

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, including next-generation Cryo Chip on Quartz™ (CQAA) technology, 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	CQAA 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

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

NEW: CQAA – Cryo Chip on Quartz



Scale cryogenic systems with a chip-level attenuation platform designed for high-density, millikelvin operation

- Standard dB values: 0-20 dB, DC-18 GHz performance, with MIL-qualified options and multiple finishes available
- CTE advantage resulting in lower thermal stress and lower thermal noise
- Chip-scale, wire bondable design enables high-density integration
- Stable, repeatable attenuation from 300K to mK
- Quartz substrate improves RF performance and thermal stability



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

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

Learn More 

