Renesas jitter attenuation products use a low-jitter external reference and control circuitry to remove unwanted noise from one or more input clock signals. Some devices use VCXOs or simple crystals for this reference. Innovative techniques allow the use of fixed-frequency crystals rather than hard-to-find pullable crystal devices. In addition, our jitter attenuators also include a frequency translation stage that allows the output frequency or frequencies to be different than the input frequency.

The integration of a jitter attenuator and frequency translator simplifies the circuit and minimizes the BOM. Renesas’ rich portfolio of jitter attenuators and frequency translators come in varying levels of performance, power, and programmability to address the needs of virtually any application. The portfolio supports various single-ended and differential signaling levels.

**Benefits**

- Combines flexibility with high performance
- Simplifies solving complex timing problems
- Enables last minute changes to clocking frequency without disrupting design cycle
- Reduces BOM cost, saves board space
- Powers up in user defined configuration

**Features**

- RMS phase jitter $<100$ fs (12 kHz to 20 MHz)
- Up to four input clocks ranging from 8 kHz up to 1000 MHz
- Input clocks standards: LVPECL, LVDS, LVHSTL, HCSL or LVCMOS
- Output frequency range: 8 kHz to 2.5 GHz
- I2C / SPI interfaces and external I2C memory access to registers

**Applications**

- Networking equipment
- High-end audio / video systems
- 10 / 40 / 100 / 400 GbE line cards
JITTER ATTENUATORS

Typical Application Diagram

1PPS PTP Clk (Active/Standby)
25MHz Physical CLK (Active/Standby)

Recovered Clock

Clock Matrix

RC325x4A/
RC225x4A

“point-of-use” Clock

100fs
At the pin

Destination

Featured Jitter Attenuator Products

<table>
<thead>
<tr>
<th>Part #</th>
<th>Jitter</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Output Freq.</th>
<th>Output type</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>8V41NS0412</td>
<td>95 fs</td>
<td>2</td>
<td>12</td>
<td>5MHz-1GHz</td>
<td>HCSL</td>
<td>10x10 mm QFN</td>
</tr>
<tr>
<td>RC32504/14</td>
<td>79 fs</td>
<td>1</td>
<td>4</td>
<td>5MHz-1GHz</td>
<td>HCSL, LVCMOS</td>
<td>4x4mm QFN</td>
</tr>
<tr>
<td>RC32012</td>
<td>150 fs</td>
<td>10</td>
<td>24</td>
<td>0.5Hz-1GHz</td>
<td>HSTL, LVCMOS, LVDS, LVHSTL, LVPECL, LVTTL</td>
<td>10x10 mm QFN</td>
</tr>
<tr>
<td>8V19N492-39</td>
<td>46 fs</td>
<td>2</td>
<td>15</td>
<td>20MHz-3.9GHz</td>
<td>LVDS, LVPECL</td>
<td>10x10 mm QFN</td>
</tr>
</tbody>
</table>

Making Complex Configurations Simple

Renesas RICBox is an easy-to-use Windows®-based software platform enabling system designers to configure, program and monitor sophisticated Renesas devices with an intuitive and flexible GUI.

FemtoClock™2 Evaluation Kit

Features

- Stand-alone evaluation board configuration
- Phase noise and power estimation
- PLL gain and phase transfer plots
- Input and output termination generator

To request samples, download documentation or learn more visit: renesas.com/ja