

# SUCCESS STORY

## Powerfilm Chip Attenuators for Cryogenic Applications

*Proprietary thin-film technology maintains resistance down to near absolute zero*

Spectrum Control's line of Powerfilm chip attenuators and resistors are used in aerospace, satellite, and other extreme environments, so it's no surprise our parts are a go-to choice for cryogenic applications such as quantum computing. Powerfilm cryogenic chip attenuators retain their electrical characteristics down to near absolute zero (0K) temperatures where quantum effects are dominant.

### Performance Maintained at Cryo Temperatures

Eliminating thermal noise in a quantum computing installation, or supporting any cryo application, demands a high degree of performance and reliability. Most common thick-film resistors become insulators and turn attenuators into opens. Common thin-film resistors become super-conductive and turn attenuators into shorts. Powerfilm's cryogenic thin-film technology maintains its resistance to less than 1K.

*The leader in high power attenuators, resistors and terminations, with the proven ability to customize designs and deliver for any quantity.*

Spectrum Control's expertise in delivering custom components for use in harsh environments with high reliability requirements, like space, is the foundation supporting our work in cryogenic technology. Design, testing, manufacturing and application support are performed in-house.



Powerfilm CCAA cryogenic chip attenuators have gold terminals suitable for both solderable or wire-bondable applications.



### Testing, Customization & Optimization

The Powerfilm team can analyze each customer's application requirements and determine opportunities to deliver optimized performance for power, frequency, size, finish, attenuator accuracy, volumes, mounting, and how the chip should be placed; all to deliver optimum results. For our standard Cryo Low Temp chip attenuator, features include:

### Cryo Low Temp Chip Attenuators

- Frequency range DC - 18 GHz
- 0 - 20 dB
- 50 Ohms
- Alumina substrate
- Gold terminals; gold, silver, tin-lead and lead-free solder finishes available
- Mounted circuit side up or down
- 4 mK to +150 Celsius
- MIL-PRF-55342, MIL-PRF-55182, MIL-DTL-8833 testing available