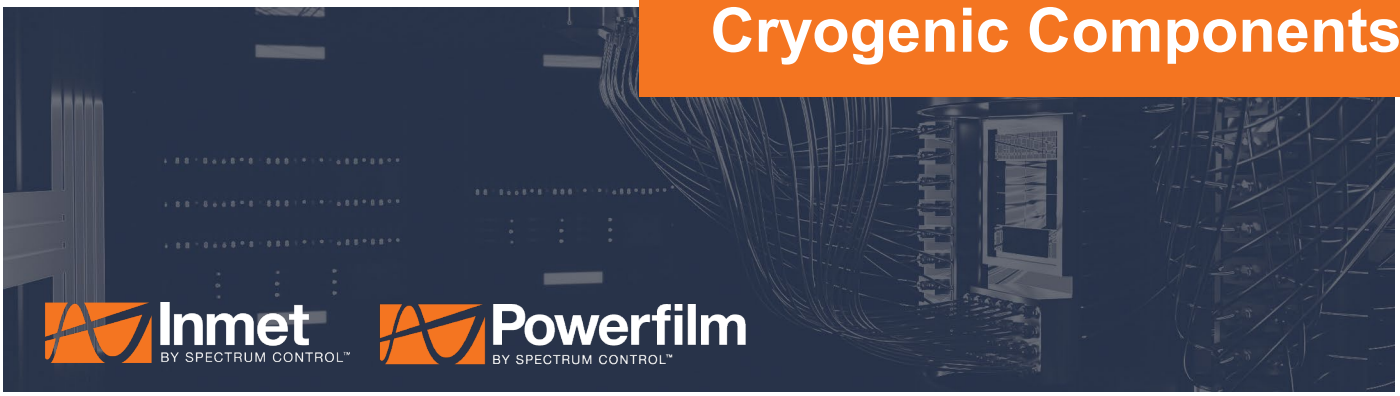
Cryogenic Components



Passive RF components are critical to cryogenic scalable quantum systems, where thermal noise, signal integrity, and scalability directly impact performance.

Spectrum Control delivers proven coaxial and chip-based attenuation solutions enabling engineers to move from lab-scale designs to scalable quantum architectures with confidence.

- **RF signal integrity** across cryogenic stages (300K → 4K → mK)
- **Ultra-low noise** and **predictable RF behavior**
- **Coaxial + chip-scale solutions** for every stage of the cryogenic chain
- Designed to **support high-density, scalable quantum systems**
- **Custom** and **production-ready** configurations

Challenge	Our Solution	System Impact
Thermal noise & signal instability	Cryogenic attenuators	Stable attenuation at 4 mK, minimal self-heating
Reflections degrading signal integrity	Precision terminations	Consistent impedance and signal integrity across temperature stages
Scaling from 10s → 1000s of channels	Chip-scale attenuators	Enables compact, high-density system architectures
Inconsistent in-house cryo designs	Standardized thin-film + quartz platforms	Repeatable, production-ready performance

Where Spectrum Delivers Value: Reliable, low-noise performance in cryogenic environments where signal integrity is critical.

Applications

Test & Measurement

Industrial Electronics

Satellites

SPECTRUM CONTROL

Attenuators

Control thermal noise at the source with stable, low self-heating attenuations down to millikelvin temperatures

- Stable attenuation from 300K to 4 mK for consistent system performance
- Minimal self-heating improves thermal equilibrium and noise control
- Low-noise performance supports sensitive quantum measurements
- DC-40 GHz coaxial solutions for cryogenic signal chains

Terminations

Maintain signal integrity by minimizing reflections across extreme cryogenic temperature transitions

- Absorbs RF energy while maintaining impedance stability
- Reduces reflections that degrade signal fidelity
- Consistent performance across wide temperature ranges
- Proven cryogenic coaxial solutions (3175-CRYO)

SMT Chip Attenuators

Enable compact, reliable cryogenic designs with surface-mount attenuation optimized for low-temperature performance

- Standard dB values: 0-20
- MIL-DTL-3933 testing available
- Compact form factor supports space-constrained cryogenic assemblies
- Stable thin-film performance near absolute zero
- Standard attenuations values (0-20 dB) for flexible integration

About Spectrum Control

Spectrum Control is a mission-focused technology company delivering innovative, adaptable solutions across RF, optical, power, digital, and EMI protection that go beyond specifications to support system performance and program success.

RF Signal Chain | Power/Protect/ Interconnect | Communications & Data Layer

Learn More

To learn more about these products or Spectrum Control email us at sales@spectrumcontrol.com

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