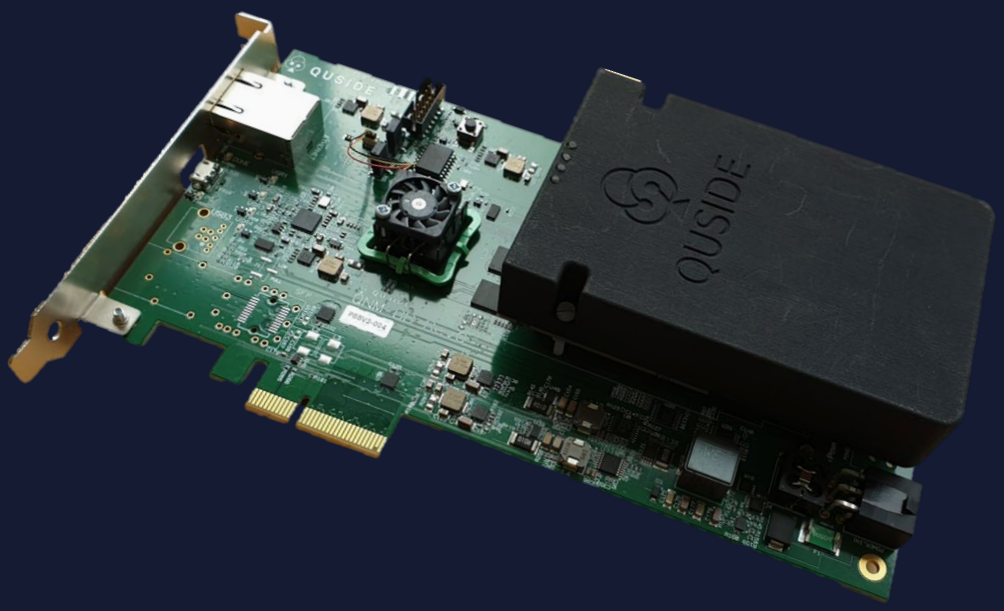
Quside

Product Datasheet

# Quside Garnet™ PCIE 400




The Quside Garnet™ PCIE 400 is a **quantum random number generator** designed for 400 Mb/s raw randomness generation on a standard PCIe interface. The Quside Garnet™ 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 Quside Garnet™ 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

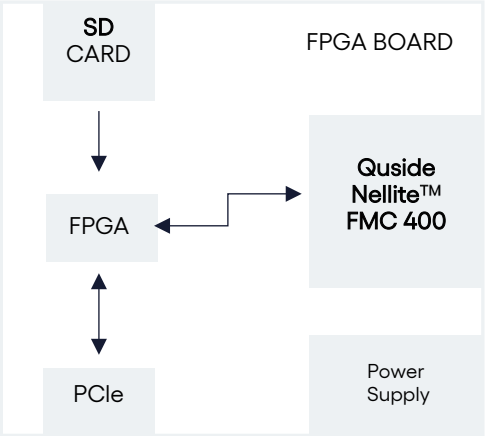



*Figure 1*. Block diagram of the Quside Garnet™ PCIE 400.

The Figure 1 shows a block diagram of the Quside Garnet™ PCIE 400. The system consists of an Quside Nellite™ 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].
[3] Tested under the presented range.

## OS compatibility

The system is compatible with:
LINUX Ubuntu 20.04 and Windows 10, 11 & Windows Server 2016.

## Power Supply

QRNG PCIe400 is power supplied by PCI connection, as default and unique mode.

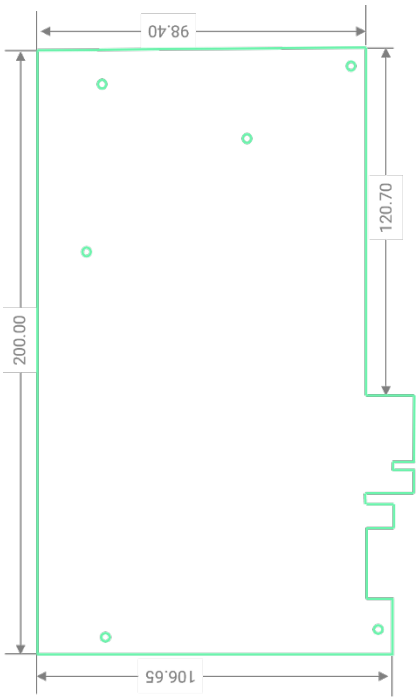
## Mechanical specifications

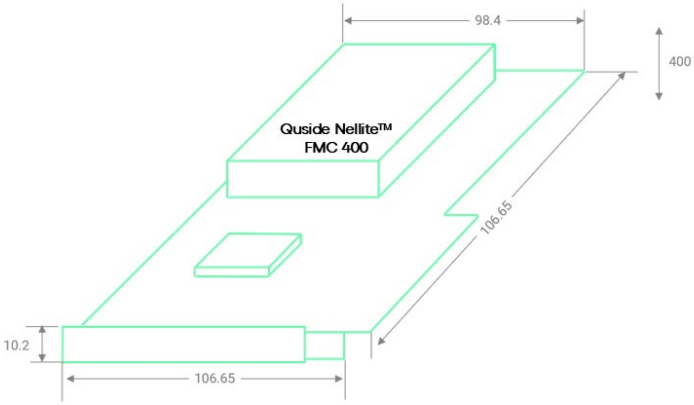
The Quside Garnet™ PCIE 400 is composed by the FPGA board and the Quside Nellite™ FMC 400.

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!

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