OPTIGA™ Authenticate NBT

NFC-I2C bridge tag for contactless authentication and secured configuration of IoT devices

Customer presentation

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Limitations of traditional IoT device configuration methods

User experience

Device pairing or configuration involves navigating multiple steps

BoM costs

Need for additional controls and switches for configuring industrial devices leads to an increase in the Bill of Material (BoM) costs

Authentication

Lack of security features risks unauthorized access, data breaches, and compromises system integrity and reliability

What is an NFC-I2C Bridge Tag?

What is NFC?

Short-range, contactless communication based on RF field of 13.56 MHz

Data exchange with a simple tap

Secured communication

Supported by all **major smartphone OS**

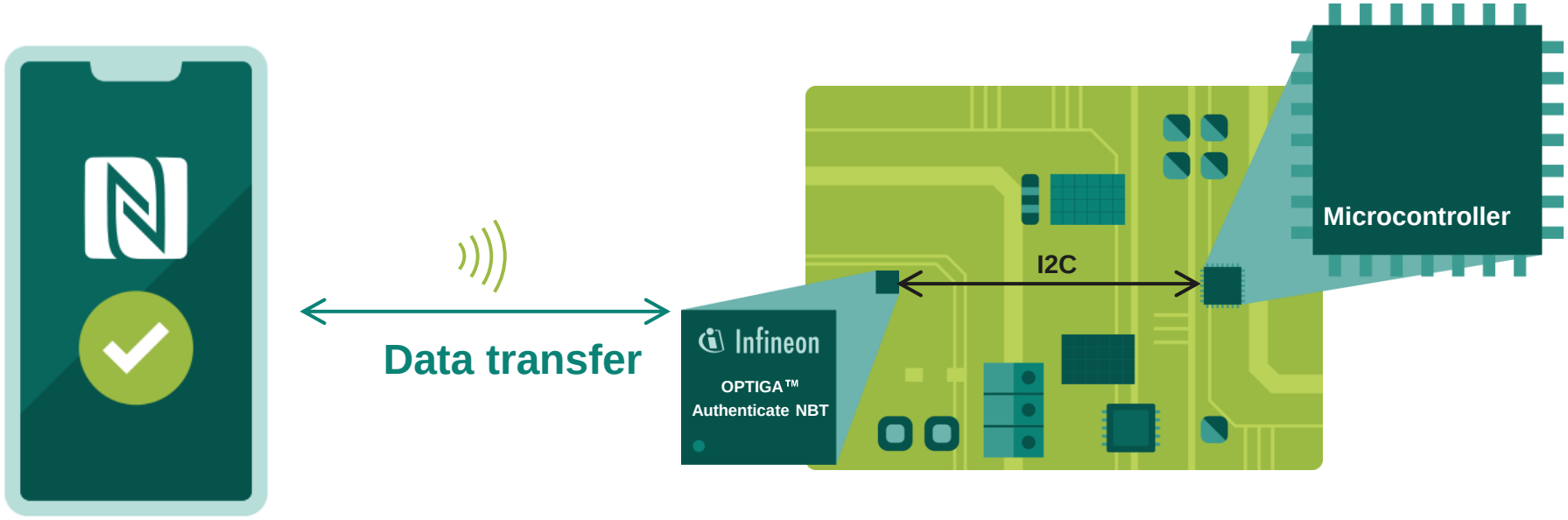
What is I2C?

I2C is a widely used **serial communication protocol** for connecting **multiple components** on a **single bus**. It supports **multi-master** and **multi-slave configurations** and operates at varying speeds.

How does a NFC I2C bridge tag chip help?

- Enables **seamless data transfer** between NFC-enabled smart phone/reader to the internal components of the IoT device such as MCU connected via I2C
- NFC interface **facilitates implementation** of **robust security measures** to allow only authorized personnel to configure/activate the IoT device

How does an NFC-I2C Bridge Tag work?



NFC-enabled phone/ reader

IoT Device

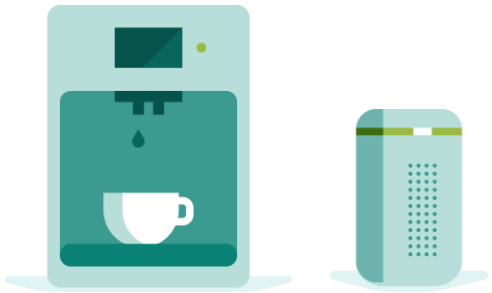
Active Device
Delivers power to the NFC interface
e.g. Smartphones, Tablets, Standalone Reader

Passive NFC Interface
Battery-less, receives power
e.g. NFC Type 4 Tag

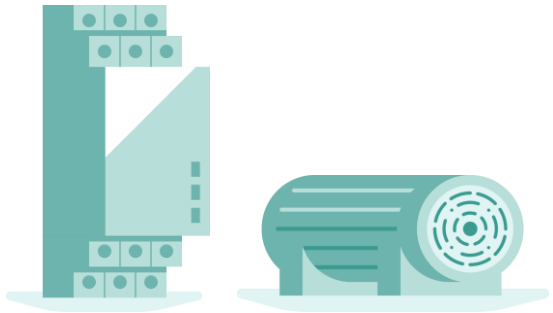
I2C
Wired
serial communication interface to the microcontroller

Scenarios where a Bridge Tag offers seamless connection and configuration

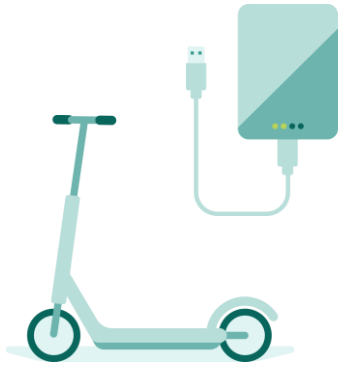
Pairing



Configuration

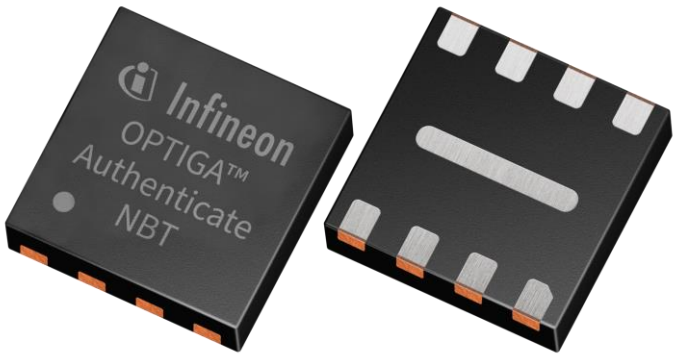


Activation



Data logging

Introducing OPTIGA™ Authenticate NBT



High-performance NFC-I2C bridge tag for secured contactless device authentication and configuration

OPTIGA™ Authenticate NBT solves common challenges in device authentication and configuration

Challenges

Navigating multiple steps during device pairing and commissioning

Increased BoM due to need for additional controls and switches for configuring traditional devices

Lack of security features risks unauthorized access, data breaches, and compromises system integrity and reliability

Solution

OPTIGA™ Authenticate NBT facilitates communication between IoT devices and NFC-enabled smart phones with just a tap using pass-through or asynchronous data transfer modes.

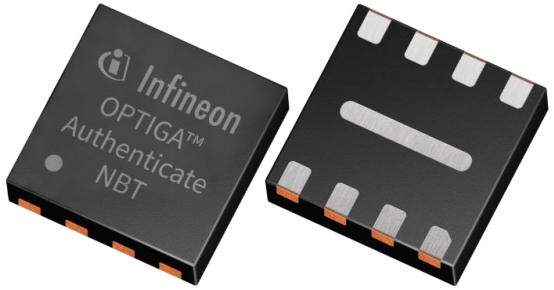
OPTIGA™ Authenticate NBT provides a seamless way to configure devices with NFC technology using smartphones

With our Integrity Guard 32 security architecture combined with hardware and crypto libraries – both certified to EAL6+, this bridge tag provides a high level of security. It supports both symmetric and asymmetric cryptographic authentication as well as password-based access control.

High-performance NFC-I2C bridge tag for secured contactless device authentication and configuration

Key features

- **Superior security:** Infineon TEGRION™ hardware (with Integrity Guard 32)
- **Open standards:** Java card OS and applets, I2C, GPT=1’
- **Ample memory:** 8 KB user NVM
- **Ultra-fast data transfer:** 106 up to 848 Kbit/s (NFC), 1 Mbit/s (I2C)
- **Multiple security options**
  - Flexible password management commands
  - Asymmetric cryptography (NIST P-256) authentication with public key infrastructure (PKI) and certificates
  - AES-128 based symmetric crypto, with on-chip generated dynamic URL & CMAC verification online
- **Small antenna form factor:** 78 pF on-chip tuning capacitance
- **Chip-individual pre-provisioning:** UID based, individual key-pair, certificate and default file data
- **Compliant & certified:** NFC Forum Type 4 Tag, Common Criteria EAL 6+ certification (for hardware and the crypto library), Personal Health Device Communication (PHDC)



Product details

Sales codes	NBT2000A8K0T4
Application	Industrial, Healthcare, Smart devices
Memory	8kB user NVM
Cryptography	AES-128 based symmetric crypto
Availability	May 2024
Temperature	-40°C to +85°C (NFC), -40°C to +105°C (I2C)
Interface	I2C
Package	USON-8-8
Size	2x2x0.55 mm

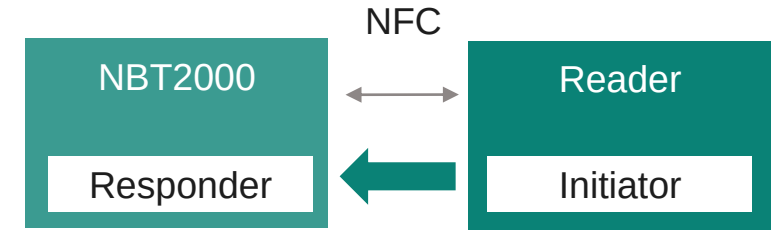
The benefits of OPTIGA™ Authenticate NBT

- ✓ Superior security
- ✓ Open standards
- ✓ Ample memory
- ✓ Ultra-fast data transfer
- ✓ Multiple security options
- ✓ Small antenna form factor
- ✓ Chip-individual pre-provisioning
- ✓ Compliant & certified

Modes of operation

Authentication mode

- Offline authentication using asymmetric crypto
- Online authentication via COTT, symmetric scheme using a dynamic URL
- E.g: App-less brand verification, connected smart devices authentication



Pass-through mode (Synchronous)

- Synchronized data transfer over NFC and I2C interfaces, Host Card Emulation capable
- E.g: Secured configuration of headless devices, product activation of shared mobility vehicles

Asynchronous data transfer mode

- Allows transfer of application data from an NFC reader to the device passively via the NFC Interface when device is switched off
- E.g: Passive commissioning of smart bulbs, electronic devices and wi-fi (for applications such as matter onboarding)

Key applications & use-cases

Smart Home & Smart City

Industrial

Target use cases
Product activation
Headless configuration
Device pairing
Assembly line programming
Fault diagnostics
Data logging for healthcare
Sensing & control

Shared Mobility & LEVs

Smart Personal Devices

OPTIGA™ Authenticate NBT in action - 1
Product Activation of shared e-bikes

Shared mobility vehicles such as e-bikes require secured activation so that only paid users are provided access

Advantages

- Simplified activation with a tap
- Choice of multi-security options (symmetric authentication or asymmetric authentication)

Benefits

- Improved user experience: The tap-and-activate works even in low-light and bad weather
- Providing peace of mind for bike-sharing operators and riders with protection against misuse

OPTIGA™ Authenticate NBT in action - 2
Product activation of electronic devices

Portable hard-disks that carry data to be protected can be locked / unlocked with a smart phone with tap-to-unlock.

Advantages

– Significantly reduced cost of implementation, thus enabling the feature across a wider range of products

Benefits

– No need to remember passwords or access using a card which can be lost / stolen

OPTIGA™ Authenticate NBT in action - 3
Configuration of headless* devices

NBT 2000 in pass-through mode enables secured product configuration of headless* devices by authorized personnel.

Advantages

- Quick and accurate way to configure headless devices
- Eliminates the need for costly displays and knobs on the front panel of industrial devices, reducing Bill of Materials (BoM) cost

Benefits

- Increased efficiency in device setup and maintenance
- Allow only authorized personnel to modify machine parameters, protecting against unauthorized access and data breaches

* Headless: Device without knobs or displays for configuration

OPTIGA™ Authenticate NBT in action – 4 Remote diagnostics for electronic devices

Appliances with NFC-I2C tags enable consumers to simply tap their smartphone on the appliance to access diagnostic information, even **when the device is completely powered off**.

This also allows technicians to easily access information such as firmware versions, battery status, and operation/error log.

Advantages

- Cost effective solution for monitoring device health
- Multiple security options to fit each application

Benefits

- Reduce the need for technician's on-site visits and minimize downtime for the customer
- Significant reduction in RMA costs

OPTIGA™ Authenticate NBT in action – 5
Authentication and data logging of healthcare monitoring devices

Healthcare devices such as insulin pens and patient monitors need data logging. In the absence of display, read the data from your NFC enabled phone and authorize only certain people access to your private data.

Advantages

- Small form factor suitable for compact devices
- Ultra-fast speed for quick data processing
- Customizable security options for optimal protection
- Ample memory to store data
- PHDC compliant

Benefits

- Enables tracking and analysis of patient health data
- Easy integration with other healthcare devices

OPTIGA™ Authenticate NBT in action – 6
Product activation of electronic devices for an anti-theft solution

Theft of electronic items in stores remains a persistent challenge for retailers requiring proactive strategies to deter potential thieves and protect valuable merchandise.

Advantages

- Product activation only after a legitimate purchase
- Secured (encrypted) activation/deactivation even when the device is not powered
- Storage of warranty details and any other relevant information into the device for later readout
- At each boot, device MCU* checks if the Secured NFC Tag is valid

Benefits

- Prevent revenue loss

* **MCU** – Microcontroller

OPTIGA™ Authenticate NBT in action – 7
Passive commissioning of smart home devices

NBT 2000 enables passive commissioning of non-powered smart home devices by simplifying the setup process for onboarding of Matter, pre-installation of settings, configuring wi-fi and so on

Advantages

- Easy configuration, making the setup process simple and user-friendly
- Users can quickly connect their smart home devices without the need for complex manual configurations, saving time and eliminating the hassle of setting up each device individually

Benefits

- Hassle-free user experience and efficient network integration

OPTIGA™ Authenticate NBT in action – 8 Secured top up of prepaid electricity meters

Traditionally, customers visit a prepaid meter vendor or a designated payment location to add credit to their meter. With NFC I2C tag, customers can use their smartphones to securely transfer payment information to the meter.

Advantages

- Eliminates the need to travel to a physical location, saving time and effort for customers
- Cost-effective for utility companies as it reduces the need for physical payment locations

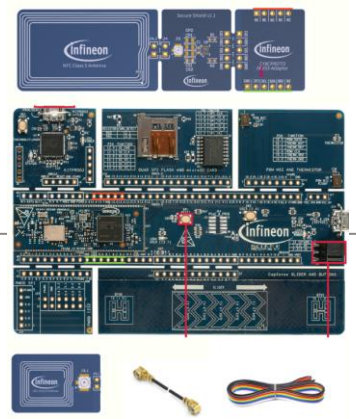
Benefits

- Customer benefits from convenience, secure transactions, and real-time information, with a simple tap of their smartphone

Options for Development Kit

OPTIGA™ Authenticate NBT Development Kit*

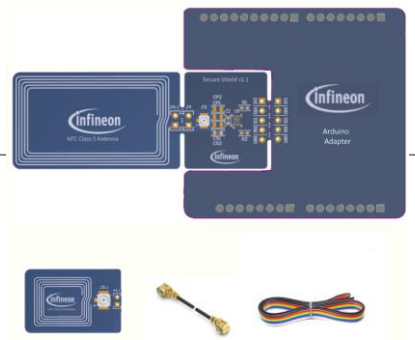
– CY8CPROTO-062S2-43439 main board + NBT eval shield + Class 6 antenna + Software



iOS source code, Android App

OPTIGA™ Authenticate NBT Development Shield*

– NBT eval shield + Class 6 antenna + Arduino adapter + Software



iOS source code, Android App

* Pictures for illustration purposes only

OPTIGA™ Authenticate NBT customer journey

Personalization state (State at delivery)
- Application developers can unconditionally modify settings such as
  - Interface configurations
  - File access conditions
  - Cryptographic keys
  - User data in files

Operational state
- OPTIGA™ Authenticate NBT is ready for use in target applications
  - Interface configurations are locked
  - File access policies prevent unverified operations
  - NFC commands can be used to read/update files
  - Authentication features are available
  - This state is irreversible

Infineon Fab

Personalizer/Inlay

End user

- NBT 2000 in Personalization state
- Chip individual AES and ECC Key
- Infineon’s public key certificate
- Default file data

- Validate product origin with Infineon keys
- Tags can be personalized over NFC or I2C interface
- Update individual AES and ECC Key
- Personalize customer specific certificate
- Update file data (optional)
- Configure interface settings
- Finalize personalization to change state to “operational”

- Perform authentication
- Read user data (if access enabled in personalization)
- Write user data (if access enabled in personalization)

Key takeaways

- Infineon's OPTIGA™ Authenticate NBT is a high-performance NFC-I2C bridge tag for secured contactless device authentication and configuration
- Advantages include best-in-class secured hardware, easy antenna design, ultra fast data transfer, BoM optimization, plenty of user memory, and multi-security options
- Use cases include pairing and passive commissioning of smart home devices, product activation of shared mobility vehicles, configuration of headless devices, and data logging in the healthcare sector
- OPTIGA™ Authenticate NBT is NDA-free and is accompanied by a development kit for ease of design

Infineon's OPTIGA™ family: flexibility, robust security, ease of use and a commitment to quality, supply and support

- Scaling from basic authentication chips to sophisticated implementations
- Designed for easy integration into embedded systems
- Robust protection of the confidentiality, integrity and authenticity of information and devices
- A trusted advisor with 30+ years of expertise in hardware security, helping you to reduce complexity and implementation costs

Our solution comes with service and support

We support you by…

- Providing Design-In Application Notes for our products
- Host side integration support
- Evaluation kits

- Providing a secured Public Key Infrastructure
- Custom certificate loading in secured production environment

- Answering questions immediately
- Two-level customer service

- Providing trainings for our security products
- Showing Demo Applications as a starting point for custom designs

You can count on us

Extensive track record and reliable logistics

> 2.5 billion

Security ICs shipped every year

Best partner network

50+ partners

for security

Most trustworthy and innovative network of partners in the security space

Shaping tomorrow's standards

> 100

standardization bodies

Driving standardization bodies like GSMA, ETSI, Global Platform, 3GPP, and NFC Forum

Strong innovation power

> 25,000

patents

7,161 R&D employees; 11% of Infineon's revenue goes into R&D

A high-performance NFC-I2C bridge tag for secured contactless device authentication and configuration

-> Pre-order now

More information: www.infineon.com/OPTIGA-Authenticate-NBT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