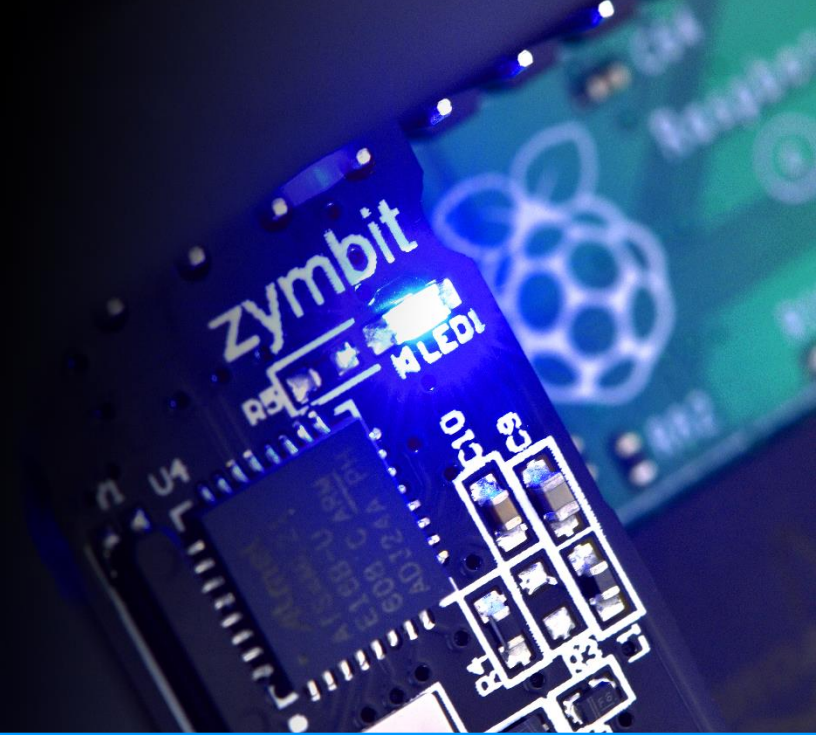


## ZYMKEY 4i HARDWARE SECURITY MODULE FOR RASPBERRY PI



### Key Features

- Multifactor device identity and authentication
- Data encryption and signing engine
- Key generation and secure storage
- Physical tamper detection sensors
- Secure element as root of trust

### Applications

- SD card file system encryption for protection of IP, data and credentials
- Secure device registration with AWS IoT
- Autonomous security for unattended IoT devices, no cloud dependence

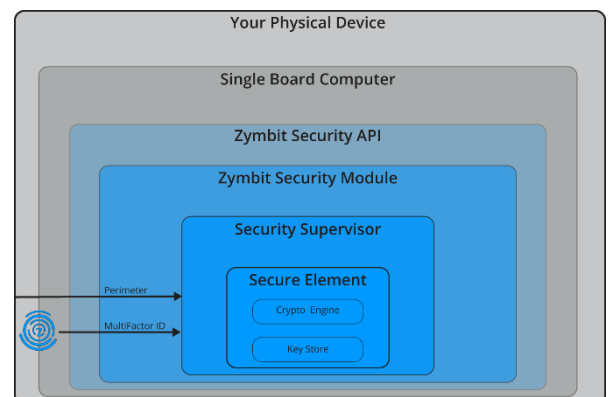
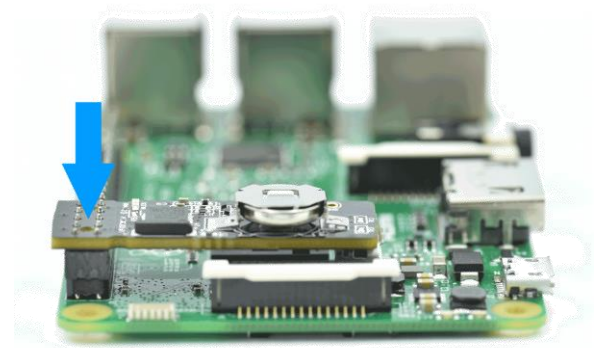
### Easy To Integrate Module

Zymkey plugs directly onto the GPIO header of a Raspberry Pi making it quick and easy to install, even late in the design cycle.

Software APIs are available in Python, C and C++. Example code and online documentation provide a simple low-risk way to integrate Zymkey security into your application running on standard Raspbian distributions. Support for other Linux distributions is optionally available.

### Hard To Penetrate

Zymkey delivers multiple layers of security to protect against cyber and physical threats. A secure element (SE) with micro-grid protected silicon stores the most sensitive resources. A security supervisor isolates the SE from the host computer and provides additional functions of multi-factor identity/authentication for devices, and multi-sensor physical security.



# SPECIFICATIONS

## Multifactor Device ID and Authentication



ZYMKEY 4i enables remote attestation of host device hardware configuration:

- Unique ID token created using multiple device specific measurements
- Cryptographically derived ID token never exposed
- Custom input factors available to OEMs
- ID tokens bound to host permanently for production, or temporarily for development
- Changes in host configuration trigger local hardware & API responses, policy dependent

## Data Integrity Encryption & Signing



ZYMKEY 4i provides a cryptographic engine featuring some of the strongest commercially available cipher functions to encrypt, sign and authenticate data:

- Strong cipher suite includes ECDSA, ECDH, AES-256, SHA256
- AES-256 encrypt/decrypt data service
- Integrates with TLS client-side certificates
- TRNG - true random number generator, suitable seed for FIPS PUB 140-2, 140-3 DRNG.

## Key Security Generation & Storage



ZYMKEY 4i generates and stores key pairs in tamper resistant silicon to support a variety of secure services:

- Multiple key slots, pre-defined and user available
- Private keys never exposed outside of silicon
- Keys destruction available, user selectable

## Physical Tamper Detection



ZYMKEY 4i monitors the physical environment for symptoms of physical tampering:

- Power quality monitor detects anomalies like brown-out events
- Optional accelerometer detects shock and orientation change events
- Optional perimeter integrity circuits detect breaks in user defined wire loops/mesh
- Event reporting and response according to pre-defined policies

## Real Time Clock



ZYMKEY 4i includes a battery-backed real time clock to support off grid applications:

- 18-36 month operation, application dependent
- RTC clock service, available to client applications
- RTC/UTC anomaly alerts available with zymbit security services
- 20ppm accuracy (standard). Optional 5ppm accuracy (OEM feature, MOQ apply)

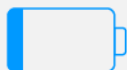
## Secure Element Hardware Root of Trust



ZYMKEY provides multiple layers of hardware security:

- Hard to penetrate dual secure-processor architecture
- Secure microcontroller supervises device multifactor identity / authentication and physical security.
- Secure microcontroller isolates secure element from host
- Secure elements from Microchip - ATECC608, ATECC508
- Hardware based cryptoengine and keystore

## Ultra-Low Power Operation



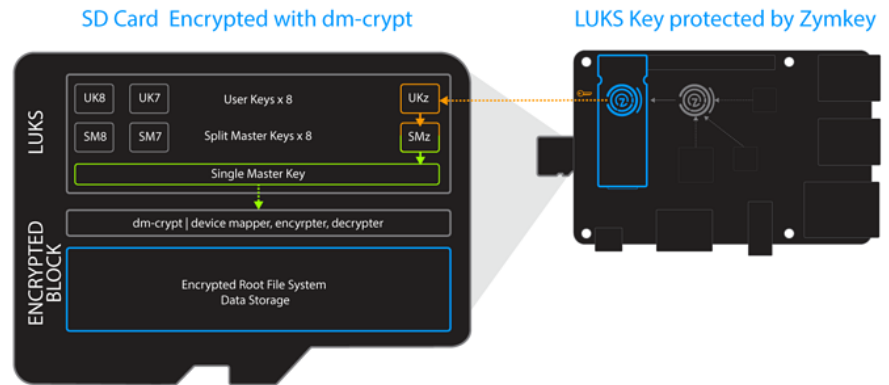
ZYMKEY delivers long term autonomous security from a battery:

- ARM Cortex-M0 microcontroller
- Years of secure operation from a coin cell - optional larger battery
- Secure operation autonomous from host

# APPLICATIONS

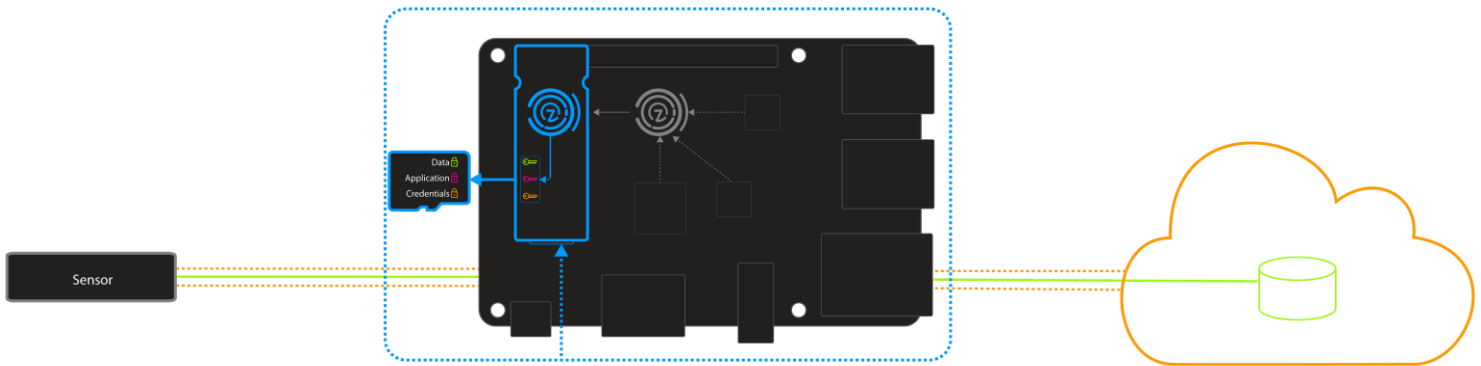
## SD Card Encryption

There are many reasons to encrypt the Root File System (RFS) on the Raspberry Pi, from keeping Wi-Fi credentials private to protecting proprietary software and sensitive data from cloning. Zymkey integrates seamlessly with dm-crypt & LUKS open standards. [Learn how > https://community.zybit.com/t/150](https://community.zybit.com/t/150)



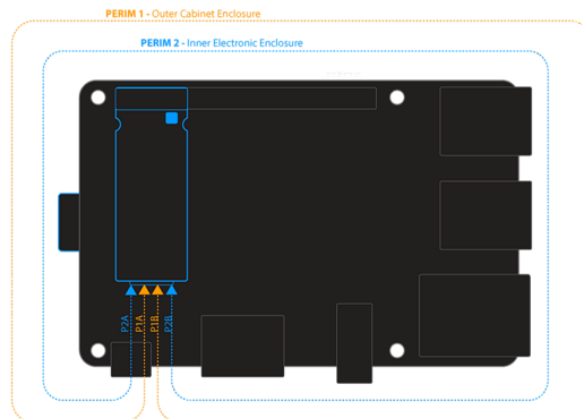
## AWS IoT Integration – TLS, JITR

Zymkey delivers device-based security features that are easy to integrate with Amazon Web Services IoT, just in time certificate registration (JITR) services. [Learn how > https://community.zybit.com/t/354](https://community.zybit.com/t/354)

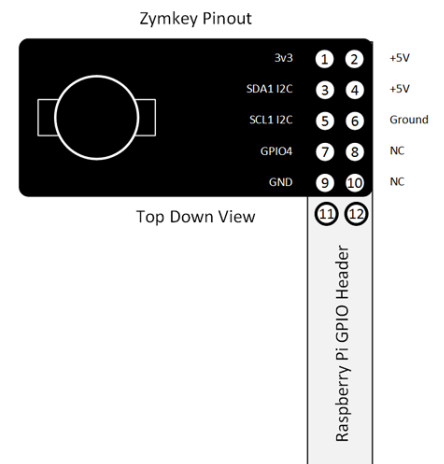
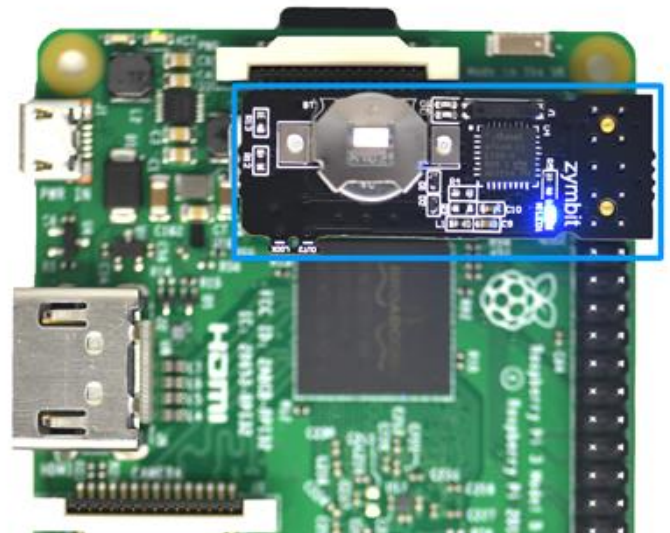
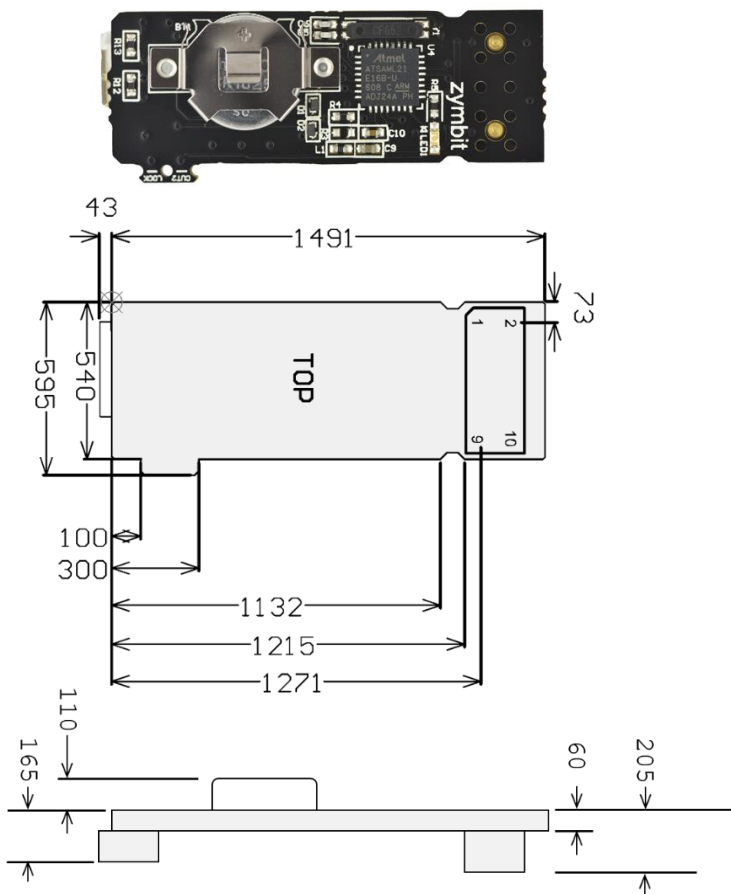


## Secure Enclosure with Tamper Detection

Zymkey provides multiple layers of physical tamper detection that protect unattended devices from threats in the real world. [Learn how > https://community.zybit.com/t/using-perimeter-detect/204](https://community.zybit.com/t/using-perimeter-detect/204)



# MECHANICAL / ELECTRICAL



# DOCUMENTATION

Zymkey is designed to be easy to integrate. For full and detailed information on how to integrate Zymkey in your application, visit <https://community.zymbit.com/>

- Getting Started
- Software APIs
- Applications
- Compliance Documentation
- CAD Footprint and mechanical Files

For more information, visit [www.zymbit.com/zyzkey](http://www.zymbit.com/zyzkey)

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