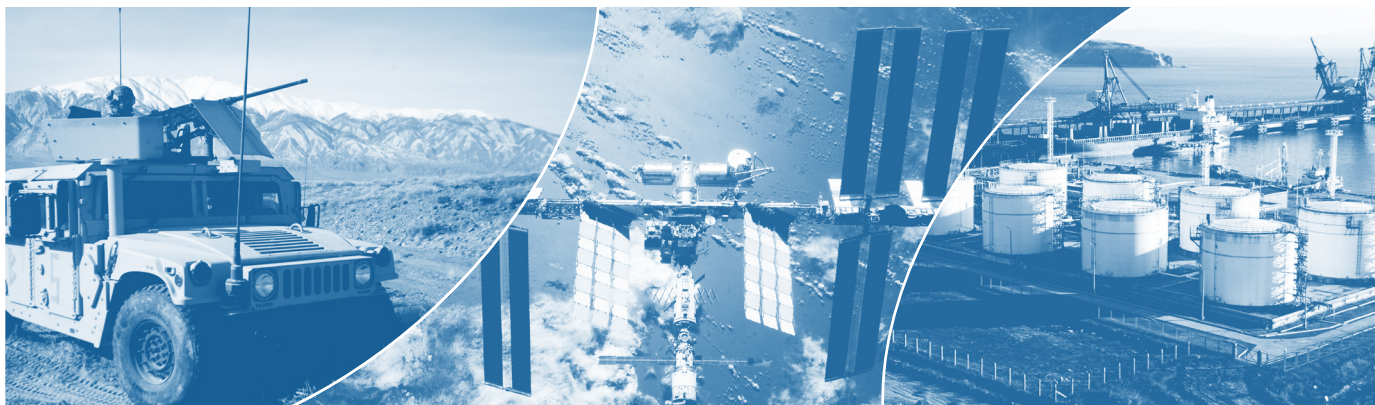




RF & microwave signal conditioning
and electromagnetic spectrum
management solutions, from
components to complete subsystems.

RF and Microwave Signal Conditioning and Management

Capabilities & Certifications



With state-of-art facilities in the US and Europe, API helps customers design and manufacture components for the most complex RF, microwave and mmW applications. A careful adherence to ISO controlled standard processes guarantees conception to design, development, and into production and final inspection that an API team member is providing the proper oversight and monitoring at each stage in the process.

Manufacturing Capabilities

- In-house Thin & Thick Film
- In-house SAW Fabrication
- Laser Sealing for Hermetic & Environmental Integrity
- Precision Machining
- Automated SMT & CCA assembly
- Solder Reflow
- Automated Pick & Place
- Chip on Board
- Ultra High Temp (225°C and above)
- Fluxless Soldering
- In-house Chip & Wire (Hybrid) Technology
- Automated Wirebonding
- Wire Bond Pull Qualification
- Parallel Gap Welding
- Auto Epoxy & Solder Dispensing
- Auto Die Attach
- Void-Free Die Attach
- Manual Wire Bonding & Ribbon Bonding
- Nitrogen Backfill & Pre-Seal Vacuum Bake
- Fine and Gross Leak Hermetic Seal Verification
- Steam Aging & J-STD-001 Solderability Testing
- Low Temperature Co-fired Ceramic (LTCC)
- Glass Microwave Integrated Circuit (GMIC)

Environmental Screening

- Mechanical Shock
- Vibration (Random & Sinusoidal)
- Thermal Cycling & Thermal Shock
- PIND (Particle Impact Noise Detection)
- Passive & DC Biased Burn-In
- Accelerated Life Testing

Certifications

- All Manufacturing Facilities Certified to ISO 9001:2015
- Six Certified AS9100 Facilities
- ANSI 20.20 Compliant Facilities
- Department of State ITAR Compliant
- Cleared Facilities & Personnel
- Six Sigma Greenbelts
- Hybrid Lab certified MIL-PRF-38534 (Class H and K)
- QPL MIL-PRF-15733 & MIL-PRF-28861 (Selected Products)
- MIL-STD 790 (DSCC), MIL-STD 1553 (Data Bus), MIL-STD 883 (Hybrid), MIL-STD 202 (Passive), MIL-STD-810 (Systems), MIL-STD 461 A/B/C/D/E (EMC), MIL-STD 1399 Surge (EMC)
- Solder/Assembly J-STD-001 Class 3 & IPC-A-610
- NEBS Approved (Selected Products)
- RoHS Compliant (Selected Products)

RF/Microwave Components, Assemblies & Subsystem Solutions

AESA Radar Subsystems

- Scalable Active Antenna Array Unit
 - » Line-replaceable quad T/R modules contained within modular plank assemblies

Programmable Attenuator, Switch Units and Subsystems

- Multi-Channel Attenuation Subsystems
- Switch Matrices
- Mobile Unit Fading Simulators
- Programmable Attenuators and Controllers

CNI Subsystems

- I Band Transponders
- RRB Receiver for surveillance/navigation radars

Integrated Microwave Assemblies (IMAs) & Subsystems

- Amplifier Based IMAs & Subsystems
 - » Up to 3,200 watts output power; frequencies up to 50 GHz; various forms of control & interface
- Frequency Generation IMAs & Subsystems
 - » Frequency generation from DC input supply; up to 50 GHz
- Filter Based IMAs
 - » DC – 40 GHz, excellent rejection; low loss designs
- Switched Filter Banks
 - » 20 – 7,500 MHz; 2 to 7 channels; user-configurable
- IFMs and DFDs
 - » 2 – 18 GHz coverage in a single unit
- Up/Down Converters
 - » High linearity; low power consumption
- Receiver Front-Ends
 - » Low noise; up to 50 GHz

Power Distribution & Conversion

- Switched Power Distribution Unit
 - » Single phase up to 30 Amps power; 1U package
- Junction Box
 - » 28 VDC output; 150 Amps DC input
- Intelligent Power Distribution Unit
 - » Frequency up to 400 Hz; single and 3-phase inputs to 80 Amps
- Tactical Power Supply
 - » Ruggedized, portable, COTS; AC/DC/dual input models
- Power Entry and Export Panel
 - » +24/28 VDC to 200 Amps; 3-Phase AC to 60 Amp per phase input/output

Differentiators:

- **Advantages in system performance and reliability:** Vertical integration utilizing in-house components and multi-disciplined engineering and design expertise.
- **Reduced material costs across the supply chain:** Standard products and common integration platforms.
- **Reduced size and weight:** Multiple RF and function components integrated in a single housing.



Passive & Active RF/Microwave Components

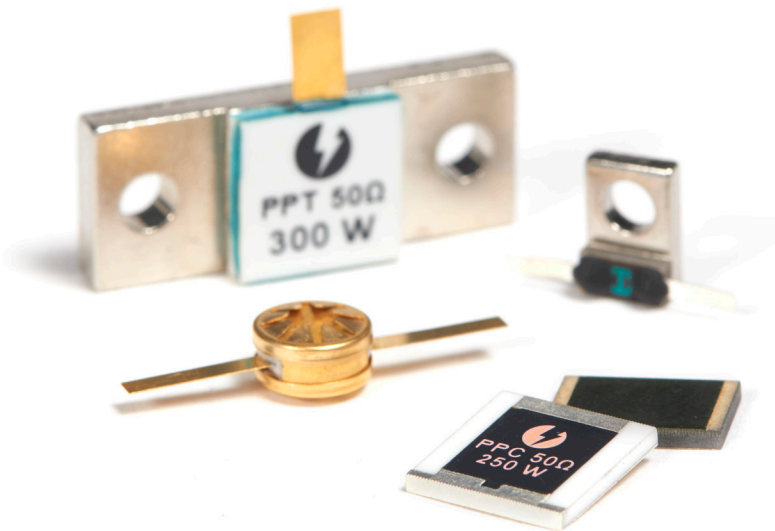
- **Attenuators**
 - » Convection and conduction cooled
 - » Fixed DC – 26.5 GHz; 2 – 1,000 watts
 - » Variable DC – 4 GHz; cycle life up to 10,000 cycles
 - » Manual Step DC – 6 GHz; up to 2 watts
 - » DC – 10 GHz low PIM designs
- **Terminations and Loads**
 - » Convection and conduction cooled
 - » Fixed DC – 26.5 GHz; 2 – 1,000 watts
 - » DC – 20 GHz low PIM designs; 25 – 500 watts
 - » Convection cooled flat packs DC – 40 GHz; 50 – 550 watts
 - » 0.01 – 20 GHz; voltage 50 – 200 (high voltage options from 900-3,000)
- **DC Blocks**
 - » Inner, outer, inner-outer
 - » 0.01 – 20 GHz; 50 – 200 volts
 - » High voltage options 900 – 3,000 volts
- **Mechanical Phase Shifters**
 - » DC – 26.5 GHz; 10 – 50 watts
- **Power Dividers and Splitters**
 - » 2- and 4-way dividers
 - » DC – 40 GHz; 0.5 – 2 watts
- **Bias Tees**
 - » General purpose, high power, high current, pulsed
 - » 75 Ohm and broadband options
 - » 0.1 – 50 GHz; 16 – 100 volts
- **Gain Equalizers**
 - » Broadband; narrowband
 - » Negative and positive slope and ripple options
 - » DC – 40 GHz
- **Adapters and Connector Systems – Planar Blindmate®**
 - » Threaded and threadless connectors
 - » DC – 40 GHz and DC – 800 MHz
- **Delay Lines**
 - » BAW, SAW, lumped constant, steel dispersive, & coaxial topologies
- **Rotary Joints**
 - » SMA, N, TNC and 2.92 connectors; wideband; miniature designs
- **Phase Shifters**
 - » Coaxial; DC to 40 GHz; Trombone & trough line designs
- **Power Divider/Couplers**
 - » Quadrature hybrid
 - » Multi-octave broadband
 - » 1,000 watts
- **Mixers**
 - » 0.5 MHz – 26.5 GHz; double and triple balanced; SMT, drop-in and connectorized
- **Switches**
 - » PIN diode, connectorized and GaAs; frequencies up to 22 GHz
- **Limiters**
 - » Waveguide and Receiver Protector; GMIC Limiters; RF Limiters & Limiting Amps
- **Detectors**
 - » Analog and threshold detectors; 10 MHz – 16 GHz
- **Variable Attenuators**
 - » Surface Mount; DC – 2 GHz
- **A/D & D/A Converters**
 - » CMOS or TTL compatible; +5 volts or +15 volts
- **Patch Antennas**
 - » Ceramic, off-the-shelf; cable or SMA connector
- **Diodes**
 - » Space-screened; frequency multiplier, tuning varactor, and PIN silicon diodes

Differentiators:

• **System integration solutions:** Broad portfolio of components spanning a wide variety of systems and applications.

• **Large selection of ITAR-free solutions:** Manufactured in the U.K.

• **Design flexibility:** Products available in standard, configurable or as customizable models.



Powerfilm® Surface Mount Resistive Products

- Flange Attenuators
 - » 0.5 – 4.0 GHz;
 - 10 – 100 watts
- Chip Attenuators
 - » 0.5 – 18 GHz;
 - 0.75 – 100 watts
 - » Temperature variable option
- Flange Terminations
 - » 0.4 – 7 GHz;
 - 20 – 800 watts
- Chip Terminations
 - » 0.5 – 18 GHz;
 - 0.5 – 600 watts
- Flange Resistors
 - » 0.4 – 4.0 GHz;
 - 10 – 800 watts
- Chip Resistors
 - » 0.4 – 18 GHz;
 - 0.05 – 800 watts

Differentiators:

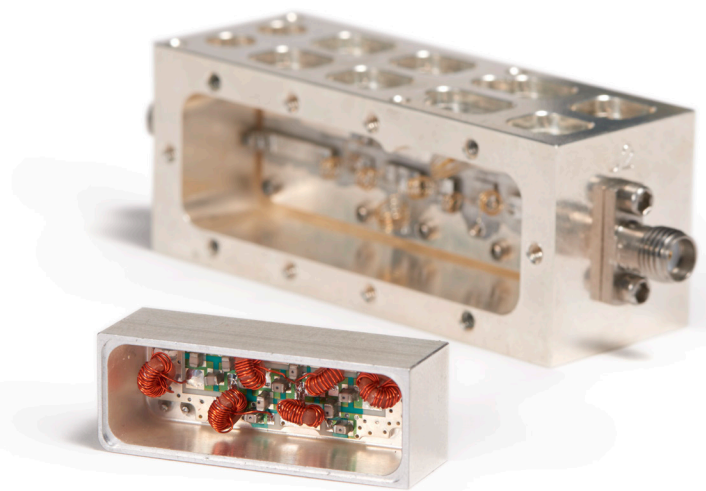
- **MIL-SPEC quality:** Standard in-house screening.
- **Dedication to quality:** Highest quality surface mount attenuator, termination and resistor chips in the industry.
- **Variety of substrates and wrap options:** Thin and thick film technologies.

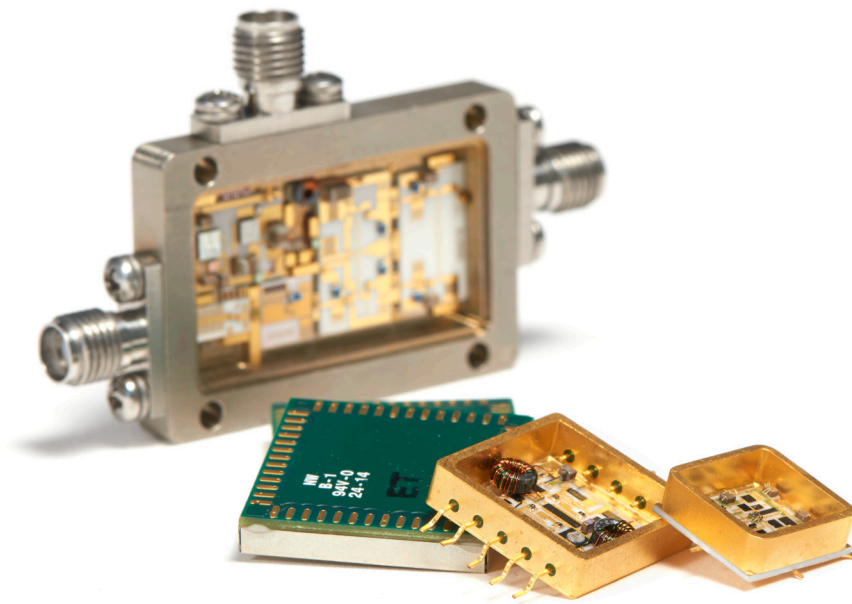
Filters

- Bandpass, Lowpass, Highpass, Band Reject
- Lumped Element, Cavity, Tubular, Ceramic, Suspended Substrate, Waveguide
- Multiplexers, Triplexers, Diplexers
 - » DC to 40 GHz; contiguous and non-contiguous; mixed topologies

Differentiators:

- **Integration expertise:** Multiple and mixed topologies integrated in a single unit to optimize system performance.
- **Market-driven solutions:** Space, wireless telecom, co-location and defense.
- **Smallest footprint possible:** State of the art design and simulation software utilized to produce the highest performance, custom filter products.





Amplifiers & Power Amplifiers

- High Power
 - » Frequencies to 26 GHz; Broadband; Class A, Class AB; linear; operating
- Pulsed Power
 - » Pulsed, solid state power amplifier technology
- GaN Solid State Power
 - » 1kw output power; ideal for TWT replacement
- High Frequency
 - » 4 – 50 GHz; no NRE charges on most designs
- High Linearity
 - » Performance up to IP2 values of +120 dBm
- Low Noise
 - » Noise figure values as low as 0.8dB
- Low Phase Noise:
 - » -181 kHz at 10kHz performance
- Automatic Gain Control Amps
- Power Amp Drivers & Gain Blocks
- Filtered GPS LNAs
 - » COTS-based; 1.8 dB typical noise figure

Differentiators:

- **Technology expertise:** Hybrid thick and thin film, chip and wire, and SMT processes with leading edge semiconductor technologies.
- **In-house machining:** Expertise in ceramic, metal, plastic and hermetically sealed packaging.
- **Design flexibility:** Custom solutions without NRE charges on most standard amplifiers.

Frequency Sources

- Synthesizers
 - » Wide bandwidth; multiple step size; fast switching; low phase noise
- Configurable Surface Mount Synthesizers
 - » Full octave designs; excellent phase noise performance; standard designs to 6 GHz
- Comb Generators
 - » Step recovery diode (SRD) generates very narrow voltage spikes
- Frequency Multipliers
 - » Low signal degradation and multiple frequency options
- Dielectric/Coaxial Resonator Oscillators (DRO / CRO)
 - » 500 MHz – 21.5 GHz
- Phase Locked Oscillators (PLO)
 - » High reliability; excellent phase noise performance
- Master Reference Oscillators
 - » 60 – 480 MHz; Output power level +20 dBm
- Voltage Controlled Oscillators (VCO)
 - » Up to 7 GHz; gold substrates; low junction temperature

Differentiators:

- **Extensive design library:** Custom and standard building blocks of low phase noise frequency sources.
- **Optimized performance:** Combining various technologies such as hybrid chip and wire for maximum component density and heat dissipation.

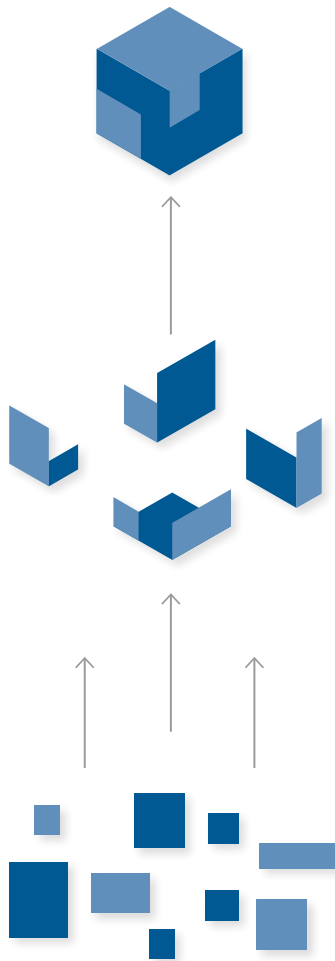
Microelectronics

- PIN Diode Drivers
 - » Output current of 10 – 50 mA; switching speeds as fast as 6 ns
- Thin Film
 - » Plated through and filled interconnects; metallization options
- Thin Film Chip Resistors
 - » Silicon or alumina substrate; resistor tolerance 0.1%
- Thick Film
 - » Ceramic and LTCC
- Optoelectronics
 - » 20 Mbps to 12.5 Gbps data rates; ultra-low power consumption
 - » Protocol-agnostic optical transceivers and optical media converters
 - » ITAR-free solutions
- High Temperature Electronics
 - » Hybrid modules, data processors, sensor/ motor controls
 - » Extreme/harsh environments
 - » Extended lifetime at 225°C continuous
- SAW Filters
 - » 20 – 2,600 MHz; Insertion loss as low as 1.2 dB
- SAW Oscillators
 - » 100 MHz – 4,000 MHz; low phase noise performance to -124 dBc/Hz at 1 kHz offset
- SAW Delay Lines
 - » 20 MHz – 2,000 MHz; 1 µsec to 10 µsec delay
- Multi-Chip Modules (MCMs) & Hybrid Microcircuits
 - » Multi-layer interconnects; chip and wire; wire bonding; ultra-high temperature
- Substrate Printing
 - » LTCC, HTCC, thick film, KQ fine line, BeO
- A/D & D/A Converters
 - » High resolution, high speed, small packages; ability to operate over extended temperatures
- High Power DC/DC Converters
- PCBa, Box Manufacture and Assembly

Differentiators:

- **Broad technology competencies:** Mixed signal and power, optoelectronics, thin film and SAW fab with proficiencies in advanced thermal and packaging techniques.
- **Harsh environment solutions:** High reliability electronics for ultra high temperature and extreme environments.
- **Most rigorous requirements:** Products designed and manufactured in MIL-PRF-38534 Class H & Class K certified facilities.
- **Program heritage:** Deep space, scientific, military and satellite communications and commercial.





Value-Added Integration

From components to subsystem solutions

API 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 prime contractors, our precision-engineered MIL-grade products are ideal for applications where uncompromised reliability and uninterrupted performance is required.



API Technologies is an innovative designer and manufacturer of high performance systems, subsystems, assemblies and components for technically demanding RF, microwave, millimeterwave, electromagnetic, power, and security applications. A high reliability technology pioneer with over 70 years of heritage, API'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.

What We Do

RF and Microwave Signal Conditioning & Management

RF, microwave, millimeterwave, and power solutions to enable the wireless link across global defense, commercial, space and test applications.



Electromagnetic Spectrum Management

Electromagnetic and security solutions to mitigate interference and protect the safe transmission of data in high performance defense and mission critical applications.