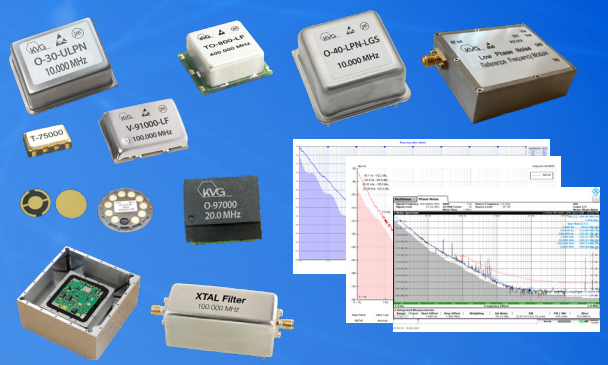




# Quartz Crystal Technology GmbH



KVG Quartz Crystal Technology GmbH is a leading manufacturer of frequency control products. It has more than 75 years of experience in quartz crystal products design and permanent innovations. KVG provides a wide product range of crystals, oscillators (XO, TCXO, VCXO, OCXO), filters, specific quartz crystal products and a high variety of custom specific solutions.

We are proud to cooperate with DESY for the production and test of the Main Oscillator module and the Local Oscillator Generation module.



**840 Bäume**  
420,0 t CO<sub>2</sub>  
BPC-125KV



## Quartz Crystal Products

### Ultra-low Phase Noise OCXO 10 MHz Series



#### Overview

- Package: 36.1 x 27.2 x 15 mm leaded package
- Supply voltage: +12.0 V
- Output level: Sine wave  $\geq +8$  dBm

#### Product Highlight

- Low phase noise
  - $\leq -120$  dBc/Hz at 1 Hz
  - $\leq -148$  dBc/Hz at 10 Hz
  - $\leq -160$  dBc/Hz at 100 Hz
  - $\leq -165$  dBc/Hz at 1 kHz
  - $\leq -168$  dBc/Hz at  $\geq 10$  kHz
- Low power consumption
- Tight frequency stability
- Fast warm-up time
- Electrical frequency tuning
- Reference voltage output

### Ultra-low Phase Noise OCXO 100 MHz Series



#### Overview

- Package: 25.8 x 25.8 x 14 mm leaded package
- Supply voltage: +12.0 V
- Output level: Sine wave  $\geq +12$  dBm

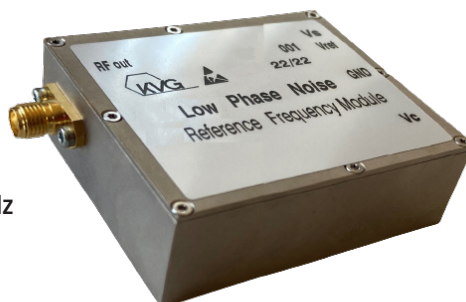
#### Product Highlight

- Low phase noise
  - $\leq -110$  dBc/Hz at 10 Hz
  - $\leq -140$  dBc/Hz at 100 Hz
  - $\leq -170$  dBc/Hz at 1 kHz
  - $\leq -180$  dBc/Hz at 10 kHz
  - $\leq -182$  dBc/Hz at 100 kHz
  - $\leq -182$  dBc/Hz at 1 MHz

### Ultra-low Phase Noise Reference Frequency Module

#### 1.3 GHz Module

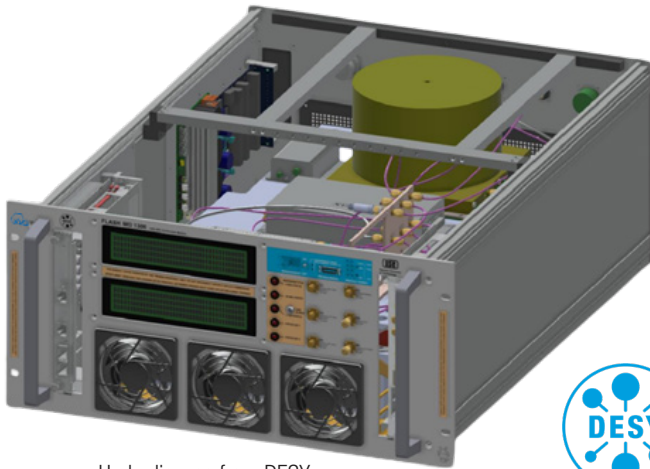
- Low phase noise
  - $\leq -90$  dBc/Hz at 10 Hz
  - $\leq -120$  dBc/Hz at 100 Hz
  - $\leq -145$  dBc/Hz at 1 kHz
  - $\leq -160$  dBc/Hz at 10 kHz, 100 kHz, 1 MHz
  - $\leq -170$  dBc/Hz at 10 MHz



#### 1 GHz Module

- Low phase noise
  - $\leq -88$  dBc/Hz at 10 Hz
  - $\leq -118$  dBc/Hz at 100 Hz
  - $\leq -148$  dBc/Hz at 1 kHz
  - $\leq -157$  dBc/Hz at 10 kHz
  - $\leq -162$  dBc/Hz at  $\geq 100$  kHz

## Main Oscillator (MO) Module with high Power and sub-fs Resolution



Under license from DESY



The MO module provides different fixed frequencies with excellent short-term noise below 1 fs, long-term stability and high-power output. The working principle is to synchronize an ultra-low phase noise dielectric resonator oscillator output signal with a 1.3 GHz signal synthesized from an ultra-stable GPSDO 10 MHz signal.

### Key Features

- Custom designed 19" 600 mm 5U housing
- Excellent short-term phase noise and jitter
- Frequency stability better than  $10^{-12}$  (hours-days)
- Support high power outputs  $\geq +46$  dBm
- Provide different frequencies optional
- Support remote diagnostic for maintenance
- Tight operational reliability

- Ultra-low phase noise at 1.3 GHz
  - $\leq -88$  dBc/Hz at 10 Hz
  - $\leq -120$  dBc/Hz at 100 Hz
  - $\leq -138$  dBc/Hz at 1 kHz
  - $\leq -142$  dBc/Hz at 10 kHz
  - $\leq -161$  dBc/Hz at 100 kHz
  - $\leq -169$  dBc/Hz at 1 MHz
  - $\leq -170$  dBc/Hz at 10 MHz
- Ultra-low integrated jitter at 1.3 GHz
  - 11.4 fs [ 10 Hz to 100 Hz]
  - 1.8 fs [100 Hz to 1 kHz]
  - 0.9 fs [ 1 kHz to 1 MHz]

## High Performance Local Oscillator Generation (DeRTM-LOG)



Under license from DESY

The DeRTM-LOG is a high-performance multi-channel local oscillator, high frequency signal and clock generator module for the MicroTCA standard.

### Key Features

- Two double-width, full-height, MicroTCA.4 compliant extended Rear Transition Module (eRTM)
- 9 frequency reference, 9 local oscillator and 9 calibration signals from 400 MHz to 6 GHz
- 22 low-jitter, differential clock signals up to 160 Msp
- Local oscillator residual phase noise  $< 3$  fs (rms) [10 Hz to 1 MHz] at 1.354 GHz
- On/Off switching of output clocks and RF signals
- No program is needed for basic board functionality
- On-board temperature regulation for long-term stability of RF signals (optional)
- Currently available for 1.3 GHz and 1.5 GHz

## KVG Quartz Crystal Technology GmbH

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