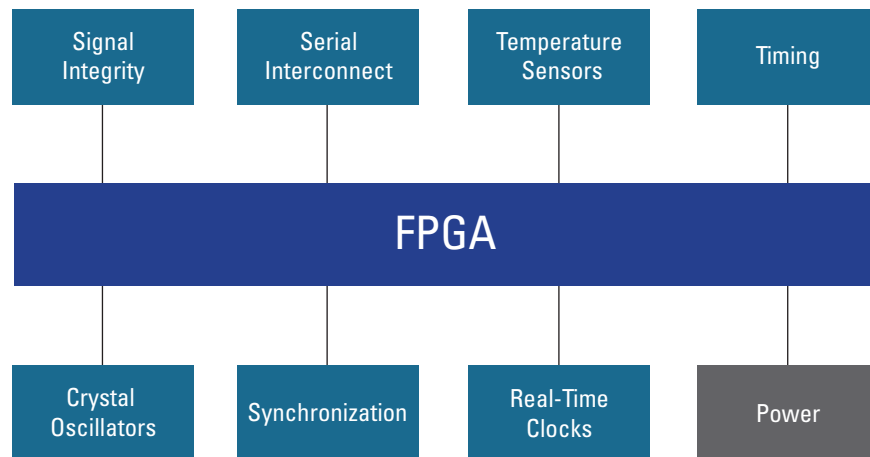


IDT Solutions for FPGAs

IDT's broad portfolio of analog and mixed-signal solutions is well-suited for FPGA and multiprocessor SoC applications. High-performance interconnect devices and industry-leading timing solutions address the stringent requirements of programmable solutions, while wide design margins and flexible timing architectures help ease the clock tree design and implementation process.



Timing Products for FPGAs

IDT is in a unique position to address the needs of virtually any application. Our industry-leading portfolio of timing devices consists of clock generators, buffers, dividers, multiplexers, crystal oscillators, and jitter attenuators with frequency translation – many with programmable capabilities for maximum flexibility. Application-specific clock ICs address needs for RF timing and network synchronization, including JESD204B, Synchronous Ethernet, IEEE 1588, PDH, and SONET / SDH.

Frequency Control	Clock Generators	Buffers	Jitter Performance (RMS)	Applications
CMOS Oscillators	CMOS Clock Generators	CMOS Buffers	3 ps	Consumer, Embedded Computing
Differential XO, VCXO	Differential Clocks, PCIe Clocks	Differential Buffers, PCIe Buffers	3 ps - 1 ps	Datacenter, Server, Storage
Low Jitter XO, VCXO	Jitter Attenuator Clocks	Differential Buffers	1 ps - 100 fs	Enterprise Switch /Router, Communications
			< 100 fs	RF and Military

Programmable Clocks

Programmable clock generators allow designers to save board space and cost by replacing crystals, oscillators, and buffers with a single timing device. This makes them well-suited for consumer, data communications, telecommunications and computing applications.

UNIVERSAL FREQUENCY TRANSLATOR FAMILY

- Synthesizer or jitter attenuator modes
- Translations from virtually any input frequency to any output frequency
- Eight independently programmable clocking outputs
- Flexibility to generate eight different frequencies in up to four frequency domains
- Excellent phase noise performance
- Redundancy for high reliability



VERSACLOCK® 6E PRODUCT FAMILY

- < 500 fs RMS phase jitter for stringent noise requirements
- 30 mA core current consumption
- Any-in, any-out frequencies with four fractional dividers
- Four individually programmable output pairs support LVDS/LVPECL/HCSL/CMOS
- No external memory needed – four configurations available in OTP
- I²C programmable
- PCIe Gen 1/2/3/4 standard-compliant

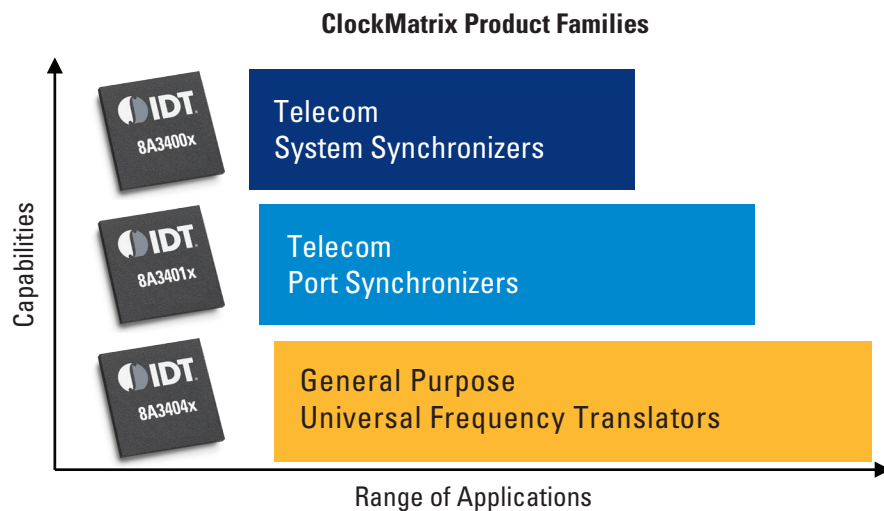


Network Synchronization

IDT's portfolio of DPLLs (digital PLLs) for IEEE 1588 and Synchronous Ethernet are designed for synchronization over packet switched networks. Embedded DCOs (digitally controlled oscillators) can be used as low-jitter synthesizers for IEEE 1588 clock recovery algorithms.



The ClockMatrix™ family of devices are high-performance, precision timing solutions designed to simplify clock designs for applications with up to 100 Gbps interface speeds. A range of devices in the family support BBU, OTN, SyncE, synthesizer and jitter attenuator applications with several density options for each.





Crystal Oscillators

IDT's family of clock oscillators offers designers a reliable on-time solution. Short lead-time, low noise, wide frequency range, excellent temperature versus frequency performance, and very little engineering effort for design in, makes them an excellent choice over conventional solutions. The devices feature stabilities as tight as ± 20 ppm, a range of phase jitter options, and temperature capabilities up to $+105^{\circ}\text{C}$. IDT also offers extremely quick delivery for both standard and custom frequencies from 16 kHz to 2.1 GHz.

ADVANTAGES

- Configurable output type
 - LVCMOS (HCMOS), LVPECL, LVDS, HCSL, and CML
- Phase jitter options
 - 1000 fs, 400 fs, and 150 fs
- 1.8, 2.5, and 3.3VDC voltage options
- Frequency versus temperature performance options from ± 20 ppm to ± 100 ppm



Configurable PLL Oscillator Families

Model	ProXO XF & XP	XU	XL	XA (AEC-Q200)
Package Options	2.5 x 2.0 mm	5.0 x 3.2 mm	3.2 x 2.5 mm	3.2 x 2.5 mm
	3.2 x 2.5 mm		5.0 x 3.2 mm	
	5.0 x 3.2 mm		7.0 x 5.0 mm	
	7.0 x 5.0 mm			
Voltage Options	1.8V, 2.5V, 3.3V	1.8V, 2.5V, 3.3V	2.5V, 3.3V	2.5V, 3.3V
Phase Jitter (12 kHz to 20 MHz)	< 150 fs	< 400 fs	< 1000 fs	< 1000 fs
Outputs	LVDS, LVPECL, HCSL, LVCMOS, CML	LVDS, LVPECL, HCSL, LVCMOS	LVDS, LVPECL, LVCMOS	LVDS, LVPECL, LVCMOS
Frequency Range	15 to 2100 MHz	0.016 to 1500 MHz	0.75 to 1350 MHz	0.75 to 1350 MHz
VCXO option	Yes (analog and I2C)	—	Yes (analog) +/-50ppm APR	—



Making Complex Configurations Simple

IDT Timing Commander is an easy-to-use Windows®-based software platform enabling system design engineers to configure, program and monitor sophisticated timing devices with an intuitive and flexible GUI.

Get command of your timing tree

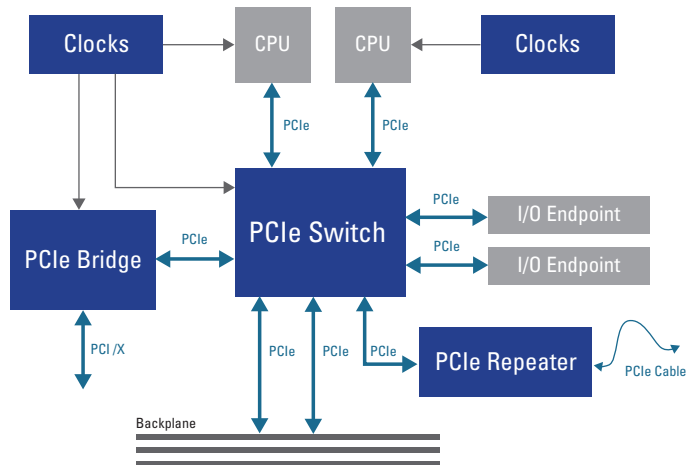
- Configure, program, and monitor sophisticated timing devices
- Create phase noise plots
- Generate schematic symbols and termination circuits
- Calculate estimated power consumption



PCIe and Signal Integrity Products

IDT PCIe® Gen2/Gen3 devices drive long on-board traces, backplane traces and cables to external devices ensuring optimum system performance to address signal integrity challenges for system designers. Our devices offer power saving modes for the lowest-possible power consumption, incorporate advanced receive equalization and transmit de-emphasis capabilities, as well as diagnostic features to help achieve a simplified design and faster time-to-market.

To see the complete portfolio of optimized switches, bridges and signal integrity devices from IDT, visit idt.com/pcie.



PCIe Retimers and Repeaters

Part Number	Channels	Pin Config	I ² C Config	Package (mm)	Contact Pitch (mm)
PCIe 3.0 Retimers					
89HT0808P	8	N	Y	9 x 9 BGA	0.8
89HT0816AP	16	N	Y	15 x 15 BGA	1.0
89HT0832P	32	N	Y	13 x 20 BGA	0.8
89HT0832P	32	N	Y	16 x 24 BGA	1.0
PCIe 2.1 Repeaters					
89HP0504P	4	N	Y	4 x 7.5 QFN	0.5
89HP0504P	4	Y	Y	9 x 9 BGA	1.0
89HP0504PB	4	Y	N	4 x 7.5 QFN	0.5
89HP0508P	8	N	Y	9 x 9 BGA	1.0

PCI Express Bridges

IDT offers bridges connect PCIe® to the PCI and PCI-X bus standards. A PCIe bridge is used to bridge devices that use the PCI/X interface to provide a PCIe connection to a host processor or root complex. Applications include PCIe adapter cards, embedded computing, and motherboards to provide connection to PCI/X devices or additional PCI/X expansion slots.

Bridge	Part Number	PCIe I/F	PCI Speed (MHz)	External Master Support	Power	Package (mm)
PCIe to PCI	89HPEB383	x1 Gen1	32/66	4	450 mW	14 x 14 QFP 10 x 10 QFN
PCIe to PCI	Tsi381	x1 Gen1	32/66	4	700 mW	13 x 13 PBGA
PCIe to PCI	Tsi382	x1 Gen1	32/66	4	700 mW	10 x 10 PBGA
PCIe to PCI-X	Tsi384	x4 Gen1	64/133	4	1.3W	28 x 28 QFP

To request samples, download documentation or learn more visit: idt.com/timing