available in several package sizes and produce an accurate clock for RTC and other IoT applications.

32.768kHz Quartz Crystal Oscillators

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (kHz)	VDD OPTIONS (V)	TECHNOLOGY	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W				
Abracon	ASAKMP	1.6	1.2	32.768	1.60~3.63	Quartz	-40°C to +85°C
Abracon	ASAK	2.0	1.6	32.768	1.8, 2.5, 3.3	Quartz	-40°C to +85°C
Abracon	ASAKDV	2.0	1.6	32.768	1.62~3.63	Quartz	-40°C to +85°C
Fox	FO1HK	2.0	1.6	32.768	1.8, 2.5, 3.3, 1.6~3.63	Quartz	-40°C to +85°C
Abracon	ASDKDV	2.5	2.0	32.768	1.62~3.63	Quartz	-40°C to +85°C
Abracon	ASDK	2.5	2.0	32.768	1.8, 2.5, 3.3	Quartz	-40°C to +85°C
Fox	FO2HK	2.5	2.0	32.768	1.8, 2.5, 3.3, 1.6~3.63	Quartz	-40°C to +85°C
Abracon	ASH7KW	3.2	2.5	32.768	1.2~5.5	Quartz	-40°C to +125°C
Abracon	ASEKDV	3.2	2.5	32.768	1.62~3.63	Quartz	-40°C to +85°C
Abracon	ASEK	3.2	2.5	32.768	1.8, 2.5, 3.3	Quartz	-40°C to +85°C
Abracon	ASHEK	3.2	2.5	32.768	1.5, 1.8, 2.8, 3.3, 5.0	Quartz	-40°C to +85°C
Fox	FO3HK	3.2	2.5	32.768	1.8, 2.5, 3.3	Quartz	-40°C to +85°C
Abracon	ASFLK	5.0	3.2	32.768	2.5, 3.0, 3.3, 5.0	Quartz	-40°C to +85°C
Abracon	ASVK	7.0	5.0	32.768	2.8, 3.0, 3.3	Quartz	-40°C to +85°C

General Purpose MHz MEMS Oscillators

Abracon's MEMS oscillator product lines feature high temperature operation with stability options as low as ± 10 ppm, resistance to shock and vibration, and compact form factors enabling space savings in IoT and wearable applications.

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W				
Abracon	ASDM	2.5	2.0	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +85°C
Abracon	ASDMB	2.5	2.0	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abracon	ASDMP	2.5	2.0	10 to 460	2.25~3.6	CMOS, LVDS, LVPECL, HCSL	-55°C to +125°C
Abracon	ASDMDC	2.5	2.0	2.3 to 170	2.25~3.6	CMOS	-55°C to +125°C
Abracon	ASEM	3.2	2.5	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +85°C
Abracon	ASEMB	3.2	2.5	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abracon	ASEMP	3.2	2.5	10 to 460	2.25~3.6	CMOS, LVDS, LVPECL, HCSL	-55°C to +125°C
Abracon	ASFLM	5.0	3.2	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +85°C
Abracon	ASFLMB	5.0	3.2	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abracon	ASFLMP	5.0	3.2	10 to 460	2.25~3.6	CMOS, LVDS, LVPECL, HCSL	-55°C to +125°C
Abracon	ASVM	7.0	5.0	1 to 110	1.8, 2.5, 2.8, 3.3	CMOS	-40°C to +85°C
Abracon	ASVMB	7.0	5.0	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abracon	ASVMP	7.0	5.0	10 to 460	2.25~3.6	CMOS, LVDS, LVPECL, HCSL	-55°C to +125°C

Power Optimized MEMS Oscillators

Power optimized oscillators based on MEMS are ideal for compact, portable, and battery power applications. MEMS devices present a very small footprint and produce an accurate clock that is robust and immune to shock and vibration.

BRAND	SERIES	PACKAGE SIZE (mm)		FREQUENCY (MHz)	FUNCTIONAL OPTIONS	STANDBY IDD (μ A)	IDD (mA)	STABILITY OPTIONS (ppm)	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W						
Abrakon	AMJM	1.6, 2.0, 2.5, 3.2	1.2, 1.6, 2.0, 2.5	1 to 100	OE or Standby	12	3.0	$\pm 50, \pm 25$	-40°C to +85°C
Abrakon	AMJD	1.6, 2.0, 2.5, 3.2	1.2, 1.6, 2.0, 2.5	1 to 100	Frequency Select	N/A	3.0	$\pm 50, \pm 25$	-40°C to +85°C
Abrakon	AMPM	1.6, 2.0, 2.5, 3.2	1.2, 1.6, 2.0, 2.5	1 to 80	OE or Standby	12	1.3	$\pm 50, \pm 25$	-40°C to +85°C
Abrakon	AMPD	1.6, 2.0, 2.5, 3.2	1.2, 1.6, 2.0, 2.5	1 to 80	Frequency Select	N/A	1.3	$\pm 50, \pm 25$	-40°C to +85°C

Real Time Clock - Low Power Consumption Solutions

Stand-alone real time clocks (RTC) using external crystals deliver industry leading low time keeping current consumption solutions that extend battery life.

BRAND	SERIES	PACKAGE SIZE (mm)		PACKAGE	FEATURES	VDD OPTIONS (V)	INTERFACE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W					
Abrakon	AB0805	3.0	3.0	16-QFN	Alarm, Leap Year, SRAM, Trickle-Charger, Watchdog Timer	1.5 ~ 3.6	I2C, 2-Wire Serial	-40°C to +85°C
Abrakon	AB0815	3.0	3.0	16-QFN	Alarm, Leap Year, SRAM, Trickle-Charger, Watchdog Timer	1.5 ~ 3.6	SPI	-40°C to +85°C
Abrakon	AB1805	3.0	3.0	16-QFN	Power Management, Alarm, Leap Year, SRAM, Trickle-Charger, Watchdog Timer	1.5 ~ 3.6	I2C, 2-Wire Serial	-40°C to +85°C
Abrakon	AB1815	3.0	3.0	16-QFN	Power Management, Alarm, Leap Year, SRAM, Trickle-Charger, Watchdog Timer	1.5 ~ 3.6	SPI	-40°C to +85°C

Real Time Clock - Integrated Quartz Crystal Solutions

Stand-alone real time clocks (RTC) with integrated quartz crystals external crystals offer a variety of industry leading low power or high accuracy temperature compensated (TCXO) solutions.

BRAND	SERIES	PACKAGE SIZE (mm)		PACKAGE	FEATURES	VDD OPTIONS (V)	INTERFACE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W					
Abrakon	AB-RTCMC-32.768kHz-AIGZ-S7	3.2	1.5	8-CLCC	Alarm, Leap Year, Watchdog Timer	1.3 ~ 4.4	I2C	-40°C to +85°C
Abrakon	AB-RTCMC-32.768kHz-B5GA-S3	3.7	2.5	10-VDFN	Alarm, Timer, Built-in Crystal, Programmable output	1.8 ~ 5.5	I2C	-40°C to +85°C
Abrakon	AB-RTCMC-32.768kHz-B5ZE-S3	3.7	2.5	10-VDFN	Alarm, Timer, Built-in Crystal, Programmable output	1.6 ~ 5.5	I2C	-40°C to +85°C
Abrakon	AB-RTCMC-32.768kHz-ZIZE-S2	5.0	3.2	10-TDFN	Alarm, Timer, Built-in Crystal, Programmable output	1.6 ~ 5.5	SPI	-40°C to +85°C

PROGRAMMABLE OSCILLATORS

Abracon's programming capability, offered under the Abracon and Ecliptek brands, provides a quick-turn delivery of low, medium, and high volume programmable oscillators, resulting in the shortening of the customer design cycle and the delivery of production lots. These solutions are ideally suited for industrial, consumer, data centers, and telecommunications infrastructure architectures.

The programming capability enables the Abracon and Ecliptek brands to offer the following:

- Output frequencies in the 1.000MHz to 1,500MHz range.
- Industry-standard and custom/non-standard frequencies.
- All industry-standard packages available to include 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2 and 7.0 x 5.0mm.
- Output logic types: CMOS, LVDS, LVPECL (series dependent).
- Power supply voltage options: 1.8V, 2.5V, 2.8V, 3.0V, 3.3V, and 5.0V.
- Commercial, industrial, and extended industrial OTR options.
- E/D Tri-State and power down output control functions.

Programmable Oscillators

BRAND	SERIES	PACKAGE SIZE (mm)		PACKAGE	OSCILLATOR TYPE	FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W						
Abracon	ASDM	2.5	2.0	4 Pad SMD	MEMS	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +85°C
Abracon	ASDMB	2.5	2.0	4 Pad SMD	MEMS	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abracon	AP2S	2.5	2.0	4 Pad SMD	Quartz	1 to 200	1.8, 2.5, 3.3	CMOS	-40°C to +85°C
Abracon	ASG2	2.5	2.0	6 pad SMD	Quartz	8 to 1500	2.5, 3.3	CMOS, LVDS, LVPECL	-40°C to +85°C
Ecliptek	EH59	2.5	2.0	4 Pad SMD	Quartz	2.6 to 133	1.8	CMOS	-40°C to +85°C
Ecliptek	EH57	2.5	2.0	4 Pad SMD	Quartz	2.6 to 166	2.5	CMOS	-40°C to +85°C
Ecliptek	EH56	2.5	2.0	4 Pad SMD	Quartz	2.6 to 200	3.3	CMOS	-40°C to +85°C
Abracon	ASEM	3.2	2.5	4 Pad SMD	MEMS	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +85°C
Abracon	ASEMB	3.2	2.5	4 Pad SMD	MEMS	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abracon	AP3S	3.2	2.5	4 Pad SMD	Quartz	1 to 200	1.8, 2.5, 3.3	CMOS	-40°C to +85°C
Ecliptek	EH49	3.2	2.5	4 Pad SMD	Quartz	2.6 to 133	1.8	CMOS	-40°C to +85°C
Ecliptek	EH47	3.2	2.5	4 Pad SMD	Quartz	2.6 to 200	2.5	CMOS	-40°C to +85°C
Ecliptek	EH46	3.2	2.5	4 Pad SMD	Quartz	2.6 to 200	3.3	CMOS	-40°C to +85°C
Ecliptek	EP16E7	3.2	2.5	4 Pad SMD	Quartz	3.3 to 75	1.8	CMOS	-40°C to +85°C
Ecliptek	EP15E7	3.2	2.5	4 Pad SMD	Quartz	3.3 to 88	2.5	CMOS	-40°C to +85°C
Ecliptek	EP13E7	3.2	2.5	4 Pad SMD	Quartz	3.3 to 100	3.3	CMOS	-40°C to +85°C
Abracon	ASFLM	5.0	3.2	4 Pad SMD	MEMS	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +85°C
Abracon	ASFLMB	5.0	3.2	4 Pad SMD	MEMS	1 to 150	1.8, 2.5, 2.8, 3.0, 3.3	CMOS	-40°C to +105°C
Abracon	AP5S	5.0	3.2	4 Pad SMD	Quartz	10 to 200	2.5, 3.3	CMOS	-40°C to +85°C
Ecliptek	EH39	5.0	3.2	4 Pad SMD	Quartz	2.6 to 133	1.8	CMOS	-40°C to +85°C

Programmable Oscillators

BRAND	SERIES	PACKAGE SIZE (mm)		PACKAGE	OSCILLATOR TYPE	FREQUENCY (MHz)	VDD OPTIONS (V)	OUTPUT LOGIC TYPE	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE
		L	W						
Ecliptek	EH37	5.0	3.2	4 Pad SMD	Quartz	2.6 to 166	2.5	CMOS	-40°C to +85°C
Ecliptek	EH36	5.0	3.2	4 Pad SMD	Quartz	1 to 155.52	3.3	CMOS	-40°C to +85°C
Ecliptek	EP36	5.0	3.2	4 Pad SMD	Quartz	1 to 106.250	3.3	CMOS	-40°C to +85°C
Ecliptek	EH35	5.0	3.2	4 Pad SMD	Quartz	1 to 155.52	5.0	CMOS	-40°C to +85°C
Ecliptek	EP35	5.0	3.2	4 Pad SMD	Quartz	1 to 125	5.0	CMOS	-40°C to +85°C
Abrakon	ASVM	7.0	5.0	4 Pad SMD	MEMS	1 to 150	1.8, 2.5, 2.8, 3.3	CMOS	-40°C to +85°C
Abrakon	ASVMB	7.0	5.0	4 Pad SMD	MEMS	1 to 150	1.8~3.3	CMOS	-40°C to +105°C
Abrakon	AP7S	7.0	5.0	4 Pad SMD	Quartz	10 to 200	2.5, 3.3	CMOS	-40°C to +85°C
Abrakon	ASG	7.0	5.0	6 pad SMD	Quartz	10 to 1500	2.5, 3.3	CMOS, LVDS, LVPECL	-40°C to +85°C
Ecliptek	EH29	7.0	5.0	4 Pad SMD	Quartz	2.6 to 133	1.8	CMOS	-40°C to +85°C
Ecliptek	EH27	7.0	5.0	4 Pad SMD	Quartz	1 to 200	2.5	CMOS	-40°C to +85°C
Ecliptek	EH26	7.0	5.0	4 Pad SMD	Quartz	1 to 155.52	3.3	CMOS	-40°C to +85°C
Ecliptek	EP26	7.0	5.0	4 Pad SMD	Quartz	1 to 106.25	3.3	CMOS	-40°C to +85°C
Ecliptek	EH25	7.0	5.0	4 Pad SMD	Quartz	1 to 155.52	5.0	CMOS	-40°C to +85°C
Ecliptek	EP25	7.0	5.0	4 Pad SMD	Quartz	1 to 125	5.0	CMOS	-40°C to +85°C
Ecliptek	EPH13	12.7	12.7	HS DIP	Quartz	1 to 106.25	3.3	CMOS	-40°C to +85°C
Ecliptek	EHH11	12.7	12.7	HS DIP	Quartz	1 to 155.52	5.0	CMOS	-40°C to +85°C
Ecliptek	EHH13	12.7	12.7	HS DIP	Quartz	1 to 155.52	3.3	CMOS	-40°C to +85°C
Ecliptek	EPH11	12.7	12.7	HS DIP	Quartz	1 to 125	5.0	CMOS	-40°C to +85°C
Ecliptek	EHF13	20.2	12.7	FS DIP	Quartz	1 to 155.52	3.3	CMOS	-40°C to +85°C
Ecliptek	EPF13	20.2	12.7	FS DIP	Quartz	1 to 106.25	3.3	CMOS	-40°C to +85°C
Ecliptek	EHF11	20.2	12.7	FS DIP	Quartz	1 to 155.52	5.0	CMOS	-40°C to +85°C
Ecliptek	EPF11	20.2	12.7	FS DIP	Quartz	1 to 125	5.0	CMOS	-40°C to +85°C

Ceramic Resonators

BRAND	SERIES	PACKAGE SIZE (mm)		PACKAGE	FREQUENCY (MHz)	C1 = C2, PLATING LOAD (pF)	ESR MAX (Ω)	WIDEST AVAILABLE OPERATING TEMPERATURE RANGE	TOLERANCE OPTIONS (±)	STABILITY OPTIONS (±)
		L	W							
Abrakon	AWSCR-CELA	3.2	1.3	3 Pad SMD	8 to 12	10 to 33	40	-40°C to +85°C	0.5%	0.2%
Abrakon	AWSCR-CELB	3.2	1.3	3 Pad SMD	8 to 12	10 to 33	40	-40°C to +125°C	0.5%	0.2%
Abrakon	AWSCR-CVLA	3.7	3.1	3 Pad SMD	8 to 13	10 to 39	30	-40°C to +85°C	0.5%	0.4%
Abrakon	AWSCR-CVLB	3.7	3.1	3 Pad SMD	8 to 13	10 to 39	30	-40°C to +125°C	0.5%	0.3%
Abrakon	AWSCR-CVHA	3.7	3.1	3 Pad SMD	13 to 50	5,10,15,22	40	-40°C to +85°C	0.5%	0.2%
Abrakon	AWSCR-CVHB	3.7	3.1	3 Pad SMD	13 to 50	5,10,15,22	40	-40°C to +125°C	0.5%	0.2%
Abrakon	AWSCR-CRLA	4.5	2.0	3 Pad SMD	4 to 12	10 to 47	40	-40°C to +85°C	0.5%	0.3%
Abrakon	AWSCR-CRLB	4.5	2.0	3 Pad SMD	5 to 12	10 to 47	40	-40°C to +125°C	0.5%	0.2%
Abrakon	AWSCR-CPLA	6.0	3.0	3 Pad SMD	1.84 to 12	10 to 47	30	-40°C to +85°C	0.5%	0.4%
Abrakon	AWSCR-CPLB	6.0	3.0	3 Pad SMD	1.84 to 12	11 to 47	20	-40°C to +125°C	0.5%	0.5%

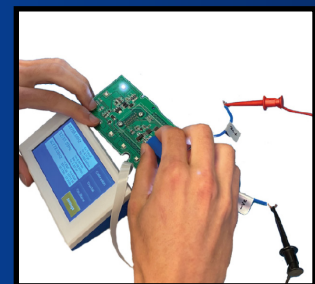
PIERCE ANALYZER SYSTEM (PAS)

ADVANCED BOARD CHARACTERIZATION SERVICE

SOLUTION AND FEATURES

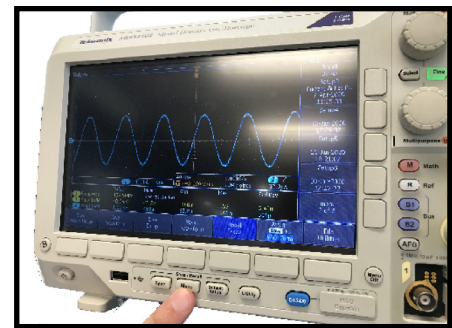
INTRODUCTION

Today's electronic designs include some form of timing device. Depending on the frequency accuracy requirements, some employ oscillators while others use off-the-shelf crystals in conjunction with the built-in oscillator circuit embedded in most microcontrollers and microprocessors. Due to their simple configuration and design, most embedded solutions use the Pierce Oscillator configuration integrated as part of the system on chip (SOC). The advantages of this solution include cost, size, and power reduction compared to a stand-alone oscillator, while the key limitation is the proper matching of the quartz crystal with the on-board oscillator and feedback components.



SOLUTION

Abracon provides an accurate assessment of the oscillator loop dynamics to overcome these barriers. Abracon's Engineering Team developed a proprietary Pierce Analyzer System (PAS), which is designed to analyze both the stand-alone crystal, as well as the performance of the crystal in the customer's circuit.



FEATURES

- Circuit characterization, providing the best possible match between the quartz crystal and oscillator loop feedback components.
- Eliminates production launch issues related to crystal oscillator-based timing circuits.
- Provides a customer oscillator circuit overview in the form of a detailed report, providing a third-party assessment for the design history file or PPAP documentation.
- This report encompasses both the stand-alone crystal performance, as well as in-circuit closed loop oscillator performance.
- For additional information, please contact Abracon at: tech-support@abracon.com

PIERCE ANALYZER SYSTEM (PAS)

ADVANCED BOARD CHARACTERIZATION SERVICE

DELIVERABLES

DETAILED TEST REPORT INCLUDES:

- Project background information
- Abracon test instrumentation and equipment setup
- Customer PCB and crystal documentation
- Customer product photographs
- Quartz crystal electrical specifications
- Pierce oscillator design and theory of operation
- Quartz Crystal AC equivalent model characteristics
- Customer's existing oscillator design configuration performance data:
 - Stand-alone quartz crystal measurements
 - Series resonant (FS) and parallel resonant (FL) frequencies
 - Motional parameters (R_m , C_m , L_m)
 - Shunt capacitance (C_o)
 - Closed-loop oscillator circuit measurements
 - Oscillator output frequency
 - Oscillator - crystal power dissipation
 - Maximum projections
 - Calculated worst-case drive level
- Abracon Engineering recommended oscillator design configuration
- Abracon Engineering review and conclusion

ORDERING INFORMATION

- EXPEDITED-PAS-SVC
- STANDARD-PAS-SVC



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