



Military Products

Crystal & Oscillators

- XTAL - Quartz Crystals
- XO - Clock Oscillators
- VCXO - Voltage Controlled Crystal Oscillators
- VCSO - Voltage Controlled SAW Oscillators
- TCXO - Temperature Compensated Crystal Oscillators
- OEXO - Oven Controlled Crystal Oscillators
- EMXO - Evacuated Miniaturized Crystal Oscillators

Filters

- SAW - Surface Acoustic Wave Devices
- MCF/DCF - Monolithic / Discrete Crystal Filters
- LCF - LC Filters

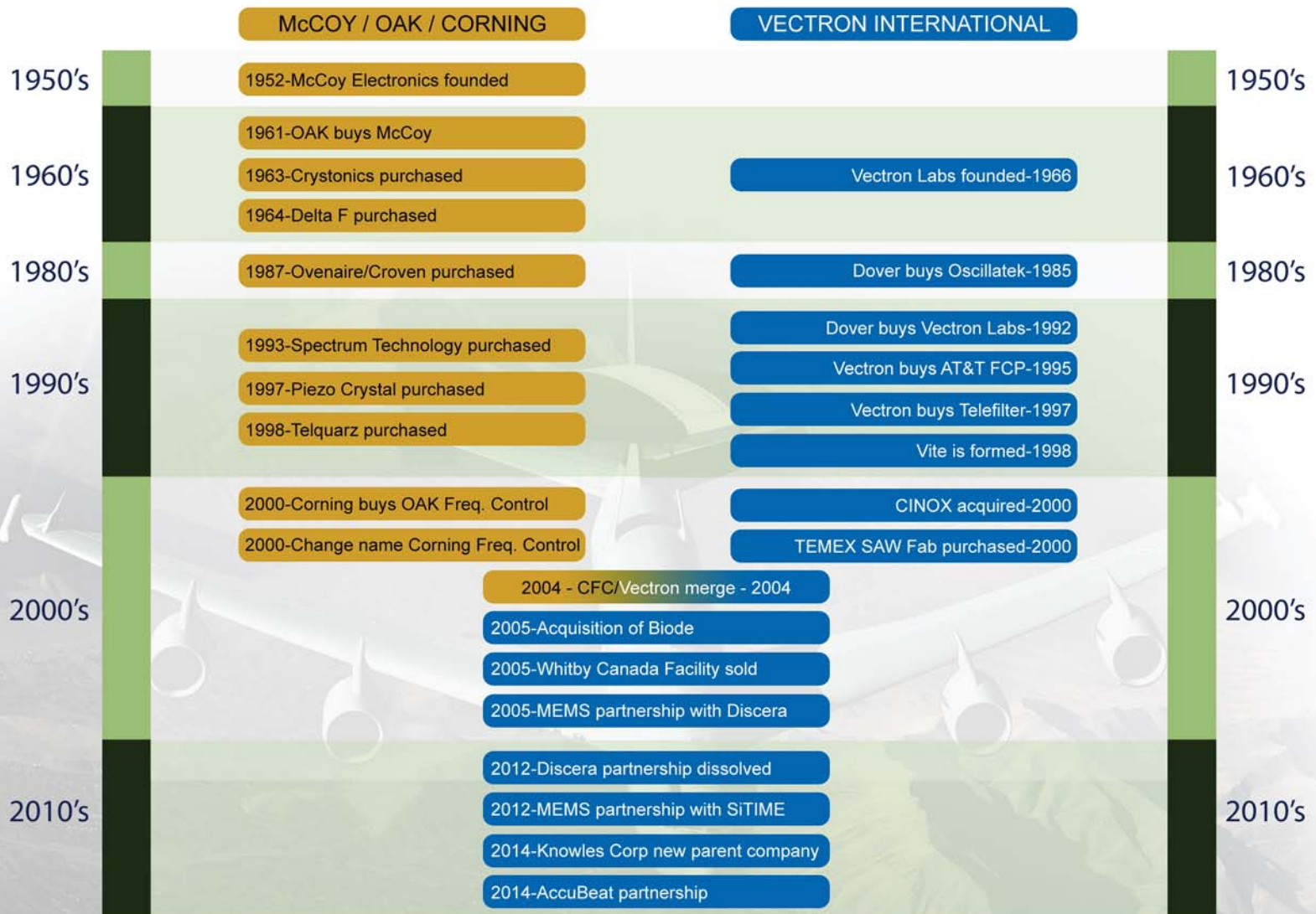
Modules, Translators & Phased Lock Loops

- FX - Frequency Translators
- CD - Clock & Data Recovery
- Custom Timing Modules

Our Heritage

The oldest branch of the Vectron family tree takes us back to 1952 when McCoy Electronics Co. in Mt. Holly Springs, PA was founded. It was the decision of the founding fathers that all products manufactured by that facility be high end state-of-the-art technology devices. This simple decision placed us on the path to become the premier supplier of frequency control products for military use and those applications where the parts will be exposed to extreme environments. Over that last half century we have maintained our position in this market place, supplying the industry with leading edge Vectron products. No company has been involved in more military programs than Vectron. Our company has one goal; Helping Customers Innovate, Improve and Grow.

The Vectron Family Tree



Vectron Today

A world leader in the design, manufacture and marketing of Frequency Control, Sensor, and Hybrid Product solutions using the very latest techniques in both bulk acoustic wave (BAW) and surface acoustic wave (SAW) based designs from DC to microwave frequencies. Products include crystals and crystal oscillators; frequency translators; clock and data recovery products; SAW filters; Crystal filters and components used in telecommunications, data communications, frequency synthesizers, timing, navigation, military, aerospace and instrumentation systems.

Headquartered in Hudson, NH and with operating facilities and sales offices in North America, Europe and Asia, Vectron International is well known for its technical capabilities in both crystal oscillator and SAW filter design. The innovation and capability provided by the company reflects the trend towards higher frequencies, low cost designs and miniaturization, as well as more technologically sophisticated integrated solutions. Some of the key technologies offered include: ASIC Design, Surface Mount Technology, Ceramic Packaging, Hybrid Manufacturing to class "S"; High Frequency Fundamental (HFF) Crystal design and Space Component Capability.

Vectron International's facilities contain state of the art equipment. From discrete crystal technology highlighted by the advanced manufacture of High Frequency Fundamental and SC cut crystals...to class 100 and class 10,000 clean room facilities in the manufacture of leading edge ceramic packaged VCXO's, timing recovery and clock recovery units and SAW based filters... to state of the art testing capabilities including a dedicated facility for space component manufacture.

Vectron International is both a product manufacturer and a solutions provider, leading with its unique technology but always prepared to design and engineer custom solutions, where required. Vectron's core competency combines its classic crystal and SAW technology with sophisticated integrated circuits and advanced packaging. Aside from these great innovative capabilities, Vectron strives to be extremely flexible and focused on service, responding quickly and professionally Helping Customers Innovate, Improve and Grow their business.

Vectron Global Facilities



Low Phase Noise Product Solutions

In both the analog domain and the digital domain spectral purity of an oscillator or clock source can account for a large portion of a systems performance budget. Improving signal to noise ratio, meeting EVM targets and working with high modulation rates can come down to making the right oscillator choices. Vectrons 50+ years of engineering Low Phase Noise and Low Jitter Oscillators has resulted in a range of oscillators designed to provide the highest performance in radio, test and measurement and radar applications. A cross section of Low Noise Oscillators is shown in the table below.

Full Military Temperature Range with B-Level Screening Option				Phase Noise ² (dBc/Hz)		Outputs					
	Product	Temp Stability ^{1,3} -55°C to +125°C	Frequency Range (MHz)	10Hz Offset	1MHz Offset	TTL	CMOS	LVPECL	LVDS	HCSL	Sinewave
XO	PX-500	±50ppm	1 to 800	-70	-160	●	●	●	●		
	PX-501	±50ppm	1 to 1200	-95	-160		●	●	●		●
	PX-571	±50ppm	32.768kHz to 40MHz	-70	-160	●	●				
	PX-700	±50ppm	1 to 800	-70	-160	●	●	●	●		
	Product	Absolute Pull Range ¹ -55°C to +125°C	Frequency Range (MHz)	10Hz Offset	1MHz Offset	TTL	CMOS	LVPECL	LVDS	HCSL	Sinewave
VCXO	VX-500	±25ppm min	1 to 1200	-70	-160	●	●	●	●		
	VX-700	±25ppm min	77.76 to 200	-70	-160	●	●	●	●		

1. Contact factory for tighter temperature stability requirement over reduced temperature range

2. Typical Phase Noise performance at 20MHz. HCMOS Output

3. Exclude Initial accuracy specification

				Phase Noise ² (dBc/Hz)		Outputs					
	Product	Max Stability ¹	Frequency Range (MHz)	10Hz Offset	1MHz Offset	TTL	CMOS	LVPECL	LVDS	HCSL	Sinewave
VCXO	VS-501	N/A	800 to 2800	-33	-155		●				●
	VS-508	N/A	800 to 2900	-34	-154			●			●
	VS-800	N/A	800 to 3200	-39	-163						●
TCXO	VT-501	1ppm	8 to 61.44	-107	-154		●				●
	VT-803	100ppb	10 to 52	-91	-160		●				●
	TX-801	100ppb	8 to 26	-93	-157		●				●
OCXO	OX-305	100ppb	80 to 120	-105	-178						●
	OX-205	100ppb	80 to 120	-105	-176						●
	OX-209	50ppb	20 to 35	-115	-175						●
	OX-204	10ppb	5 to 20	-135	-175						●
	OX-405	100ppb	80 to 120	-95	-165			●			
	OX-043	5ppb	8 to 15	-135	-170						●

1. Maximum Stabilities that could be offered at most frequencies and output configurations.

2. Please refer to oscillator datasheet for the measured oscillator frequency used for phase noise measurements, available at www.vectron.com.



High Shock & Vibration Product Solutions

When oscillators need to operate in a High Shock and Vibration environment such as in avionics, missiles, vehicles, construction equipment and industrial applications, the oscillator must be specially designed to both survive and operate in these environments. The main performance parameter that is affected from vibration is phase noise. When designing for survival in harsh environments, the designer must be concerned about both the crystal design and the oscillator design. It is a challenge to create an oscillator with state of the art performance while maintaining a small form factor.

	Product	Package Size (mm)	Frequency Range ¹	Temp Stability ² -55°C to +125°C	Shock	Vibration
XO	PX-421	12.7 x 12.7 x 5.08	32kHz to 40MHz	±50ppm	1000g	20g
	PX-508 ³	9 x 14 x 6.2	10 to 120MHz	±25ppm	5000g	70g
	PX-507	9 x 14 x 3.66	1 to 125MHz	±50ppm	3000g	36g
	PX-570	8 x 8.5 x 2.91	32kHz to 40MHz	±50ppm	1000g	20g
	PX-702	5 x 7 x 1.8	32kHz to 40MHz	±50ppm	3000g	36g
	HT-MM900	5 x 7, 3.2 x 5, 3.2 x 2.5, 2.5 x 2, 1.6 x 2	1 to 137 MHz	±25ppm	50,000g	70g
	Product	Package Size (mm)	Frequency Range ¹	Absolute Pull Range ² -55°C to +125°C	Shock	Vibration
VCXO	VX-507	9 x 14 x 3.68	1 to 100MHz	±25ppm min	3000g	36g
	VX-508 ³	9 x 14 x 6.2	10 to 120MHz	±25ppm min	5000g	70g

1. Contact factory for higher frequency requirement

2. Contact factory for tighter temperature stability requirement over reduced temperature range

3. Reduced operating temperature range from -55°C to +105°C

	Product	Package Size (mm)	Frequency Range	Temp Stability -40°C to +85°C	Shock	Vibration
TCXO	TX-508	9 x 14 x 6.2	10 to 100MHz	1.0ppm	5000g	70g
	TX-550	9 x 11	8 to 50MHz	1.0ppm	50g	10g
OCXO/EMXO	EX-200	23.6 x 26.2	10 to 20MHz	30ppb	100g	20g
	OX-043	2 x 2	10 to 20MHz	30ppb	100g	20g

Low G-Sensitivity Product Solutions

G-Sensitivity is defined as a change in frequency resulting from an acceleration force applied to an oscillator. It is often expressed in terms of ppb/g. How does this affect performance? When an oscillator is used in an environment conducive to vibration, the frequency of the vibration will modulate the carrier frequency degrading the phase noise performance of the oscillator. This phenomenon is similar for both random and sine vibration and is also very deterministic meaning the magnitude of the induced phase noise degradation can be calculated if the G-Sensitivity of the oscillator is known.

	Product	Package Size (mm)	Frequency Range	Temp Stability -55°C to +125°C	G-Sensitivity
XO	PX-508	9 x 14 x 6.2	10 to 120MHz	25ppm	0.5ppb/g
	PX-990	48.27 x 58.25 x 27	60 to 120MHz	25ppm	0.5ppb/g
VCXO	VX-508	9 x 14 x 6.2	10 20MHz	25ppm	0.5ppb/g
	VX-990	48.27 x 58.25 x 17	60 to 120MHz	25ppm	0.5ppb/g
	Product	Package Size (mm)	Frequency Range	Temp Stability -40° to +85°C	G-Sensitivity
TCXO	TX-707	5 x 7 x 2.8	10 to 50 MHz	1.0ppm	0.1ppb/g
	VT-803	3.2 x 5 x 1.5	10 to 52MHz	200ppb	0.6ppb/g
	TX-508	9 x 14 x 6.2	10 to 100MHz	1.0ppm	0.5ppb/g
	TX-550	9 x 11 x 3.76	8 to 50MHz	1.0ppm	0.2ppb/g
OCXO	OX-043	52.07 x 52.07 x 26.67	3 to 20MHz	30ppb	0.02ppb/g
	OX-046	52 x 52 x 20	50 to 250 MHz	200ppb	0.05ppb/g
	OX-407	14 x 20 x 11	10 to 50 MHz	100ppb	0.07ppb/g
	OX-405	13.21 x 20.83 x 10.16	80 to 120MHz	700ppb	0.5ppb/g
	OX-990	48.27 x 58.25	60 to 120MHz	200ppb	0.5ppb/g
	EX-400	20.8 x 13.2 x 7.6	10 to 80MHz	100ppb	1ppb/g

High Stability Product Solutions

The Stability characteristics of a frequency source over temperature and time are key components in the design of wireless base stations, precision test and measurement equipment, network timing sources and military communications equipment. Oscillator Stability forms the foundation of a frequency or timing reference design and depending on the system more or less of the oscillators performance will show through in the overall performance. Making the right choices to guarantee the lowest aging, the best Temperature Stability or the highest Short Term Stability can be challenging, but Vectron has 50+ years in working with customers to ensure the success of their design.

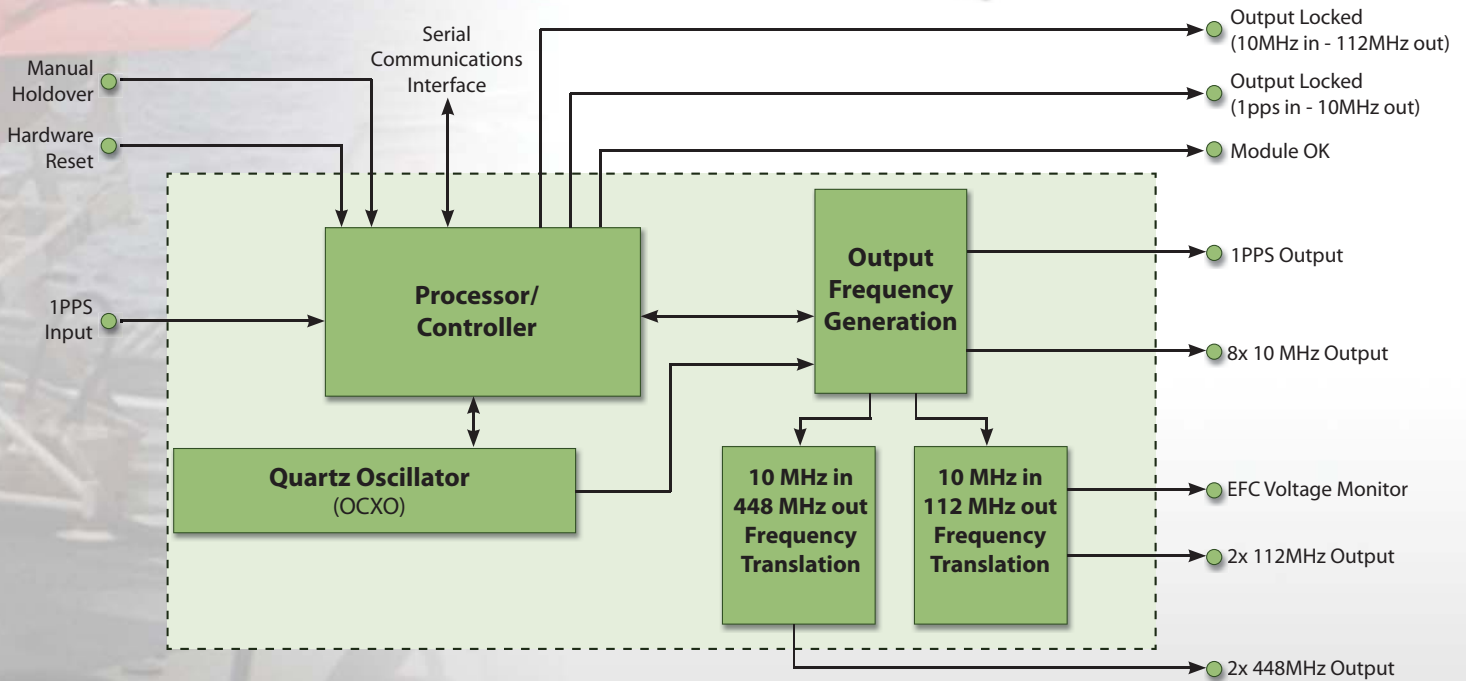
			Aging	Temp Stability		Outputs	
	Product	Package Size (mm)	Daily Aging (ppb)	Stability (ppb)	Temp Range	CMOS	Sinewave
Rubidium	AR-133	77 x 77 x 25	0.05 (per month)	0.3	-20 to 65°C	●	●
Microprocessor Corrected Ovens	MX-041	50 x 50 x 14.55	0.1	0.6	-40 to 85°C	●	●
	MX-503	9.5 x 14.4 x 3.8	0.8	30	-20 to 70°C	●	
OCXO	OX-171	38 x 28 x 14	0.06	0.8	-40 to 85°C	●	●
	OX-208	25.4 x 25.4 x 12.7	0.15	0.8	-40 to 85°C	●	●
	OX-221	22 X 25.4 X 12.1	1	3	-40 to 85°C	●	
	OX-045	50 x 50 x 26.42	0.1	5	-20 to 70°C		●
	OX-400	12.7 X 20.32 X 10.8	5	10	-20 to 70°C	●	●
	OX-407	20 x 14 x 11	5	100	-40 to 70°C	●	●
	OX-501	9 X 14 X 6.4	5	100	-20 to 70°C	●	
EMXO	EX-400	13.2 x 20.8 x 7.6	2	100	-40 to 85°C	●	●
	EX-200	23.6 x 26.2 x 8.9	2	50	-40 to 85°C	●	●
TCXO	VT-803	3.2 X 5 X 1.5	NA	100	-10 to 70°C	●	●
	TX-801	5 x 3.2 x 1.7	40	100	-10 to 70°C	●	●



MD (Precision Modules)

Features / Performance Options:






- Build to print or customer concept.
- No Pure tin available
- Incorporation of all Vectron's oscillator and frequency translators
- Disciplining to 1pps or internal GNSS receivers (MD-261)
- Phase-locked loops
- g-sensitivity to 0.02 ppb/g.
- Enclosures for ruggedized performance, improvement in EMI
- Rackmount packages possible
- Possible inputs include, 1pps, alternate frequencies, GNSS receivers
- Multiple synchronized outputs.
- Timelines 4 months for proof of concept, 6 to 8 months for hardware.
- Electrical, mechanical and thermal simulations and analysis
- Embedded microprocessors with customizable firmware
- Evaluation kits and performance analysis software.



OCXO (Oven Controlled Crystal Oscillator)

Vectron is the world leader in Precision OCXO production. Whether your program is a Radar or Missile System, or Military Avionics we have an oscillator that will meet your needs. Our wide selection of world class designs offer everything the user could ask for: tight stabilities, small size, low power, excellent phase noise and a wide variety of inputs and outputs. The models shown in this brochure are only a sampling of the pre-qualified designs that are available from Vectron. We invite you to visit our website at www.vectron.com to review and/or download the complete specification for any model. We also encourage you to call our application engineers for help in selecting the right model for your application or to answer any questions that you might have.




OCXOs - Standard

Product	Frequency Range (MHz)	Output & Supply	Temp Stability -40°C to +85°C	Aging (ppb) Day	Aging (ppb) Year	Phase Noise at 10 Hz	Phase Noise Floor	Sub Market	Features
 OX-501 9.5 x 14.4 x 6.2 mm	10 to 40	HCMOS 3.3 V	10ppb	5	500	-100	-148	Radar Radios Synthesizers Command Control	<ul style="list-style-type: none"> • Small Size, Surface Mount • Low Power
 OX-400 13.2 x 20.8 x 10.2 mm	10 to 52	HCMOS 3.3 or 5 V	5ppb	1	100	-100	-145	Radio Avionics	<ul style="list-style-type: none"> • TCXO Replacement • Small Size • Fast Warm-up
 OX-221 22 x 25.4 x 12.1 mm	10 to 32.72	HCMOS 3.3 V	3ppb	0.5	60	-122	-154	Radio Avionics	<ul style="list-style-type: none"> • Low Profile • SMD Option
 OX-200 25.4 x 25.4 x 11.2 mm	10 to 100	HCMOS/Sine 3.3, 5 or 12 V	5ppb	0.1	20	-120	-150	Radio Avionics Command Control	<ul style="list-style-type: none"> • 1" x 1" Low Profile • Low Aging • Phase Noise Floor of 165dBc/Hz
 OX-170 38.1 x 27.9 x 19 mm	5 to 40	HCMOS/Sine 3.3, 5 or 12 V	1ppb	0.1	1	-125	-165	Radar Radio Avionics Command Control	<ul style="list-style-type: none"> • Eurocase • Fast Warm-up • Low Aging • Both AT & SC Cut Xtals




OCXOs - Low Phase Noise

Product	Frequency Range (MHz)	Output & Supply	Temp Stability -40°C to +85°C	Aging (ppb) Day	Aging (ppb) Year	Phase Noise at 10 Hz	Phase Noise Floor	Sub Market	Features
 OX-046 52 x 52 x 20.3 mm	50 to 250	Sinewave 12 or 15 V	200ppb	5	200	-100	-175		
 OX-204 25.4 x 25.4 x 15 mm	10	Sinewave 12 V	20ppb	0.5	30	-135	-175	Radar Radios Synthesizers Command Control	<ul style="list-style-type: none"> • Ultra Low Noise, 1" x 1" package
 OX-205 25.4 x 25.4 x 15 mm	60 to 120	Sinewave 12 V	200ppb	5	500	-105	-175	Radar Radios Synthesizers Command Control	<ul style="list-style-type: none"> • Ultra Low Noise, 1" x 1" package
 OX-043 50.8 x 50.8 x 26.4 mm	8 to 15	Sinewave 12 or 15 V	5ppb	0.5	40	-127	-165	Radar Radio Avionics	<ul style="list-style-type: none"> • 0.02 ppb/g • Low Phase Noise • High Stability • SC-Cut Crystal • Electronic Vib Compensation
 OX-405 13.2 x 20.8 x 10.2 mm	80 to 120	HCMOS/Sine 3.3 or 5 V	50ppb	3	300	-95	-160	Radar Radio Command Control	<ul style="list-style-type: none"> • Low g-sensitivity • Excellent phase noise performance at 100MHz

OCXOs - High Stability

Product	Frequency Range (MHz)	Output & Supply	Temp Stability -40°C to +85°C	Aging (ppb) Day	Aging (ppb) Year	Phase Noise at 10 Hz	Phase Noise Floor	Sub Market	Features
 OX-203 25.4 x 25.4 x 13.4 mm	5 to 20	HCMOS 5 V	1ppb	0.1	20	-120	-145	Radar Radio Command Control	<ul style="list-style-type: none"> 1" x 1" Package 1ppb stability at low power microprocessor temperature correction
 OX-208 25.4 x 25.4 x 12.7 mm	5 to 20	HCMOS/ Sine 5 or 12 V	0.8ppb	0.15	20	-125	-155		
 OX-171 38 x 28 x 14 mm	5 to 20	HCMOS/ Sine 3.3, 5 or 12 V	0.8ppb	0.06	15	-125	-145		

EMXOs - Evacuated Miniature Crystal Oscillators

Product	Frequency Range (MHz)	Output & Supply	Temp Stability -40°C to +85°C	Aging (ppb) Day	Aging (ppb) Year	Phase Noise at 10 Hz	Phase Noise Floor	Sub Market	Features
 EX-420 13.21 x 13.21 x 7.62 mm	10 to 30	HCMOS/Sine 3.3 or 5 V	100ppb	1	300	-100	-145	Radio Avionics	<ul style="list-style-type: none"> Low Power Fast Warm-up Good Size vs Performance Good g-Sensitivity
 EX-400/401/405 13.2 x 20.8 x 7.6 mm	10 to 80	HCMOS/Sine 3.3 or 5 V	100ppb	1	200	-100	-145	Radio Avionics	<ul style="list-style-type: none"> Small Size Fast Warm-up Low Power Excellent Stability
 EX-200 23.6 x 26.1 x 9 mm	10 to 40	HCMOS/Sine 3.3 or 5 V	50ppb	2	200	-100	-150	Radio Avionics	<ul style="list-style-type: none"> Low Power Fast Warm-up Ruggedized Hybrid Excellent Stability

OCXOs - Low G-Sensitivity

Product	Frequency Range (MHz)	Output & Supply	Temp Stability -40°C to +85°C	Aging (ppb) Day	Aging (ppb) Year	Phase Noise at 10 Hz	Phase Noise Floor	Sub Market	Features
 OX-990 58.25 x 48.27 x 27 mm	60 to 120	Sinewave 15 V	200ppb	10	500	-95	-170	Radar Radio Avionics	<ul style="list-style-type: none"> Low phase noise floor of -175dBc/Hz Designed for harsh environments
 OX-046 51.8 x 51.8 x 20	50 to 250	Sinewave 12 or 15 V	200ppb	5	200	-127	-165	Radar Radio Avionics	<ul style="list-style-type: none"> 0.2ppb/g Low Phase Noise High Stability
 OX-043 50.8 x 50.8 x 26.4 mm	8 to 15	Sinewave 12 or 15 V	5ppb	0.5	40	-127	-165	Radar Radio Avionics	<ul style="list-style-type: none"> 0.02 ppb/g Low Phase Noise High Stability SC-Cut Crystal Electronic Vib Compensation

TCXO (Temperature Compensated Crystal Oscillator)







TCXO's (Temperature Compensated Crystal Oscillators) are XO's with a compensation circuit added to the unit. This provides a much more stable output frequency over temperature than what is achievable in an XO. Where the XO can meet stabilities of ± 50 ppm over temperature, some TCXO's are capable of meeting frequency stabilities as low as 0.28 ppm. Vectron engineers design their TCXO's to meet the tough environmental conditions of munitions, missiles, vehicular and aircraft applications.

Product	Legacy Model #	Package Style(mm)	Frequency (MHz)	Output Logic	Temp Stabilities -40°C to +85°C	Sub Market	Features
 VT-803		3.2 x 5 x 1.5 SMD	10 to 52	CMOS Clipped Sinewave	200ppb	Radio	<ul style="list-style-type: none"> • 100ppb Temp Stability over -10 to 70°C. • P Noise floor of -159 dBc/Hz @ 1 MHz offset • Aging < 0.5 ppm/year
 TX-500	C2310	9.5 x 14.4 x 5.9 SMD	6.4 to 160	HCMOS Clipped Sine True Sinewave PECL	280 ppb	Radar Command Control	<ul style="list-style-type: none"> • Standard SMD Package • Low Profile, wide frequency range • Low Phase Noise Option
 TX-400	C2400	13.1 x 20.7 x 7.5 SMD	10 to 200	HCMOS Sinewave	1.0 ppm	Radar Radio Avionics	<ul style="list-style-type: none"> • Hermetic Seal • Wide Frequency Range • Mil Temp range -55 to 105°C
 TX-508		9 x 14 x 5.9 SMD	10 to 100	HCMOS LVC MOS	± 280 ppb	Radio Avionics Command Control	<ul style="list-style-type: none"> • Low G-Sensitivity • High Shock Resistant • Vibration Hardened
 VT-700	VTC1	5 x 7 x 2 SMD	10 to 40	CMOS Clipped Sinewave	1.0 ppm	Radio Avionics	<ul style="list-style-type: none"> • Fundamental Crystal Design • Optional VCXO Function Available • Gold Over Nickel Contact Pads
 TX-402		13.2 x 20.8 x 10.2 4 pin DIP	6.4 to 26	HCMOS	100 ppb	Radio Avionics	<ul style="list-style-type: none"> • High Precision TCXO, OCXO Replacement • Low Power Consumption • Hermetically Sealed
 TX-550		9 x 11 x 3.7	8 to 50	HCMOS Clipped Sinewave	1.0ppm	Radio GPS Telemetry	<ul style="list-style-type: none"> • Low G-Sensitivity <0.2ppg
 TX-707		5 x 7 x 2.8	10 to 50	HCMOS Clipped Sinewave	1.0ppm	Radio Avionics Command Control	<ul style="list-style-type: none"> • High Shock Low G-Sensitivity
 TX-801		5 x 3.2 x 1.7 SMD	8 to 26	CMOS Clipped Sinewave	280ppb	Radio Command Control Radar	<ul style="list-style-type: none"> • Low Phase Noise option

VCXO (Voltage Controlled Crystal Oscillator)




A VCXO (voltage controlled crystal oscillator) is an uncompensated clock oscillator with a control voltage input, which allows the user to shift the frequency typically by ± 50 ppm up to ± 200 ppm. A VCXO includes a varactor diode and associated circuitry allowing the frequency to be changed by application of a voltage across that diode. When used in series with a crystal, changing the control voltage causes the diode capacitance to change. This change in capacitance causes the total crystal load capacitance to change and subsequently causes a change in the oscillator frequency.

Vectron offers a wide variety of VCXO's for military and aerospace applications. A few of our standard models are shown below offering output frequencies from 1 MHz to 800 MHz. We invite you to visit our website at www.vectron.com to review and/or download the complete specification for any model. We also encourage you to call our application engineers for help in selecting the right model for your application or to answer any questions that you might have.

Product	Legacy Model #	Package Style (mm)	Frequency (MHz)	Output Logic	Sub Market	Features
 VX-500	C5300	14.2 x 9.14 x 3.68 6 Pin J-Lead	1 to 100	HCMOS TTL	Radio Avionics Command Control Precision Guided Munitions	<ul style="list-style-type: none"> • Low Jitter • Full Military temp range (-55 to +125°C) • B-Level Screening available
 VX-507		9 x 14 x 3.68	1 to 100	HCMOS TTL	Avionics Command Control Precision Guided Munitions Navigation	<ul style="list-style-type: none"> • Low Jitter • Military Temperature Range • Class B Screening
 VX-504		9.5 x 14.5 x 2.8 SMD	30 to 160	HCMOS	Radar Radio Avionics Command Control Precision Guided Munitions	<ul style="list-style-type: none"> • Low G-Sensitivity • High Shock Resistance • Vibration hardened
 VX-805		3.2 x 5 x 1.2 6 Pin SMD	100 to 204.8	LVPECL		
 VV-800		3.2 x 5 x 1.2 6 Pin SMD	1,544 to 77.76	CMOS		
 VX-990		58.25 x 48.27 x 27	60 to 120	Sinewave	Radar Radio Avionics	<ul style="list-style-type: none"> • Low G-Sensitivity • Ultra low phase noise floor of -175 dBc/Hz • Frequency range from 60 MHz to 120 MHz • G-Sensitivity < 0.5 ppb/g • Designed for harsh environments

VCISO (Voltage Controlled SAW Oscillator)










Today's military electronics are operating at higher clocking rates and the supporting electronics (ADCs, DACs, SERDES, framers, etc) require cleaner signals. These signals contain not only better spurious and harmonic suppression but also lower phase noise and jitter. VCISO's, when compared to VCXO's, offer higher fundamental frequencies which require less frequency multiplication, a larger contributor to system noise. Vectron International is the world leader and innovator in VCISO technology. Our VCISO's are now reaching up to GHz frequencies, with multiple options available (gain, output buffer, output disable logic, selectable frequency) to serve your unique applications.

Product	Legacy Model #	Package Style (mm)	Frequency (MHz)	Output Logic	Sub Market	Features
 VS-705	VS-700	5 x 7.5 x 2.5 6 Pin SMD	122 to 1000	LVDS LVPECL	Radio Radar Avionics Command Control	<ul style="list-style-type: none"> • Fundamental SAW Oscillator Design • Spurious Suppression <90 dBc • 120 fs-rms (12 kHz to 20 MHz) • 105 fs-rms (50 kHz to 80 MHz) • 2.5 or 3.3 V Supply
 VS-702	VS-720	5 x 7.5 x 2 6 Pin SMD	150 to 1000	LVDS LVPECL	Radio Radar Avionics Command Control	<ul style="list-style-type: none"> • BAW Multiplier Design with SAW Harmonic Filter • ± 20 ppm Temperature Stability • 100 fs-rms (12 kHz to 20 MHz) • 120 fs-rms (50 kHz to 80 MHz)
 VS-501		9 x 14 x 2.3 6 Pin SMD	800 to 2500	Sinewave Balanced Sinewave LVPECL	Radio Radar Avionics Command Control	<ul style="list-style-type: none"> • 3.3 or 5.0 Voltage Operation • Fundamental SAW Oscillator Design • 120 fs-rms (12 kHz to 20 MHz) • 105 fs-rms (50 kHz to 80 MHz)

Precision XO (Clock Oscillator)

Vectron offers a complete line of XOs (Clock Oscillators) for military applications. We can supply a wide variety of military QPL oscillators if required, including both B and S level clocks under MIL-PRF-55310. We also provide several varieties of XOs for high shock and vibration environments seen in smart munitions and missile applications. Consult our web site at www.vectron.com to review and download the complete specification for any model.

XOs - Standard


Product	Legacy Model #	Package Style (mm)	Frequency (MHz)	Output Logic	Sub Market	Features
 PX-500	C1300	14.2 x 9.14 x 3.68 SMD	1 to 800	ACMOS TTL LVPECL LVDS	Avionics Command Control Precision Guided Munitions Navigation Instrumentation	<ul style="list-style-type: none"> • Low Jitter • High Shock Option • Military Temperature Range • 9 x 14 J-Lead • Class B Screening Option
 PX-571		8 x 8.5 x 2.91 4 Pin Thru-Hole (SMD options)	32 kHz to 80 MHz	ACMOS TTL	Avionics Precision Guided Munitions Navigation Instrumentation	<ul style="list-style-type: none"> • Supply: 1.8, 2.5, 3.3, 5V • Full Military Temp Range (-55 to +125°C) • B-Level Screening available • High Shock & Vibration Resistance
 PX-400	CO-401/402 CO-441/442 CO-431/451 CO-432/452	20.32 x 12.7 x 5.08	1 Hz to 200 MHz	ACMOS TTL ECL PECL LVPECL	Military Systems Avionics Command Control Navigation	<ul style="list-style-type: none"> • Supply: 3.3, 5, -5.2, -4.2V • Low Profile SDIP package • Full Military Temp Range (-55 to +125°C) • B-Level Screening available
 XO-400	CO-40x C1400	20.32 x 12.7 x 10.29 DIP	15 to 250	Complementary PECL	Radar Avionics Command Control	<ul style="list-style-type: none"> • Low Jitter
 VC-840		2 x 2.5 x 0.9 4 Pin SMD	1 to 60	CMOS		
 VC-826		2.5 x 3.2 x 1.05 6 Pin SMD	20 to 170	Complementary LVPECL		
 PX-700	C1250	5 x 7 x 2.3 6 Pin SMD	1 to 800	ACMOS TTL LVPECL LVDS	Avionics Command Control Precision Guided Munitions Navigation Military Portable Radio	<ul style="list-style-type: none"> • Shock Survival >15,000g • Available with J Leads • Full Military Temp Range (-55 to +125°C) • B-Level Screening available
 VC-820		2.5 x 3.2 x 1.0 4 Pin SMD	0.625 to 133	CMOS	Radio Command Control	<ul style="list-style-type: none"> • Reference Clock with Jitter <250 fs RMS • -55°C to 125°C
 PX-501	C1310	9 x 14 x 5.9 4 or 6 Pin SMD	1 to 1200	CMOS LVPECL LVDS	Radio Command Control	<ul style="list-style-type: none"> • AT Cut Crystal • Low Phase Noise • Tight Tolerances

XOs - QPL







Product	Package Style (mm)	Frequency (MHz)	Output Logic	Sub Market	Features
M55310/16	14 Pin DIP	0.016 to 60	TTL	Radio, Avionics Command Control	<ul style="list-style-type: none"> • Most Popular Military Oscillator • B & S Level Available
M55310/26	14 Pin DIP	0.01 to 65	HCMOS	Radio, Avionics Command Control	<ul style="list-style-type: none"> • 10 - 65 MHz
M55310/21	20 Lead Flatpack	1 to 60	TTL	Radio, Avionics Command Control	<ul style="list-style-type: none"> • SMD Packaging
M55310/27	9 x 14 SMD J Lead	1 to 85	HCMOS	Radio, Avionics Command Control	<ul style="list-style-type: none"> • SMD Packaging
M55310/28	10 x 14 SMD J Lead	1 to 85	TTL	Radio, Avionics Command Control	<ul style="list-style-type: none"> • SMD Packaging
M55310/19	40 Pad LCC	1 to 60	TTL	Radio, Avionics Command Control	<ul style="list-style-type: none"> • LCC Packaging

XOs - MEMS

Vectron's model HT-MM900A was designed to withstand the severe conditions of smart munitions or other high shock and vibration environments. This model has been qualified to MIL-PRF-55310 specifications along with shock conditions of 50,000g's @ 0.1ms and vibration levels of 70g's. Output frequencies from 1 to 110 MHz are available in 4 different miniaturized package sizes.

Product	Package Style (mm)	Frequency (MHz)	Output Logic	Sub Market	Features
HT-MM900A 	7.0 x 5.0 5.0 x 3.2 3.2 x 2.5 2.5 x 2.0	1 to 110	CMOS	Precision Guided Munitions	<ul style="list-style-type: none"> • High Shock (50,000 G) • Temperature Range: -55°C to +125°C • Vibration: 70g • G-Sensitivity: 0.1ppb/g

XOs - High Shock & Vibration

Product	Package Style (mm)	Frequency (MHz)	Output Logic	Sub Market	Features
PX-507 	9 x 14 x 3.66	1 to 125	CMOS	Avionics Command Control Precision Guided Munitions Navigation & Instrumentation	<ul style="list-style-type: none"> • Low Jitter • Military Temperature Range • Class B Screening Options
PX-508 	14.4 x 9.5 x 5.9 SMD	10 to 120	HCMOS LVC MOS	Radar, Radio, Avionics Command & Control Precision Guided Munitions	<ul style="list-style-type: none"> • Low g-sensitivity • High Shock • Vibration Hardened
PX-421 	12.7 x 12.7 x 5.08	1 to 100	HCMOS TTL	Radar Radio Avionics	<ul style="list-style-type: none"> • Low Jitter and Phase Noise • Military Temperature Range • Class B Screening Options
PX-570 	8 x 8.5 x 2.91	32kHz to 40MHz	HCMOS	Extended Temperature Avionics Engine Control Precision Guided Munitions	<ul style="list-style-type: none"> • Low Jitter and Phase Noise • SMD and Thru-Hole Mount Options • Extended Operating Temp range to +200°C
PX-702 	5 x 7 x 1.8	32kHz to 50MHz	HCMOS	Avionics Engine Control Precision Guided Munitions	<ul style="list-style-type: none"> • Low Jitter and Phase Noise • Small SMD Footprint • Extended Operating Temp Range to +200°C
PX-990 	58.25 x 48.27 x 27	60 to 120	Sinewave	Radar Radio Avionics	<ul style="list-style-type: none"> • Low g-sensitivity <0.5 ppb/g • Ultra Low Phase Noise Floor of -175 dBc/Hz • Designed for Harsh Environments




Precision Crystals and Blanks

Vectron International's state-of-the-art crystal manufacturing facility in Cincinnati Ohio offers extensive capability in the design and manufacture of precision crystal solutions for demanding military applications. Innovations in process, metrology, and design technology have enabled us to deliver breakthrough performance to our customers.

Readily available swept and non-swept AT and doubly rotated quartz bars, sophisticated cutting and lapping capabilities, Class 10K and 100K cleanrooms for finishing operations, fully integrated cold weld vacuum seal systems, an ISO-9001-2008 certified quality system and efficient in house environmental and electrical test facilities, keep lead-times to a minimum while helping us consistently produce high quality quartz resonators.

We are here to assist you with selecting the best valued crystal for your applications.

Low G-Sensitivity (QRM-Quad Relief Mount)

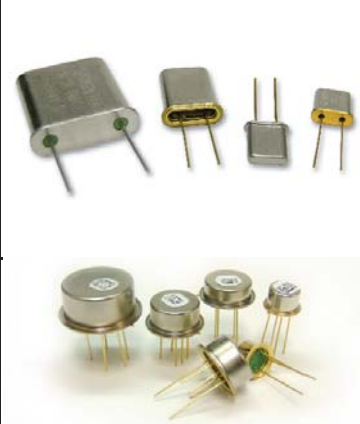



- VECTRON PATENTED QRM DESIGN (HC40 Package Outline)
- SC/IT Cut 3rd OT 8 - 20 MHz
- g-sensitivity down to $1.0 \times 10^{-10}/g$
- Ideal for Hi-Rel Vibration Sensitive Environments, Low-G OCXOs
- Avionics, Marine (shipboard), Aerospace, LO Reference



Available in any of the packages above or below:






- 100% screening for phase noise
- Low g-sensitivity
- Swept Quartz for Space applications
- MIL-PRF-3098 and ESA-3501 equivalents
- Active or passive pre-aging, full traceability

Precision Crystal Offerings (Industry Standard Holders) ----- AT and Doubly Rotated (SC, IT) Cuts										
Package	Holder Type		Frequency Range (MHz)		Modes-Frequency (MHz)					
	Resistance Weld	Cold Weld	min.	max.	Fund	3 rd	5 th	7 th	9 th	
	HC48/U	HC36/U	1.5	75.0	1.5 - 15	4 - 45	8 - 75	call	call	
	HC51/U	HC47/U								
	HC50/U	HC42/U	2.2	210	2.2 - 30	10 - 90	20 - 150	70 - 210	call	
	HC49/U	HC43/U								
	HC52/U	HC45/U	7.0	225	7 - 35	25 - 105	40 - 175	70 - 225	call	
	UM1									
	UM5		10.0	225	10 - 35	30 - 105	50 - 175	70 - 225	call	
			HC40	1.5	105	1.5 - 15	4 - 45	8 - 75	15 - 105	call
			HC37	2.5	140	2.5 - 20	5 - 60	15 - 100	25 - 140	call
			TO-6 (C460)	2.5	140	2.5 - 20	10 - 60	20 - 100	70 - 140	call
		HC35	7.0	225	7 - 35	17 - 105	40 - 175	70 - 225	call	
	SM1 (8mm sq.)		7.0	225	7 - 35	17 - 105	40 - 175	70 - 225	call	

* custom lead forming for surface mount applications is available for leads <0.30" diameter.

FX/CS/CDR (Frequency Translators / Jitter Attenuators)

Frequency Translators and Jitter Attenuators are commonly implemented using an analog phase-locked loop (PLL) which is comprised of three main components; phase detector, loop filter, and VCXO. Since the quality of the PLL is primarily due to the VCXO or VCSO, many customers have come to Vectron for their frequency translator or jitter attenuation needs. Whether you are multiplying a low noise reference signal from a OCXO or a TCXO source or need to condition a highly jittered clock signal for your radar, command control, or radio board, Vectron is eager to assist you and can improve your time to market with a convenient, tested, drop-in solution. Our world class application engineering support will assist in specifying the appropriate product, designing and simulating the loop filter, and facilitating samples conveniently populated on an evaluation board for simple plug-and-play design verification.

Product	Legacy Model #	Package Style (mm)	Input Supply	# of Inputs	Input Freq. Min/Max	Output Logic	# of Outputs	Output Freq. Min/Max	Sub Market	Features
 FX-400	FX-424	13.7 x 20 x 5.1 14 Pin SMD	CMOS LVDS LVPECL 3.3V	Up to 4 EXT.	8kHz to 170MHz	LVPECL LVDS Single Freq.	1	1.5MHz to 1GHz	Radar Command Control Radio	• Drop in Integrated PLL for Versatile Frequency Translation
 FX-402	FX-427	13.7 x 20 x 5.1 14 Pin SMD	CMOS LVDS LVPECL 3.3V	Up to 4 EXT.	8kHz to 200MHz	LVPECL LVDS Dual Freq.	2	125MHz to 1GHz	Radar Command Control Avionics	• Drop in Integrated PLL for Versatile Frequency Translation
 CD-700		5 x 7.5 x 2 16 Pin SMD	CMOS TTL 3.3V or 5V	1	8kHz to 78MHz	LVPECL LVDS Dual Freq.	2	100kHz to 78MHz	Radar Command Control Avionics	• Smallest User-Configurable Analog PLL • Low Jitter
 FX-700		5 x 7.5 x 2 16 Pin SMD	CMOS TTL 3.3V or 5V	1	8kHz to 78MHz	LVPECL Single Freq.	1	100kHz to 78MHz	Radar Command Control Avionics	• Drop in Integrated PLL for Frequency Translation Applications and Clock Smoothing
 FX-702	FX-703	5 x 7.5 x 2.5 14 Pin SMD	LVC MOS LVDS LVPECL 3.3V	1	1MHz to 1GHz	LVPECL LVDS Single Freq.	1	62.5MHz to 1GHz	Radar Command Control Avionics	• Frequency Translation and Jitter Attenuation up to 1GHz • VCSO based for Ultra-Low Jitter • Clock Bypass Mode • Complete Easy to Implement Solution

Vectron Frequency Control University

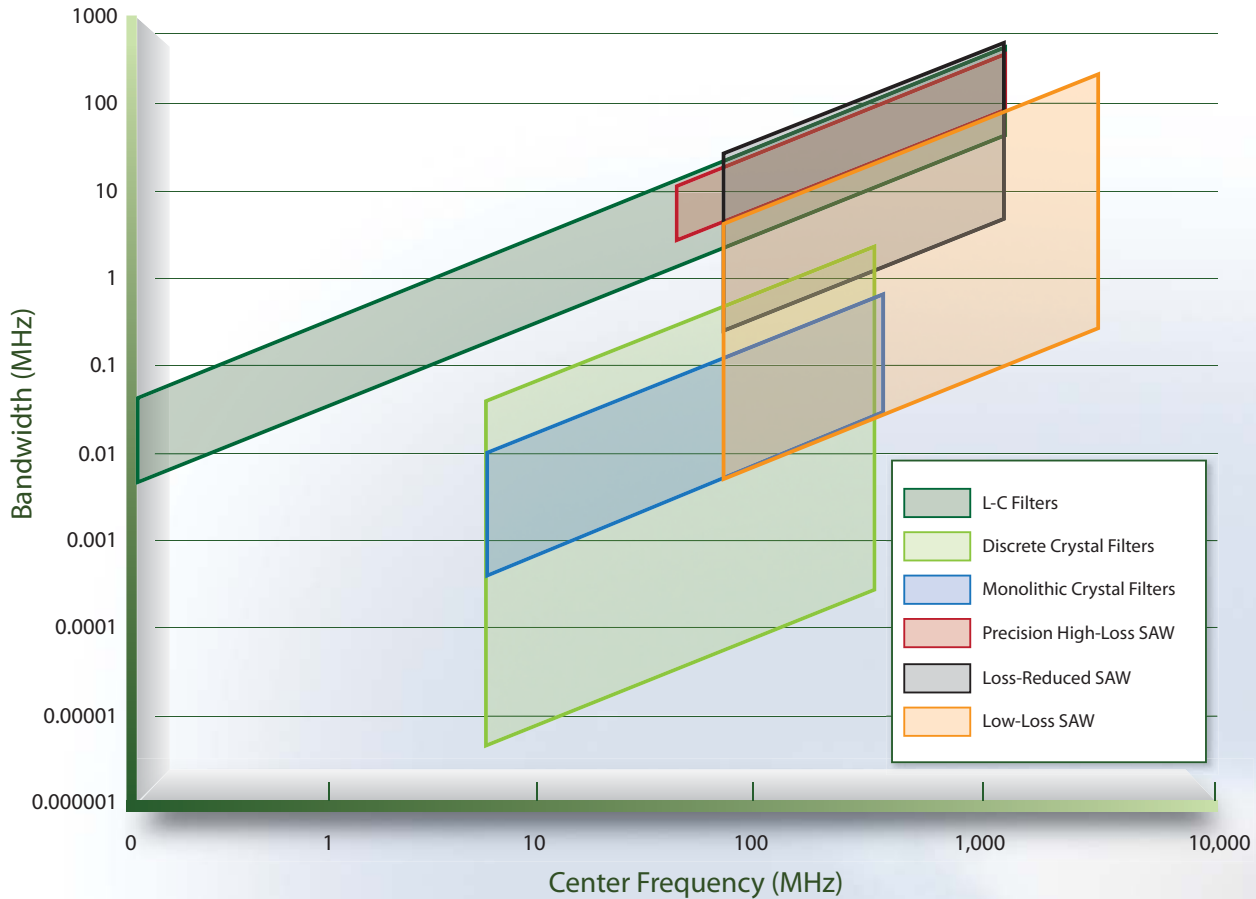


Vectron International offers its FCU to provide both commercial and military personnel with a comprehensive overview of the manufacturing process and basic design information for crystals, crystal oscillators (XO, VCXO, TCXO, OCXO, EMXO, VCSO), crystal filters, SAW Filters, and oscillator based modules. As the focus is product training, we will use our frequency control components for training examples where necessary, though there will be no sales pitch for Vectron Products. These classes have been attended by both technical and non-technical personnel with excellent results. The training session is free and you will be provided with all reference material required. Sessions are held several times per year at our facilities in Mt. Holly Springs, PA, Neckarbischofsheim, Germany and Hudson, NH. To get more information on our FCU, log onto our website at www.vectron.com and click on Vectron FCU.

Vectron's Precision Filter Capability

Vectron International, Inc. is a leading manufacturer of precision Crystal, SAW and LC Filters for the Military and Space market place. We have been manufacturing filters since 1956 and have supplied these products for thousands of different military applications. Whether your application is ground based, ship based, airborne or in deep space, Vectron has the engineering capability and manufacturing expertise necessary to assure the success of your project. Most filters we manufacture are considered "custom" and we have thousands of successful "custom" designs in our files. Let us design one for you.

Frequency and Bandwidth Range of Vectron's Filter Offerings



Filter Technology

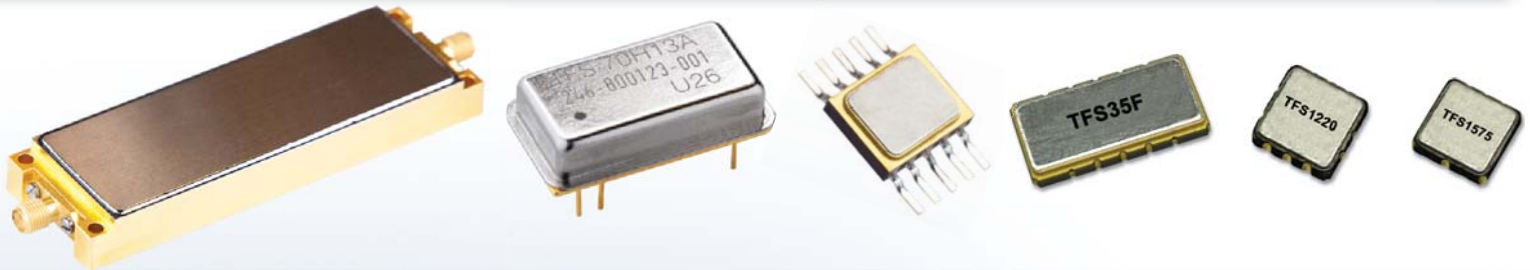
Specification	SAW Filter	Monolithic / Discrete Crystal Filter	LC Filter
Frequency	30 MHz to 2.7 GHz	1.4 MHz to 250 MHz	1 MHz to 1 GHz
Bandwidth	0.01% to 60% some limitations apply	<.001% to >1% some limitations apply	>5% some limitations apply
Filter Type	Bandpass, Bandstop, Delay Lines, Resonators, Du-/Diplexer	Bandpass, Bandstop	Bandpass, Bandstop, Lowpass, Highpass
Response Characteristics	Butterworth, Chebyshev, Reactance Filters, various FIR and IIR types	Gaussian, Chebyshev, Butterworth	Gaussian, Chebyshev, Butterworth
Shape Factor	≥ 1.03:1	1.4:1 to 30:1	1.25:1 to 30:1 some limitations apply
Packaging Attributes	Ceramic QFN/DFN, Connectorized, Through Hole, Surface Mount, Hermetic	Options include: Leaded or Leadless Crystal Packages, Through-Hole, Surface Mount, Connectorized, Solder Sealed	Options Include: Through-Hole, Surface Mount, Connectorized, Solder Sealed

SAW Filters

The Vectron Military and Space Family of SAW Filters offers high reliability under the most stringent environmental conditions. However, each solution is unique to a particular requirement. Therefore, Vectron's SAW design team offers custom filter designs over a wide frequency range from 30 MHz to 2.7 GHz.

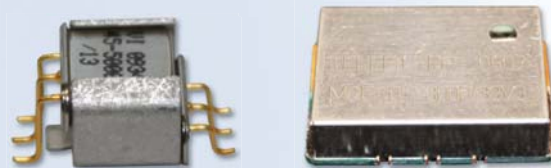
- Low Loss SAW = approx. 1...5dB insertion attenuation ($f_c \leq 2.7\text{GHz}$)
- Loss Reduced SAW = approx 5...15dB insertion attenuation ($f_c \leq 1\text{GHz}$)
- Precision high-loss SAW: $\geq 10\text{dB}$ insertion attenuation; shape factor ≥ 1.03 ($f_c \leq 1\text{GHz}$)

In addition, we have hundreds of filters already designed and production ready which can be built and screened to most military and Space requirements. The SAW Filters shown are only a sample of the many filters available for military applications. We invite you to visit our website at www.vectron.com to see a listing of most of the standard products available.



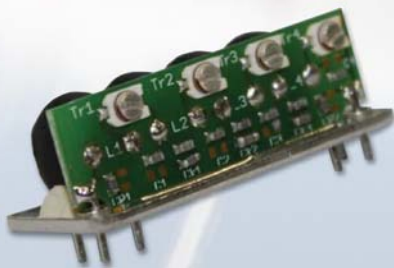
Monolithic Crystal Filter

Vectron offers a wide array of standard monolithic (MCF) type crystal filters for use in military and space applications in the 10.7 MHz, 21.4 MHz, 45 MHz, 70 MHz and 90 MHz center frequencies. In addition, Vectron also offers other standard designs in the center frequency range of 1.4 MHz to 173 MHz with designs from 2 poles to 12 poles. We invite you to see our complete listing on our website at www.vectron.com.



LC Filters

For military and space applications requiring bandwidth in excess of 5% of center frequency, Vectron LC filters can provide the necessary selectivity and reliability to meet system performance objectives. See our technology matrix (preceding page) or visit www.vectron.com for more details.



World-Wide Locations

United States

VI Hudson, Corporate Headquarters
 267 Lowell Road, Suite 102
 Hudson, NH 03051
 Tel: 1.888.328.7661
 Fax: 1.888.329.8328

VI Mount Holly Springs
 100 Watts Street
 Mount Holly Springs, PA 17065
 Tel: 1.717.486.3411
 Fax: 1.717.486.5920

* Military/Space
 Center of
 Excellence

VI Cincinnati
 4914 Gray Road
 Cincinnati, OH 45232
 Tel: 1.513.542.5555
 Fax: 1.513.542.5146

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 Landstrasse, D-74924
 Neckarbischofsheim, Germany
 Tel: +49 (0) 7268.8010
 Fax: +49 (0) 7268.801281

VI Teltow
 Potsdamer Strasse 18
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 Fax: +49 (0) 3328.4784.30

Asia

VI Shanghai
 68 Yin Cheng Road(C), 22nd Floor
 One LujiaZui
 Pudong, Shanghai 200120, China
 Tel: 86.21.6194.6886
 Fax: 86.21.6163.3598

VI Singapore
 56 Serangoon North Avenue 4, #06-01
 Singapore, 555851
 Tel: 65.6555.1926
 Fax: 65.6555.4377



Helping Customers Innovate, Improve & Grow

Test Capabilities

Test	MIL-STD-202		MIL-STD-883		In-House Testing
	Method	Test Cond.	Method	Test Cond.	
Salt Atmosphere	101	A,B	1019	A,B,C,D	✓
Temperature Cycling	102	C	1010	A,B,C	✓
Humidity	103	A,B			✓
Immersion (Seal)	104	A,B,C	1002	A,B,C	✓
Moisture Resistance	106		1004		✓
Thermal Shock	107	All	1011	All	✓
Life	108	A,B,C,D	1005		✓
Seal	112	All	1014	A,C	✓
Vibration, Sine	204	All		A,B,C	✓
Vibration, Random	214	All	2007		✓
Radiographic (Real Time)	209		2012	A,B,C,D,E,F	✓
Acceleration	212	A,B,C	2001		✓
Shock	213	All	2002	A,B	✓
PIND			2020		✓
Solderability w/Steam Age	208		2003		✓
Barometric Pressure	105	A,B,C			✓
Resistance to Soldering Heat	210	B,C			✓
Aging at Room Temperature					✓
Aging at Elevated Temperature					✓
Die Shear Testing			2019		✓
Terminal Strength	211	A,B,C			✓
Phase Noise Under Vibration					✓
g Sensitivity					✓
Wirebond Pull Testing			2023,2011		✓
XRF Testing (Pure Tin)					✓
RGA	Outside Test				
Radiation	Outside Test				
Pyrotechnic Shock	Outside Test				

World Class Production & Test

Our space and military hybrid manufacturing and test facilities are segregated from our commercial product areas with their own engineering, management and quality personnel providing a focused approach to giving our customers the best in quality and on-time deliveries.

Our people are our most valuable asset and production, engineering and management personnel provides us with experience unparalleled in our industry. Our most experienced production people are assigned to the military and space product lines providing a top quality product.

We have two Class 100,000 clean rooms totaling 9,350 sq ft for our hybrid production which are maintained to Class 10,000 and the many additional Class 100 Laminar Flow work centers provide us with the right environment to build products second to none in our industry. Couple the clean room area with state-of-the-art manufacturing equipment and the industry's best people, and it's easy to see why Vectron is the global leader in military frequency control products.



Our Quality Policy

Vectron is, and will remain, a world-class supplier to its global market and will apply innovative, forward-looking, ethical principles in complying with requirements of the market. We are totally committed to recognizing the needs of our customers, and responding to those needs with superior quality, service, responsiveness, and specification compliance. All of our employees are dedicated to these principles with total customer satisfaction and continual improvement as their constant goal.

- ISO 9001:2000 Certified
- Quality Verification using Real Time X-Ray
- Level III Certified Radiographer
- Quality Engineers/Reliability Engineers

General Notes of Interest

No Pure Tin:

Vectron is aware of the stringent requirement from many of our customers to assure that no components contain pure tin. In order to meet this requirement and assure that the reliability of the products are not jeopardized with pure tin, Vectron has on site XRF capability in order to perform 100% verification of the plating on incoming components.

Mounting Points on Crystal Blanks:

The extreme shock and vibration levels specified for military applications are of special interest to all engineers. The most fragile component used in oscillators and filters is the quartz crystal. Vectron engineers will specify a 3 or 4 point mount on the crystal blanks where extreme ruggedization is mandated.

AS9100 - Quality Management Standard:

Vectron is certified as an AS9100 supplier. AS9100 is a Quality management standard (QMS) for the Aerospace Industry based on a set of standards developed by the International Aerospace Quality Group (IAQG) that addresses the stringent quality requirements and unique demands of the defense and commercial Aerospace industry. Certification against AS/EN 9100 standard requirements focuses on areas directly impacting reliability and results in a robust process from initial design, through supply chain, production, testing and verification. AS9100 is similar to ISO 9001:2000 with nearly 100 additional requirements specific to Aerospace, and ensures that each phase of product realization, from planning, procuring and manufacturing to shipment is controlled for delivery of product conforming to customer requirements.

Source Inspections:

Many military programs require a source inspector to visit our plant and view the units just prior to their sealing process (pre-cap inspection) and also to review the test data package and mechanical dimensions and marking just prior to final shipment (final source inspection). We have source inspectors visiting our plant on a daily basis and our Quality personnel are able to efficiently handle this task. We are also able to provide Government Source Inspection and are serviced by government inspectors working out of the New Cumberland, PA office of DCMA.

Program Management:

For those customers requiring a higher level of order visibility and supplier communications for critical programs, Vectron's Program Management is an essential element of their purchase order. The assigned program manager will follow the project from beginning to end and communicate order progress with the customer on a regular basis.

Acceptance Test Procedure:

Acceptance Test Procedures (ATP) are written to assure all customers requirements are met and documented throughout the test process. When required by the sales order, ATPs will be submitted to the customer for approval prior to testing.

Qualification Test Procedure:

Similar to the ATP, Qualification Test Procedures (QTP) are written when qualification is required per the sales order. The QTP will be forwarded to the customer for approval prior to the start of qualification testing.

Groups A, B, and C Testing, QCI Inspection, etc:

Whatever the testing requirements are for a military order, Vectron has a fully equipped testing laboratory along with test engineers capable of performing most of the normal environmental test sequences. See the section on In-House test capabilities for details on this subject.

Parts and Materials List; Counterfeit Material Control:

Bills of materials (BOM) and Process Identification Documents (PID) will be provided to the customer when required by the sales order. If customer approval is required, manufacturing of the product will not start until the BOM and/or PID is approved. Vectron has a counterfeit control program to ensure only authentic materials are used in the product.

PDR/CDR/MRR:

Preliminary Design Reviews (PDR), Critical Design Reviews (CDR), Manufacturing Readiness Reviews (MRR) and Stress Simulation Analysis are often required on sales orders by our customers. Typically design reviews are performed on site at Vectron, since a tour of factory and processes are usually part of the review. If necessary, we can also accommodate design reviews via video conference or teleconference.