

# Secure Compute Module

The hardened Linux compute module for zero-trust environments.

[zymbit.com/scm](https://zymbit.com/scm)

## Hardened Linux Compute Module

- Raspberry Pi 4 compute module
- Protected by dedicated verified hardware agent.
- Fully encapsulated module with encrypted file system.
- Secure boot with verified artifacts and rollover policies.
- Physical and digital tamper sensors with user defined policy responses.
- Footprint and code compatible with RPI CM4.

## Engineered for a Lifetime of Operation

- *Develop* applications quickly by leveraging the RPI ecosystem, third party CI/CD tools and cloud integrations.
- *Qualify* your design against common security requirements, with reduced risk and faster time to market.
- *Operate* for years, unattended in the field with secure, reliable updates.
- *Recover* to a known bare-metal-state in the event of failed updates.
- *Destroy* sensitive contents with certainty for end-of-life or lost-in-action scenarios.

## Compute Resources

Compute resources	Broadcom BCM2711 quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz H.265 (HEVC) (up to 4Kp60 decode), H.264 (up to 1080p60 decode, 1080p30 encode) OpenGL ES 3.1, Vulkan 1.0 Up to 8GB LPDDR4-3200 SDRAM Up to 32GB eMMC Flash memory
Compute interfaces	Gigabit Ethernet, IEEE 1588 precision time protocol 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless Bluetooth 5.0, BLE 28 x user GPIO configurable for SPI, I2C, UART, ADC, DAC, PWM, I2S 2 x HDMI 2.0 ports (up to 4kp60 supported) 1 x MIPI DSI Serial Display 1 x MIPI CSI-2 Serial Camera 1 x PCIe 1-lane Host, Gen 2 ( 5Gbps ) 1 x USB 2.0 port ( highspeed )
Software API	Python, C++, C
Physical Format	Encapsulated module
Dimensions	57.2 x 42.5x 9.5 mm 2.25 x 1.67 x 0.37 Inches
Connectors	Module main connectors: 2x Hirose Header DF40C-100DP-0.4V Mating main connectors: 2x Hirose Receptacle DF40C-100DS-0.4V, 1.5mm clearance Mating main connectors, extended** : 2x Hirose Receptacle DF40HC(3.0)-100DS-0.4V, 3.0 mm clearance Mating external battery connector: 1x KYOCERA AVX 009155002201006 Mating perimeter, LED connector: 1x KYOCERA AVX 009155004201006 <b>** required if CR2412 battery fitted under module</b>

## Environmental & Regulatory

Operating Temperature	0°C – 70°C. Extended temperature ranges available.
Certifications	CE, FCC, ROHS

## Documentation

<a href="#">Using Product &gt;</a>	Getting started Software APIs – python, C, C++ Tutorials, FAQ & troubleshooting
<a href="#">Conformity Documents &gt;</a>	EU Declaration of Conformity FCC Declaration of Conformity RoHS/Reach Declaration of Conformity California Prop 65 Declaration of
<a href="#">CAD Files &gt;</a>	Step model Mechanical dimensions

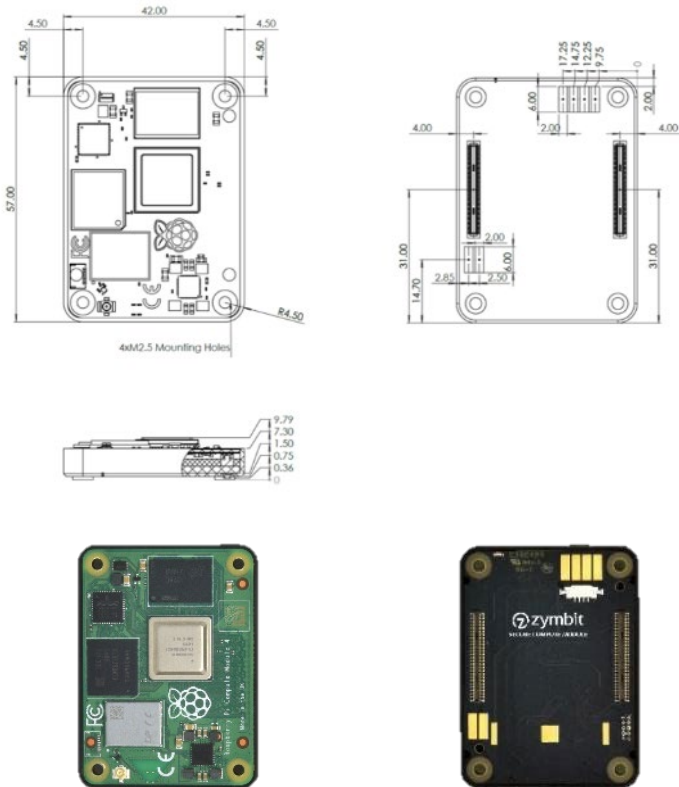
## Security Resources

Security Highlights	Secure boot on Raspberry Pi File system encryption Key generation, storage and management in secure hardware Cryptographic engine
Private / public key pairs	512
Foreign public keys	128
Key Wallet Functions	BIP 32 – hierarchical deterministic wallet BIP 39 – master seed mnemonic generator SLIP 39 – with Shamir's secret sharing BIP 44 – multi-account support
Cryptographic Services	ECC KOBLITZ P-256 (secp256k1) ED25519, X25519 ECDH (FIPS SP800-56A) TRNG (NIST SP800-22) ECC NIST P-256 (secp256r1) ECDSA (FIPS186-3) AES-256 (FIPS 197)
Tamper Sensors	2 x Perimeter breach detection circuits Accelerometer shock & orientation sensor Power monitors: main voltage, battery voltage, battery removal
Software API	Python, C++, C
Production mode lock	Software API command
Measured system identity & authentication	Standard factors include RPI host, Zymbit HSM, eMMC memory
Data encryption & signing applications.	Encrypt root file system with dm-crypt, with LUKS key manager hook Encrypt data blobs with "zblock" function Encrypt data in flight with OpenSSL integration
Real time clock	36-60 months operation with external CR2032, application dependent, 5ppm accuracy.
Backup battery	Used for RTC and perimeter circuits Under-module battery connector pads, to any 3V source on motherboard. Optional under module battery holder, for CR2412 coin cell. <b>requires motherboard connector height 3.0mm</b>

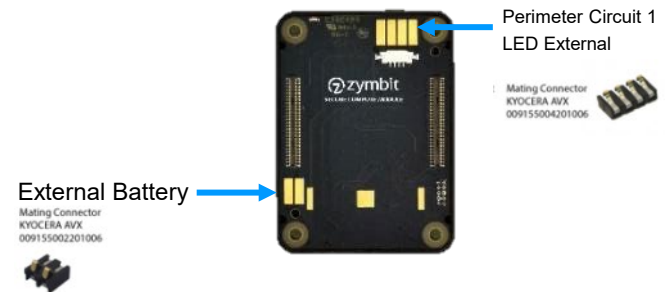
## Mechanical

Dimensions	57.2 x 42.5x 9.5 mm 2.25 x 1.67 x 0.37 Inches
Weight	1 oz, 30 grams

## Mechanical



## Connectors



Example Motherboard  
ZYMBIT SCM MOBO1

