



CHRONICLED

CryptoSeal (CSS100)

How Chronicled's cryptographic, NFC-enabled, tamper-proof seals can physically secure products and packaging.

Contact: sales@chronicled.com

What is a CryptoSeal?

A *CryptoSeal* is a tamper-evident security sticker used to seal products, envelopes, containers, hardware enclosures, and packaging. Each seal contains a cryptographic NFC chip which uses public key encryption to create an unforgeable identity. Registrant and asset meta data is then registered and verified on an immutable blockchain. Tampering with the security sticker results in permanent damage of the circuitry—verifiably proving that a product or package is compromised.

TRUST & INTEGRITY

Recent government leaks from U.S. intelligence agencies have shown cases where routers and flight computers have been bugged and tampered. Cargo theft is a common problem in the supply chains. Wine, art, luxury products, pharmaceuticals, and, government documents are commonly counterfeited. This has compromised the trust of businesses and consumers resulting in enormous losses.

SOLUTION

CryptoSeals offer a cost-effective solution to physically secure items with a tamperproof security sticker, signed with a cryptographic digital signature. This solution offers several benefits:

- *Anti-Counterfeit* - An item's identity chip can be verified against the blockchain registration for the item established by the manufacturer.
- *Physically Tamper Proof* - The integrity of an item is protected against tampering, and any attempt to open the item will compromise the seal making verification impossible.

- *Immutable Event Logging* - events associated with the lifecycle of the packaging can be immutably recorded to blockchain, e.g. shipment, delivery, etc.
- *Customer Engagement* - product manuals, videos, item provenance, option to purchase related products, informed consent forms can all be displayed via smartphone and updated thru the cloud.

HOW IT WORKS

CryptoSeals are manufactured by Chronicle. CryptoSeals are designed to match the dimensions of the physical product or packaging, and can be customized. CryptoSeals are installed onto products in batches at factory or one-off in field. An employee writes the cryptoseals and metadata describing a product or batch of products to blockchain using the Chronicle Dashboard, and the seals are signed by the manufacturer's private key. Now, anyone can download an App to scan a product and verify authenticity and integrity of the seal. Now, a item has a secure identity that is linked to the immutable blockchain registry, and events associated with the life of the item can be immutably recorded on a blockchain back-end.

CUSTOMIZATION

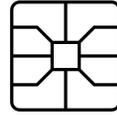
CryptoSeals can be customized to fit the dimensions and engineering requirements of any packaged product or hardware enclosure. Existing labels on packaging or enclosures can be redesigned to include the CryptoSeal components.

Platform Overview



CHRONICLED CLOUD & DASHBOARD

The *Chronicled Cloud* is used to synchronize product/chip registrations and sensor data with blockchain systems, and to manage digital content. The Cloud also allows sensors deployed on products to become blockchain-notaries, and writes events and data signed by the private key within the sensors to an immutable blockchain ledger. The Cloud is blockchain agnostic, which allows for collaboration with partners that might be working with different blockchains. The *Chronicled Dashboard* is the interface used by clients to provision chips read and write data to the Chronicled Cloud.



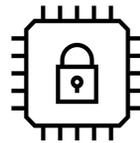
CRYPTOGRAPHIC FIRMWARE

Chronicled installs *Cryptographic Firmware* onto sensor boards, product inlays, and crypto seals in order to encode them with a blockchain-compatible, unforgeable digital identity. The firmware also allows sensor boards to cryptographically sign data measured by the sensors, ensuring the attestation of any measurement, including temperature, humidity, vibration, and tilt. This level of immutable data attestation gives peace of mind when dealing with service level agreements, traceability, auditing, trust, and compliance. Chronicled can work with customers to integrate the firmware into existing devices.



SENSOR BOARDS

Sensor Boards monitor the environmental conditions of items and shipments, including temperature, humidity, and movement (e.g., vibration, tilt). Sensor Boards run Chronicled's Cryptographic Firmware, which ensures end-to-end attestation of measurements from the board to the blockchain.



PRODUCT INLAYS & CRYPTO SEALS

Ready-to-use *Product Inlays* and *CryptoSeals* can be applied easily to luxury products, machines, appliances, hardware, and packaging to create a secure digital identity, make tampering detectable, and support secure chain of custody. *CryptoSeals* are available in a variety of tamperproof form factors, and can be customized for each application.

About Chronicled

Based in San Francisco, Chronicled, Inc. delivers trusted IoT and supply chain solutions to enterprise clients. Chronicled secures IoT device identities, data, and event logs and automates IoT-dependent business logic through smart contracts. Chronicled is also a founding member of the Trusted IoT Alliance, with the mission of creating tools and standards to connect IoT and blockchain ecosystems to deliver business value.

For additional info, contact sales@chronicled.com