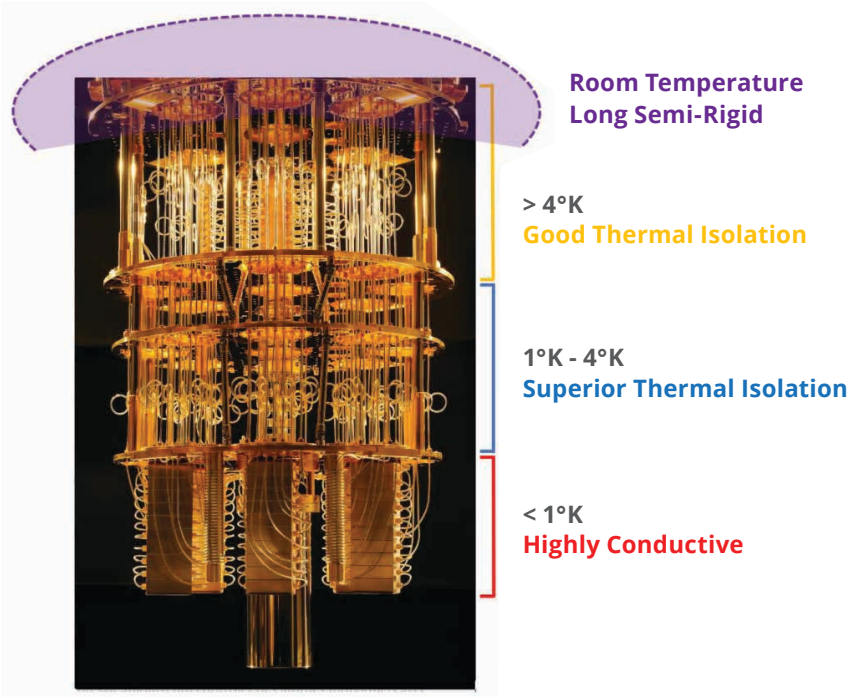
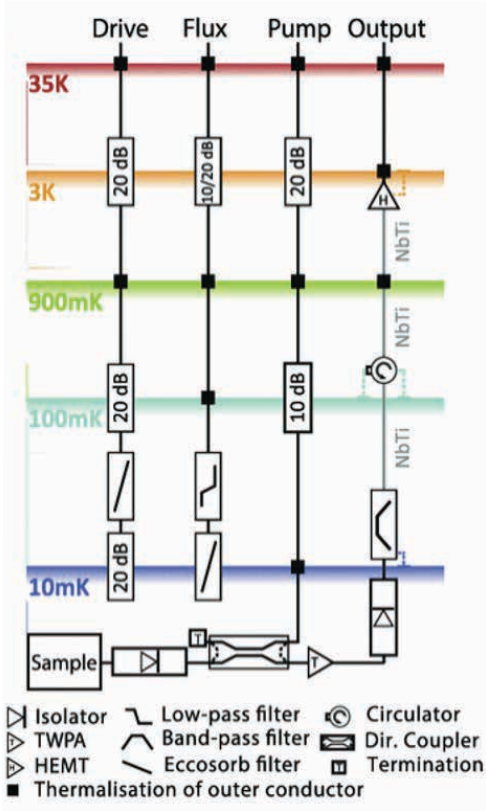
QUANTUM TECHNOLOGIES

SIMPLIFICATION IS OUR INNOVATION

Radiall™



Source: Krinner, S., Storz, S., Kurpiers, P., Magnard, P., Heinsoo, J., Keller, R., Luetolf, J., Eichler, C. and Wallraff, A., 2019. Engineering cryogenic setups for 100-qubit scale superconducting circuit systems. EPJ Quantum Technology, 6(1), p.2.



SEMI-RIGID CABLE ASSEMBLIES

Radiall semi-rigid cables assemblies use proprietary/specific technologies to withstand the lower temperatures up to tens of millikelvin. These technologies have been proven in the laboratory in the field. With cables in .047" (and .033" - .013" under development), we have SMA, SMPM and multiport coax connector solutions. Stage interface could use Radiall attenuators (0-30 dB on request):

- Room temperature long semi-rigid, precise bending shape
- 4°K: Cable with good thermal isolation, CuproNickel CuN semi-rigid cables
- 1°K: Cable with superior thermal isolation, superconducting semi-rigid cables in Niobium Titanium (NbTi)
- 10°mK: Highly conductive, close to qubit, lower temperature, amagnetic, hand formable cable assembly in Copper Silver (CuPro)

RF CABLES, CONNECTORS & ASSEMBLY SOLUTIONS

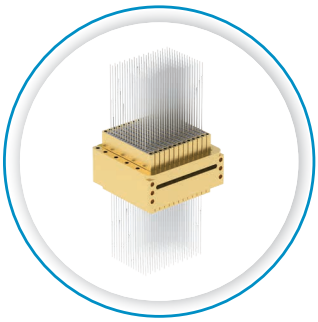
Radiall's RF cables, connectors and assemblies are able to satisfy quantum technologies' specific requirements, including:

- Densification: Miniature connectors, multi coaxial harness (bundle), small diameter semi-rigid cables, multipin coax connectors
- Thermalization: Through panel, thermal conductivity insulator
- Solution: A-magnetism, seamless/solderless connectors, HF and material expertise, (cryo)switches and (cryo) attenuators

With testing during the R&D stage, Radiall determined that SMA, 2.92, SMP and SMPM connectors remain stable at low temperatures. VSWR, insertion loss and mechanical properties remain stable down to 10 mK.

To meet market demands, Radiall is continuously developing more modular, miniaturization and cryogenic evaluation on cryogenic representative environments.

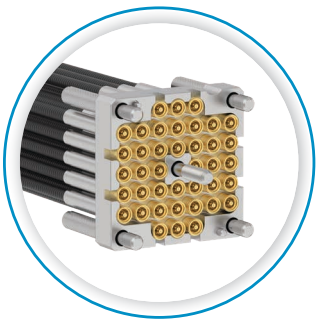
Quantum computers are accelerating the transformation of various industries like aeronautic conception and design, health care and life science, financial services and manufacturing efficiency and productivity. To support the growing quantum technologies, Radiall is working with R&D, laboratories, start-ups and others to create new interconnect solutions that are tested in-house and qualified in accredited labs. Radiall's interconnect offering brings together a solution of RF cable assemblies, connectors, attenuators, switches and fiber optics to emerging technology to solve application challenges like densification, thermalization to some tens of milliKelvin, networking and integration, miniaturization and non-magnetism.



SIDE LOADER

Equipped with small form factor connectors and attenuators, the matrix allows you to interconnect the stages of a cryostat with very high density wiring.

PART NUMBER	DESCRIPTION
EPT2201-70	SMPM Interconnection Matrix Equipped with Attenuators (0-20 dB)



F2C-40

F2C-40 is a 40-pin high-density multi-coaxial solution designed for commercial quantum computer market demands. This solderless, cryogenic and non-magnetic solution features a floating structure to support market requirements.

PART NUMBER	DESCRIPTION
RF2C-00010040	Solderless, Compression Mount PCB Interface

SMPW

Radiall's new subminiature coaxial connector features higher data rates and frequencies for next-generation equipment. SMPW satisfies market demands for defense and telecom markets, specifically for electronic warfare and Dense Wavelength Division Multiplexing Modules (DWDM).

PART NUMBER	DESCRIPTION
R218423000	Male Edge Mount Full Detent
R218508700	Straight Male Receptacle SMT Smooth Bore
R218705030	Female - Female Adapter
R218890700	Right Angle Receptacle 4 Channels SMT Type Smooth Bore

SEMI-RIGID 3D BENDING

Radiall semi-rigid cable assemblies use proprietary/specific technologies to withstand lower temperatures up to tens of milliKelvin. These technologies have been proven in the laboratory and in the field.

PART NUMBER	DESCRIPTION
C291052005	Semi-Rigid .034" (0.86 mm) NbTi
C291850016	Semi-Rigid .034" (0.86 mm) CuNi

RF ATTENUATORS

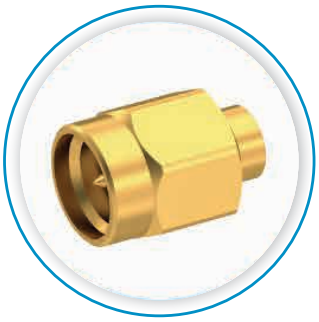
In quantum computing, cryogenic microwave attenuators are used in different stages of the thermal dilution refrigerator to reduce the thermal noise in the signal. The RF lines within each layer increases the signal-to-noise ratio (SNR), requiring the attenuator for the thermalized layer to protect the signal level.

PART NUMBER	DESCRIPTION
R429800000	SMA Attenuator 0 dB 18 GHz 2W
R429820000	SMA Attenuator 20 dB 18 GHz 2W
R429810000	SMA Attenuator 10 dB 18 GHz 2W

RF SWITCHES

With cryogenic switches, Radiall provides a solution to meet emerging market demands. These switches function at extremely low temperatures (0 Kelvin/-273 °C) and actuate at very low power. They can be easily integrated into equipment and are a perfect solution for a variety of laboratory applications.

PART NUMBER	DESCRIPTION
R583423141	Specific SP6T Ramses SMA 18 GHz Latching 28 Vdc D-SUB Male Connector Bipolar Actuator Command for Cryogenic Application
R571433141	Specific SPDT Ramses SMA 18 GHz Latching 28 Vdc Pins Terminals Bipolar Actuator Command for Cryogenic Application
R5927B2141	Specific SP6T Ramses Sub-Miniature SMA 26.5 GHz Latching 12 Vdc Pins Terminals Bipolar Actuator Command for Cryogenic Application



SMA

The SMA connector was originally designed in 1958 and standardized years later under IEC 60169-1. SMA connectors are the most popular coaxial RF/microwave connector. The range includes some SMA connectors specified up to 27 GHz.

PART NUMBER	DESCRIPTION
R125052C10	Straight Male Plug Solderless Type Non Magnetic Cable .033

SMPM-LOCK

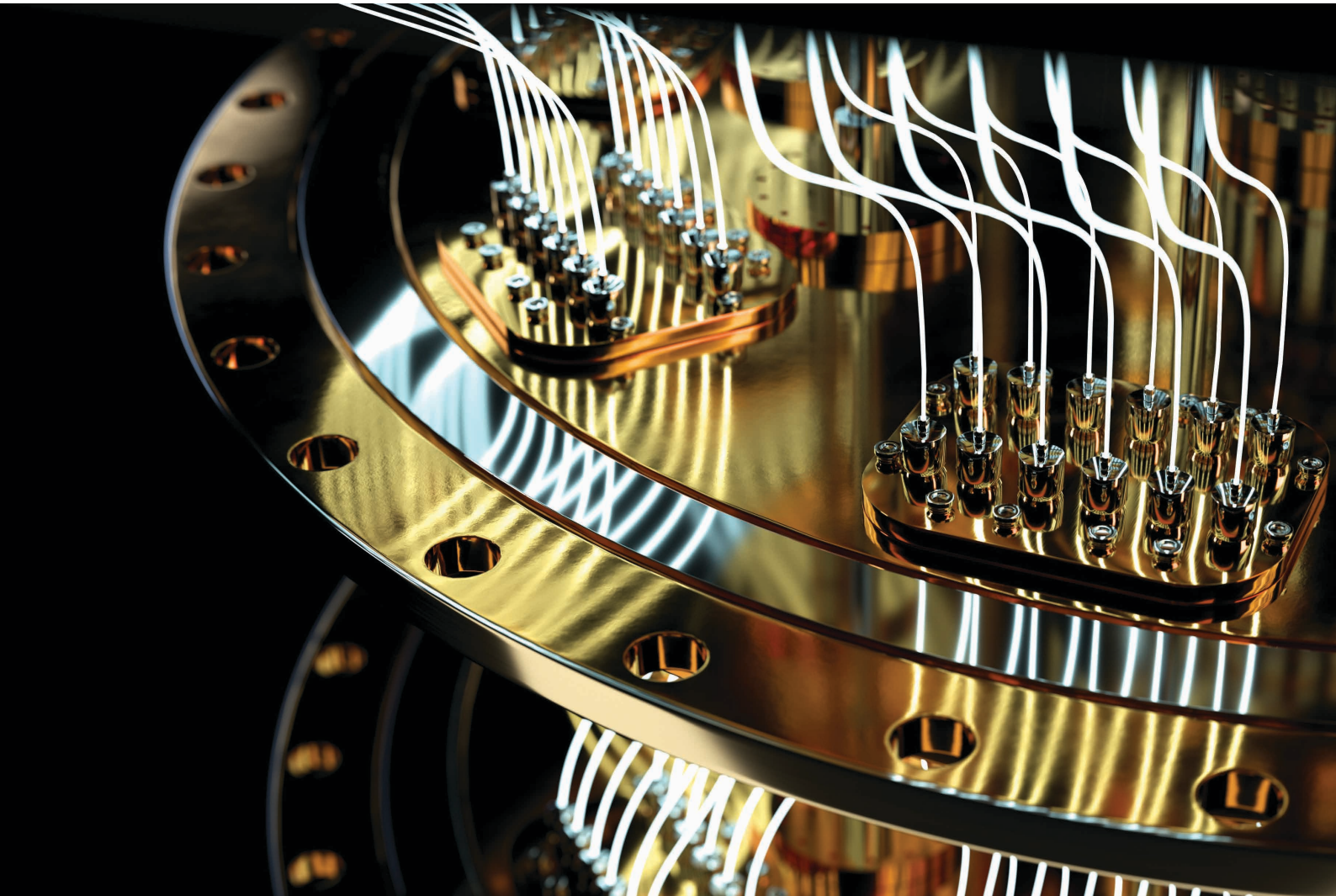
This micro-miniature product features electrical performance up to 65 GHz. It is the smallest SMPM connector on the market with a locking system and space optimization, even in the tightest spaces, thanks to our right angle plug version. SMPM-LOCK features a robust locking mechanism.

PART NUMBER	DESCRIPTION
R201L80300	Female Right Angle Plug Solder Type for 1.42/50d Cable
R201L80000	Female Straight Plug Solder Type for .047 Cable
R201L00010	Edge Card Male Straight Receptacle - Tape and Reel / 500

INFRARED FILTERS

Infrared filters are utilized in quantum computing environments to manage thermal noise and electromagnetic interference, ensuring the qubits remain in their delicate quantum states for longer durations by blocking unwanted IR radiation.

PART NUMBER	DESCRIPTION
R438538000	Infrared Filter 2 dB
R438538001	Infrared Filter 0.5 dB



Radiall™

SIMPLIFICATION *is our* INNOVATION

We advance the design and engineering process for innovators, groundbreakers and pioneers of technology. We reduce weight, improve durability and streamline installation to provide leading-edge connectors that drive product performance.

AREA OFFICES LOCAL CONTACTS

EUROPE	ADDRESS	PHONE	FAX	EMAIL
FINLAND	**Radiall Finland** PO Box 202, 90101, Oulu	+358407522412		infofi@radiall.com
FRANCE	**Radiall SA** 25 Rue Madeleine Vionnet, 93300, Aubervilliers	+33149353535		info@radiall.com
GERMANY	**Radiall GmbH** Carl-Zeiss-Straße 10, 63322, Rödermark	+49607491070	+496074910710	infode@radiall.com
ITALY	**Radiall Elettronica S.R.L.** Via Zambeletti 19, 20021, Baranzate Milano	+39024885121	+390248843018	infoit@radiall.com
NETHERLANDS	**Radiall Nederland BV** Hogebrinkerweg 15b, 3871, KM Hoevelaken	+31332534009	+31332534512	infonl@radiall.com
SWEDEN	**Radiall AB** Sollentunavägen 63, 191 40 Sollentuna	+4684443410		infose@radiall.com
UNITED KINGDOM	**Radiall Ltd.** Profile West, 950 Great West Rd., Brentford, Middlesex TW8 9ES	+441895425000	+441895425010	infouk@radiall.com

ASIA				
CHINA	**Shanghai Radiall Electronics Co., Ltd.**	+862166523788	+862166521177	infosh@radiall.com
	No.688 Hui Fang Road, Shanghai, China, 201806			
HONG KONG	**Radiall Electronics (Asia) Ltd.** Room A, 16/F., Ford Glory Plaza,	+85229593833	+85229592636	infohk@radiall.com
	37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong			
INDIA	**Radiall India Pvt. Ltd.**	+918028395271	+918028397228	infoin@radiall.com
	25D, Phase 2, Peenya Industrial Area, Bengaluru 560 058			
JAPAN	**Nihon Radiall K.K.**	+81364274455	+81364274456	infojp@radiall.com
	Sawada Building 8F, Shibuya-ku, Tokyo 150-0011			

AMERICAS				
USA & CANADA	**Radiall USA, Inc.** 8950 South 52nd Street, Ste. 401 Tempe, AZ 85284	+14806829400	+14806829403	infousa@radiall.com

GLOBAL PRESENCE

Australia · Austria · Belgium · Brazil · Czech Republic · Denmark · Estonia · Greece · Hungary · Indonesia · Israel · Korea · Latvia · Lithuania Malaysia · Norway · Philippines · Poland · Portugal · Singapore · South Africa · Spain · Switzerland · Taiwan · Thailand · Turkey · Vietnam