



S I L I C O N L A B O R A T O R I E S

Silicon Laboratories Enters the
Frequency Control Market

Silicon Laboratories' Product Portfolio



Wireless Solutions

- Aero[®] Transceiver**
- Power Amplifier**
- Broadcast Radio Tuners**
- RF Synthesizer**
- FM Tuners**



Wireline Solutions

- Silicon DAA**
- ISOmodem[®]**
- ProSLIC[®]**
- DSL AFE**



Microcontroller Solutions

- Precision Mixed-Signal**
- Small Form Factor**
- General Purpose**
- CAN**
- USB**
- Interface Products**
- Digital Power Controllers**



Networking Solutions

- SiPHY[®] Transceiver**
- SiPHY CDR**
- Precision Clock**



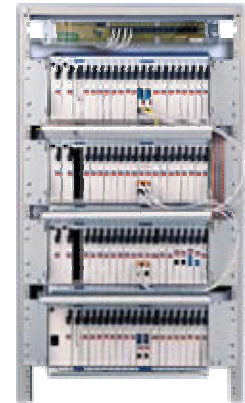
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Networking Product Family



Networking Solutions

- ◆ **SiPHY Transceivers**
- ◆ **SiPHY Clock & Data Recovery ICs**
- ◆ **Precision Clocks**
- ◆ **Frequency Control Solutions**



Applications:

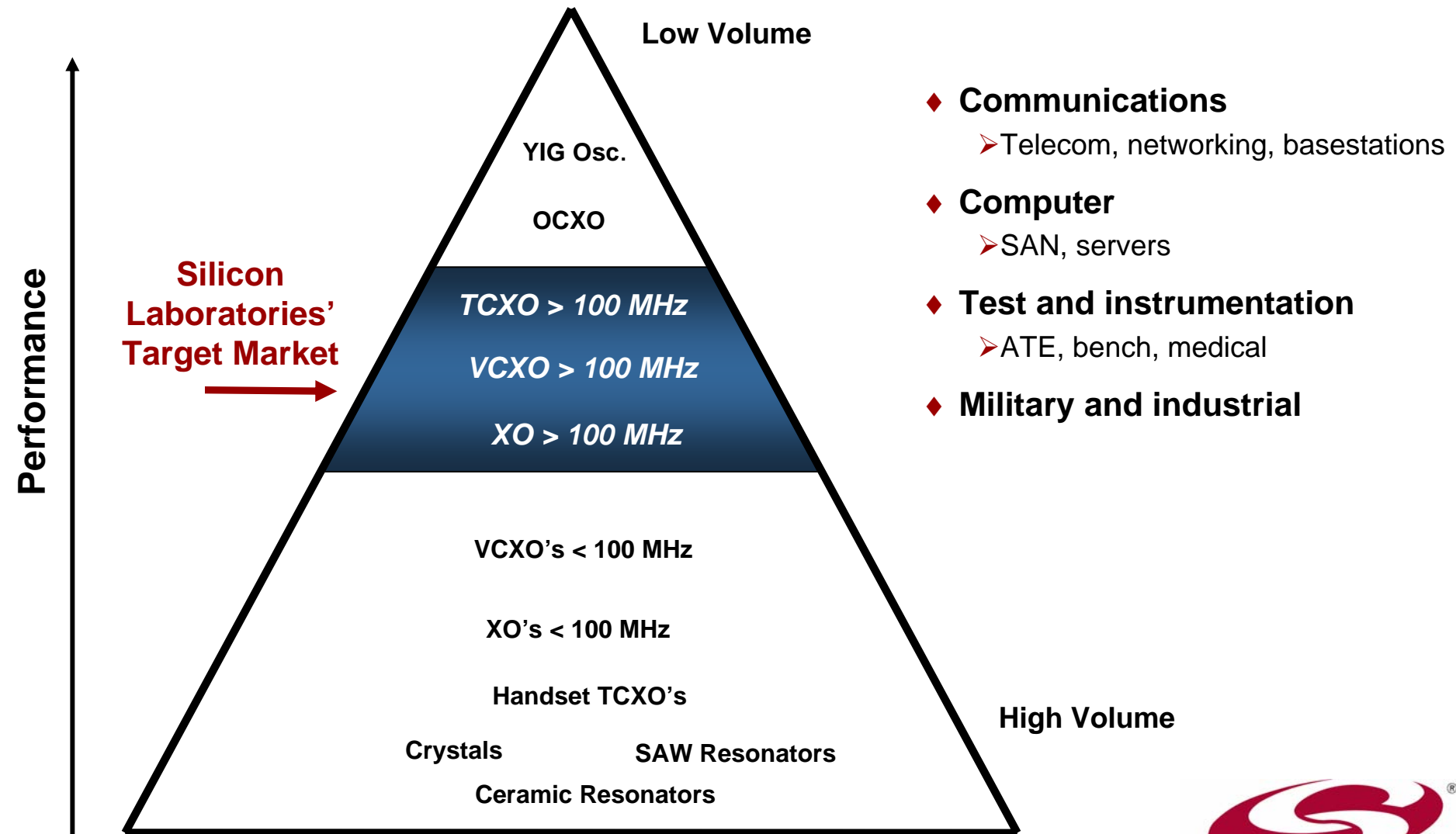
SONET/SDH Optical Port Cards
Multi-Service Edge Equipment
Long-Haul Transmission Equipment
Test and Measurement Equipment
Communications Equipment

"Innovative, low jitter physical layer
and clock ICs that are ahead of their time."

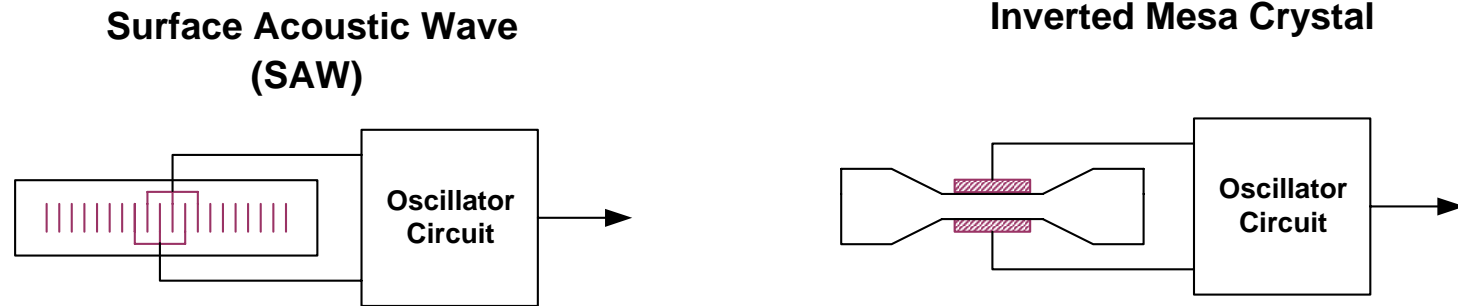


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Frequency Control Market

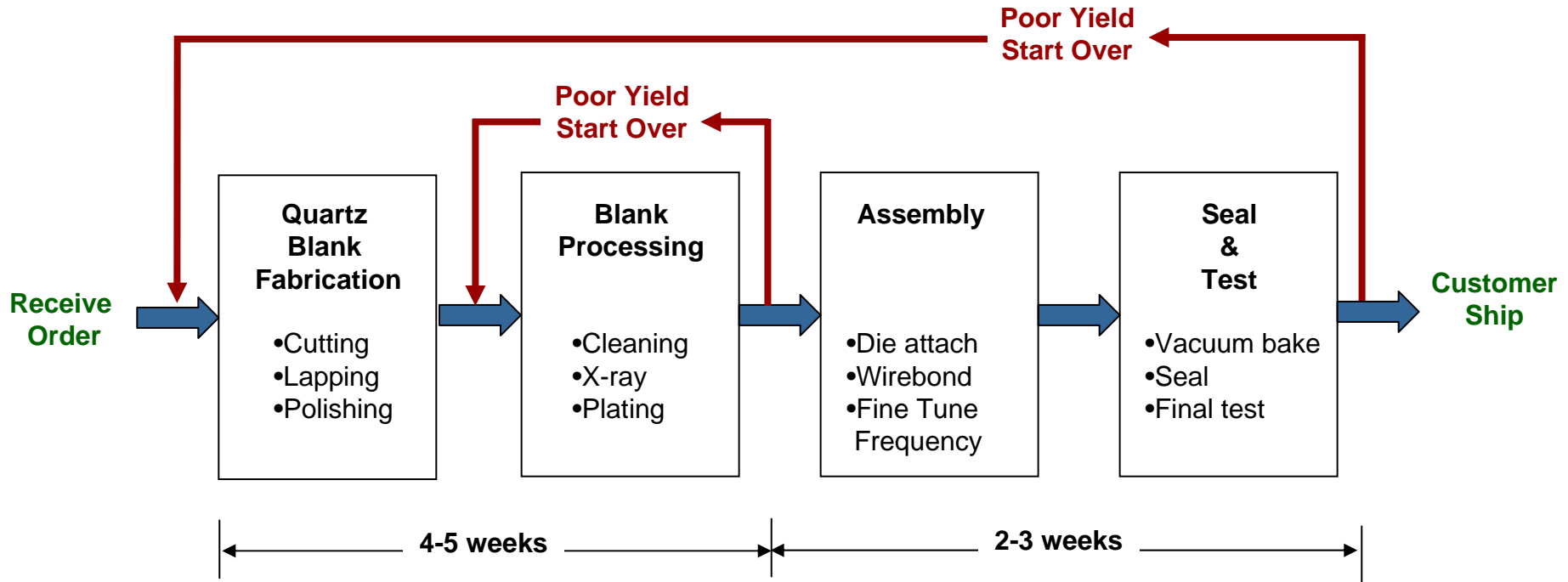


High Frequency Oscillators Today



- ◆ **High frequency oscillators require complex materials processing**
 - Frequency tuned by adding/removing layers of atoms
- ◆ **Specific resonators must be fabricated for each frequency**
- ◆ **Traditional high frequency oscillator technology has issues**
 - Long unpredictable lead times
 - Poor frequency stability over time and temperature
 - Mechanical reliability (for inverted mesa-based oscillators)

Today – Long Unpredictable Lead Times



- ◆ **Unique blanks must be fabricated for each oscillator frequency**
- ◆ **High frequency oscillators require precision processing**
 - Frequency tuned by adding or removing atomic layers of material
- ◆ **Manufacturing process subject to poor yields**



Silicon Laboratories' Frequency Control Products

- ◆ Si530/Si550 high frequency, low jitter XO and VCXO products
- ◆ Revolutionary manufacturing flow, industry's shortest lead times
- ◆ New level of reliability
- ◆ Industry's first quad frequency XOs and VCXOs
- ◆ Based on Silicon Laboratories' patented DSPLL[®] architecture

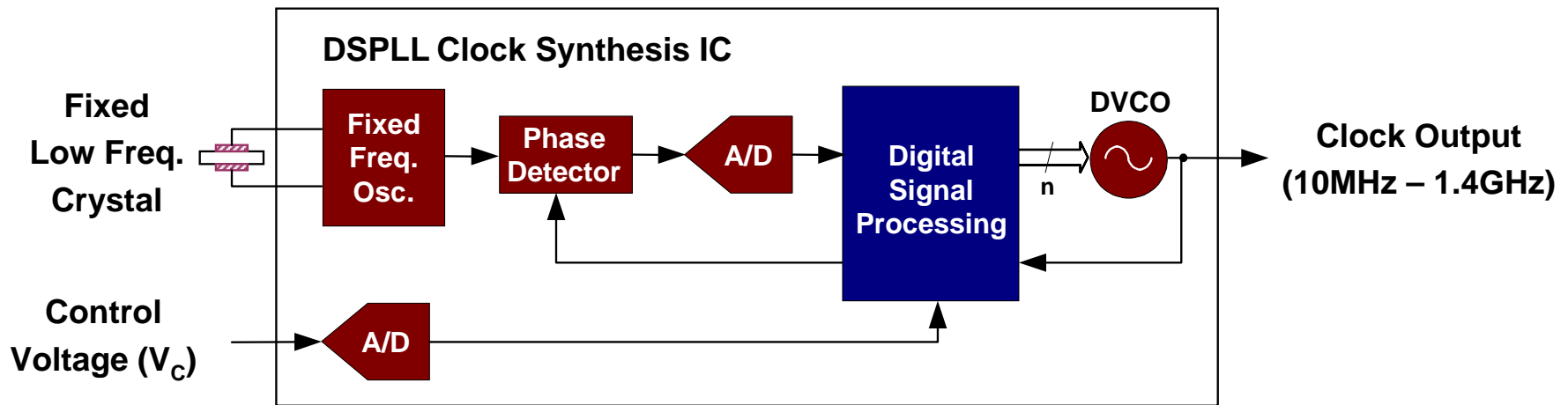


Finally, precision clocks that are on time!



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The DSPLL Advantage

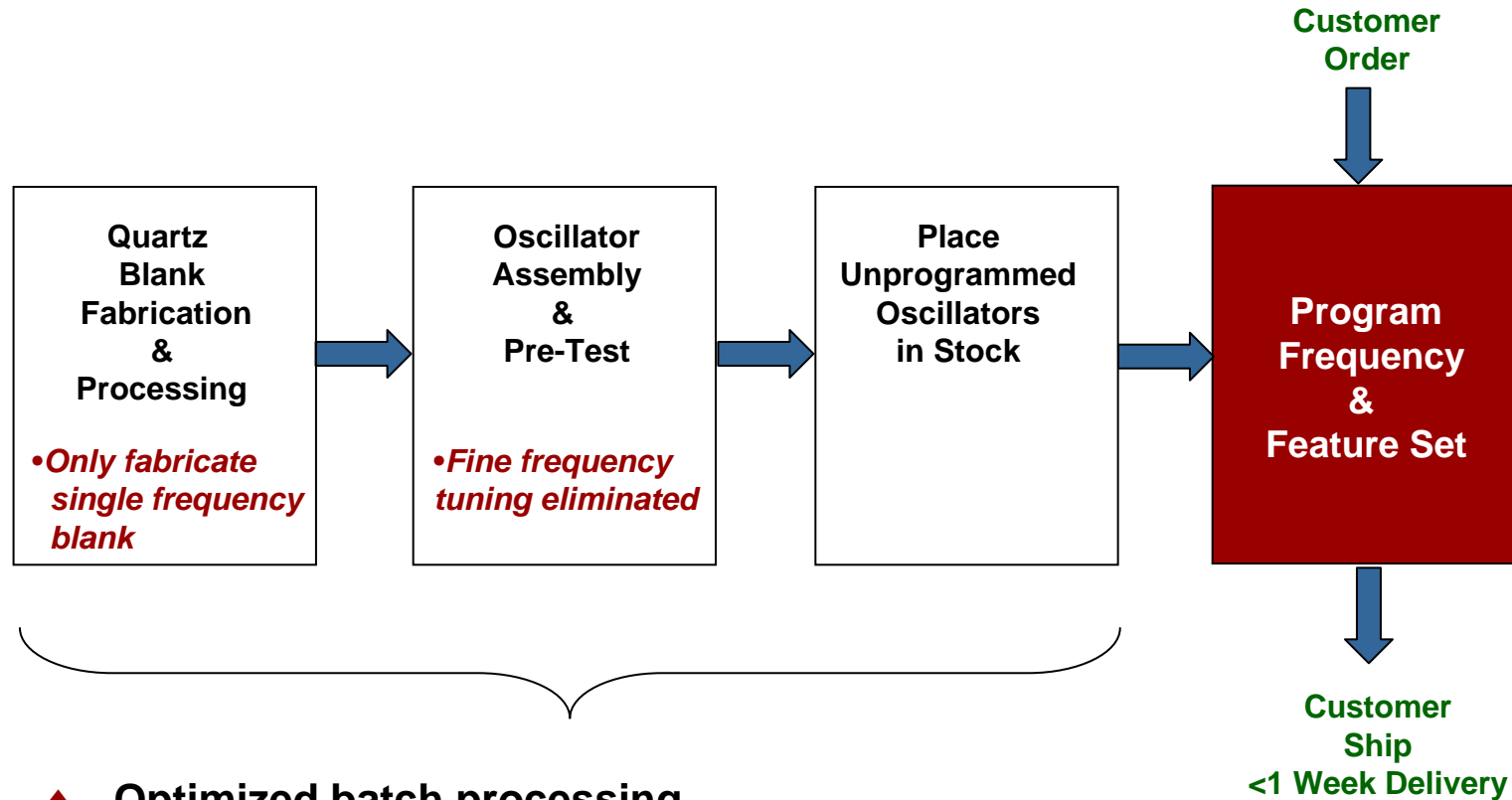


- ◆ **DSPLL eliminates need for complex high frequency resonators**
 - All frequencies generated from simple, fixed, low frequency, resonator
- ◆ **Output frequency set by programming the DSPLL**
 - Tuning resolution <1ppb
- ◆ **DSPLL-based oscillator technology has advantages**
 - Short lead-times
 - Better frequency stability over time and temperature
 - Wide output frequency range 10MHz to 1.4GHz



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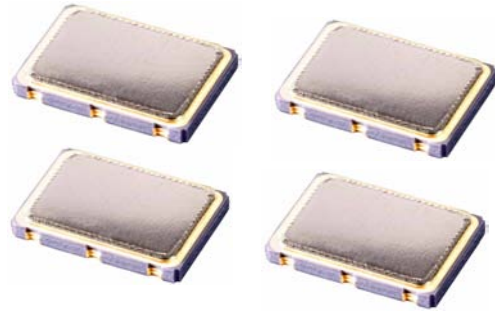
DSPLL Technology - Short Lead Times



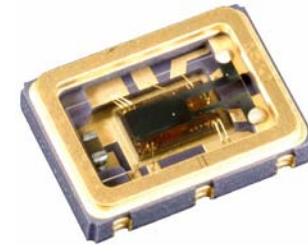
- ◆ Optimized batch processing
- ◆ Fine frequency resonator tuning eliminated
- ◆ Uses easy to make low frequency resonator



New Architecture Provides Big Benefits



Replace Four Discretes



With One

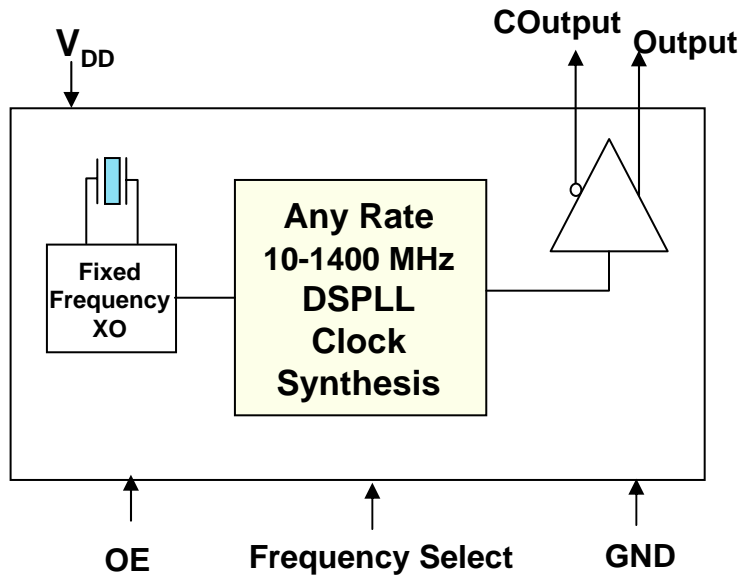
- ◆ **Quad frequency operation**
- ◆ **Significantly improved reliability**
 - Big reduction in frequency drift with aging and temperature
 - Significantly improved initial frequency accuracy
- ◆ **Significantly improved performance**
 - Excellent jitter performance (<0.3 ps RMS typ)
 - Big improvement in control voltage linearity
 - Big increase in immunity to supply voltage noise



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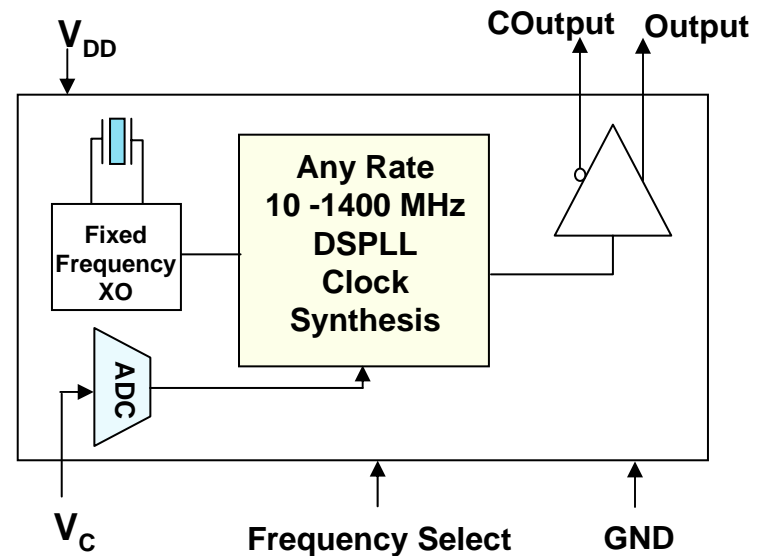
Silicon Laboratories XO/VCXO Products

XO - Si530, Si532, Si534



- ◆ Supports frequencies up to 1.4GHz
- ◆ Multi-frequency operation via pin select
- ◆ Common output formats (LVPECL, LVDS, CMOS and CML)
- ◆ Low voltage operation supported (3.3, 2.5 and 1.8V)
- ◆ Industry standard 5 x 7mm package

VCXO - Si550, Si552, Si554



Same base features as Si530 plus:

- ◆ Multi-frequency operation via pin select
- ◆ Selectable VCXO parameters (pull range and K_V)
- ◆ Industry's best control voltage linearity (+/- 1% typical)



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Silicon Laboratories vs. Conventional Solutions

Parameter	Inverted Mesa (XO/VCXO)	SAW Oscillators (SO/VCSO)	Si530/Si550	
Frequency (MHz)	Fixed	Fixed	Any Rate: 10 - 1400	
Initial Accuracy (ppm)	10	25	1	← 10X Better
Temperature Stability (+/- ppm)	25	100	20	
Yearly Aging (ppm)	5	10	1	← 5X Better
Tuning Linearity (% from BSL)	15	10	<5	← 3X Better
Supply Noise Rejection	Medium	Low	High (best)	
Lead time	8 weeks	8 weeks & new SAW mask	<1 week: any frequency	



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Summary

- ◆ The Si530 and Si550 fundamentally change the frequency control market
- ◆ DSPLL is the patented technology that enables the mixed-signal innovation in frequency control
- ◆ The Si530 & Si550 families enables the shortest lead times for high frequency, low jitter XO and VCXO devices
- ◆ The Silicon Laboratories devices offer a higher standard of reliability and improved performance





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