

MICROELECTRONICS BROCHURE

The logo for API Tech, featuring the word "apitech" in a white, lowercase, sans-serif font. A stylized white atom symbol with three orbiting electrons is positioned above the letter "i".



APITech is a full-service partner for hybrid engineering and thermal design expertise. We provide high performance products through top-notch manufacturing for reliability and superior quality that today's customers demand.



Microelectronics Capabilities & Technology

APITech is a world class leader in vertically integrated microelectronic solutions.

APITech is a full-service partner for hybrid engineering and thermal design expertise. We provide high performance products through state-of-the-art manufacturing processes with the reliability and superior quality that today's customers demand.

API Technologies is your complete microelectronics solution provider.

Our World-Class Facility

APITech has outfitted a 45,000 ft² facility to support the combined manufacturing and engineering operations of our Worcester and Marlborough facilities. Located in Marlborough Massachusetts Technology Park, the facility is AS9100 registered and fully certified to MIL-PRF-38534 Class H and Class K standards.

Within this facility, APITech professionals design and manufacture high performance hybrids, MCMs, power conversion and control products, SAW filters and SAW based sub-systems. Product functions include oscillators, filters, power regulators and conversion products as well as precision analog circuits.

Our team brings over 45 years of design experience, and our high volume automated assembly lines allow the facility to develop custom solutions for defense, space, satellite, commercial, communications, avionics, and industrial industries.



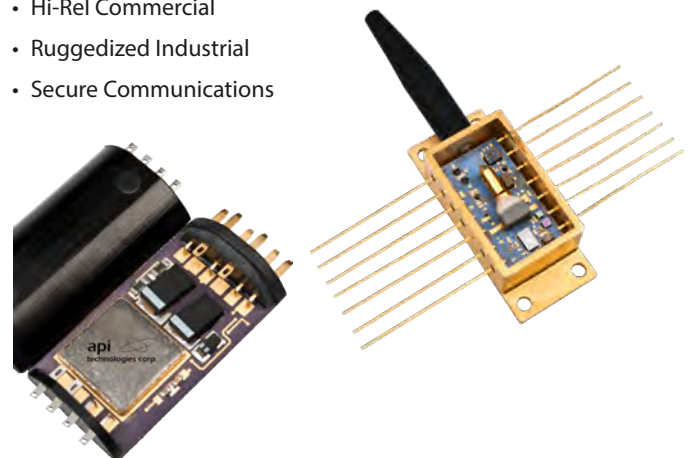
1 Microelectronics Brochure

Technologies

- Mixed Signal & Power
- RF, Microwave & MMW
- Optoelectronics
- Space
- Thin Film / SAW Wafer
- Power Conversion / Regulation
- In-house Thin and Thick Film Fabrication
- In-house Chip & Wire (Hybrid) Technology
- SMT Manufacturing
- Void Free Die Attach Process
- Thermal Simulation
- Built-in Monitoring
- Linear & Non-linear Simulations
- In-house SAW Fabrication
- In-house Laser Sealing
- Precision Machining
- Unique packaging options: modules, pallets, surface mount, and drop-in

Markets

- Defense (MIL-PRF-38534 Class H)
- Space (MIL-PRF-38534 Class K)
- Avionics
- Hi-Rel Commercial
- Ruggedized Industrial
- Secure Communications





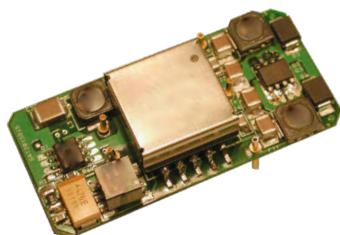
Capabilities

- Advanced Engineering
- High Density Manufacturing
- DC-50 GHz
- High Reliability
- Class K Certified Facility
- Thin Film / SAW Wafer Fab

APITech Benefits

- Fully Certified to MIL-PRF-38534 Class H and Class K
- 30,000 square feet of Class 100,000 Clean Room
- Prototypes, Production and Qualification
- Reduce Size/Lower Weight
- Improve Performance and Reliability
- Full Temperature Testing
- Environmental Stress Screening

Certifications



State-of-the-Art Engineering

Using state-of-the-art software and simulation tools, our experience engineering team is able to quickly take a requirement from concept to production.

- | | |
|----------------------------|--|
| • Ansoft HFSS | • AutoCAD |
| • Ansoft Designer | • Cadence Allegro |
| • Microwave Office | • Sonnet EM Simulator |
| • Agilent ADS Design Suite | • PSpice |
| • SolidWorks | • PCad |
| • Labview | • Or Cad |
| • Agilent Genesys | • Finite Element Analysis for Thermals |

Space Capabilities

Developing mission critical solutions for space applications has never been more challenging. Prime contractors delivering today's deep space exploration, scientific discovery, military surveillance/protection, and commercial communications innovations demand suppliers who combine the highest reliability products with cost efficiency. APITech is exactly that kind of partner. With a space heritage dating to 1976, we have proven experience participating in a long line of past and present space programs.

APITech is a designer and manufacturer of RF/microwave and hybrid components, microwave semiconductors and microelectronic assemblies for space systems, satellites, launch vehicles, and associated support networks. We utilize five manufacturing space centers of excellence offering a wide range of space and Hi-Rel certifications and extensive testing capabilities. Our experienced engineering team will recommend one of our many space-approved standard designs or develop a custom solution radiation hardened to withstand the most extreme environments.



Program Heritage

Deep Space Launch

- Galileo
- Cassini
- USERS (2 sats)
- Selene & Okina
- Mars Phoenix
- Lunar Reconnaissance Orbiter

Scientific Missions

- SAOCOM
- Hershel Plank
- AMS-02
- Aquarius (SAC-D)
- Lisa Pathfinder
- Juno

Launch & Reentry

- Vehicles
- Taurus
- Minuteman
- H-II

Communications

- GPS-2F
- Prima
- O3B
- Inmarsat
- Intelsat
- Sirius Radio
- Direct TV
- Optus 10
- Amazonas 3
- Grail (2 sats)
- EnMap
- Vegetation
- Cassini
- Meteosat
- Thor 7
- MUOS
- Hot Bird
- MARECS
- Olympus
- SkyNet
- Eutelsat
- Koreasat
- OCO
- LCROSS
- Mars Science Lab
- ISS Kibo EF



Certifications

- MIL-PRF-38534 Class K
- MIL-PRF-38534 Class H
- AS9100
- ISO9001
- IPC-610 Class 3
- J-STD 001
- MIL STD 883
- ESA/SCC 5010 – Microwave Diodes QPL

Process Verification & Environmental Screening

- Wirebond Pull & Shear Tester
- Pressurizing Helium Chamber
- Temp Cycling
- Fine Leak Test
- Gross Leak Test
- Real Time X-Ray
- Centrifuge
- PIND Test
- Thermal Shock





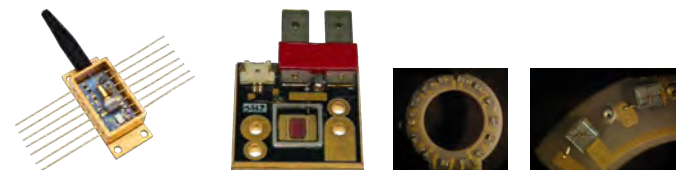
RF, Microwave/MMW Solutions

- QFN (Quad Flat No-lead) Custom Packaging
- Q Band Power MMIC Amplifier
- S Band SiC/GaN MMIC Amplifier
- High Power Radar (X Band) Amplifier
- 16-way Power Amplifier
- 8-way Power Amplifier
- Ka Band Power Amplifier
- High Shock Timer
- SAW Oscillator
- Voltage Controlled SAW Oscillator
- Phase Locked Oscillator
- PIN Diode Drivers



Mixed Signal & Power Solutions

- Analog to Digital Converters
- Digital to Analog Converters
- Voltage References
- Operational Amplifiers
- Full Custom Mixed Signal Microelectronic Solution
- Full Custom Build to Print Power
- Solid State Opto-Isolated Relay
- Build to Print Motor Control Assembly
- Custom Build to Print Liquid Cooled IGBT Module



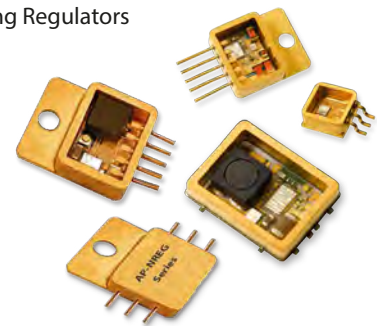
Optoelectronics/LED Illumination Solutions

- VCSEL Encoder
- Tunable Receiver for Wavelength Monitoring
- Laser Range Finder
- Custom Build to Print Silicon Carbide Backlighting LED
- Custom Build to Print Silicon Carbide LED Illumination



Rad-Hard Power Conversion & Control Products

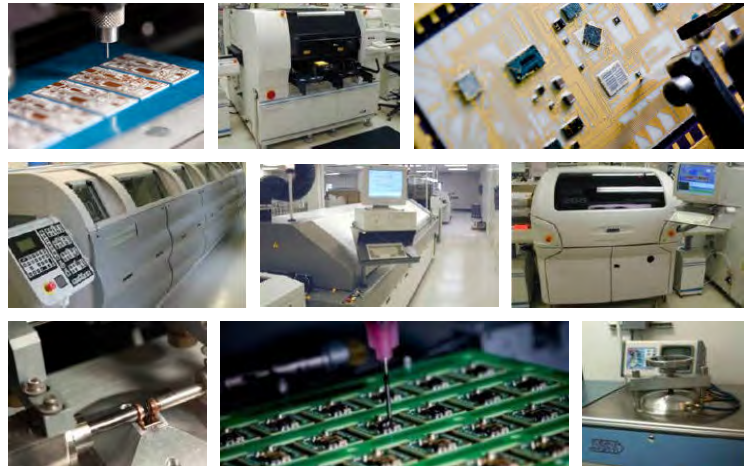
- Positive & Negative Voltage Reference/Regulators
- Remote Sense, High Precision, Laser Trimmed Voltage Regulators
- High Power Solid State Relays including SPDT SSRs
- Point-of-Load Switching Regulators
- DC/DC Conversion
- Data Converters
- High Reliability
- Space Level





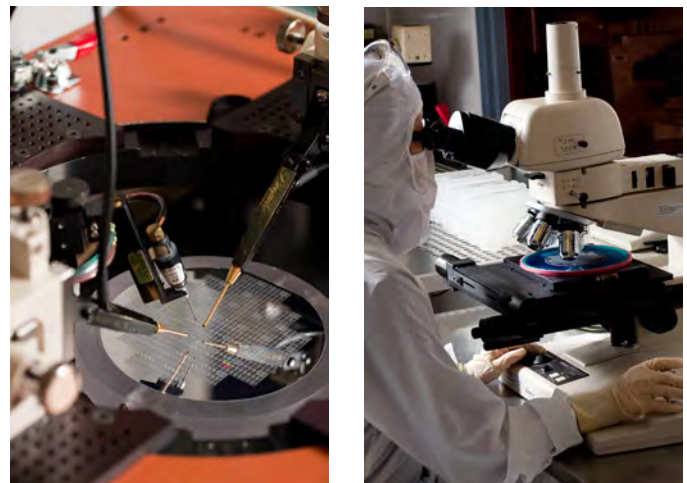
Manufacturing Capabilities

- Auto Dispensing
- Auto Die Attach
- Auto Flip Chip/BGA
- Auto Wirebonding
- Stenciling/Screen Printing
- SMT/Pick n Place
- Solder Reflow
- Aqueous Cleaning
- Hermetic Cover Seal
- Vacuum Seal
- Encapsulation



Engineering Expertise

- Extensive design experience in high-reliability microelectronics solutions
- Deep space, scientific, military communications, and commercial programs
- Thermal and packaging expertise
- State of the art design and simulation tools, ATE, and element evaluation
- Vertically integrated, in-house machining, thin film FAB, SAW
- Certified to MIL-PRF-38534 Class H/K
- ISO 17025 accredited test facility
- Environmental screening to IECQ, MIL-STD-202, MIL-STD-883



Test Technologies

- VLSI Tests
- Mixed Signal Test Stations
- MMW LabView Test & Chamber
- Custom ATE Stations
- High Power Testers
- RF Test Benches





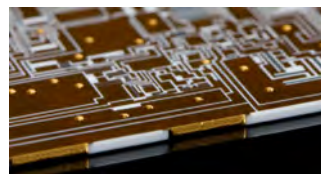
SAW Wafer Fab Technology

APITech's SAW filters, in frequencies from 20 MHz to 2600 MHz, offer many outstanding features including:

- Loss Less Than 2 dB
- Fractional Bandwidths from 0.04% to 60%
- Shape Factors Below 1.10:1
- Hermetically Sealed Packages

APITech's SAW Oscillators include Rad-Hard Voltage Controlled (VCSOs), Fixed Frequency, and Phase Locked. Low phase noise SAW oscillators feature high stability and reliability in frequencies from 100 MHz to 20 GHz.

- Low Jitter Planar SAW
- High Stability of less than 10 ppm/Year
- Class-K and Class-H Rugged Designs
- On-board Micro-controllers to Maintain Signal Integrity



Thin Film Capabilities

Whether drilling on Alumina, Aluminum Nitride, BeO, Silica or Quartz, using our advanced laser drilling method ensures enhanced mounting convenience without the need for awkward bonding techniques. Specific Core Competencies Include:

- Tolerances to $\pm 0.00005"$ (1.27 μ m)
- Resistor Tolerance to 0.1% Absolute, 0.01% Matching
- Metallized Vias and Wraparounds
- Gold Filled Vias
- Copper Filled Vias
- Polyimide, Silox and Silicon Nitride Dielectrics
- Dielectric Bridges
- Gold/Tin Selective Deposition
- Fine Lines and Spaces 0.0004"/0.0004" (10 μ m)

Thin Film & SAW Fab Technologies

APITech provides cutting edge technologies for today's military, space, and commercial markets with in-house state-of-the-art SAW fab technology and thin film capabilities.

- Laser Cutting
- Metal Deposition
- Photo Lithography
- Auto Redical Stepper
- Precision Photo Resist
- Automated Developer Application
- Ion Etching
- Pack
- Auto Probe & Trim
- Auto Wafer Dicing

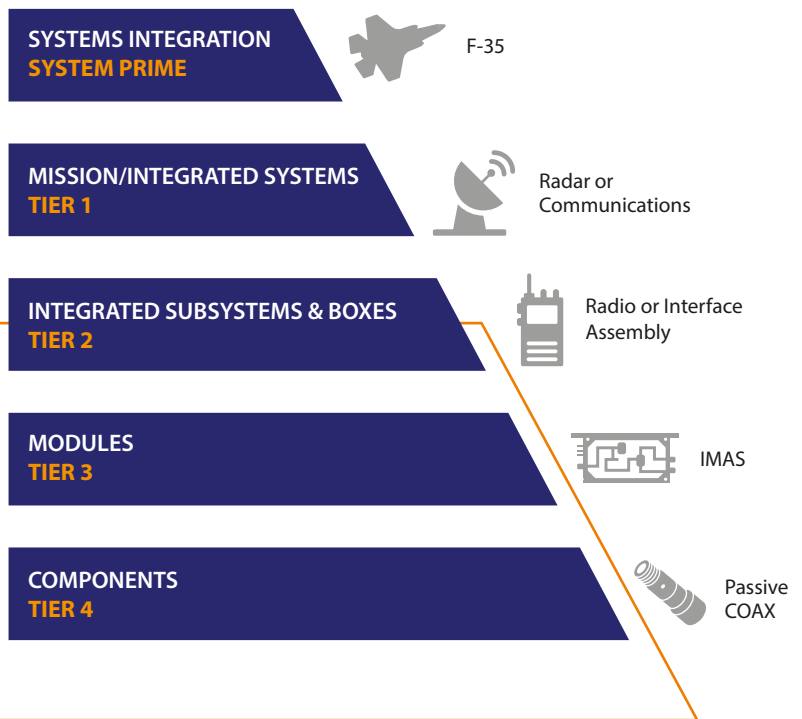




Who We Are

Value-added Integration from Components to Subsystem Solutions

APItech provides rugged, reliable, and efficient subsystems, assemblies, and components for use in the most mission critical defense and military applications, supporting government programs throughout the world. With diverse program experience and preferred supplier status with some of the industry's top premier contractors, our precision-engineered MIL-grade products are ideal for applications where uncompromised reliability and uninterrupted performance is required. APItech is the Electromagnetic Spectrum Innovator at Tier 2.5-4 in the supply chain.



The Electromagnetic Spectrum Innovator

APItech is an innovative designer and manufacturer of high performance systems, subsystems, assemblies and components for technically demanding RF, microwave, millimeter wave, electromagnetic, power, and security applications.

A high reliability technology pioneer with over 70 over 70 years of heritage, APItech's products are used by global defense, industrial, and commercial customers in applications spanning radar, electronic warfare, unmanned systems, missile defense, harsh environments, space, communications, medical, test and instrumentation, and more.



www.apitech.com | 855.294.3800

CONTACT US