AEROSPACE + DEFENSE

SPECTRUM CONTROL™

Solutions Guide

Components, subsystems, and capabilities to manage the electromagnetic spectrum

Take Control.

Dominating the battlefield starts with controlling the RF spectrum. From enabling drones, to guiding munitions, to protecting vital communications and operations in contested areas, we help defense programs gain a critical edge.

About Spectrum Control

Ensuring highly reliable radio signals are transmitted and received can be the difference between life and death in mission-critical use cases. Spectrum Control helps you take control of the electromagnetic spectrum with state-of-the-art capabilities for managing and conditioning signals, and for protecting sensitive equipment from EM interference. Leading companies and governments trust Spectrum Control to help them design, engineer, and build the devices and solutions that connect and protect our world.

SPECTRUM CONTROL

Electronic Warfare

Electromagnetic spectrum operations (EMSO) requires high-powered, precise, ruggedized components, and sub-assemblies. Spectrum Control is an industry leader in providing integrated, embedded, high-performance capabilities for EW systems in land, sea, air and space. Spectrum Control is innovating with open, highly integrated, modular solutions aligned with DoD SOSA standards and VPX form factors.

Radar

Spectrum Control's high-reliability systems, subsystems, and components are embedded in key defense and government programs throughout the world such as AEGIS, AN/APS-127, AN/SPQ-9, Artisan 3D, SEAVUE, and the Cooperative Engagement Capability system. The emergence of the hypersonic threat requires compressed/immediate decision times. Reliable, precise and rapid processing of threat data requires the highest-performing, most reliable RF and microwave components available to the warfighter today. Spectrum Control answers that need.

Communications

No plan survives contact with the enemy. Flexibility and rapid adaptation are achieved through reliable and secure communications from the squad to the battalion level. Spectrum Control specializes in precise, high fidelity RF connectors, filters, and subassemblies that enable end-to-end connectivity in harsh and extreme environments and secure those systems from EM interference and signal jamming.

Precision Munitions & Missiles

Spectrum Control has integrated key components and subassemblies on both legacy and next generation aircraft and missile systems. Whether it is the B-1, the B-52 or new JSF and Long Range Strike platforms, Spectrum Control is relied upon to supply critical components. Strategic and tactical missile systems such as TJAGM, JASSM, JDAM, JSOW, and Tomahawk include Spectrum Control components, which are designed to withstand extreme temperature, shock, and acceleration parameters.

SCi BLOCKS™

A New RF+Digital™ Approach

Spectrum Control is leveraging its 70 years of spectrum leadership with a clear vision for addressing industry requirements for RF miniaturization, open standards and embedded intelligence. This product suite leverages novel designs, simulation and modeling, and innovative packaging to deliver breakthrough size and performance.

Miniature. Spectrum Control has dramatically reduced the size of the RF front end with system blocks that deliver wideband fidelity and excellent signal isolation.

Modular. These new products are designed to be easily integrated using open standard interfaces. That speeds up system integration and allows for easy future upgrades.

Intelligent. RF with a brain. Each of this new generation of integrated solutions was designed from the ground up with integral digital control and I/O for RF tuning, temperature control, and block management.

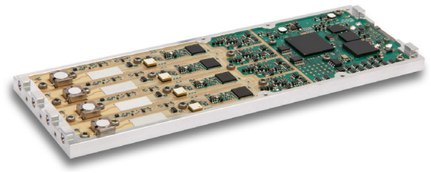
RF Sip Platform — IMA-on-Chip
Spectrum Control has launched a System-in-Package platform to bring miniaturization, modularity and intelligence to Integrated Microwave Assemblies. This is proven technology to miniaturize RF circuits to meet our customers' unique specifications. These SiPs are easily customizable with minimal NRE. Examples include x-Band Tx/Rx, EW front end and mmWave block converters and clock generation circuitry.

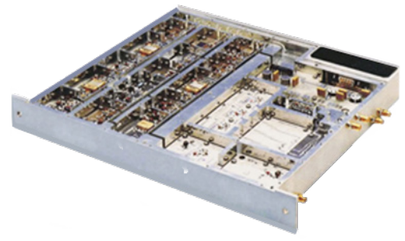
RF Sip Platform Features

- Designed for high volume production and optimized to minimize supply chain risk
- Wide frequency coverage through 40 GHz
- Integrated digital gateway for command/ control with health/temperature monitoring
- SMT-ready BGA

IMAs

Spectrum Control designs and builds high reliability integrated microwave assemblies to your specifications including custom MMIC based IMAs, multi-chip modules and hybrid microcircuits. We also offer build-to-print options. Examples include upconverters and downconverters, block converters, RF filter banks, Tx/Rx modules, dual- and quad-band solutions for Active Phased Array Radar and Multi-Function Radar.





RF Distribution & Antenna Interface

Spectrum Control offers the design and manufacturing of custom RF distribution systems for a range of aerospace and defense applications. These systems can be built to your print or engineered by Spectrum Control's design team.

We incorporate high-performance switches, combiners, amplifiers, directional couplers, and other standard microwave components. These would include a mixture of Weinschel brand components, customer-supplied components and components from third parties as required by the specifications. Custom components can be designed if needed.

RF Conditioning

Device validation in todays congested wireless environments makes modern wireless test setups critical. Spectrum Control solutions include fixed and programmable attenuators, butler matrices, and multipath emulation. Our Weinschel brand products are ideal for 5G and WiFi 6e/7 test setups to support mobile devices, computers, gaming and IoT.

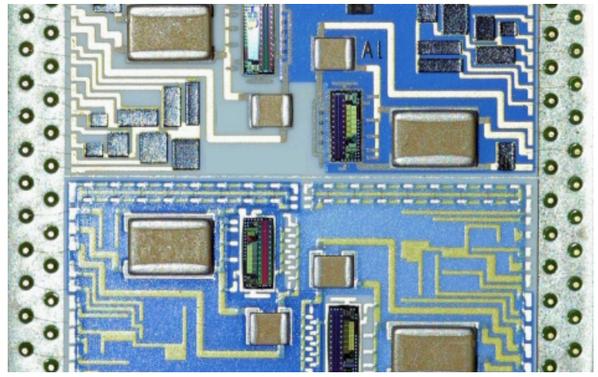
Butler Matrices

Programmable Attenuators

Multipath Emulator

High Temp Electronics

Spectrum Control has proven abilities in building electronic systems that perform reliably overtime in ultra high temperature environments (225°C) with severe mechanical shock and vibration. Our customers see the value in locating control, and signal conditioning subsystems in the hot zone, close to the point of gathering. This results in faster response speeds, reduced electrical noise, reduction in size, weight and cabling. One example is Full Authority Engine Control, computer-managed ignition and engine control for aircraft.



Power Distribution

Spectrum Control power distribution units are designed for Aerospace, Defense and Industrial customers that need to manage and protect high value assets in harsh environments. Our best-in-class, purpose-built PDUs are field-ready with a rugged design and a robust feature set including customizable inputs/outputsand flexible software operation. They feature secure control and reliable protection, unlike COTS vendors. To enhance product availability and shorten lead times we designed ourPDUs for manufacturability, incorporating readily available components.

AC PDU

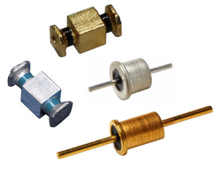
DC PDU

Optoelectronics

Spectrum Control's OptoXtremeTM SMT optical transceivers are designed for high speed, mission-critical data transfer in harsh environments. They offer a wide temperature range of -50°C to +125°C and fully hermetic SMT packaging. Our latest OptoXtreme product is a multi-mode wavelength optical transceiver, featuring a unique pluggable optical connector interface and BGA base layer contacts all within a fully hermetic enclosure. These transceivers are proven to operate with high reliability in extreme environments where high temperature and shock/vibration are normal operating conditions.

EMI Protection

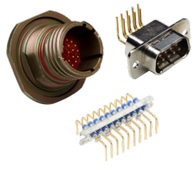
Electromagnetic Interference (EMI) can affect your electronic system in many ways. Partner with us to address your most demanding EMI/EMC requirements. Spectrum Control is a global leader in reliable filter products to mitigate EMI and radio frequency interference (RFI) –even in the most challenging environments. These solutions range from panel-mount, chassis-mount, and connectorized solutions. Our vertically integrated, US manufacturing locations ensure full control over the supply chain.



Board Mount

Chassis Mount

Panel Mount



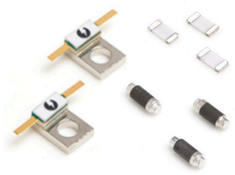
Interconnects

Resistive Products

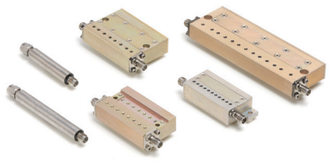
Spectrum control has a long history in designing and manufacturing high reliability passive components for RF and microwave applications. These Inmet and Weinshcel brand products(are designed for quality and performance. Choose from traditional coaxial options or from our extensive family of Powerfilm™ surface mount resistives.

Attenuators

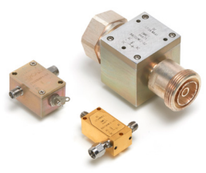
Terminations



Resistors



Gain Equalizers



Bias Tees

DC Blocks

Amplfiers, Filters, & Splitters

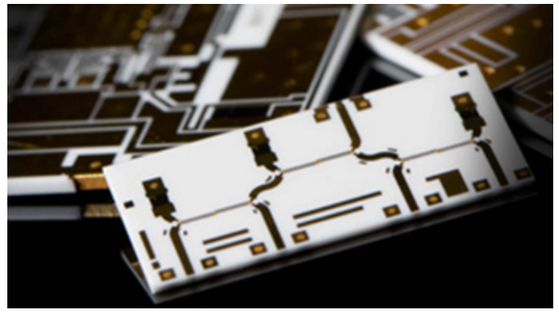
Spectrum Control has a strong industry reputation for designing and building high precision RF and microwave components. These standard and custom solutions are built on our years of RF engineering expertise.

Custom RF Amplifiers
Low noise, superior low phase noise, ultra high linearity, and medium power amplifiers

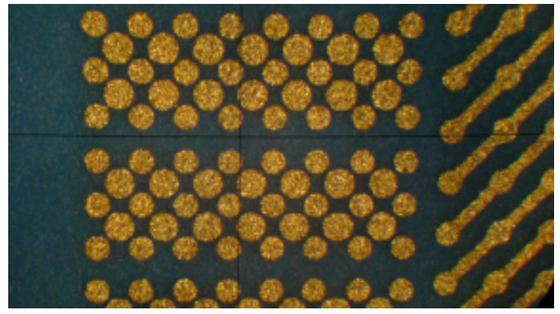
RF Filters
Tubular, Lumped Element, Cavity, Ceramic, Waveguide, Suspended Substrate, SAW, Printed, and 3D glass.

Power Dividers & Splitters
Wilkinson broadband resistive power dividers up to 40.0 GHz with a variety of connector types.

Services & Solutions



Thick Film Deposition
Spectrum Control specializes in the screen printing of multi-layer thick-film hybrid interconnect on ceramic substrates. Material systems include gold for wire bonding and blends of silver and gold with platinum and palladium for solder-based assemblies. Conventional screen printing is supplemented by a photo-defined process to achieve high-density, high-precision conductors. Diffusion patterning is also employed to provide small diameter, high density vias in dielectric layers.



Thin Film Deposition
Spectrum Control offers highly specialized thin film substrate metallization services to meet your needs for resistive coatings. From engineering to layout & design to approval process to manufacturing to quality assurance. With over 40 years of experience, we are the industry leader in substrate metallization and process development.

Proud Heritage. Limitless Future.

Spectrum Control has a strong heritage of technical prowess and manufacturing excellence built over seven decades. Through successful growth and market expansion the company has acquired or merged in synergistic companies and operating divisions including well-known brands such as Inmet, Weinschel, Spectrum Microwave, Amplifonix, Sage Microwave and more. Today's Spectrum Control embodies the legacy of more than 40 businesses and product groups.

What Sets Us Apart

- Innovation-Driven
- Team-Empowered
- Customer-Centric
- Commitment-Focused

MKTG-AD-8-F0-01

SpectrumControl.com
Info@am.SpectrumControl.com