Specifying Rubidium Oscillators

IQD currently offers a variety of small sized Rubidium products. The smallest being the ICPT-1 which has an external 1pps synchronisation. 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 these products to suit your specific needs.

What is a rubidium oscillator?

The unit contains a high quality quartz crystal based oven controlled oscillator (OCXO), which creates the output signal, and also a "Physics Package" along with its associated control circuitry. 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 even less frequency drift than an OCXO, they can have a short term stability of 2E-12 @100s tau, and a long term ageing of sub 1ppb/year, providing significant improvements in performance over OCXOs.

A common application for rubidium oscillators is their use as timing and frequency references. 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 rubidium clocks is that they provide accurate source of timing while being smaller is size when compared to other atomic clocks, like Caesium clocks.