

IQD currently offer two very small sized Rubidium products. The smallest being the IQRB-1, and the newer IQRB-2 which has improved phase noise performance. Due to the complex nature of the devices any variations to the specification require engineering input, therefore please contact our Application Support team to discuss developing a customised version of the product to suit your specific needs.

### What is a rubidium oscillator?

The units contain a high quality quartz crystal based oven controlled oscillator (OCXO), which creates the output signal, and also a "Physics Package" rubidium oscillator. The two oscillators are locked together with a PLL circuit optimised to take advantage of the best features of both technologies.

### How does a rubidium oscillator work?

In simple terms, the physics package contains a chamber of rubidium gas, a light is shone through the gas and the level of this light is detected. The rubidium gas is excited by microwave energy at the transition frequency of the gas. This causes the gas to transition from one energy level to another, when the change in energy level occurs it causes a dip in the light level. This dip in light is detected, thus the detector is measuring the oscillation in energy levels.

### Why use a rubidium oscillator?

Rubidium oscillators offer far less drift than an OCXO, they can have a short term stability of 0.002ppb/s at 100s, and a long term ageing of sub 1ppb/year, providing significant improvements in performance over OCXOs.

A common application for rubidium oscillators is as the frequency source within an atomic clock. These clocks are very accurate time standards and are used as time distribution services to control things such as telecommunications infrastructure, TV broadcasts and global navigation satellite systems (GPS).

The advantage of a rubidium clock over the other atomic devices, such as caesium clocks, is that rubidium clocks are lower cost, smaller and therefore more portable.

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