

# TIMING OVERVIEW SOLUTIONS

Industry's broadest and deepest timing portfolio



Renesas offers the broadest and deepest silicon timing portfolio in the industry. In addition to our wide selection of buffers and clock synthesizer products, we deliver leading-edge system timing solutions to resolve timing challenges in virtually any applications. With proven expertise spanning more than twenty years in both analog and digital timing, our portfolio features the lowest phase noise and highest performance advanced timing technology.

## Renesas timing features

- Lowest phase noise and highest performance
- Industry's broadest and deepest portfolio
- Proven expertise in both analog and digital timing
- Advanced timing technology

## Renesas timing benefits

- Extensive online tools library
- Deep knowledge base / FAQ
- Complimentary clock tree design and review services
- Expert engineering support

## Applications

- Wireless infrastructure
- Networking
- Datacenters
- Consumer electronics
- Industrial systems
- Automotive infotainment and navigation

## APPLICATION-SPECIFIC AND REAL-TIME CLOCKS

### Application-Specific Clocks

Meeting Industry Standards

Renesas's wide variety of application-specific clocks give your customers targeted solutions to simplify their design process. These devices are optimized for specific requirements so perform better and are easier to use in target applications than general-purpose clocking parts. We offer a full portfolio of clock generation and distribution products designed specifically for:

- Network Synchronization, IEEE 1588, Synchronous Ethernet
- PCI Express
- RF and JESD204B
- Spread Spectrum clocks
- Processor clocks

To learn more, visit [renesas.com/appclocks](https://renesas.com/appclocks)

### Real-Time Clocks

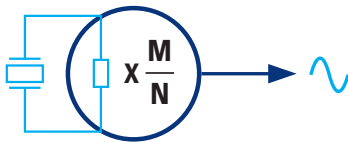
Renesas's real-time clock ICs are ultra-low-power clock/date devices with programmable time-of-day alarms and programmable square-wave outputs. High noise immunity, low current consumption, 12 / 24 hour operation mode, leap year auto correction, and programmable square wave output make them ideal for a wide range of design applications.

Our RTCs count seconds, minutes, hours, day, date, month, and year with leap-year compensation valid up to 2100 and feature:

- Normal and fast-mode I2C interfaces
- Two time-of-day alarms
- Oscillator stop flag
- Operating voltage range from 1.8 – 5.5V

To learn more, visit [renesas.com/rtc](https://renesas.com/rtc)

## CLOCK GENERATORS



- General purpose solutions
- Low and ultra-low jitter families
- Extreme performance products
- Flexible programmable clocks

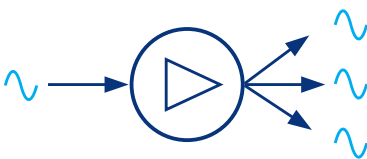
### Industry's most comprehensive portfolio of ultra-flexible programmable timing devices

Widely recognized as the industry's most comprehensive portfolio of ultra-flexible, programmable timing devices, Renesas clock synthesizers are all PLL clock-based products that generate one or more clock signals within an application. Our clock generators and frequency synthesizers can generate different output frequencies from a common input frequency. Our clock generators and frequency synthesizers can generate different output frequencies from a common input frequency, satisfying complex clocking system requirement needs.

Renesas's products produce clock output frequencies within strict tolerances for the application they are clocking and allow for frequency translation – either multiplication or division. We also offer solutions for single-ended and differential clock outputs, as well as devices with an external feedback path for more precise control.

To learn more, visit [renesas.com/clockgen](https://renesas.com/clockgen)

## CLOCK DISTRIBUTION



- Clock dividers and fanout buffers
- Zero delay buffers
- Multiplexers and fanout multiplexers

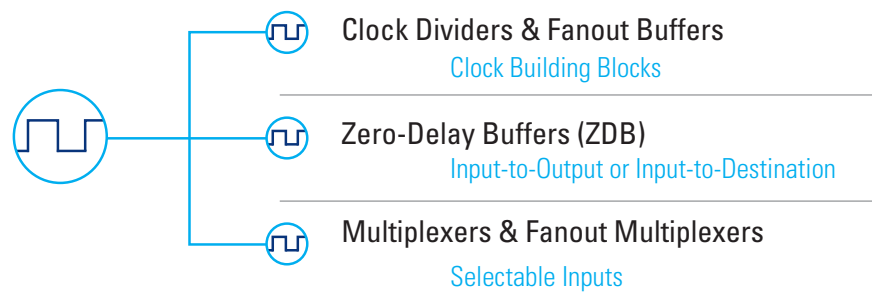
Renesas clock distribution products are used to condition, manipulate and distribute clock signals within a system, with or without the use of a PLL. These devices are well-suited for most applications where the input signal is of good quality and the goal is to buffer, fanout, divide, or multiplex the input signal. A single-output clock buffer is also useful for translating a clock from one signaling standard to another, such as LVCMOS-in to LVPECL-out.

Our rich portfolio of clock buffer, distribution and multiplexer solutions meets your needs for virtually any application. With the industry’s largest portfolio of clock distribution devices supporting differential signals, Renesas products cover all of the standard I/O levels – LVDS, LVPECL, HCSL, LVCMOS, CML, HSTL, or SSTL.

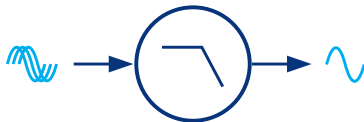
Renesas Advantages:

- Broad portfolio – Industry-leading coverage for all market segments
- Strong performance – Best in class combination of skew (<35 ps), jitter (<50 fs) and power (30 mA for 4 outputs)
- Flexible designs – Pin-selectable output type and I<sup>2</sup>C programmable families
- Robust – Available in commercial and industrial temperature ranges
- Space-saving devices – Small packages and integrated input termination networks for differential signals

To learn more, visit [renesas.com/buffers](https://renesas.com/buffers)



## JITTER ATTENUATORS AND OSCILLATORS



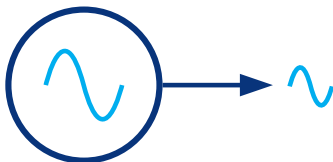
Renesas’s jitter attenuators remove unwanted noise from one or more input clock signals. Integrating a jitter attenuator and frequency translator simplifies the circuit and minimizes the BOM for your designs.

Universal frequency translator (UFT) family offers:

- 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

To learn more, visit [renesas.com/ja](https://renesas.com/ja)

## Oscillators



### Quartz Crystal Oscillator ICs (XO), Crystal Clock Oscillators, and Low Power Oscillator Circuits

Renesas offers XO’s and FemtoClock® NG programmable oscillator ICs to meet your needs in virtually any application.

- High-performance, low-jitter XL and XU crystal oscillators
  - Various frequency, performance level, output, package, and temp options
  - AEC-Q200 Automotive-grade XA family
- Programmable FemtoClock NG devices for advanced system designers
  - High-performance flexibility in standard XO footprints
  - <0.5 ps RMS jitter with frequency options from 15.48 – 1300 MHz

To learn more, visit [renesas.com/xo](https://renesas.com/xo)

## DESIGN RESOURCES

### Timing Commander™ Software

Renesas's Timing Commander™ is a simple configuration tool for complex timing solutions. This innovative Windows™-based software platform enables system design engineers to configure, program, and monitor sophisticated timing devices with an intuitive and flexible GUI. Timing Commander empowers your customers to expedite their development cycles and optimize the configuration of our industry-leading clocking solutions.

Help your customers get command of their timing tree and easily:

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

To learn more, visit [renesas.com/timingcommander](https://renesas.com/timingcommander)

### Reference Designs

Shorten and simplify your design cycle and speed time to market with trusted reference design solutions from the industry's leading timing experts. Renesas's reference design library leverages our best technology for FPGAs, processors, and targeted applications.

To learn more, visit [renesas.com/refdesigns](https://renesas.com/refdesigns)

### Clock Tree Design and Services

Clock tree design can be a complex task with many considerations that can overwhelm designers unfamiliar with clock trees and the associated language of timing. While there are some automated tools available, they simply cannot address many complexities of advanced requirements like phase jitter and spread spectrum.

As the market leader in silicon timing, Renesas is the only one-stop-shop for timing solutions with expertise and products from full-featured system solutions to simple clock building-block devices. Our in-house experts can assist you in building a new clock tree from the ground up or evaluate and improve an existing clock tree design.

To learn more, visit [renesas.com/clocktree](https://renesas.com/clocktree)

To request samples, download documentation or learn more visit: [renesas.com/timing](https://renesas.com/timing)



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