

# SAW Technology and Capabilities

*High performance SAW oscillators, filters, and delay lines for space, military and commercial applications*

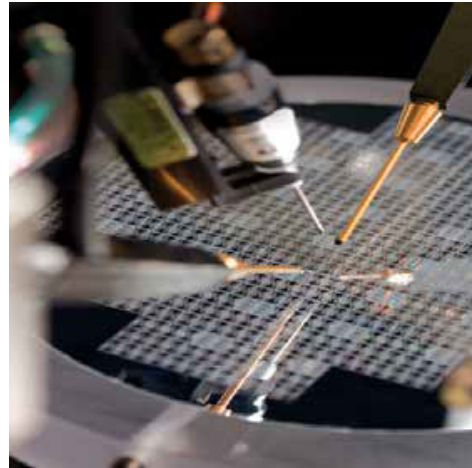
With over 40 years of design and development expertise in Surface Acoustic Wave (SAW) products, APITech provides cutting-edge SAW filters, oscillators, and delay line solutions for today's military, space, and commercial markets. Utilizing in-house, state-of-the-art SAW wafer fab technology, and our own SAW design simulation software, our engineers are able to leverage this expertise and provide high performance SAW solutions that feature minimal group delay variation and low insertion loss. Additionally, APITech has the ability to manufacture SAW products on a certified MIL-PRF-38534 Class H&K line with Class 100 clean rooms and the capability to certify, screen and, test to the most rigorous of industry standards.

- Certified to ISO 9001 and AS9100
- Quality control system compliant to AS9100
- ANSI/Z540-1-2006 compliant calibration
- Screening available to the test methods of MIL-STD-883
- Performs 100% wafer probe testing for every SAW die
- Class 100 Clean Rooms
- 8,000 SAW die per hour throughput rates

APITech's sealing methods include seam sealing which provides a very reliable hermetic seal, while maintaining a stable environment for the package and its sensitive contents.

Hermetic seam sealing also maintains environmental integrity to pass the rigors of MIL-STD-883 Method 1014 Conditions A & C for both gross and fine leak detection.

SAW oscillator products undergo rigorous testing at pre and post seal for critical parameters at room and over temperature including: phase noise, center frequency, pull range, spurious, harmonics, output power, and tuning



## SAW Oscillators

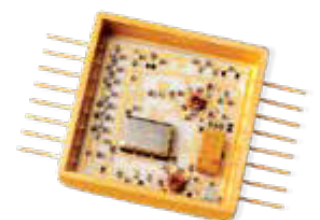
APITech utilizes a low jitter planar SAW which translates to extremely low phase noise performance and exceptionally low accumulated jitter. High performance is the cornerstone of our SAW Oscillator designs. APITech's SAW Oscillators undergo rigorous testing which include; constant acceleration, vibration testing, and stability bake. We use a low loss planar SAW device as the frequency controlling element. Adding multiple complimentary features including gold for low loss and kovar SAW packages results in a product with inherent high reliability to meet today's demanding requirements.

## Features

- Low phase noise performance to -124 dBc/Hz at 1 kHz offset
- High stability of less than 10 ppm/year
- Hermetically sealed
- Rugged design for space and military markets
- 100 - 4000 MHz

## Applications

- Clock and data recovery
- Identify friend of for (IFF)
- Radar



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## SAW Filters

APITech provides SAW filter solutions for narrowband, GPS band applications, standard IF and, standard RF bands. APITech's design library consists semi-standard and custom SAW filter solutions of filters from 20 to 2600 MHz with exceptionally low group delay.

### Features

- 20 – 2600 MHz
- Insertion loss as low as 1.2 dB
- Shape factors below 1.10:1
- Hermetically sealed packages
- Meets MIL-STD-883 method 1014 conditions A & C for gross and fine leak
- Ultra-Flat group delay as low as 8 ns part to part
- Pre-Aged at 100°C to lock center frequency within 0.0005% (quartz only)

### Applications

- Satellites
- Cellular Base Stations
- Military Radar
- Cable TV Equipment
- Global Positioning Systems



## SAW Delay Lines

APITech's line of non-dispersive and dispersive SAW Delay Lines offer semi-standard or custom designs with various delay and bandwidth options. SAW Delay Lines are available in several packaging options such as ceramic leadless chip carriers, which provide small size and weight, and platform packages, which are suited for harsh applications. APITech has experience with delay lines on various substrates including quartz, lithium tantalate and, lithium niobate. All SAW Delay Lines are hermetically sealed to ensure robust performance

### Features

- 36 - 2000 MHz
- .1  $\mu$ sec - 10  $\mu$ sec delay
- 10 dB insertion loss, increases with delay and bandwidth
- Fractional bandwidths between 5 & 55%

### Applications

- Radar Systems
- Electronic Warfare
- Communication Systems
- Collision Avoidance

