# TROPOS (QRNG)

True Random numbers play an important role in data security to provide robust encryption. QRNG from QNu labs addresses different data rates and standard interfaces to cater to multiple applications.

TROPOS QRNG QNLX 100 G

## Introduction:

Traditional random number generators like PRNG and TRNG use predictable inputs which are deterministic. These inputs have a higher probability of repeating which creates predictability. Hence, making the entire system vulnerable.

Quantum random number generator (QRNG) uses the principles of quantum mechanics to generate truly random numbers. In fact, quantum physics is fundamentally random in nature which has been confirmed by theory and experimental research.

Quantum Random Number Generator is a highly sophisticated engineering innovation that involves the power of complex deep-tech technologies (such as semiconductors, opto-electronics, high precision electronics and quantum physics) working together to create the highest level of randomness possible.

## How QRNG works

A laser-based quantum source generates the randomness in

Tropos quantum random number generator.

To elaborate on the process, a laser produces a stream of elementary particles (photons). The photons generated from the laser are used to generate the random numbers.

These photons unlike classical objects are unpredictable under certain situations. When it is incident is on a semitransparent mirror, the photon has a 50/50 chance of being reflected or transmitted. The photon is then in a superposition of both the states (reflected and transmitted), i.e. the photon exists in both the states simultaneously. Upon measurement, it collapses to one of these states, which is intrinsically random and there is no way to predict which state the photon will collapse to. This gives the inherent randomness from the photons, which cannot be influenced by any external parameters.

| Use Cases | |
|---|---|
| Identity Management | QRNG technology applied to ID card systems generates random numbers with each use, allowing precise personnel tracking, particularly in defense facilities, to reduce unnecessary movement. |
| Data Centre | Data centres act as the processing, storage, and recovery points of critical data for any organization. Therefore, they are also most prone to the wholesale theft of an organization's digital assets. QNu's solutions are built to ensure a high level of data security for data in transit and at rest in data centres. |
| Wireless Network for Security Monitoring | The secure wireless network will enable the integration of IoT sensors, wireless cameras, and IR sensors to capture and transmit data to a central monitoring location. It also offers mobility to sensor-equipped vehicles within the directional antenna's range. |
| Authentication and IAM | Digital certificates are vital for authentication and identity management. We bolster security with QNu's QRNG. |
| Gaming and Lotteries | Online gaming and lotteries must ensure exceptional randomness to secure transactions and prevent unfair advantages. QNu QRNG is the reference hardware random number generator for high-security industries. |

## Specifications

| Model | Quantum Random Number Generation (QRNG) | |
|---|---|---|
| Random Number Parameters | Quantum Entropy | Time of Arrival |
| | Unconditioned Entropy Rate | 100 to 115 Mbps |
| | Conditioned Entropy Rate | 64000 keys(128 bit)/sec<br>32000 keys(256 bit)/sec |
| General Characteristics | Operating System | Hardened |
| | Output Interfaces | Ethernet |
| | Local Craft | USB |
| | Processing Engine | FPGA |
| | Physical security | Tamper-proof hardware |
| | Random Number Format | Randbin, Rawbin, Base64, Hex |
| Operations | Access Control | Admin Based |
| | Interface for Random Numbers | RESTful Interface over HTTPS, PQC integrated TCP Client over Secure socket |
| | Management and Monitoring | Web GUI, Over HTTPS |
| Power | Input | 100-240VAC, Auto-ranging, 50/60Hz |
| | Nominal Power | 120W |
| Operating Environment | Temperature Range | 15°c - 25°c (ambient), 60% RH |
| Dimensions | Dimensions | 424mmx570mmx85mm(WxDxH) |
| | Mounting | Standard 19" Rack Mounted, Mounting Rails Provided |
| | Weight | 12 kg |
| Certification | SYSTEM & PEN Test | CERT-IN certified , TUV |
| | Randomness | ENT, NIST SP 800-22, Dieharder, NIST SP 800-90B, CR Rao |
| Applications | Cryptographic Algorithms and Protocols, Gaming and Casinos, Statistical Analysis, Key Management Systems, Smart Networks, Deterministic RNG Seeding | |

## Advance Features

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|---|---|
| High-Speed Quantum Random Number Generation: | Unprecedented entropy rate of 100-115 Mbps, making it one of the fastest quantum random number generators available. |
| Unparalleled Security: | Tamper-proof hardware and PQC-integrated interface ensure that generated random numbers are completely secure and resistant to cyber threats. |
| Advanced Entropy Management: | Conditioned entropy rate of 80-100 Mbps and unconditioned entropy rate of 100-115 Mbps provide superior randomness and flexibility. |
| Comprehensive Certification: | Certifications from esteemed organizations like CERT-IN, TUV, NIST, and CRRao Institute, ensuring its reliability and trustworthiness. |
| Easy Integration and Management: | RESTful interface over HTTPS, TCP client over a secure socket, and web GUI over HTTPS make integration and management seamless. |
| Robust and Reliable Hardware: | Hardened output interfaces, FPGA processing engine, and 19" rack-mounted design ensure high performance and durability. |
| Flexible Random Number Formats: | Various random number formats (Randbin, Rawbin, Base64, Hex) to cater to diverse customer requirements. |
| High-Performance Processing: | FPGA processing engine enables fast and efficient processing of random numbers. |
| Global Compatibility: | Auto-ranging power input (100-240VAC, 50/60Hz) and nominal power of 120W make it suitable for global deployment. |

# Q→NU

QNu Labs is revolutionizing cybersecurity with cutting-edge quantum-safe solutions, making India a leader in quantum cryptography. Through its patent-protected products - Armos and Tropos, QNu Labs is at the forefront to enable quantum secure key generation & distribution for secure data transmission.

With its innovative QShield platform, which is based on NIST complaint PQC algorithms, QNu offers quantum-secure services such as VPN, messaging, file sharing & key management (QHSM).

QNu Labs is at the forefront of quantum security, shaping the future of secure communications & protecting critical infrastructures like finance, defence, and telecom from future quantum threats.

Have a trusted advisor get in touch with you to explore how QHSM can protect your operations from quantum cyber threats.

Scan for more details