

Timing Simplified

Silicon Labs offers a broad portfolio of frequency flexible timing products that enable hardware designers to simplify clock generation, distribution, and jitter attenuation. The portfolio includes:

- Network synchronizers
- Jitter attenuating clocks
- Clock generators
- Clock buffers
- PCIe clocks and buffers
- Oscillators (XO/VCXO)

Silicon Labs clocks use proprietary DSPLL and MultiSynth technologies to generate any combination of frequencies with ultra-low jitter, enabling best-in-class clock tree integration. Clock buffers provide low-jitter, low-skew clock distribution with integrated format/voltage level translation. PCIe clocks/buffers combine Gen 1/2/3/4 compliance with on-chip series termination, simplifying design. XO/VCXOs are factory-customizable to any frequency, with samples available in one to two weeks.



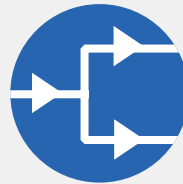
Oscillators

- Any frequency up to 1.5 GHz
- Ultra-low jitter: 80 fs RMS
- Short lead times: 1-2 weeks (samples)



Clock Generators

- Any-frequency, any-output
- Ultra-low jitter: 90 fs RMS
- Clock tree on a chip replaces clocks and XOs



Clock Buffers

- Integrated format/level translation
- Ultra-low additive jitter: 50 fs RMS
- PCI Express Gen 1/2/3/4 compliant



Jitter Attenuating Clocks/Network Sync

- Any frequency, any output
- Ultra-low jitter: 90 fs RMS
- Clock tree on a chip replaces clocks, XOs, VCXOs

Recommended Timing Solutions for Xilinx



Protocol	Xilinx										Silicon Labs							
	Virtex			Kintex			Artix	Zynq	Jitter Band (MHz)	Refclk TJ rms max (fs)	XO/VCXO			Buffer	Clock Gen			Jitter Atten
	Ultra Scale+	Ultra Scale	7	Ultra Scale+	Ultra Scale	7	7	Ultra Scale+			Si51x	Si59x	Si54x	Si533xx	Si5338	Si5322	Si5341	Si534x/8x
SGMII/QSGMII	✓	✓	✓	✓	✓	✓	✓	✓	1-20	1400	✓	✓	✓	✓	✓	✓	✓	✓
QPI		✓	✓		✓	✓	✓		Intel	200	✓		✓	✓	✓	✓	✓	✓
SAS/SATA 6G	✓	✓	✓	✓	✓	✓	✓	✓	2.6-15	780	✓	✓	✓	✓	✓	✓	✓	✓
SAS/SATA 12G	✓	✓	✓	✓	✓	✓	✓	✓	2.6-15	390	✓		✓	✓		✓	✓	✓
SDI 3G, 6G		✓	✓		✓	✓	✓		0.1-F/2	800		✓	✓	✓		✓	✓	✓
SDI 12G		✓	✓		✓	✓	✓		0.1-F/2	400		✓	✓	✓		✓	✓	✓
SFI-5.1		✓	✓		✓	✓			4-20	1300	✓		✓	✓	✓	✓	✓	✓
SFI-5.2		✓	✓		✓	✓			4-20	380	✓	✓	✓	✓		✓	✓	✓
RapidIO-1, -2, -3		✓	✓		✓	✓	✓		4-20	410	✓	✓	✓	✓	✓	✓	✓	✓
RapidIO-4		✓	✓		✓	✓	✓		1.9-10	290		✓	✓	✓		✓	✓	✓
SONET/SDH OC-48		✓	✓		✓	✓			1-20	1000	✓		✓	✓	✓	✓	✓	✓
SONET/SDH OC-192		✓	✓		✓	✓			4-20	240		✓	✓	✓		✓	✓	✓
XAUI 10GBASE-X		✓	✓		✓	✓	✓		0.6-20	430	✓		✓	✓	✓	✓	✓	✓
XLAUI (40GbE)		✓	✓		✓	✓	✓		0.6-20	430	✓		✓	✓		✓	✓	✓

Xilinx UltraScale+ Phase Noise Mask Requirements



Xilinx Virtex, Kintex UltraScale+ GTY Transceiver		XO		VCXO	Clock Buffer	Clock Generator			Jitter Attenuating Clock	Network Synchronizers (SyncE/1588)
Offset	QPLL PN 156.25 MHz (dBc/Hz)	Si540 (dBc/Hz)	Si570/ Si53x (dBc/Hz)	Si55x (dBc/Hz)	Si5330x Universal Buffers (dBc/Hz)	Si5341 Si5340 (dBc/Hz)	Si5332 (dBc/Hz)	Si5338 Si5335 (dBc/Hz)	Si5347/6/5/4/2 (dBc/Hz)	Si5383/48 (dBc/Hz)
10 Hz	-112	-132	-129	-132	-140	-136	-125	126	-136	-137
100 kHz	-128	-151	-134	-142	-150	-141	-132	132	-141	-145
1 MHz	-145	-160	-145	-148	-154	-150	-145	132	-154	-150

Xilinx Zynq UltraScale+ GTH Transceiver		XO		VCXO	Clock Buffer	Clock Generator			Jitter Attenuating Clock	Network Synchronizers (SyncE/1588)
Offset	QPLL PN 156.25 MHz (dBc/Hz)	Si540 (dBc/Hz)	Si570/ Si53x (dBc/Hz)	Si55x (dBc/Hz)	Si5330x Universal Buffers (dBc/Hz)	Si5341 Si5340 (dBc/Hz)	Si5332 (dBc/Hz)	Si5338 Si5335 (dBc/Hz)	Si5347/6/5/4/2 (dBc/Hz)	Si5383/48 (dBc/Hz)
10 Hz	-111	-132	-129	-132	-140	-136	-125	126	-136	-137
100 kHz	-130	-151	-134	-142	-150	-141	-132	132	-141	-145
1 MHz	-136	-160	-145	-148	-154	-150	-145	132	-154	-150

Xilinx UltraScale Phase Noise Mask Requirements



Xilinx Virtex, Kintex Ultrascale GTY Transceiver		XO		VCXO	Clock Buffer	Clock Generator			Jitter Attenuating Clock	Network Synchronizers (SyncE/1588)
Offset	QPLL PN 156.25 MHz (dBc/Hz)	Si540 (dBc/Hz)	Si570/ Si53x (dBc/Hz)	Si55x (dBc/Hz)	Si5330x Universal Buffers (dBc/Hz)	Si5341 Si5340 (dBc/Hz)	Si5332 (dBc/Hz)	Si5338 Si5335 (dBc/Hz)	Si5347/6/5/4/2 (dBc/Hz)	Si5383/48 (dBc/Hz)
10 Hz	-112	-132	-129	-132	-140	-136	-125	126	-136	-137
100 kHz	-128	-151	-134	-142	-150	-141	-132	132	-141	-145
1 MHz	-145	-160	-145	-148	-154	-150	-145	132	-154	-150

Xilinx Virtex, Kintex Ultrascale GTH Transceiver		XO		VCXO	Clock Buffer	Clock Generator			Jitter Attenuating Clock	Network Synchronizers (SyncE/1588)
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10 Hz	-111	-132	-129	-132	-140	-136	-125	-126	-136	-137
100 kHz	-130	-151	-134	-142	-150	-141	-132	132	-141	-145
1 MHz	-136	-160	-145	-148	-154	-150	-145	132	-154	-150

For more information, visit silabs.com/timing