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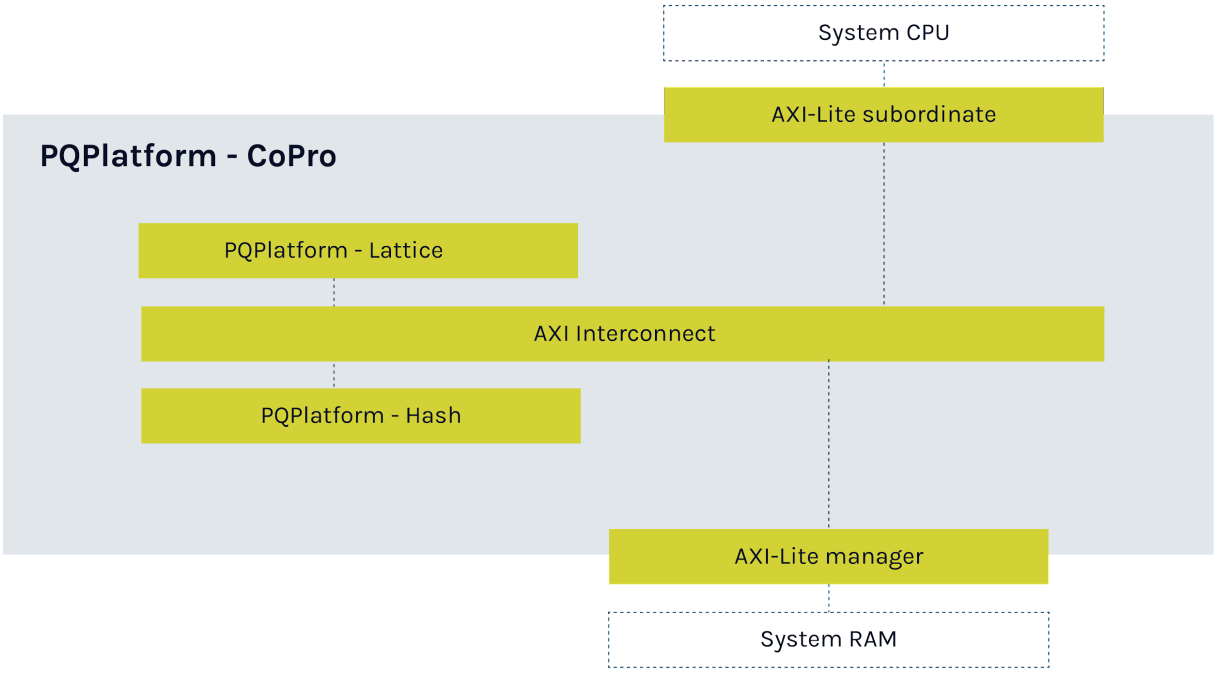
PQPlatform-CoPro

Post-Quantum Cryptography Processor (PQP-HW-COP)

PQPlatform-CoPro (PQP-HW-COP) adds PQShield's state-of-the-art post-quantum cryptography (PQC) to your security sub-system, with optional side-channel countermeasures (SCA). PQPlatform-CoPro can be optimized for minimum area as part of an existing security sub-system.

PQPlatform-CoPro is designed to be run by an existing CPU in your security system, using PQShield's supplied firmware.



Key Features and Parameters: PQPlatform-CoPro

- PQC coprocessor with hardware Keccak accelerator
- NIST SP 800-56A Compliant
- NIST FIPS-202 Compliant

- NIST FIPS 186-4 and 186-5 Compliant
- ANSSI X9.142-2020
- Supports:
    - NIST FIPS-203 ML-KEM 512/768/1024
    - NIST FIPS-204 ML-DSA 44/65/87
    - NIST FIPS-202 SHA3-224/256/384/512
    - NIST FIPS-202 SHAKE 128/256
    - NIST SP 800-56A
    - ECDH and ECDSA
    - Elliptic Curve P-384
    - Optional non-invasive side-channel (power, EM) attack countermeasures for PQC algorithms

- Memory: requires up to 96Kb working memory

- Interfaces:
    - 64-bit AXI4-Lite manager interface for connection with working memory
    - 64-bit AXI4-Lite subordinate interface for controlling the coprocessor via the host CPU.

Size Requirements

Config Information	IP Area
ML-KEM, ML-DSA	~125KGte
ML-KEM, ML-DSA, ECC, DSA	~150Kgte

Performance Expectations

Algorithm	Security Level	Max Performance (cycles)
ML-KEM Key generation	ML-KEM-512	500K
ML-KEM Encapsulation	ML-KEM 512	700K
ML-KEM Decapsulation	ML-KEM 512	1M
ML-DSA Key generation	ML-DSA 44	1.2M
ML-DSA Signing	ML-DSA 44	5.25M

ML-DSA Verification	ML-DSA 44	270K

IP Overview

PQPlatform-Lattice

The PQShield lattice-based engine is used to perform post-quantum operations. Optional SCA countermeasures, implemented in firmware, can provide protection against non-invasive power and EM side-channel attacks.

This component, known as PQPlatform-Lattice, is also available as a separate implementation for situations where an existing Keccak accelerator is present.

PQPlatform-Hash

PQPlatform-Hash is PQShield's dedicated Keccak accelerator. It's designed to handle symmetric primitives SHA-3 and SHAKE, and requires PQShield-supplied firmware to run on the host CPU.

Interfaces

PQPlatform-CoPro has two main interfaces:

- A 64-bit AXI4-Lite subordinate, through which the system CPU (and PQShield-supplied firmware) controls PQPlatform-CoPro
- A 64-bit AXI4-Lite manager, through which PQPlatform-Lattice accesses the working memory while running.

PQShield Hardware IP

The following table shows how PQPlatform-CoPro compares to PQShield's security suite.

Hardware IP	Description
PQPlatform-CoPro / PQP-HW-COP	**Adds PQC to your subsystem. Requires integration with host CPU running PQShield firmware.**
PQPlatform-Hash / PQP-HW-HBS	Keccak hardware accelerator.
PQPlatform-Lattice / PQP-HW-LAT	Lattice-based mathematical hardware accelerator.
PQPlatform-SubSys / PQP-HW-SUB	Autonomous cryptographic subsystem performing PQC and classical cryptography.
PQPerform-Lattice / PQF-HW-LAT	High-speed, high-throughput, autonomous lattice PQC cryptographic subsystem