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)
- 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

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**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.
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.
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.
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.