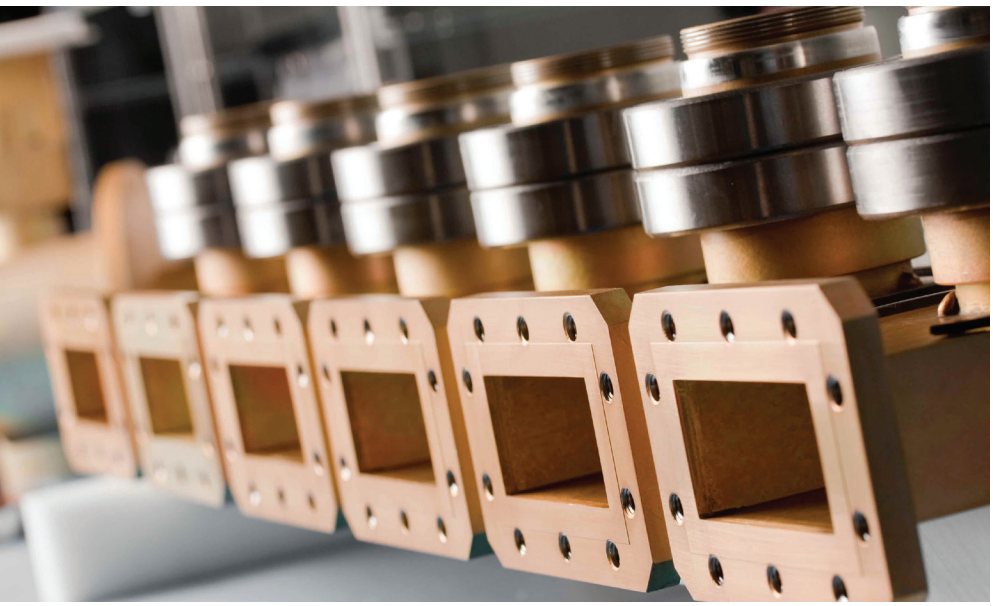
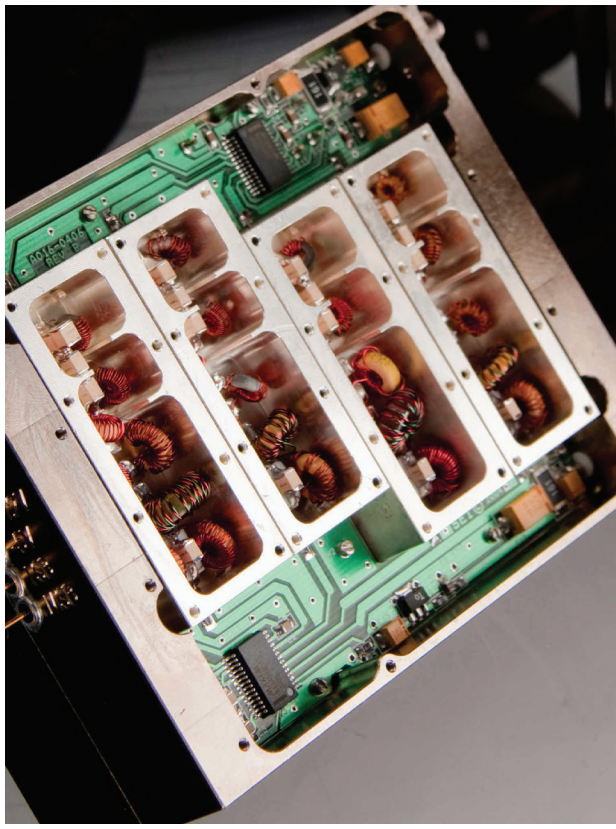
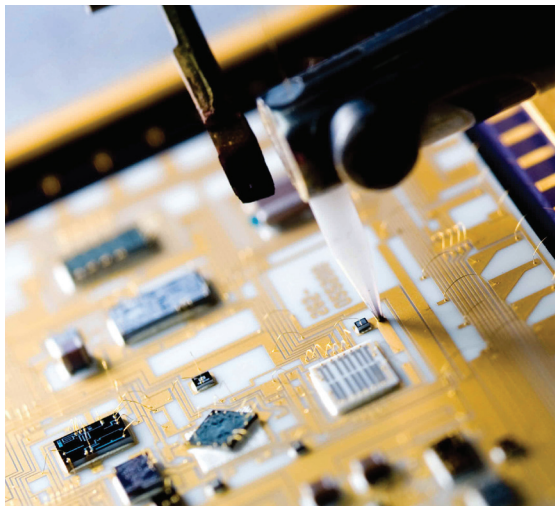
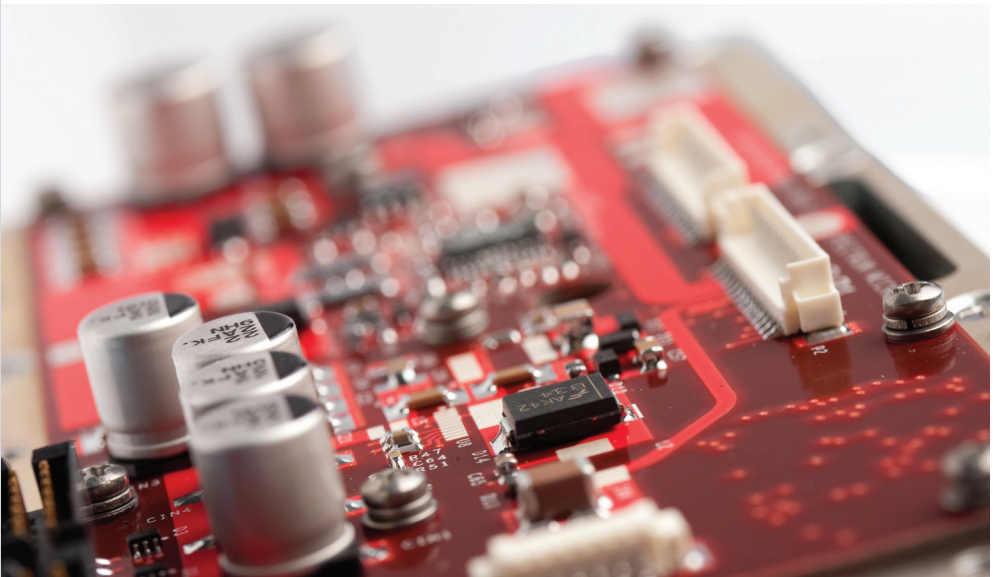
RF/Microwave & Microelectronic Solutions



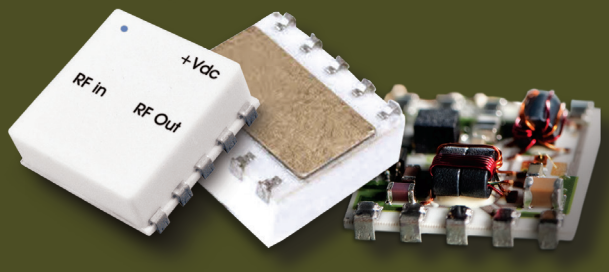








api technologies corp.



Amplifiers & Power Amplifiers

RF & Microwave Amplifiers from API have a long heritage in quality and design. From components and modules, to complete amplifier subsystems, API engineers will work with you on your design to develop a custom or semi-custom solution utilizing hybrid thick and thin film and SMT processes with leading edge semiconductor technologies like GaN, MOSFET, LMDOS, GaAs, and SIC.

- **High Power**
  Broadband; Class A, Class AB; Linear;
  Operating frequencies to 26 GHz
- **Pulsed Power**
  Pulsed, solid state power amplifier technology
- **GaN SSPA**s
  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
- **Small Signal**
  Ultra low phase noise, high dynamic range & spurious signal suppression
- **Automatic Gain Control**
  Anticipate power levels and adjust output power
- **Amplifier Drivers & Gain Blocks**
  Offer gain over frequency bands up to 26 GHz
- **Filtered GPS LNA**
  Reduce out-of-band interference;
  achieve high dynamic range



Filters

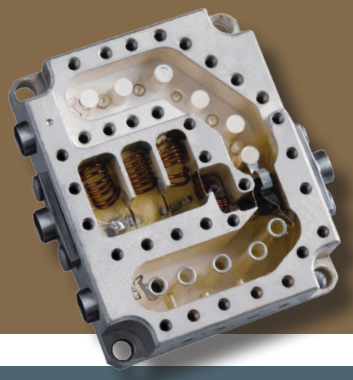
Our reputation for designing and delivering today's most challenging RF & Microwave filters for both defense and commercial applications is unsurpassed. Our engineers specialize in understanding your filter requirements and customizing a solution that delivers superior performance in the smallest footprint.

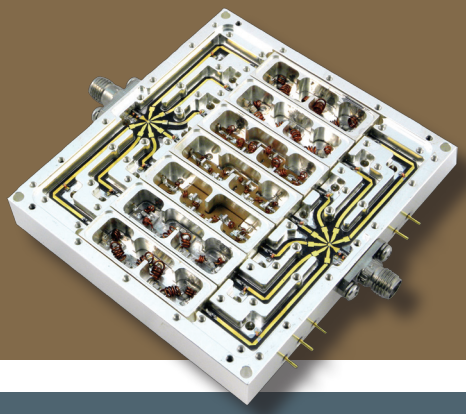
Filter Type

- Bandpass
- Lowpass
- Highpass
- Bandreject
- Space Filters & Multiplexers
- Multi-Function
- Distributed Antenna Systems
- Interference Mitigation Filters

Topologies

- Cavity, Ceramic
- Lumped Element
- Tubular, Coaxial
- Suspended Substrates
- SAW & BAW
- Waveguide





Frequency Sources

API Technologies offers an extensive design library of low phase noise sources, optimizing your overall design for superior performance and value.

Synthesizers

- **Synthesizers**
  Wide bandwidth; multiple step size; fast switching; low phase noise
- **Affordable Surface Mount Synthesizers**
  Full octave designs; excellent phase noise performance; a programmable EPROM; .800" square package

Frequency Conversion

- **Comb Generators**
  Step recovery diode (SRD) generates very narrow voltage spikes
- **Frequency Multipliers**
  Low signal degradation and multiple frequency options

Oscillators

- **Dielectric/Coaxial Resonator Oscillators (DRO / CRO)**
  500 MHz to 21.5 GHz; modified standard; units available in HF to Ku band
- **Phase Locked Oscillators (PLO)**
  High reliability; excellent phase noise performance
- **Surface Acoustical Wave (SAW) Oscillators**
  Low phase noise; excellent frequency stability; rugged construction
- **Voltage Controlled Oscillators (VCO)**
  Low phase noise; superior high selectivity



Microelectronics

A world-class leader in the microelectronic vertically integrated solutions industry, API is your one-stop, full-service partner when superior quality and high performance is a must. Our Microelectronics facilities are proudly certified to MIL-PRF-38534 Class H & K.

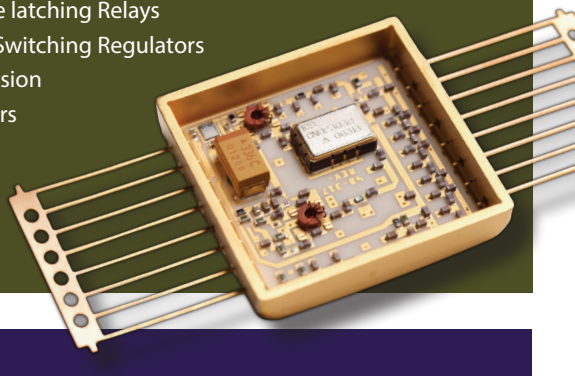
- RF/Microwave & mmW
- Mixed Signal & Power
- Optoelectronics
- Build-to-Print
- Thin Film & SAW Fab
- MIL-PRF-38534 H & K
- Optical Transceivers
- MCMs & Hybrids
- Voltage Controlled SAW Oscillators

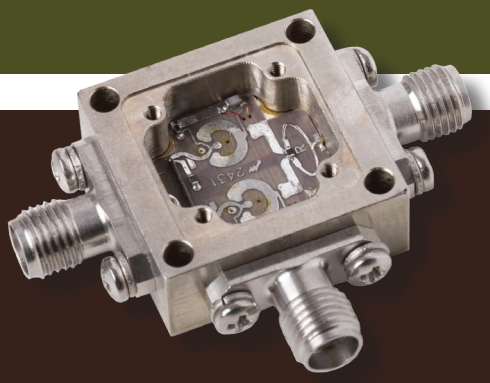
Capabilities

- Chip on Board
- Automated Pick & Place
- Automated Wirebonding
- DC to 50 GHz ATE
- High Temperature
- Void Free Solder Attach

Rad-Hard Power Conversion & Control

- Positive & Negative Voltage Reference/Regulators
- High Power Solid State Relays and Solid State latching Relays
- Point of Load Switching Regulators
- DC/DC Conversion
- Data Converters





Active Components

API engineers specialize in many types of active RF components including hybrid mixers, broadband/high isolation switches, RF limiting amps, digital and voltage variable attenuators, temperature compensated detectors, PIN diode drivers, A/D and D/A converters, and operational amps.

- **Mixers**
  Frequency ranges from 0.5 MHz to 26.5 GHz
- **Switches**
  Includes PIN diode and GaAs frequencies up to 22 GHz
- **Limiters**
  Protect from input overdrive and remove amplitude modulation
- **Attenuators**
  Steps from 0.1 dB to 63.5 dB; frequency from 5 to 200 MHz
- **Threshold & Power Detectors**
  Converts RF input powers to corresponding DC voltage
- **PIN Diode Drivers**
  Inverting/non-inverting modes; positive/negative output currents
- **A/D & D/A Converters**
  High stability and linearity; +5 volts or +15 volts
- **Receiver Protection**
  S-Band, J-Band, 12-18 GHz; C-, X-, K-Band
- **Diodes**
  Frequency Multiplier Diodes, Tuning Varactor Diodes, PIN Diodes, MNS Chip Capacitors



Passive Components

API has the ability to develop various types of passive RF components including: delay lines, low loss and durable rotary joints, electromechanical phase shifters, high-power handling couplers, and high isolation power dividers.

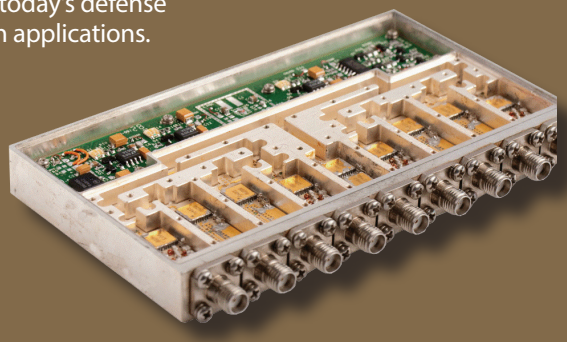
- **Power Dividers**
  High isolation; excellent phase balance & amplitude tracking; low loss
- **Delay Lines**
  BAW, SAW, Lumped Constant, Steel Dispersive & Coaxial topologies; wide range of frequency and delay
- **Rotary Joints**
  Durable design for high speed and long life; low loss
- **Phase Shifters**
  DC to 50 GHz; commercial, military, and high performance optical applications
- **Combiners & Directional Couplers**
  Multi-octave broadband; power up to 1500 W; flatness as low as +/- 0.4 dB
- **WIRELINE® and WIREPAC®, Couplers and Hybrids:**
  Frequency independent; quadrature output phase; low VSWR; low insertion loss; high directivity and freedom from intermodulation



Integrated Microwave Assemblies (IMAs)

API's diverse Integrated Microwave Assemblies are ideal for the advanced solutions needed in today's defense and commercial wireless systems including oscillator-based, filter-based, and signal conversion applications.

- Switched Filter Banks
- Switched Multiplexers
- Filtered GPS LNAs
- Wireless Filter Assemblies
- Frequency Activity Detectors
- IFMs and DFDs
- Frequency Multipliers
- Synthesizers
- Up/Down Converters
- Receiver Front-Ends
- Box Builds
- Switchable Multi-Channel Amplifiers





Active Antenna Array Solutions

API Technologies designs and develops Active Electronically Scanned Array Solutions including a modular, scalable Active Antenna Array Unit, as well as a variety of drop-in, ready to integrate, high performance T/R modules including Quad and Dual TRMs in X, C and S band configurations. These Active Antenna Array Solutions provide the RF transmit and receive functionality for the front end of transmission systems, and are ideally suited for AESA, E-Scan, naval, airborne, ground-based, vehicle-mounted, air traffic control radar applications, as well as SATCOM on the move, tactical data link applications, and ground, maritime and other missile defense program requirements.

- **Scaleable Active Antenna Array Units**

  API's Modular Active Antenna Array Unit (AAAU) is comprised of stackable X-Band Quad T/R Module 'common building block' units contained within a modular, line-replaceable plank assembly for for scaleability and ease of integration and repair.

- **Transmit Receive Modules**

  API's Quad Transmit Receive Module, or QTRM, solutions for radar applications offer a unique and innovative solution to system integrators and prime contractors seeking a high performance, high level transmit/receive solution for the development of active antenna array systems and sub-systems. Dual Transmit Receive configurations, as well as integrated T/R assemblies are also available for a variety of phased array applications.



Antennas

From design through manufacturing and testing, API is the leader in complete vertical integration of antennas. Our advanced simulation techniques, in-house prototyping and high volume manufacturing, enable us to deliver custom, or off-the-shelf solutions to meet the unique requirements of commercial, military, and space applications.

- **Patch Antennas**

  1 GHz to 6 GHz; 13mm to 50mm square; Gain response from 0 to 3 dBi for half-power beamwidths of 1100; Gain at boresite (90° elevation) can exceed 6 dBi

- **Planar Antennas**

  Custom linear and circularly polarized arrays; High gain up to 12 dBic in L- and S-Band

- **Custom/Integrated Assemblies**

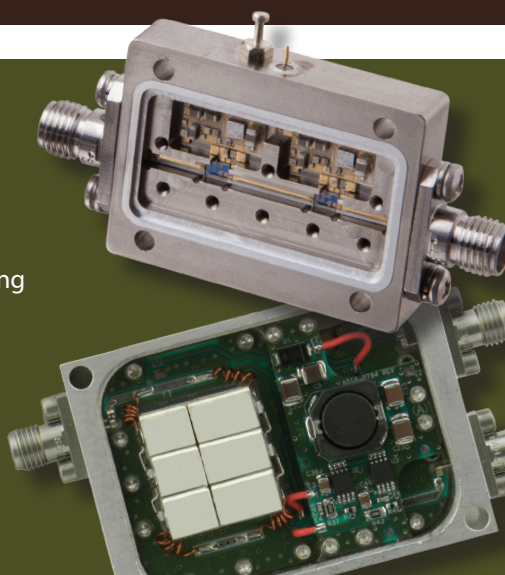
  150 MHz to 14 GHz; Active antenna assemblies with filter and switching capabilities; GPS, RFID, meter reading, asset tracking, and point-to-point communications

Configurable Product Solutions

User-Defined Modifications to Existing Standard Designs

API's configurable products provide a major advantage through the reduction of up-front engineering and development time, resulting in cost savings, shorter lead times, and faster time to market.

- High Frequency Amplifiers
- Small Signal Amplifiers
- Surface Mount Synthesizers
- Threshold Detectors
- RF Limiters
- Switched Filter Banks
- Filtered GPS LNAs



Featured Markets



Defense/Military

By utilizing advanced technologies and multiple disciplines, API provides rugged, reliable and efficient systems, subsystems, and components for use in the most critical defense and military applications, supporting government programs throughout the world. Our standard, configurable and custom-designed high-rel amplifier, IMAs, frequency sources and RF components are designed to address the most challenging current and emerging defense requirements.

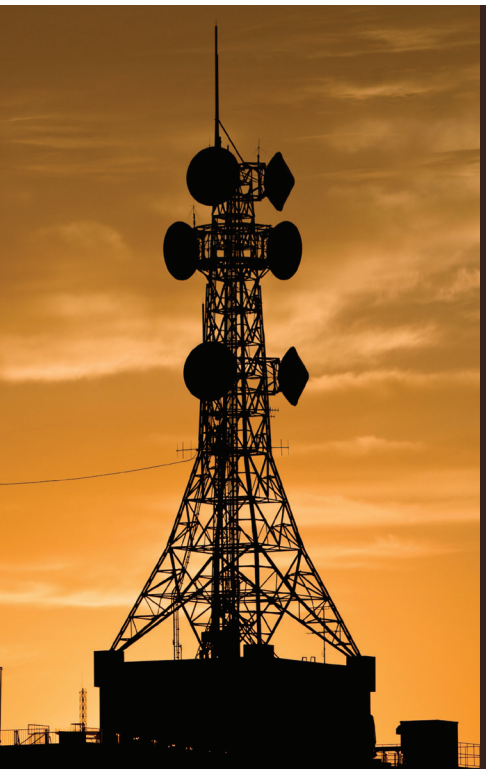
- Electronic Warfare
- Ground and Air Communications
- Broadband Jamming
- Radar
- Missile Defense
- Military Aircraft
- Manpack & Vehicular Radios
- SATCOM
- Wireless Base Stations

Space

API has a rich program heritage of being a leading supplier of some of the most advanced and sophisticated RF, microwave and microelectronic space solutions. Designed to withstand the most extreme of environments and conditions in space, these product solutions include microelectronics and rad-hard power conversion and control components as well as filters, multiplexers, oscillators and amplifiers.

- Deep Space
- Scientific Missions
- Satellite Communications
- Launch & Reentry Vehicles
- Microelectronic Assemblies for Space





Commercial

API Technologies has unparalleled engineering and industry expertise in the commercial aerospace, high temperature electronics for oil & gas, and wireless communications markets. With a rich legacy in the design and manufacture of high performance filter products for the wireless telecom industry, API is a leader in the co-site interference mitigation arena. With a specialization in integrated thick film ceramic hybrid and multi-chip modules, API provides ideal packaging solutions for high performance aerospace electronics.

- Commercial Aerospace & Aircraft
- Air Traffic Control Radar
- Wireless Site Development
- Co-Site Interference Mitigation
- Point-to-Point Communications
- Wireless Connectivity & Capacity Solutions
- Oil & Gas
- High Temperature
- High Reliability Industrial
- Healthcare & Medical Devices
- Test & Instrumentation
- Public Safety

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. Our highly trained engineers and expansive vertical integration, combined with state-of-the-art manufacturing facilities and testing, ensure superior performance and projects that are completed on-time and on-budget. API's careful adherence to ISO controlled standard processes guarantees that from 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

- Wirebonding
- Fluxless Soldering
- Automated PCB
- Automated Element Attach
- Die Bonding
- Low Temperature Co-fired Ceramic (LTCC)
- Glass Microwave Integrated Circuit (GMIC)
- Ultra High Temp (225°C and above)
- Void-free die attach process
- Braised waveguide splitter/combiner structures
- In-house Laser Sealing for Hermetic and Environmental Integrity
- In-house Thin & Thick Film
- Precision Hybrid & MIC
- Automated SMT & CCA
- In-house SAW Fab
- Precision Machining
- Comprehensive Metal Works

Certifications

- All Manufacturing Facilities Certified to ISO 9001:2008
- 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 and IPC-A-610
- NEBS Approved (Selected Products)
- RoHS Compliant (Selected Products)

api technologies corp.

API Technologies Corp. is a trusted provider of RF, microwave, microelectronics, and security solutions for high-reliability applications. The company designs, develops, and manufactures electronic components, modules, systems and products for technically demanding defense, commercial/industrial and aerospace applications. API Technologies' customers include many leading Fortune 500 companies, as well as a majority of NATO governments. While API was founded in 1981, our heritage brands have served the demanding, hi-rel marketplace for more than 60 years. API Technologies trades on the NASDAQ under the symbol ATNY.

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