



CYPRESS **TIMING** SOLUTIONS

THE PIONEER IN PROGRAMMABLE CLOCKS,
WITH A BROAD PORTFOLIO THAT INCLUDES INDUSTRIAL
AND AUTOMOTIVE GRADE PRODUCTS

WHY SILICON TIMING DEVICE?

Clock generators play a key role in designs today. In the pursuit of high speed, many systems have adopted synchronous design styles. With this methodology comes the need for precision frequencies and several copies of these precise clocks. To ensure maximum throughput, in most systems, these clocks need to be in a defined phase relation with one another.

Delay between clocks has also been minimized with the use of phase-locked loops (PLLs). These devices give designers the flexibility to align clock edges or allow them to be moved either ahead or back in time to increase their data valid windows. They can also compensate for trace length delays and unique chip timings. Skew between clocks is also significant to keep all the devices operate in their peak rates. Specialized clock buffers have led the way in providing clean, accurate clock signals.

Electro-magnetic Interference (EMI), is a very important factor in devices used by the general public. Many systems must pass rigorous testing standards before the product is released. The designer is often faced with fixing an EMI problem just prior to the final phase of the design. But on many occasions, it is not well understood what caused the EMI and, worse yet, what could be done about it. Spread spectrum clock generation helps designers overcome EMI issues not delaying product launches in the market.

All the above make clock generators and buffers must devices in today's systems, which offer multiple advantages over traditional crystal timing devices. Cypress offers a broad portfolio of clock generators and buffers to suit your very needs.

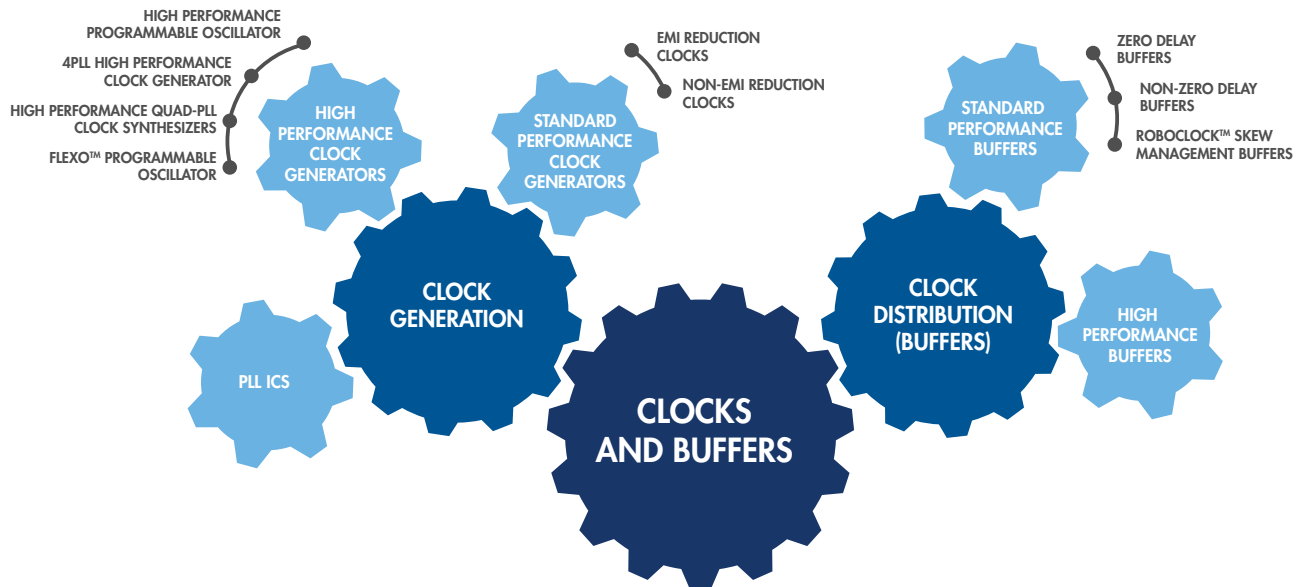
CYPRESS TIMING SOLUTIONS

Cypress is a pioneer in Programmable Timing Solutions since 1996. With over 1700 Clock Marketing Part Numbers, we have shipped more than 2.5 Billion devices over the past 20-plus years, and supported our customers with the most flexible and innovative solutions to their Clock Trees.

Cypress caters to the timing needs of consumer electronics, communication, networking, industrial and automotive applications. Cypress's portfolio of silicon based clock generators and buffers offer the best in class performance in terms of jitter, power, speed, integration and package. Our devices can go as low as 110fs in jitter and generate frequencies up to 2.1GHz. We also have AEC-Q100 qualified devices to offer.

We have a broad portfolio of devices, which includes single and multiple-PLL (Phase Locked Loop) programmable clock synthesizers, programmable crystal oscillators (XO), VCXO (Voltage Controlled Crystal Oscillators), EMI (Electro-Magnetic Interference) reduction clocks, programmable-skew buffers, and zero and non-zero delay buffers.

CYPRESS TIMING SOLUTIONS ROADMAP



	CLOCK GENERATORS			CLOCK BUFFERS
	EMI REDUCTION	NON-EMI REDUCTION	PLL ICs	ZERO/ NON-ZERO DELAY BUFFERS
HIGH PERFORMANCE	CY274x Max. Frequency: 700 MHz 12 Outputs; PCIe 3.0; 4 PLL 0.7-ps RMS Jitter ¹ ; Ind ² ; Auto A ³	CY294x/ CY5107 Max. Frequency: 2.1 GHz 1 Output; 40/100 GbE; 1 PLL 0.15-ps RMS Jitter ¹ ; Ind ²	MB15F63UL Max. Input Frequency: 2 GHz Sigma-Delta and Integer PLL; -88.5 dBc/Hz CNR ⁸ ; Ind ² ;	CY2DLx/DMx/DPx/CPx Max. Frequency: 1.5 GHz 2-10 Outputs; LVDS, LVPECL, CML 0.05-ps RMS Jitter ¹ ; Ind ²
		CY34x8 Max. Frequency: 2.1 GHz 12 Outputs; 1-4 PLL; Hitless Switching ⁶ 0.15-ps RMS Jitter ¹ ; Ind ²		
STANDARD PERFORMANCE		CY2Xx (FlexO™) Max. Frequency: 690 MHz 1 Output; Frequency Margining 0.6-ps RMS Jitter ¹ ; Ind ²		
	CY254x/CY251x Max. Frequency: 166 MHz 3-9 Outputs; 1-4 PLL; I ² C 100-ps CCJ ⁴ ; Ind ²	CY2239x/CY229x/CY2238x Max. Frequency: 200 MHz 3-6 Outputs; 3-4 PLL; I ² C 400-ps CCJ ⁴ ; Ind ² ; Auto E ⁵	MB15E07SL/05SL/03SL Max. Input Frequency: 2.5GHz 1 PLL; < 4mA PSC ⁷ ; Ind ² ;	CY230x/EP0x Max. Frequency: 220 MHz 5-9 Outputs; LVCMOS 22-ps CCJ ⁴ ; Ind ² ; Auto A ³
	CY22800/801/2429x Max. Frequency: 200 MHz 2-4 Outputs; 1 PLL; PCIe 1.1 250-ps CCJ ⁴ ; Ind ² ; Auto A ³	CY22050/150 Max. Frequency: 200 MHz 3-6 Outputs; 1 PLL 250-ps CCJ ⁴ ; Ind ²	MB15E07SR/06SR/05SR Max. Input Frequency: 3GHz 1 PLL; -86 dBc/Hz CNR ⁸ ; Ind ²	CY230xNZ Max. Frequency: 133 MHz 4-18 Outputs; LVCMOS 250-ps CCJ ⁴ ; Ind ²
	MB88151Ax/2Ax/3Ax/4Ax Max. Frequency: 134 MHz 1 Output; 1 PLL; < 200-ps CCJ ⁴ ; Ind ² ;		MB15F78UL/73UL/72UL Max. Input Frequency: 2.6 GHz 2 PLL; < 2.8 mA PSC ⁷ ; Ind ² ;	CY23S02/05/08/09/FP12 Max. Frequency: 200 MHz 2-12 Outputs; Spread Aware 200-ps CCJ ⁴ ; Ind ²
	MB88155x Max. Frequency: 80 MHz 1 Output; 1 PLL; < 200-ps CCJ ⁴ ; Ind ² ;		MB15F07SL Max. Input Frequency: 1.1 GHz 2 PLL; < 5 mA PSC ⁷ ; Ind ² ;	CY7B99x (RoboClock™) Max. Frequency: 200 MHz 8-18 Outputs; Configurable Skew 50-ps CCJ ⁴ ; Ind ²

¹ Integrated phase noise across 12-kHz to 20-MHz offset | ² Industrial grade: -40°C to +85°C | ³ AEC-Q100: -40°C to +85°C

⁴ Cycle-to-cycle jitter | ⁵ AEC-Q100: -40°C to +125°C | ⁶ Automatic clock switching on failure of a clock source

⁷ Power supply current | ⁸ Carrier-to-noise ratio

HIGH PERFORMANCE PROGRAMMABLE OSCILLATOR

SPECIFICATIONS

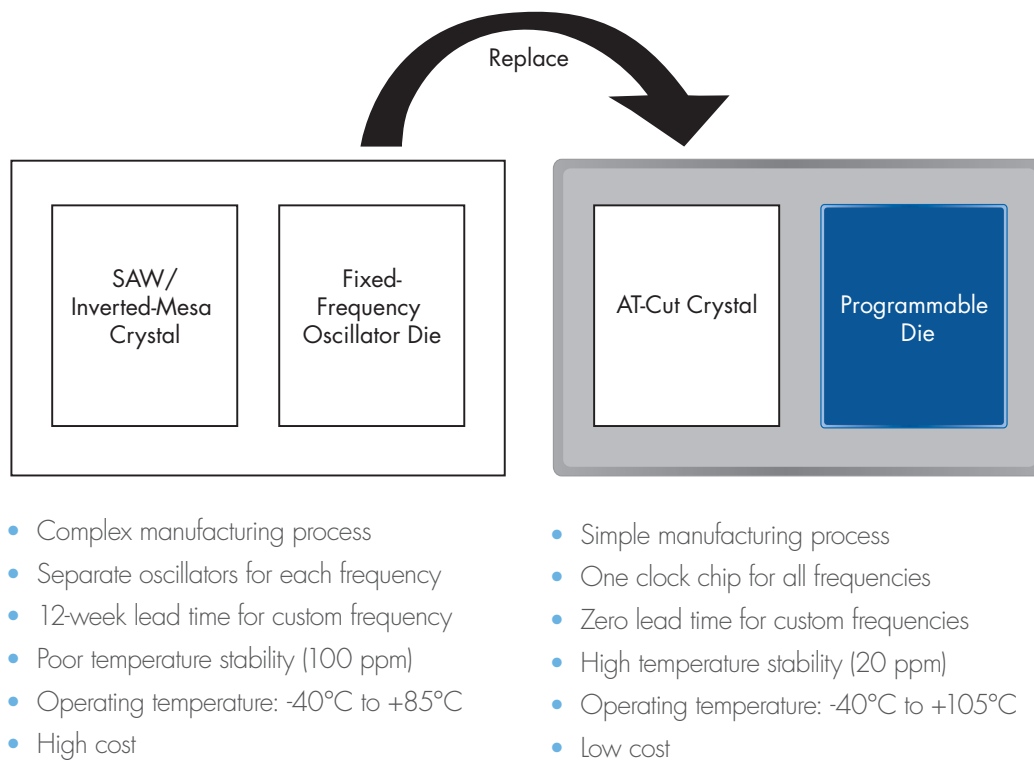
- 1 PLL, 1 Output
- Operating Frequency: 15 MHz to 2.1 GHz
- RMS Phase Jitter: 110 fs
- Operating Temperature: -40°C to +105°C
- Operating Voltage: 3.3 V, 2.5 V and 1.8 V
- Output formats: LVPECL, LVDS, HCSL, CML, LVCMOS
- CY294x represents this family

FEATURES

- VCXO functionality
- Pin Select and I²C programming
- Frequency Select
- Field and Factory-programmable
- Available in the Die form (CY51x7)
- Available in 8-LCC (5.0 x 3.2 and 7.0 x 5.0) and 16-QFN (3.0 x 3.0) packages

APPLICATIONS

Routers, Switches, Base stations, Storage area networks, Network backplanes, Wireless infrastructure, Military/Aerospace, Test and measurement, and Video.



- Evaluation Kit: CY3676 (evaluates CY29412) and CY3677 (evaluates CY29430)
- Programming Software: ClockWizard

4-PLL HIGH PERFORMANCE CLOCK GENERATOR

SPECIFICATIONS

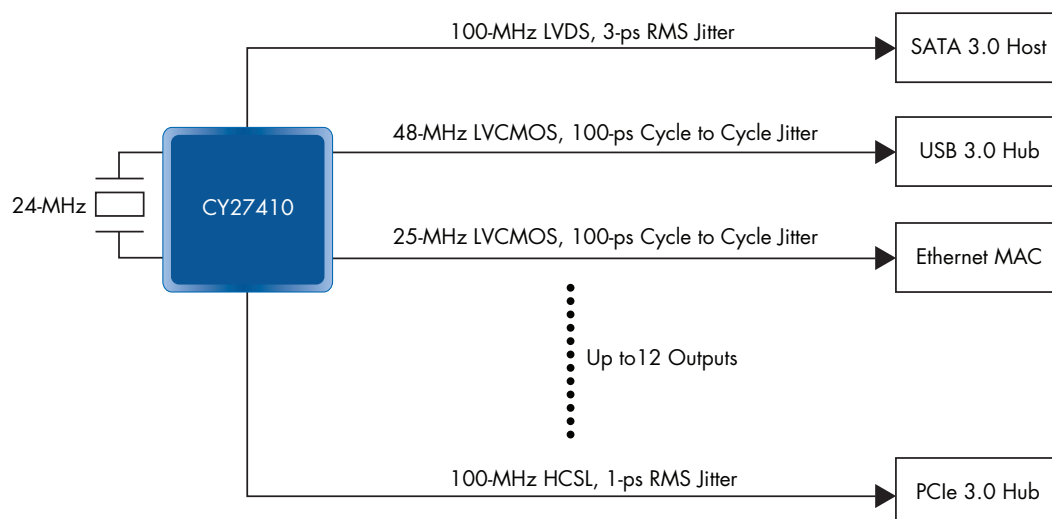
- 4 PLL, 8 - 12 Outputs
- High frequency: 700 MHz
- RMS Phase Jitter: <700 fs
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V, 2.5 V and 1.8 V
- Reference clock support for PCIe 3.0, SATA 2.0, 10 GbE and USB 3.0
- Output formats: LVPECL, LVDS, HCSL, CML, LVCMOS
- Available in 48-QFN package
- CY274x represents this family

FEATURES

- VCXO functionality
- Pin Select and I²C programming
- Frequency Select
- Field and Factory-programmable
- Configurable as Zero or Non-Zero delay buffer
- Glitch-free frequency switching
- PLL cascading
- Real Time Clock (RTC)
- Reduces EMI using Spread Spectrum Modulation
- AEC-Q100 qualified (CY27430) - Sampling

APPLICATIONS

Multi-Function Printers, Car Infotainment Systems, Media Broadcast Systems, Routers & Switches, Femtocells, Storage Networks, Camera, and Medical equipment



- Evaluation Kit: CY3679
- Programming Software: ClockWizard

HIGH PERFORMANCE QUAD-PLL CLOCK SYNTHESIZERS

SPECIFICATIONS

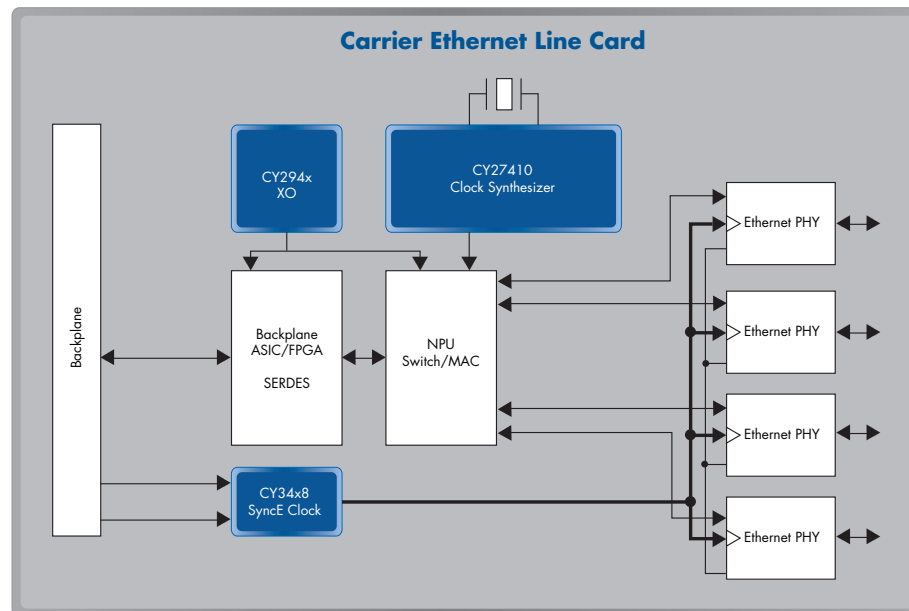
- 4 PLL, 8 - 12 Outputs
- Four inputs supporting frequencies of 8 kHz to 2.1 GHz
- RMS Phase Jitter: ~100 fs
- Twelve outputs supporting frequencies of 8 kHz to 2.1 GHz
- Output formats: LVPECL, LVDS, HCSL, CML, LVCMOS
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V, 2.5 V and 1.8 V
- CY34x8 represents this family

FEATURES

- Four independently configurable PLLs
- Programmable bandwidth from 1 mHz to 4 kHz
- All settings reconfigurable by I²C / SPI
- Completely flexible input to output frequency translation with Jitter Attenuation
- Synchronized, holdover or free run operation modes
- Hitless input clock switching: Auto or manual
- Indicators: Lock Loss, Clock Loss, Frequency Drift
- Field and Factory-programmable
- Available in 64-QFN and 44-QFN packages

APPLICATIONS

OTN, SONET / SDH, xDSL, GbE, Network Backplane, Storage Infrastructure, Broadcast Video, Higher Performance Data Converters, Wireless Infrastructure, Test and Measurement, etc.



- Evaluation Kit: CY3678 (evaluates CY3448)
- Programming Software: ClockWizard

FLEXO™ PROGRAMMABLE OSCILLATOR

SPECIFICATIONS

- 1 PLL, 1 Output
- Operating Frequency: 50 MHz to 700 MHz
- RMS Phase Jitter: ~0.6 ps
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V, 2.5 V
- Output formats: LVPECL, LVDS, LVCMOS
- CY2Xx represents this series

FEATURES

- Integrated frequency margining with 100 ppm precision
- Field or Factory programmable
- VCXO functionality
- I²C programming
- Frequency Select
- Available in 6-LCC (5.0 x 3.2 and 7.0 x 5.0) and 8-TSSOP packages

APPLICATIONS

Switches, routers, storage servers, blade servers, wireless base stations, storage servers, test equipment, and enterprise hard-disk drives

PLL FREQUENCY SYNTHESIZERS

SPECIFICATIONS

- Built-in dual modulus pre-scalar correspond to wide frequency: 50 MHz to 3 GHz
- Pre-scalar divide ratio: 8/16/32/64/128
- Operating Temperature: -40°C to +85°C
- Built-in high speed tuning, low-noise phase comparator, constant
- On-chip phase control for phase comparator
- Built-in direct power saving function
- MB15x represents this family

FEATURES

- Serial Input programmable reference counter, swallow counter and programmable counter
- Current charge pump circuit
- Built-in digital locking detector circuit to detect PLL locking and unlocking
- Ideal for Low Noise Base stations
- Available in 16-SSOP, 16-QFN, 16-TSSOP, 20-TSSOP, 20-QFN packages

STANDARD PERFORMANCE EMI REDUCTION CLOCKS

SPECIFICATIONS

- 1 - 12 Outputs
- High frequency: 700 MHz
- RMS Phase Jitter: <700 fs
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V, 2.5 V and 1.8 V
- Output formats: LVPECL, LVDS, HCSL, CML, LVCMOS
- Available in 4-LCC, 8-SOIC, 8-TSSOP, 16-TSSOP, 20-TSSOP, 24-QFN, 32-QFN, 48-QFN packages
- CY22x, CY24x, CY25x, MB88x represents this family

FEATURES

- VCXO functionality
- Pin Select and I²C programming
- Frequency Select
- Field and Factory-programmable
- Lexmark Spread Spectrum profile for maximum Electro-Magnetic Interference (EMI) reduction
- Supports PCIe standard (CY24292, CY24293)
- AEC-Q100 qualified (CY27430, CY24293)

APPLICATIONS

Multi-Function Printers, Car Infotainment Systems, Media Broadcast Systems, Routers & Switches, Display Systems, Security Systems, Audio Systems, Camera, Medical equipment, Testing Equipment

STANDARD PERFORMANCE NON-EMI REDUCTION CLOCKS

SPECIFICATIONS

- 1-3PLLs, 1 - 8 Outputs
- Operating Frequency: 8 KHz to 400 MHz
- Operating Temperature: -40°C to +125°C
- Operating Voltage: 3.3 V/ 5.0 V
- Output formats: LVCMOS, LVPECL
- EPROM/ Flash Programmable
- Available in 8-SOIC, 8-TSSOP, 16-SOIC, 16-TSSOP, 20-SOIC, 32-QFN packages
- CY20x, CY22x represents this series

FEATURES

- I²C programming
- VCXO functionality (CY241V, CY22388)
- Frequency Select
- Supports Low-Power applications
- Field and Factory-programmable
- FailSafe™ Output (CY26049)
- AEC-Q100 qualified - A and E grade (CY22392, CY22393)

APPLICATIONS

Multi-Function Printers, Home Gateways, Digital Televisions, Router/ Switch, Datacom/ Telecom/ Networking, Any application that needs clean clock in the supported frequency range

HIGH PERFORMANCE BUFFERS

SPECIFICATIONS

- 2, 4 or 10 Outputs
- Frequency: up to 1.5 GHz
- 42 fs of typical additive phase jitter
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V and 2.5 V
- Supported Outputs: LVPECL, LVDS, and CML
- Supported Inputs: LVDS, LVPECL, and LVCMOS
- CY2Cx, CY2Dx represents this family

FEATURES

- On-chip 100 Ω input termination
- Select one of two differential (LVPECL, LVDS, HCSL, or CML) input pairs
- The synchronous clock enable function ensures glitch-free output transitions during enable and disable periods
- Pin-compatible with most of the parts available in the market
- Available in 8-TSSOP, 8-SOIC, 20-TSSOP, and 32-TQFP packages

APPLICATIONS

Switches and routers, Wireless base stations, Optical networking (PON, MSTP, etc.), Blade servers, High-speed interfaces: Gb/10GbE, PCIe, FibreChannel, SONET/SDH, CPRI

ZERO DELAY BUFFERS

SPECIFICATIONS

- 2 – 12 Outputs
- Frequency: 10 MHz to 220 MHz
- RMS Phase Jitter: <200 fs
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 5 V/ 3.3 V/ 2.5 V
- Supported Outputs: LVCMOS
- Zero Input-Output propagation delay
- CY230x, CY23EPx, CY23FPx, CY23FSx, CY23Sx represents this family

FEATURES

- Standard and High Drive strength options
- Spread Aware Functionality to buffer spread spectrum clock
- Field and Factory Programmed
- AEC Q-100 qualified (CY2305)
- Available in 8-SOIC, 16-SOIC, 16-TSSOP and 28-SSOP packages

APPLICATIONS

Networking, Infotainment, Display Systems, Printers, Scanners, Camera, Medical Equipment

ROBOCLOCK™ PROGRAMMABLE SKEW MANAGEMENT BUFFERS

SPECIFICATIONS

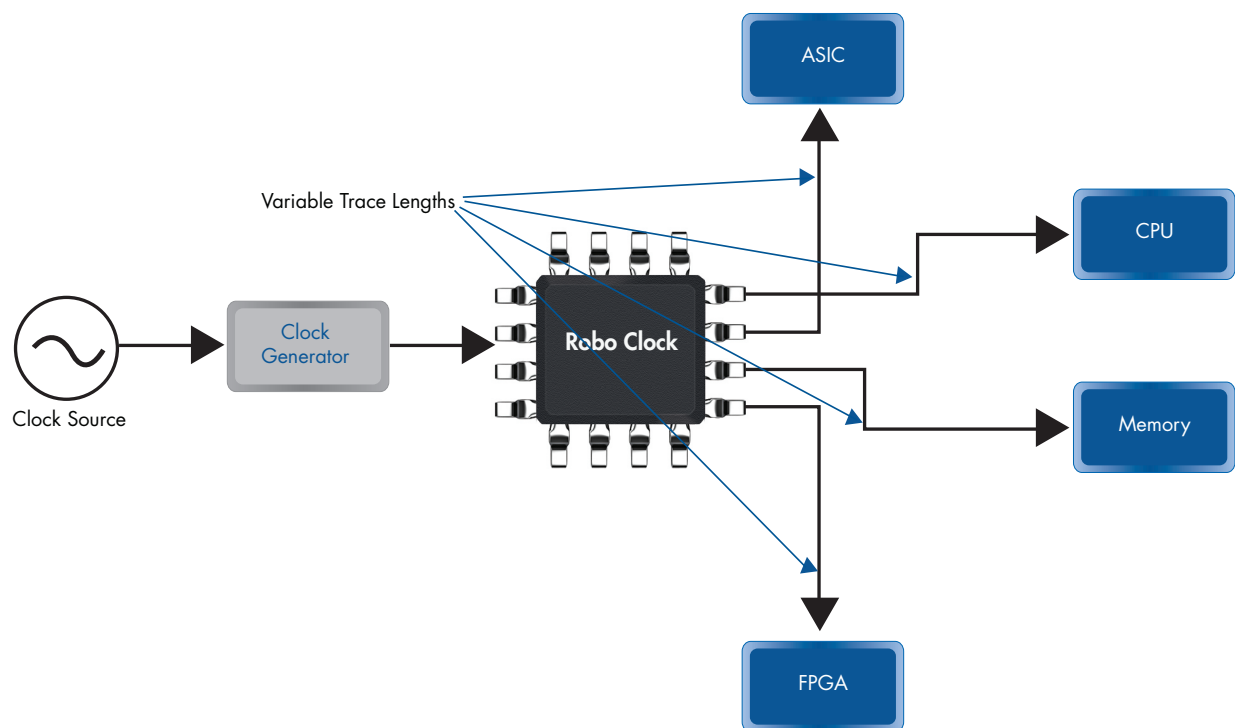
- 2 – 10 Outputs
- Frequency: up to 1500 MHz
- RMS Phase Jitter: <200 fs
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V and 2.5 V
- Supported Outputs: LVPECL, LVDS, and CML
- Supported Inputs: LVDS, LVPECL, and LVCMOS
- CY7Bx represents this family

FEATURES

- On-chip 100 Ω input termination
- Select one of two differential (LVPECL, LVDS, HCSL, or CML) input pairs
- The synchronous clock enable function ensures glitch-free output transitions during enable and disable periods
- Available in 24-SOIC, 32-PLCC, 32-TQFP, 44-TQFP, 52-TQFP, 100-TQFP

APPLICATIONS

Communication Systems, Display Systems, Embedded Systems, Medical Equipment, Security Systems, Aerospace and Defense systems, Video Systems



NON-ZERO DELAY BUFFERS

SPECIFICATIONS

- 4 – 18 Outputs
- Frequency: DC to 650 MHz
- Output-to-output skew : <250 ps
- Operating Temperature: -40°C to +85°C
- Operating Voltage: 3.3 V/ 2.5 V/ 1.8 V
- Supported Outputs: LVCMOS/LVTTL
- Supported Inputs: LVCMOS/LVTTL (CY29940 supports LVPECL input)

FEATURES

- Standard and High Drive strength options
- The CY2994X series is capable of generating 1x and 1/2x signals from a 1x source.
- Available in 8-TSSOP, 16-SOIC, 32-TQFP and 20-SSOP packages
- CY23xNZ, CY299, CY2CC represents this family

APPLICATIONS

Networking, Computer Systems, Data Servers, Camera, Embedded Systems, Aerospace and Defense

WAFER/DIE CLOCK DEVICES

SPECIFICATIONS

- 1PLL, 1 Output
- Output frequency: 5 MHz to 2.1 GHz
- Operating Voltage: 1.8/ 2.5/ 3.0/ 3.3/ 5.0 V
- RMS Phase Jitter: as low as 110 fs
- Output standards: LVPECL, LVDS, HCSL, CML, LVCMOS
- Power Management controls
- CY2037, CY5037, CY5057, CY5077, CY51x7 are the available Wafer/ Die MPNs

FEATURES

- I²C programmable (CY51x7)
- EPROM/Flash programmable
- On-chip oscillator and tuning circuit
- EMI Reduction with SS ON/OFF function (CY5057)
- Frequency Select feature (CY51x7)
- Field and Factory programmable

APPLICATIONS

Networking, Infotainment, Display Systems, Printers, Scanners, Camera, Medical Equipment



SOFTWARE - **CLOCKWIZARD**

The ClockWizard software enables you to create the configuration file used to program Cypress's CY27410, CY2941x/CY2942x and CY29430, high-performance clock generators.

CY27410 is a 4-PLL high-performance clock generator which can generate up to twelve outputs. It has eight outputs which can be configured as differential or single-ended, and four dedicated single-ended outputs. It supports frequencies up to 700 MHz and has <0.7-ps RMS phase jitter. It also meets the reference clock requirements of PCIe 3.0, 10GbE and SATA 2.0.

The CY2941x/CY2942x is a PLL-based high-performance programmable crystal oscillator solution with flexible output frequency options. It is field or factory-programmable for any output frequency between 15 MHz and 2.1 GHz.

The CY29430 is a PLL-based high-performance programmable clock synthesizer with flexible output frequency options. It is field or factory programmable for any output frequency between 15 MHz and 2.1 GHz. Four frequencies are independently programmable on the differential output with the frequency select (FS) bits. Additionally, other frequency options can be configured with the I²C interface.

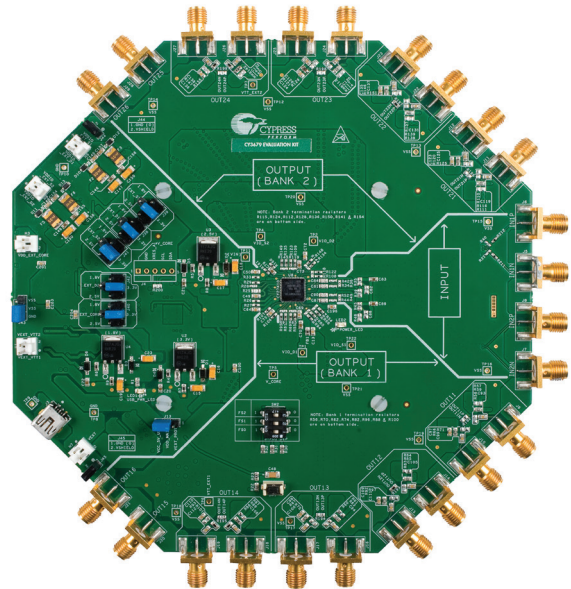
The software allows you to modify various internal settings in order for you to get the required configuration file for the working of the device. The configuration file generated can be used by the Clock Programmer tool to program the device using I²C if you are evaluating the CY27410 using the CY3679 kit, CY29412 with the CY3676 kit or CY29430 using the CY3677 kit.

EVALUATION KITS

CY3679

CY3679 is the evaluation kit to evaluate and prototype your entire clock tree using Cypress's CY27410 4-PIL High Performance Clock Generator.

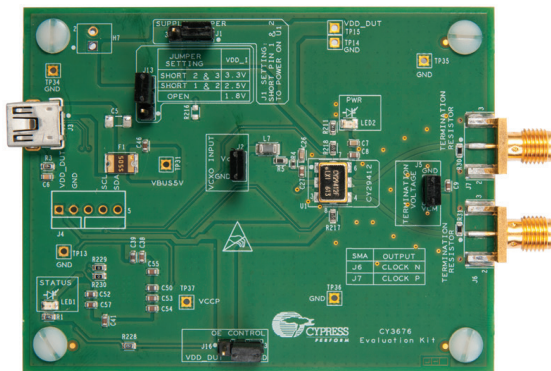
The ClockWizard software enables you to create the configuration file, and also to program the Clock device present on the Evaluation Kit. The kit has been built for evaluation purpose only and not for using directly as in an end equipment



CY3676

The CY3676 Evaluation Kit (EVK) is built to evaluate the CY29412 High Performance Programmable Oscillator. The CY29412 is packaged as an 8-pin 5x7 LCC.

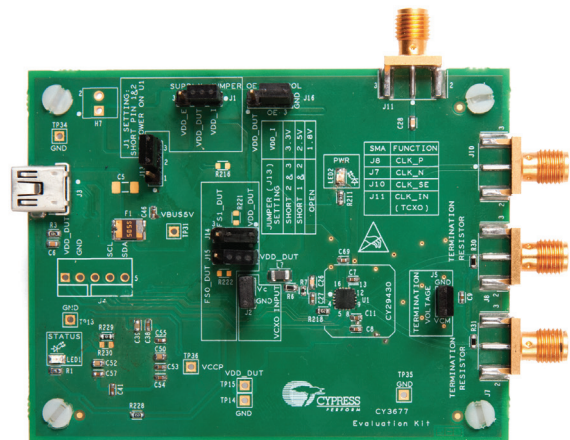
The ClockWizard software enables you to create the configuration file, and also to program the Clock device present on the Evaluation Kit. The kit has been built for evaluation purpose only and not for using directly as in an end equipment.



CY3677

The CY3677 Evaluation Kit (EVK) is built to evaluate the CY29430 High Performance Programmable Oscillator. The CY29430 is packaged as a 16-pin 3x3 QFN.

The ClockWizard software enables you to create the configuration file, and also to program the Clock device present on the Evaluation Kit. The kit has been built for evaluation purpose only and not for using directly as in an end equipment.



Visit www.cypress.com/CY3679 | Visit www.cypress.com/CY3676

Visit www.cypress.com/CY3677 | Write to us: clocks@cypress.com

PROGRAMMING KIT

– CY3675

The CY3675-CLKMAKER1 Clock programming Kit enables quick and easy configuration of Cypress's programmable clocks for evaluation and development purposes.

This Kit alone cannot program a clock device. A socket adapter, specific to a particular Clock device, is necessary to program the device. The below table highlights the available socket adapters.



KIT NAME	DESCRIPTION	SUPPORTED DEVICES
CY3675 - CLKMAKER1	Main Programming Board	- NA -
Socket Adapter Kits (Not included in CY3675-CLKMAKER1 kit. These are available separately)		
CY3675 - LCC4A	Adapter Board for LCC4A Devices	CY25701, CY25702
CY3675 - QFN8A	Adapter Board for QFN8A Devices	CY22M1, CY22U1
CY3675 - SOIC8A	Adapter Board for SOIC8A Devices	CY25402, CY25403, CY25422, CY25423, CY25482, CY25483
CY3675 - QFN24A	Adapter Board for QFN24A Devices	CY2544, CY2545, CY2548
CY3675 - LCC6A	Adapter Board for LCC6A Devices	CY2X013, CY2X014, CY2XF23, CY2XF24, CY2XF32, CY2XF33, CY2XF34, CY2X0137, CY2X0147, CY2XF327, CY2XF337
CY3675 - TSSOP20B	Adapter Board for TSSOP20B Devices	CY25404

CLOCK TREE SERVICES

Clock Tree Services is a web based service, intended to help users design their clock tree with Cypress Clocks.

Go to the link below and input your clock tree requirements. Cypress will suggest the best parts for you. If you already have a clock tree from your previous design, upload the file, and we will suggest the best and latest parts for you.

Visit : www.cypress.com/ClockTreeServices

Write to us : clocks@cypress.com

CONTACT US

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