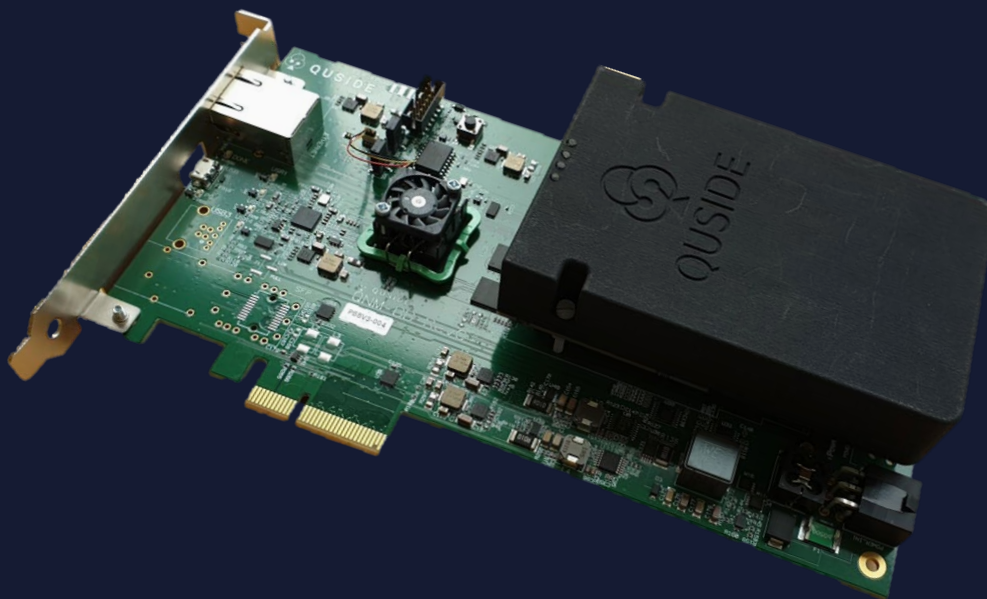


Quside PCIe 400



The Quside PCIe 400 is a **quantum random number generator** designed for 400 Mb/s raw randomness generation on a standard PCIe interface. The PCIe 400 is delivered with all embedded firmware and software libraries.

Applications

Random numbers are required in a broad range of applications, including cybersecurity, high-performance computation, or gambling. The PCIe 400 is designed for high-performance quantum random generation for a broad range of target computing devices.

- Quantum random number generation
- Crypto-agile & quantum-safe deployments.
- Quantum key distribution
- Post-quantum cryptography
- Advanced entropy monitoring
- Cloud security
- Entropy-as-a-Service
- High-performance Monte Carlo simulations

Features

- 400 Mb/s raw generation rates.
- Above 90% quantum min-entropy bounds.
- Average min-entropy above 99%.
- Standard PCIe Gen 2x4 interface
- Quside chips are cCompliant with NIST SP800B recommendations and passes DieHarder and NIST SP800-22 test suites.
- Metrology and monitoring of the entropy source and entropy quality
- Linux compatible drivers and libraries for C and Python

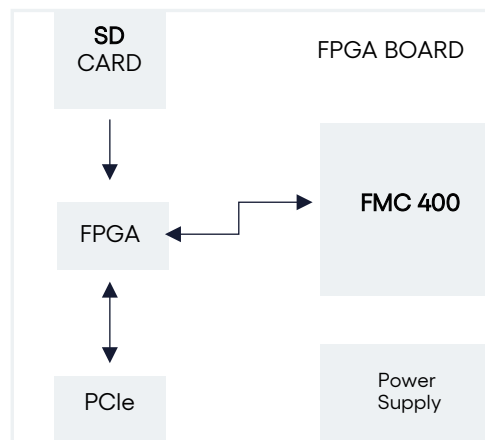


Figure 1. Block diagram of the PCIe 400.

The Figure 1 shows a block diagram of the PCIe 400. The system consists of an FMC 400 module that is the quantum entropy source connected to a FPGA using a standard FMC connector. The FPGA allows post-processing of the QES signal, providing the user with quality monitors as well as system status management.

Electrical SPECIFICATIONS

	Units	Min	Typ	Max
Power requirement (Requires power feed from the power source with standard 6-pin PCIe power connector)	Vdc		12	
Power consumption	W		8.5	

Status monitor SPECIFICATIONS

	Units	Min	Typ	Max
Bias monitor	mA	38	40	43
Optical power monitor	dBm	-20		
Temperature monitor (T = environmental temp.)	°C			T + 20

RANDOMNESS SPECIFICATIONS

	Units	Min	Typ	Max
Quantum min-entropy ¹	Bits	0.9	0.93	
Raw bit rate	Mbps		400	
Extracted bit rate ²	Mbps		290	

Absolute maximum ratings

	Units	Min	Typ	Max
Operating Temperature ³	°C	20	25	70
Storage Temperature	°C	0	25	80

¹ Average conditional min-entropy calculated as in C. Abellán *et al.*, Phys. Rev. Lett. (2015) <https://doi.org/10.1103/PhysRevLett.115.250403>.

² Extraction from 352 bits to 256 bits, using the randomness extractor from [D. Frauchiger, R. Renner, & M. Troyer (2013), [arXiv:1311.4547](https://arxiv.org/abs/1311.4547)].

³ Tested under the presented range.

OS compatibility

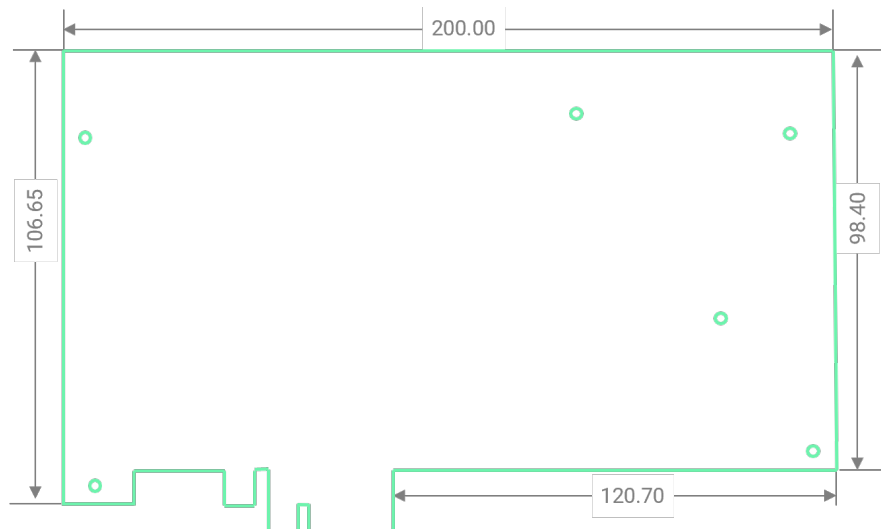
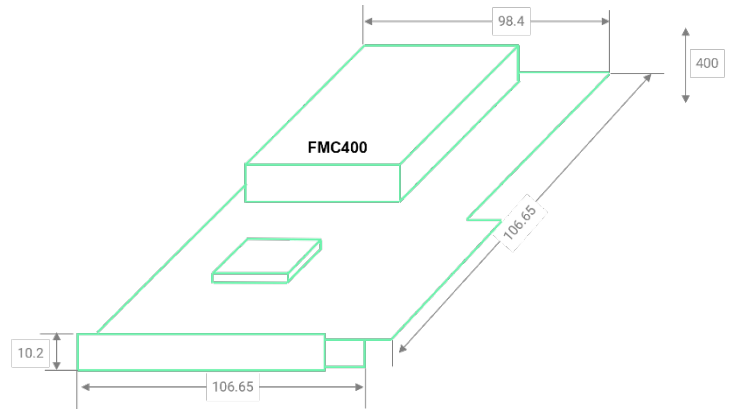
The system is compatible with LINUX Ubuntu 20.04.

Mechanical specifications

The Quside™ PCI 400 is composed by the FPGA board and the FMC400.

Dimensions:

- Full Height (107 mm for the board)
- Full Length (more than half length but less of a full length: 200 mm for the board)
- Double width (40 mm)



Thanks for being part
of our quantum journey!