



CycloneCrypto is a cryptographic toolkit designed for use in embedded systems. It provides a comprehensive set of cryptographic primitives (hash functions, stream and block ciphers, public key cryptography) that can be used to add security features to your embedded application. CycloneCrypto is available either as open source (GPLv2) or under a commercial license.

Main Features

- Base16/32/64 data encoding
- MD2, MD4, MD5, SHA-1, RIPEMD-128, RIPEMD-128, Tiger/192 and Whirlpoo hash functions
- SHA-2 family hash functions (SHA-256, SHA-384, SHA-512, SHA-512/224 and SHA-512/256)
- SHA-3 family hash functions (SHA3-224, SHA3-256, SHA3-384 and SHA3-512)
- Keccak sponge function
- Hash Message Authentication Code (HMAC) for all hash functions
- RC4 stream cipher
- Block ciphers (RC6, IDEA, DES, Triple DES, AES, Camellia, SEED, ARIA)
- Supports ECB, CBC, CFB, OFB and CTR operation modes for all symmetric block ciphers
- Cipher Block Chaining-MAC (CCM) and Galois Counter Mode (GCM)
- ChaCha encryption algorithm
- Poly1305 message-authentication code
- ChaCha20Poly1305 AEAD
- RSA public key cryptography (PKCS #1 v1.5)
- Digital Signature Algorithm (DSA)
- Diffie-Hellman key exchange (PKCS #3)
- Password-Based Cryptography Standard (PKCS #5)

- Elliptic Curve Cryptography (ECC)
- Elliptic Curve Digital Signature Algorithm (ECDSA)
- Elliptic Curve Diffie-Hellman (ECDH)
- Supports elliptic curves defined over prime fields (NIST-P and Brainpool)
- Multiple precision arithmetic library with optimized assembly code (for ARM[®] and MIPS[™]-based microcontrollers)
- X.509 certificate parsing functions
- Supports hardware accelerated encryption engines (when available)
- Flexible memory footprint. Built-time configuration to embed only the necessary features
- Portable architecture (supports little-endian and big-endian architectures)
- Debugging and trace functionality to ease development and integration
- Extensive test suite available on request
- The library is distributed as a full ANSI C and highly maintainable source code
- Dual licensing (open source or commercial license)
- Extensive test suite available on request (for commercial licenses)

Supported Devices

- ARM7TDMI[®]
- ARM926EJ-S[™]
- Cortex[™]-M3
- Cortex[™]-M4
- Cortex[™]-M7
- Cortex[™]-A5
- Cortex[™]-A8
- Cortex[™]-A9
- APS1 / APS3 / APS3R / APS5 / FPS6
- AVR32
- PIC32
- RX600

Related products

- CycloneTCP (dual IPv4/IPv6 stack dedicated to embedded applications)
- CycloneSSL (lightweight SSL/TLS library)

Reference Standards

RFC

- RFC 4648: The Base16, Base32, and Base64 Data Encodings
- RFC 1319: The MD2 Message-Digest Algorithm
- RFC 1320: The MD4 Message-Digest Algorithm
- RFC 1321: The MD5 Message-Digest Algorithm
- RFC 2104: HMAC: Keyed-Hashing for Message Authentication
- RFC 4269: The SEED Encryption Algorithm
- RFC 5280: Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
- RFC 5794: A Description of the ARIA Encryption Algorithm
- RFC 5639: Elliptic Curve Cryptography (ECC) Brainpool Standard Curves and Curve Generation
- RFC 6090: Fundamental Elliptic Curve Cryptography Algorithms
- RFC 7539: ChaCha20 and Poly1305 for IETF Protocols

IEEE

- IEEE Std 1363-2000: Standard Specifications for Public-Key Cryptography

Certicom Research

- SEC 1: Elliptic Curve Cryptography
- SEC 2: Recommended Elliptic Curve Domain Parameters
- GEC 2: Test Vectors for SEC 1

NIST

- FIPS 46-3: Data Encryption Standard
- FIPS 180-4: Secure Hash Standard
- FIPS 186-3: Digital Signature Standard (DSS)
- FIPS 197: Advanced Encryption Standard
- FIPS 198-1: The Keyed-Hash Message Authentication Code (HMAC)
- FIPS 202: SHA-3 Standard: Permutation-Based Hash and Extendable Output Functions
- SP 800-38A: Recommendation for Block Cipher Modes of Operation - Methods and Techniques
- SP 800-38C: Recommendation for Block Cipher Modes of Operation: The CCM Mode for Authentication and Confidentiality
- SP 800-38D: Recommendation for Block Cipher Modes of Operation: Galois/Counter Mode (GCM) and GMAC
- SP 800-56A: Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography

RSA Laboratories

- PKCS #1: RSA Cryptography Standard
- PKCS #3: Diffie-Hellman Key Agreement Standard
- PKCS #5: Password-Based Cryptography Standard
- The RC6 Block Cipher, algorithm specification



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