



# Company Presentation

# AXTAL

**ADVANCED XTAL PRODUCTS**

a  Q-TECH Company

## The Frequency Control Expert for 20 Years





# Who we are



- ✕ **“AXTAL”** stands for **“Advanced XTAL Products”**, where **“XTAL”** is a common abbreviation of “crystal”.
- ✕ **Founded in November 2003** by Bernd Neubig and Brigitte Neubig as fully privately owned company. Since 2023 the AXTAL GmbH is an independent subsidiary of **Q-Tech Corporation**, a US-based leading supplier of high-reliability crystal oscillators
- ✕ **Core Business** comprises advanced Frequency Control Products (FCP), i.e. mainly Crystal & SAW Oscillators and Frequency & Timing Modules. All products are ITAR free.
- ✕ **Main Product Focus** is on High-Reliability Oscillators and Frequency Control Modules with high requirements for environmental conditions, ultra-low noise performance, very high stability and frequency generation up into the GHz range for applications like microwave communication, test equipment, radar, military, aerospace and space.
- ✕ **Full Value Chain** includes R&D, design, manufacturing, screening and testing of our products from samples to production quantities completely in-house.
- ✕ **Extended Product Portfolio** includes quartz crystals & crystal filters for high-reliability applications and atomic frequency standards, which are sourced from our contract partners.



# Where we are



## AXTAL GmbH

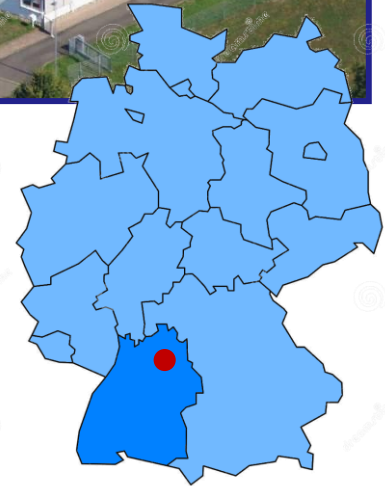
### Facility & Administration:

(Billing & shipping address)

Roemerring 9

D-74821 Mosbach

Germany 



+49 6261 939834



[contact@axtal.com](mailto:contact@axtal.com) "General"



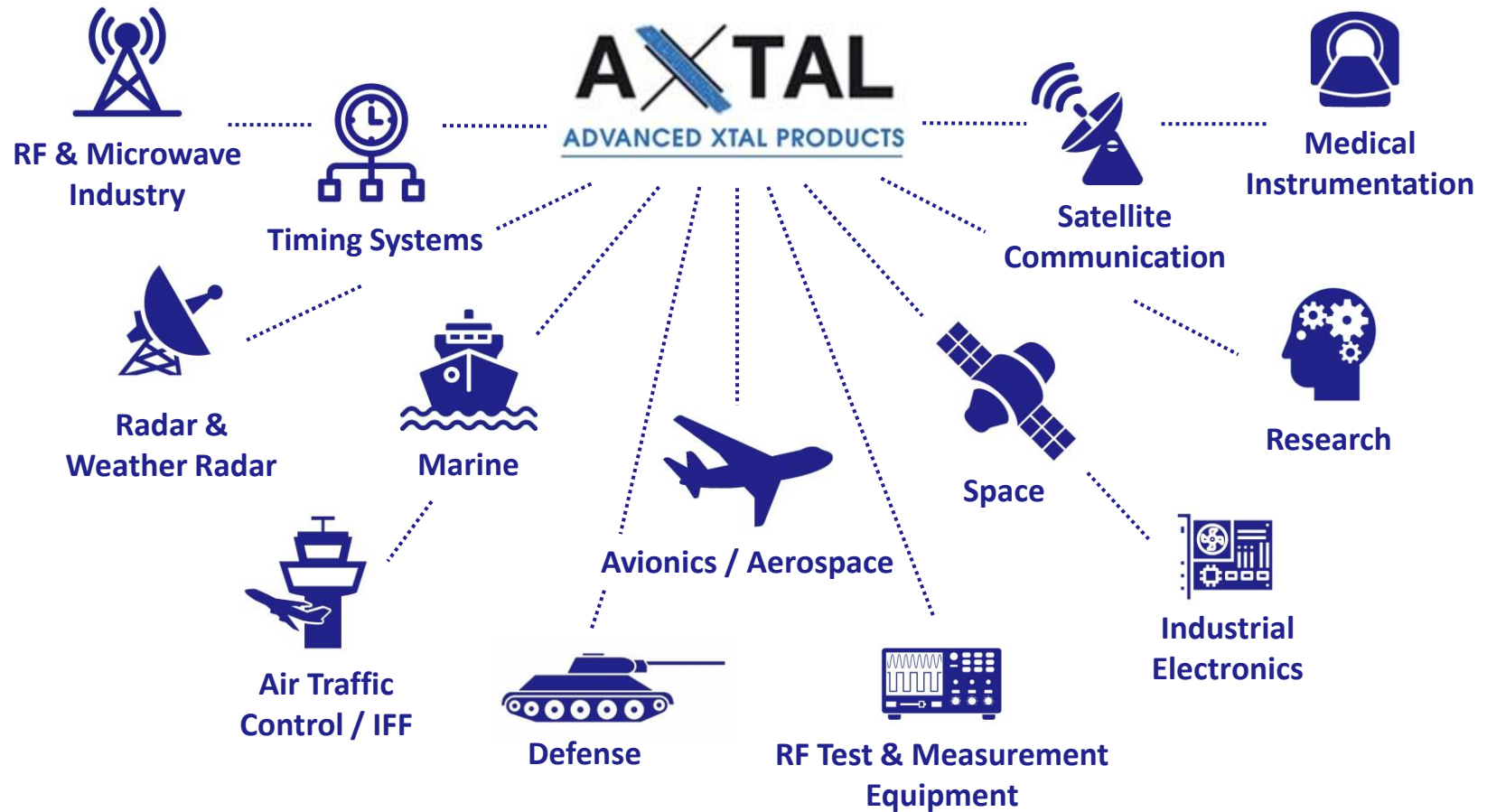
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[www.axtal.com](http://www.axtal.com)



# Markets served





# Main countries



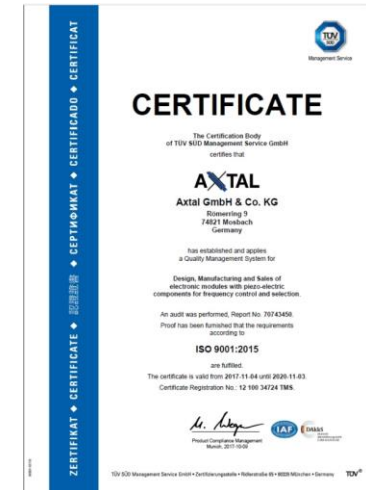
Sales Representatives – See our Website



# Quality Management

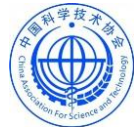


- ✗ Since 2008: Quality management system in accordance with **ISO 9001:2015**, certified by TUEV SUED.
- ✗ 2023: ISO AS 9100 in preparation.
- ✗ AXTAL Quality System includes also:
  - ✗ **Extensive process control** for R&D, manufacturing and sales
  - ✗ **100% Incoming inspection** of all quality-critical components
  - ✗ **Extended testing** of quartz resonators incl. passive & active pre-aging
  - ✗ **Full traceability** of all test & measurement results
  - ✗ **100% Final test** of all key & critical parameters
  - ✗ **Workmanship** to J-STD-001, IPC-A-610 Class 3 and ESA ECSS standards



## Customer Audits

(not complete)



CHINA AEROSPACE SCIENCE AND TECHNOLOGY CORPORATION (CASC)

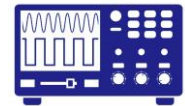




# Testing & Qualification

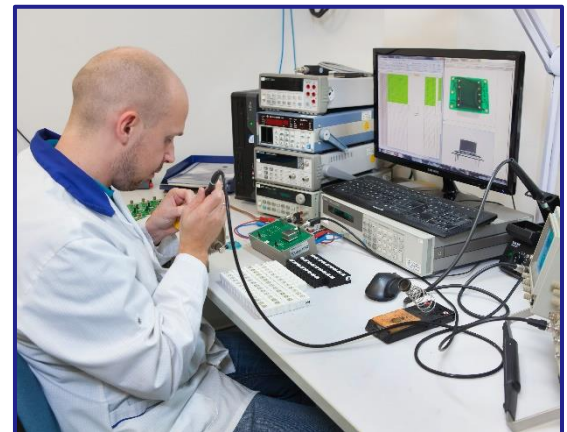


- ✕ **Inhouse Testing** of all electrical & environmental tests
- ✕ **Qualification Testing** to IEC 60679-4, MIL-PRF-55310, ESCC or Customer standards
- ✕ **AXTAL Test Capabilities – Electrical:**
  - ✕ **Crystal Testing** with Saunders, Kolinker and AXTAL Network Analyzer System
  - ✕ **Frequency Stability** over various parameters up to 20 GHz
  - ✕ **Output Waveform & Spectrum** up to 26 GHz
  - ✕ **Phase Noise** with R&S FSWP, Agilent E5052B and Noise XT up to 26 GHz
  - ✕ **Short-term Stability** (ADEV) with Microchip 53100A down to 1E-18
  - ✕ **Long-term Stability** (Aging) measured against GPS-disciplined Atomic Clock
  - ✕ **G-Sensitivity** & Phase Noise under vibration (random & sine) 5 ~ 6000 kHz
  - ✕ **Temperature Testing** -55°C to +125°C
- ✕ **AXTAL Test Capabilities – Environmental:**
  - ✕ **Vibration Testing:** Mechanical Shock, Random & Sine
  - ✕ **Temperature Testing:** Thermal Shock, Storage & Burn-in -55°C to +150°C
  - ✕ **Vacuum Testing**
  - ✕ **Leak Testing**





# Production Environment

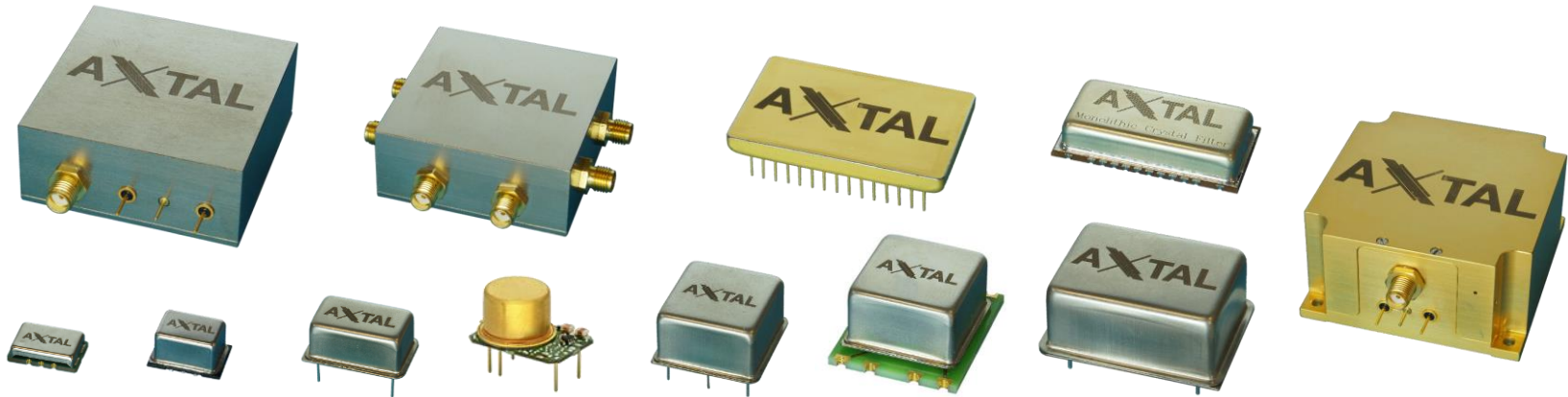






# Product Overview

SPXO    VCXO    TCXO    OCXO    PLXO    SAW    Space  
Masterclocks    Frequency References    Atomic Clocks



Expert for customized oscillators and modules

Ultra-low noise & Very high stability

Wide frequency range up to 10 GHz

Various packages: THD, SMD, Connectorized and 19" Rack

Screening & Inspection IAW MIL-PRF-55310



# OCXO

## Product Overview



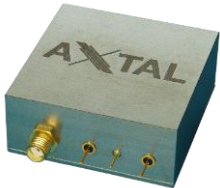
### Miniature 9x14 mm Package

- ✕ Smallest OCXO – Hermetically-sealed
- ✕  $\pm 5$  ppb,  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$



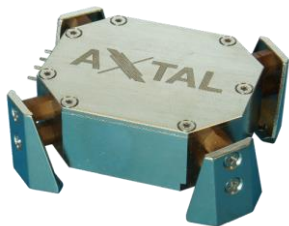
### Ultra-High Stability Double OCXO

- ✕ Eurocase 36x27 mm Package
- ✕  $\pm 0.05$  ppb,  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$



### Ultra-Low Noise

- ✕ Supreme close-in phase noise
- ✕ Noise floor down to  $-185$  dBc/Hz

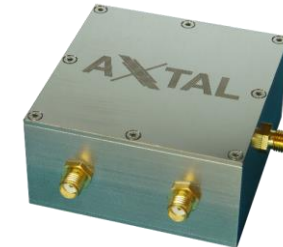


### Vibration-isolated

- ✕ G-Sensitivity down to  $0.001 \text{ g}^2/\text{Hz}$
- ✕ Noise floor down to  $-180$  dBc/Hz
- ✕ Functional profile up to  $25 \text{ g RMS}$
- ✕ Customized Absorbers

### Multiplied Ultra-Low Noise

- ✕ Up to  $7 \text{ GHz}$
- ✕ Multiple Outputs
- ✕ Fully customizable



### Low Power Fast Warm-up

- ✕ Warm-up  $60 \text{ sec}$
- ✕ Power Consumption  $< 300 \text{ mW}$
- ✕ Small Size



# TCXO

## Product Overview



### Miniature SMD Packages

- ✕ 5x3.2 mm & 7x5 mm
- ✕ High Stability down to  $\pm 50$  ppb
- ✕ Low noise & Low g-Sensitivity

### High Stability

- ✕ Down to  $\pm 50$  ppb,  $-40 \sim +85^{\circ}\text{C}$
- ✕ Various packages available

### Ultra-Low Noise

- ✕ Low close-in phase noise
- ✕ Noise floor down to  $-180$  dBc/Hz
- ✕ Ultra-low phase jitter down to 10 fs

### Very wide temperature range

- ✕ Up to  $-55 \sim +125^{\circ}\text{C}$
- ✕ Various packages available



### High frequencies

- ✕ Up to 8 GHz using PLL or Multiplication
- ✕ Low phase noise & low phase jitter
- ✕ Various packages available

### Lowest Vibration Sensitivity

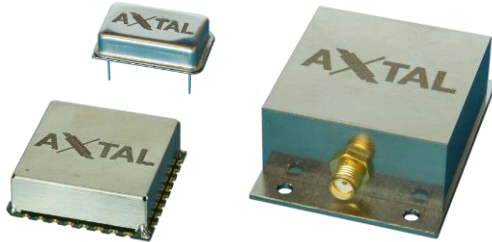
- ✕ G-Sensitivity down to 0.2 ppb/g
- ✕ Noise floor down to  $-180$  dBc/Hz
- ✕ Functional profile up to 25 g RMS





# Modules & Space

## Product Overview

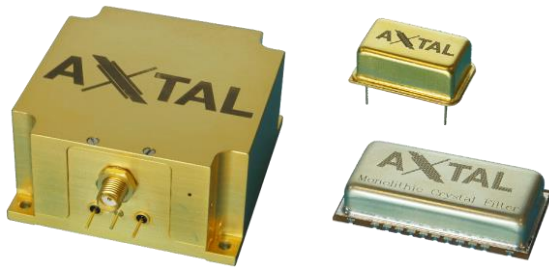
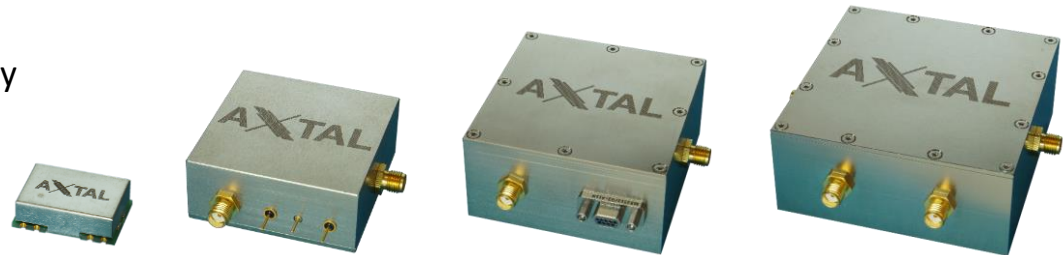


### GHz Crystal-Controlled Sources

- ✕ Various Gated Oscillators for Air Traffic Control and IFF
- ✕ PLL, Frequency Multiplication and SAW
- ✕ All stability classes up to 10 GHz

### PLL Oscillator Modules

- ✕ SPXO – TCXO – OCXO Stability
- ✕ Programmable models
- ✕ Multiple outputs
- ✕ Fully customizable



### Space

- ✕ SPXO – VCXO – OCXO – Monolithic Crystal Filter – Rubidium
- ✕ MIL-PRF-55310 Level “S” and High Radiation Hardness
- ✕ SpaceCOTS with application specific testing levels
- ✕ ESA EPPL Listed OCXO AXIOM6060
- ✕ Heritage: GEO, NCLE Moon Mission, LaRa/ExoMars etc.



# Frequency References & Distribution

## Product Overview



### Masterclocks

- ✕ Masterclocks for the most demanding Timing and Frequency Generation Systems
- ✕ Fully-customized in acc. with your requirements
- ✕ State-of-the-art Performance & Technology



### Frequency Distribution

- ✕ Frequency References: OCXO – Rubidium – GPS-disciplined
- ✕ Ultra-Low Noise & Very High Stability
- ✕ Low Noise Distribution Amplifier up to 16 outputs





# Traded FCP Products

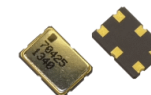


## ✕ Quartz Crystal Units

- ✕ Precision Crystals, High-Reliability, High Stability, Low Noise
- ✕ Quartz crystals for Space applications (e.g. ESCC3501)



## ✕ Low Jitter and High Temperature Clocks



## ✕ High Performance TCXOs

- ✕ High Stability & Wide Frequency Range
- ✕ Low g-Sensitivity & Low Noise/Jitter



## ✕ Atomic Clocks

- ✕ Manufacturer: ELECSN “Spaceon”
- ✕ Miniature CPT Atomic Clock
- ✕ Rubidium Clocks
- ✕ Optically-pumped Cesium Clock



# AXTAL Customers



CHINA AEROSPACE SCIENCE AND TECHNOLOGY CORPORATION (CASC)



ROHDE & SCHWARZ

ADVANTEST

CETC 中国电科



indra

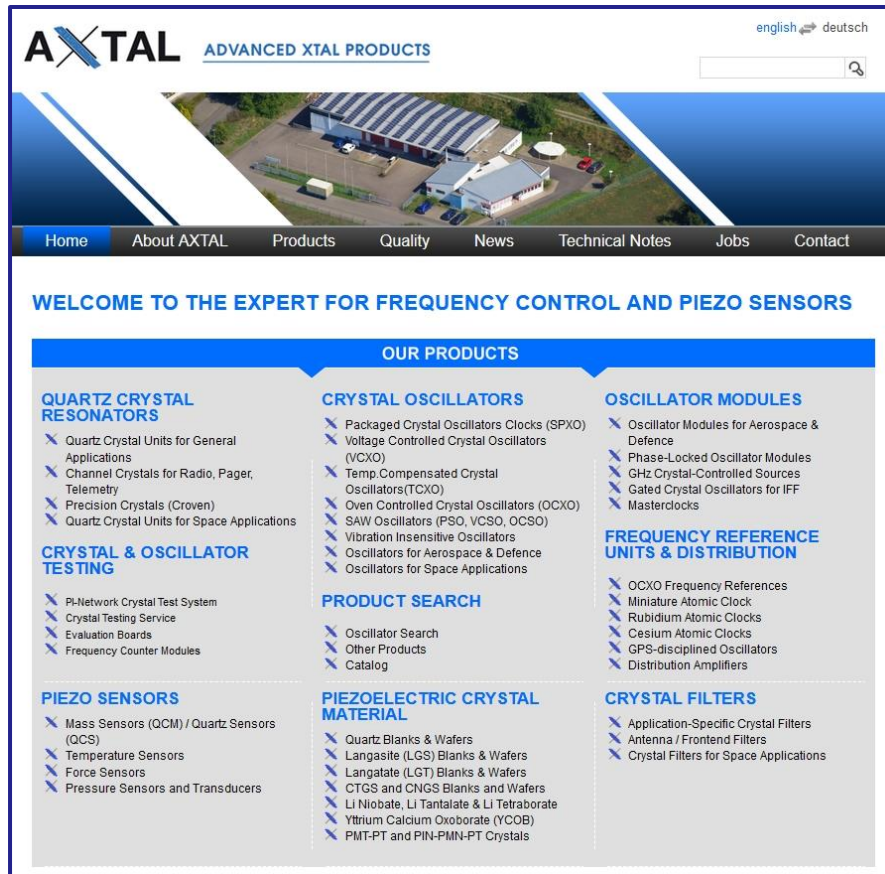
RAFAEL



OHB and many more...



# AXTAL Website



[www.axtal.com](http://www.axtal.com)

- ✗ Find our Latest Updates & News
- ✗ Download Catalog and Datasheets
- ✗ Technical Notes & Archive
- ✗ Check out where you can meet us on Trade Shows & Conferences