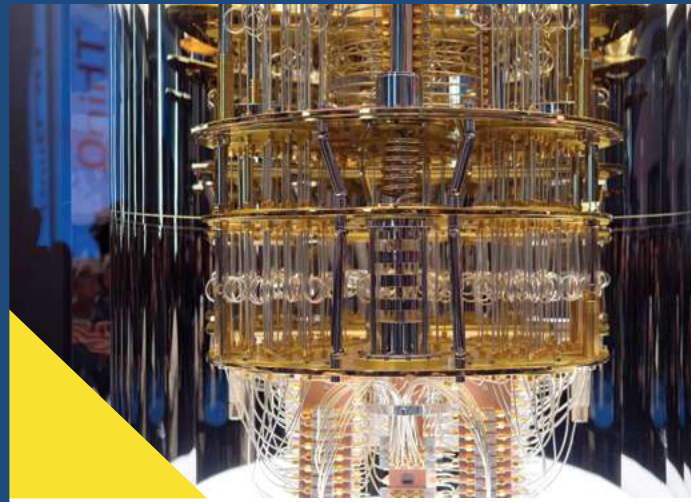









# RF INTERCONNECT SOLUTIONS FOR QUANTUM COMPUTING

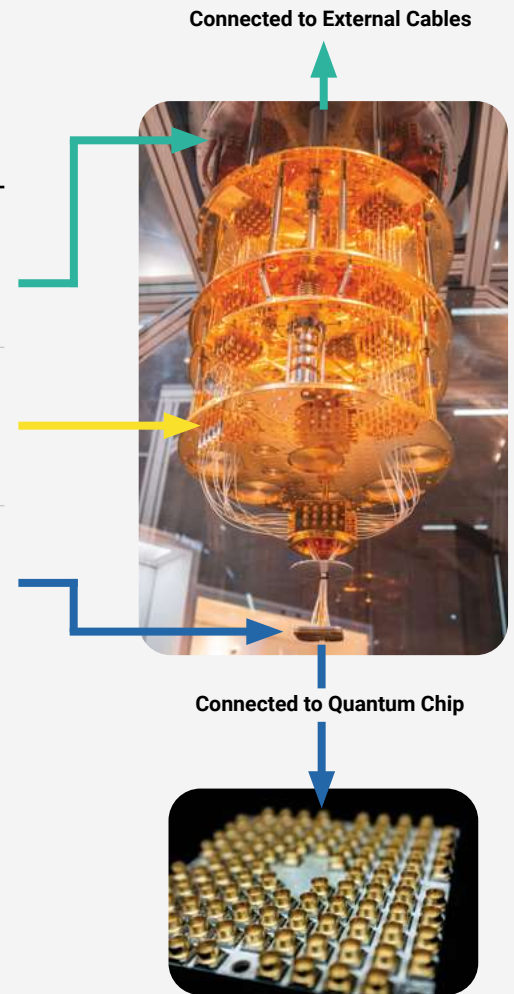
Unlike classical computers that rely on bits set to 0 or 1, quantum computers use qubits that can exist in multiple states at once. This requires advanced interconnect solutions that maintain signal integrity and enable precise system performance. RF cable assemblies and connectors play critical roles in both processing and transferring quantum data. As quantum systems scale and the number of qubits increases, the demand for reliable RF components will continue to grow. Amphenol RF provides interconnect solutions designed for next-generation quantum architectures, supporting the future of high-performance quantum computing.




## HARDWARE STRUCTURE OF A QUANTUM COMPUTER

Quantum computing can be divided into three main components.

Structure	Role	Components	Products
<b>Wiring &amp; Interconnects</b>	Transfer signals, power and data between computers and the quantum chip	RF cables, non-magnetic RF connectors, fiber optics cables	   2.92MM      SMP      SMPM
<b>Microwave &amp; Signal Processing</b>	Process microwave signals before/after reaching the qubits	RF cables, RF connectors, attenuators, amplifiers	  Cable Assemblies      Semi-Rigid Cable Assemblies
<b>Quantum Processor</b>	Perform the actual quantum computation	Quantum chip, chip packaging, chip mount or module	  SMA      SMPM



 **RF cable assemblies and interconnects** play a key role in processing and transferring quantum data.

## QUBIT SIGNAL READOUT SYSTEMS

Readout systems transmit qubit signals from the inside to the outside of the quantum computer



### Amphenol RF's proprietary AFI-Dart interface is tested and approved for quantum computing applications

- Designed for room temperature read-out electronics
- Single-ended interconnect solutions for density/pitch of 4.5 mm
- Excellent electrical performance up to 10 GHz
- Highly tooled and scalable for high-volume production
- Tested and approved for return and insertion loss

### Micro-Dart™ is Amphenol RF's next generation quantum computing interconnect solution designed for maintaining strong signal integrity even in very limited space and across multiple temperature stages.

- Compact form factor with a maximum 3 mm pitch and supports cables as small as 0.086 inches, compared to the existing AFI-Dart technology
- Provides improved electrical performance, including better return loss and shielding, which enables operation at frequency up to 20 GHz
- Reliable mating contact system to enable miniaturization with high mechanical offset flexibility
- Extensive HFSS optimization for return loss

### CORE COMPETENCIES

- Waterproof IP67/68 sealed solutions
- Lightweight, compact connector designs
- Custom cable assemblies and sub-systems
- High-density connectors solutions for efficient multi-channel connections
- Low insertion and return loss cabling and connectors for high-fidelity transmission
- Custom material selection to ensure reliable performance across extreme temperature ranges

## DESIGN FEATURES



### IP-Rated Waterproof

Waterproof sealed solutions are engineered to protect your application from outside elements and are fully tested to IP67 or higher specifications in the mated and unmated condition.



### Non-Magnetic

Non-magnetic RF connectors ensure optimal performance and safety in environments where magnetic interference is a concern.



### Vibration-Resistant

One-piece bodies and other design considerations are taken into account to provide a more robust option for applications where there are concerns for the security of the locking interface due to extreme conditions.