

AEROSPACE + DEFENSE



**SPECTRUM  
CONTROL**™

# Solutions Guide

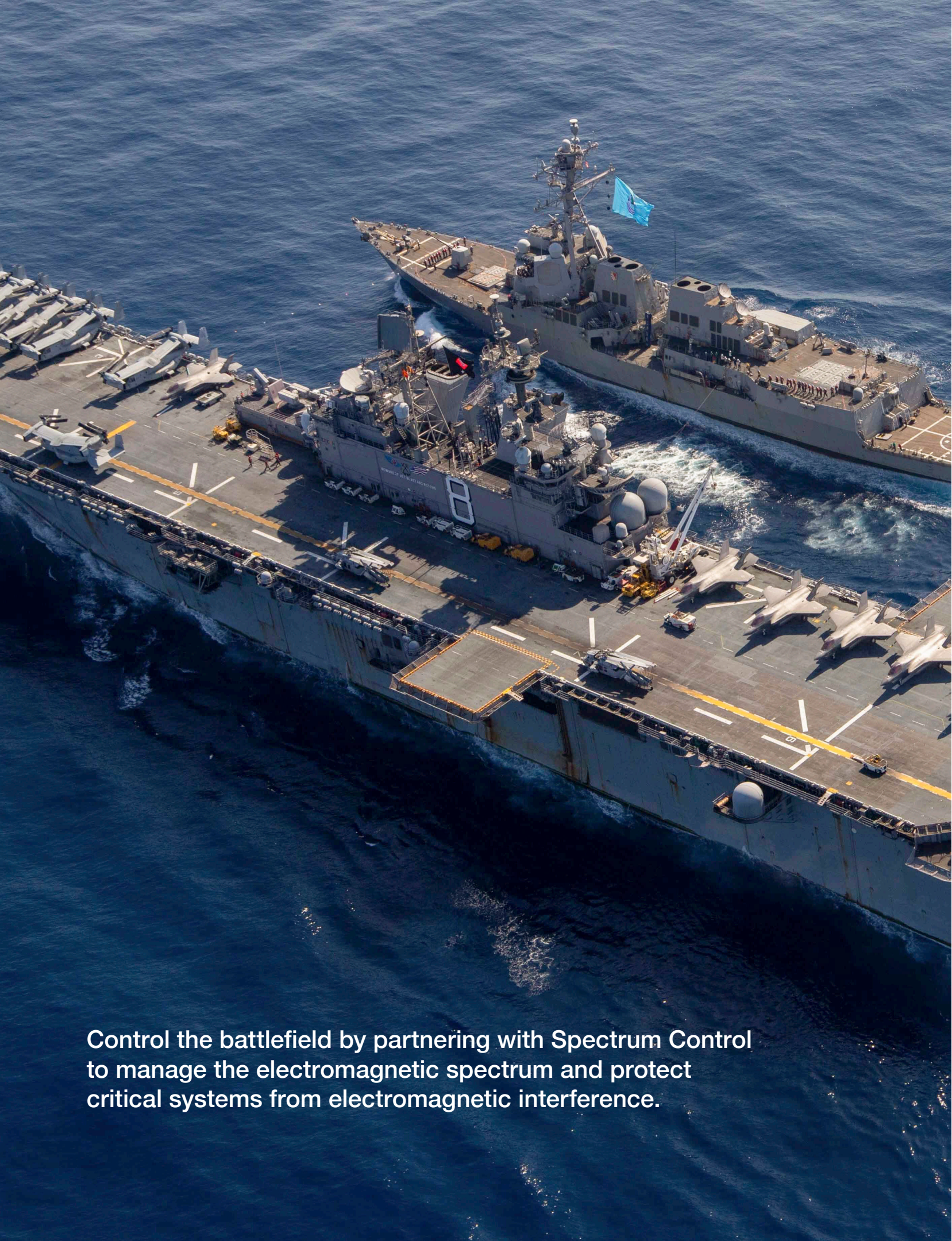
Components, subsystems, and capabilities  
to manage the electromagnetic spectrum



# 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.





Control the battlefield by partnering with Spectrum Control to manage the electromagnetic spectrum and protect critical systems from electromagnetic interference.



## 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.



## New EW/ISR System Requirements

DoD requirements for EW and ISR systems are evolving to accelerate system deployments while managing the cost and complexity of modern warfighting.

**SWaP-C.** Reductions in size, weight, power and cost are key drivers in current and next generation defense systems. Each of these factors can have a profound impact on the mission.

**Modularity.** The DoD now requires standard interfaces and modular designs for subsystems to improve agility, upgradability and repairs.

**Data-to-Effect.** Shortening the time from threat identification to response is a key initiative in modern defense strategy; rapidly identifying the signal of interest, conditioning the signal for high fidelity and converting the signal to bits for processing.

## RF+Digital™ – Revolutionary Integration

Spectrum Control has combined its industry-leading expertise in RF components and subsystems with new digital expertise to build a hybrid team of engineers to address these emerging needs.

The result is the SCi Blocks (pronounced “sky blocks”) platform. The growing architecture of system building blocks is designed and built to offer the best of RF and digital technology in small, modular form factors that can be easily integrated into the larger EW/ISR system.

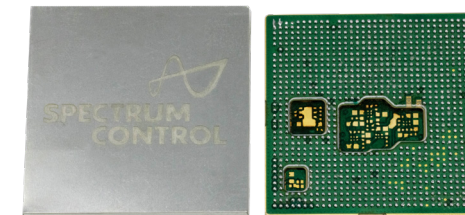
**Miniature.** Dramatic RF densification. We significantly reduced the size of the RF front end with small-footprint system blocks that deliver wideband fidelity and full signal isolation.

**Modular.** Plug and play. Open standard interfaces deliver simplified integration into the larger system, saving time and resources.

**Intelligent.** RF with a brain. Each of these sophisticated blocks was designed with integral digital control and I/O for RF tuning, block management, and industry-standard interfaces.

## SCi Blocks Platforms

SCi Blocks system building blocks are architected in three distinct tiers with vertical integration. This provides additional flexibility to our customers in building their systems. In each platform there are products and custom capabilities.



### RF Systems-in Package

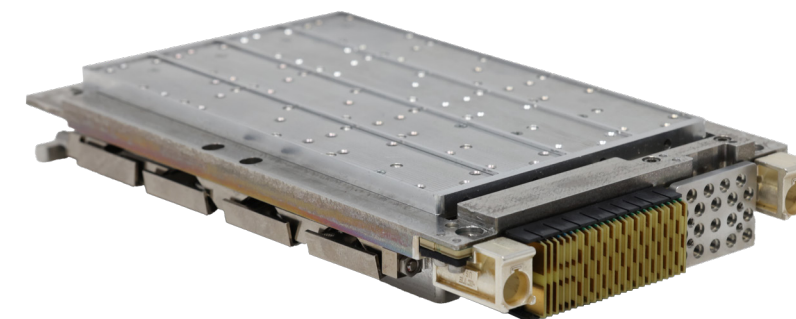
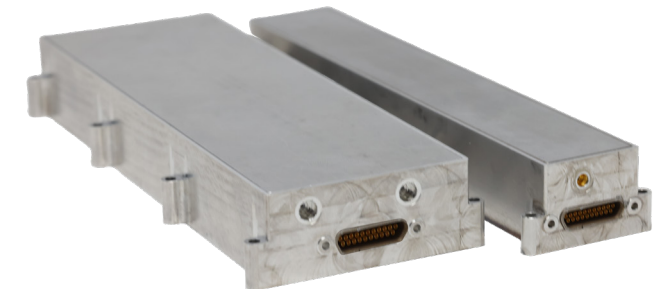
A family of ultra-miniature RF systems in package (SiPs). Revolutionary densification with embedded signal conditioning, digital control, and power management. SMT-ready, 30 mm square BGA package.

**Example:** Wideband RF front-end SiP with filtered range of 6-18 GHz and bypass range of 2-27 GHz. 2 GHz IBW. Low NRE for custom configurations.

### Mezzanines

Flexible single-channel RF front-end-on-mezzanine. Each 130 by 20 mm “stick” is available as a wideband Tx or Rx channel (0.2 – 18 GHz with 2 GHz IBW) and available in single-or dual-channel packages. Custom configurations available.

**Example:** Wideband receive module. The combination of full- spectrum coverage, small size, and low power consumption make this product ideal for attritables/ expendables, and unmanned systems.



### Modules

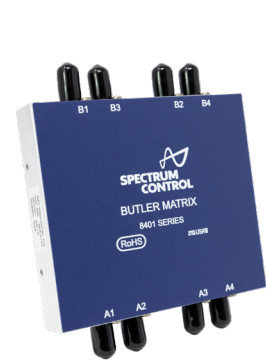
This family of 3U VPX modules includes multi-channel front-ends with up to eight configurable Tx or Rx “sticks” and new DirectRF+ digital conversion modules leveraging the RF SiP as a co-processor. Modules have standard VITA interfaces for easy integration.

**Example:** Wideband (.2-18 GHz) tuner in 3U VPX module. Up to eight configurable Tx or Rx channels in any combination. SOSA-aligned.

# RF Conditioning

Device validation in today's congested wireless environments makes modern wireless test setups critical. Hearing from your customers about poor device performance can be prevented by utilizing Spectrum Control's RF Conditioning

products in your test lab. Our Weinschel brand RF Conditioning products are ideal for 5G and WiFi 6e test setups to support mobile devices, computers, gaming and IoT.



Butler Matrices



Programmable Attenuators



Multipath Emulator

# 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/outputs and

flexible software operation. They feature secure control and reliable protection unlike COTS vendors. To enhance product availability and shorten lead times we designed our PDUs for manufacturability, incorporating readily available components.



AC PDU

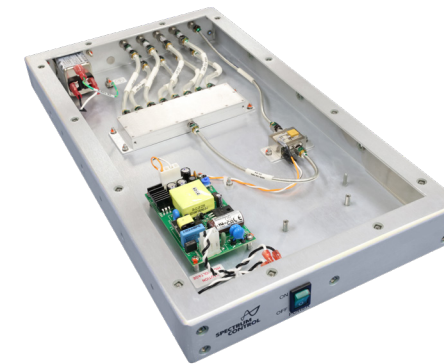


DC PDU

# 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.

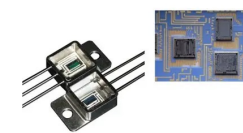
We incorporate high-performance switches, combiners, amplifiers, directional couplers, and other standard microwave components. These would include a mixture of Weinschel brand components, customer-supplied components and components from third parties as required by the specifications. Custom components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



# IMAs, Services & Solutions

Do you need a specialized or fully custom solution for your application? Most of our products have customization options. In addition, Spectrum Control has the expertise to design and build high reliability products to your specifications including specialized assemblies, custom MMIC-based IMAs, multi-chip modules and hybrid microcircuits. And we also offer build-to-print options. Our expertise extends to products that perform in extreme temperatures.

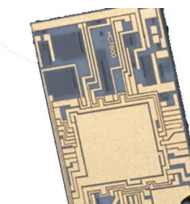
Need space-level qualified products? We have manufacturing facilities fully certified and qualified in accordance with MIL-PRF 38534 Class K requirements. Our custom products are enabled by technologies including MMIC, GMIC, thick-film and thin-film. We offer thin-film deposition with a wide range of substrate materials including Silicon, Alumina, BeO, AlN, Ferrite, Quartz, Glass, Sapphire, Fused Silica, and various Titanates. We also offer screen printing of multi-layer thick-film hybrid interconnect on ceramic substrates.



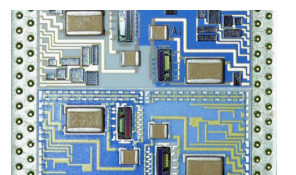
High Temperature Electronics



IMAs



Thin Film Technology

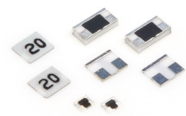


Thick Film Technology

# RF & Microwave Components

With a heritage of working on the industry's most demanding systems, Spectrum Control combines engineering expertise, innovation, and manufacturing excellence to design, develop and deliver mission-critical RF, microwave, and microelectronic solutions. Bringing an expansive breadth and depth of engineering experience, as well as our collaborative spirit,

to every relationship, we partner with our customers to deliver the highest quality outcome for any project. Standard, configurable or fully customizable, Spectrum Control's reliable RF and microwave solutions are always aligned with the performance requirements of your mission-critical systems.



**Powerfilm™  
SMT Attenuators**



**Powerfilm™  
SMT Terminations**



**Powerfilm™  
SMT Resistors**



**Gain Equalizers**



**Attenuators**



**Terminations**



**Bias Tee's**



**DC Blocks**



**Coaxial  
Connectors**



**Power Dividers  
& Splitters**



**Amplifiers**



**RF Filters**

# EMI Protection

Electromagnetic Interference (EMI) can affect your electronic system in many ways. Outside in. System out. Mitigating these problems can be a significant challenge. You need solutions to address your system's mechanical, electrical, and environmental concerns while ensuring the project is kept on budget and schedule.

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. Our vertically integrated, US manufacturing locations ensure full control over the supply chain.



**Board Mount**



**Chassis Mount**



**Panel Mount**



**Interconnects**

# About Spectrum Control

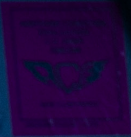
Ensuring highly reliable radio signals are transmitted and received can be the difference between life and death in mission-critical use cases. Spectrum Control helps you take control of the electromagnetic spectrum with state-of-the-art capabilities for managing and conditioning signals, and for protecting 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.

## 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



# SPECTRUM CONTROL