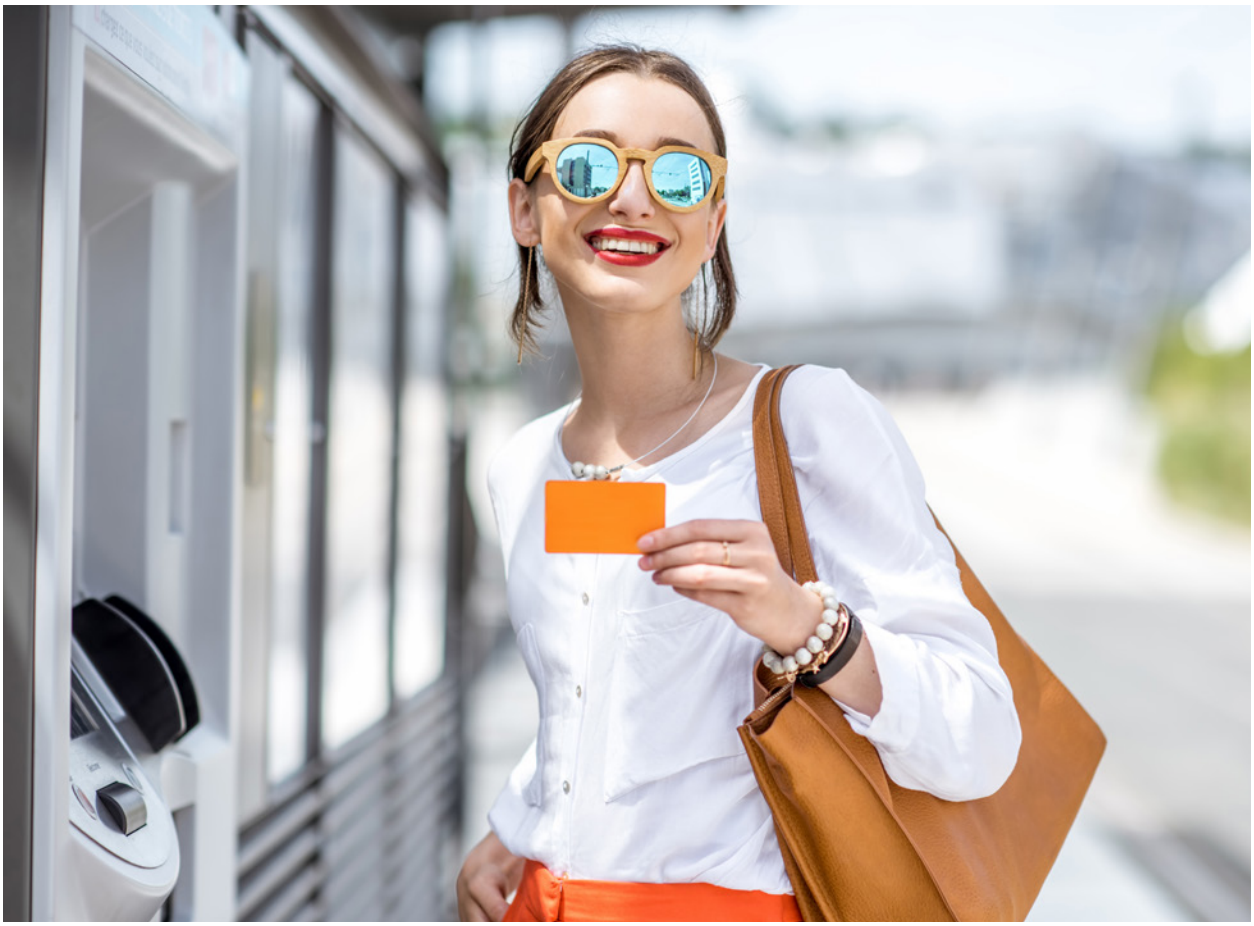
White Paper

ELATEC
RFID Systems

SECURE SELF-SERVICE WITH RFID

CONTACTLESS USER AUTHENTICATION, AUTHORIZATION AND ACCESS CONTROL FOR THE KIOSK INDUSTRY



The kiosk industry has exploded over the last decade and shows no signs of slowing down.

There isn't one standard industry definition of a "kiosk," but for purposes of this paper, we will define a kiosk as any stand-alone, automated device that enables self-service access to goods, services or information. Automated kiosks are used to vend goods and materials, process payments, take orders, input information, answer questions, print tickets or documents, and provide internet access, among other applications. More broadly, the kiosk market may be understood to include smart lockers and smart carts that provide secure storage or control access to high-value or hazardous goods.

WHERE DO YOU FIND KIOSKS?

Transit / event ticketing & check-in

Order entry / quick service

Payment processing

EV charging stations

Consumer goods vending

Industrial supply vending

Hospital / pharmaceutical dispensing

Locker systems

Visitor management

Car / Bikeshare authorization

USER AUTHENTICATION AND ACCESS CONTROL FOR KIOSKS

One job of an automated kiosk is to ensure that only authorized users are able to access the goods, services or information it provides. There are two forms of control that may be applicable for the kiosk industry: access control (the ability to limit who has access to kiosk functionality) and user authentication (the ability to identify and authorize a specific user).

Some types of self-service kiosks—such as directory kiosks found in shopping malls or hospitals—do not require either access control or user authentication. Anyone can walk up to the kiosk, make an inquiry on a touch screen, and get the information they need. Other types of kiosks may require access control (such as ensuring payment is received before goods or services are provided) but do not need the ability to identify individual users. A credit card or even cash payment is sufficient to unlock the desired functions of the kiosk.

User authentication is the ability to correctly identify an individual user and match their information to the device, equipment or systems they are using.

Access control is the ability to ensure that only authorized users are able to gain access to a device, asset or system.

For other types of kiosks, it is beneficial to have a robust mechanism to both identify and authenticate specific users and control the type or level of access for each user. For example:

- **Industrial and medical dispensing stations and lockers** allow authorized employees to gain access to safety equipment (e.g., gloves or goggles), consumables (e.g., lab chemicals and supplies) or pharmaceuticals (including controlled substances). It is beneficial to not only control who has access to materials but also be able to track exactly who has accessed the machine, what they used and when they used it. User authentication enables tracking for compliance and cost allocation and control.
- **Consumer applications such as transit and event ticketing, bike/scooter share services, electric vehicle charging and gaming** can offer more robust and individualized services when user authentication is enabled. The user identity can be connected to account information to track rewards program points, pre-paid credits, purchasing patterns and user preferences.
- **HR kiosks are used for both time-and-attendance tracking and to enable employee access to paystub and W2 information, benefit selections and other vital services.** Their use is growing in sectors such as retail and manufacturing where many employees do not use a computer for their work and may not have computer or internet access at home. For these applications, it is absolutely essential that the employee can be correctly identified.

There are several options for kiosk applications where user authentication and access control are needed.

- **Credit card:** For many consumer applications—including ticketing and check-in, consumer goods vending and payment processing—a credit card acts as both the identification and payment method.
- **Magstripe:** Magstripe cards are still used for some kiosk applications, such as transit and parking ticketing systems.
- **Touchscreen:** For employee applications, such as industrial vending or HR services, employees may be asked to enter a username and password or PIN on a kiosk touchscreen. Touchscreen entry (typically using a phone number as identification) may also be used for rewards program identification in consumer applications.

But there is a better option for many kiosk applications. **Radio-frequency identification (RFID)** and smartphone-based **Bluetooth® Low Energy (BLE)** and **Near-field Communication (NFC)** technologies enable RFID and smartphone solutions for smart kiosks.

RFID AND SMARTPHONE SOLUTIONS FOR SMART KIOSKS

RFID, BLE and NFC have a number of benefits for kiosk manufacturers, the companies that deploy the kiosks, and end-users.

+ **Access:** RFID and BLE/NFC are fast and easy for end-users—just wave a card, fob or phone over the reader for instant access. There are no passwords or PINs to remember and manage, and users do not need to carry a credit card to access services.
+ **Security:** These technologies are more secure and easier to manage than password/PIN systems and harder to counterfeit than competing magstripe or optical reader technologies. End-users are much less likely to share a phone or ID card than a password or PIN.
+ **User tracking:** RFID cards and smartphone apps provide a unique identification that can be used to match users with systems or devices. They not only prevent access by unauthorized users but enable tracking of exactly who has accessed a kiosk, when and what they did. This enables better cost accounting, membership management or consumer behavior tracking.
+ **Integration:** RFID readers can be easily integrated into the kiosk itself for seamless, invisible access.
+ **Hygiene:** RFID and BLE/NCF are contactless technologies, minimizing hygienic concerns arising from the need to touch the machine.

HOW RFID WORKS

RFID cards have two main components:

1. **an integrated circuit that can store and process information**
2. **an antenna to transmit or receive a signal**

Each RFID card stores a unique data set—such as a number—that serves to identify the card and, by extension, the person carrying it. When a card with an embedded RFID tag is in close proximity with an RFID reader, the reader transmits a radio signal to interrogate the tag. The radio signal activates the tag, which then uses the power in the radio signal to respond to the reader with its unique ID.

BLE AND NFC

Bluetooth® Low Energy (BLE) and Near-field Communication (NFC) are both contactless data exchange technologies. Their main difference from RFID is that the information carriers (e.g., a smartphone) are active radio transmitters (beacons) and require a power source.

- NFC operates in near-field ranges (<20 cm) and is based on high-frequency RFID technology (13.56 MHz).
- BLE is a short-range radio technology for distances up to 10 meters operating at a frequency of 2.4 GHz.

When smartphones are used for user authentication and access control, they act as card emulators, sending a unique user ID to the reader.

RFID CARDS VS. SMARTPHONES: CHOOSING THE RIGHT TECHNOLOGY

RFID cards (or fobs) and smartphone credentials both have applications within the kiosk industry. Choosing the right application depends on your user base and how, where and why they are accessing the kiosk. An RFID reader that is also able to read BLE and NFC signals provides maximum flexibility.

+ **Cards are cheap and easy to issue.** They make sense in environments where users are already carrying a card for identification or building entry purposes (such as a corporate ID card or membership card). They also work better for populations that are less likely to own smartphones, in corporate and government facilities where, for security reasons, mobile devices are prohibited, as well as in environments (such as water parks or labs) where it is impractical or dangerous to carry a smartphone.
+ **Smartphones are increasingly preferred** for many kiosk applications, especially for consumers and in corporate environments where "bring your own device" (BYOD) policies are in place. Smartphone adoption among consumers is greater than 80% and nearly universal among younger generations. Using the smartphone for credentialling means one less card they need to carry and keep track of. Smartphone applications are also very easy and economical for kiosk managers, as users download the app on their own and there is no physical card to distribute.

Use RFID cards when...	Use Smartphones when...
Users are already carrying an ID card that can be leveraged	Users are not part of a group already carrying ID or membership cards
Users are from population groups less likely to carry a smartphone	Users are from population groups highly likely to carry a smartphone
Users are in an environment where carrying a smartphone is impractical or dangerous	Users would prefer not to carry a card
Use of mobile devices is prohibited for security reasons	Kiosk managers would prefer not to manage physical cards

SELECTING THE RIGHT RFID READER FOR KIOSK APPLICATIONS

There are many different RFID reader technologies to choose from. Kiosk manufacturers and software providers wishing to integrate RFID into their kiosk solutions need to understand the differences and select a reader technology that meets the needs of their clients and end-users. In particular, developers should ask:

+ Will the reader work with the card or smartphone technologies already in use by clients and end-users?
+ Does the reader support the functionality and security requirements needed by my application?
+ How easily can the reader be reconfigured or updated as end-user requirements or market conditions change?

CHALLENGE: UPDATING RFID FIRMWARE OR FUNCTIONALITY FOR WIDELY DISPERSED KIOSKS

Kiosks are generally widely distributed throughout an organization, city or region. Large multinational companies may have large numbers of kiosks distributed across the globe. This makes it extremely difficult to update or reconfigure embedded RFID readers and ensure that none of them have been missed.

There are several reasons why RFID readers may need to be updated or reconfigured. Kiosk purchasers may adopt a new card or smartphone authentication technology. Emerging security threats may require manufacturers to enable advanced encryption or other security features for identity management. Or software developers may want to add new functionality to their kiosk solutions.

Field reconfiguration of most RFID readers is time-consuming and expensive. Technicians must physically access each reader, in some cases removing it from the kiosk in which it has been installed. If the installed reader cannot be configured to meet the new requirements, it must be removed and replaced. For kiosk managers, this means that every single RFID-enabled kiosk must be tracked down and updated. Missing a reader may result in an unexpected device failure. Kiosk manufacturers may also face significant expenses if they have unsold inventory in stock that must be replaced or reconfigured.

SOLUTION: Remote Configuration with ELATEC Readers

ELATEC readers support remote configuration for fast, easy updates. Manufacturers or end-user IT managers can push updates out to all installed readers at once without tracking down individual kiosks or requiring extensive technician time and expense. This increases customer satisfaction and provides a significant competitive advantage for kiosk manufacturers and software providers.

CHALLENGE: ACCOMMODATING MULTIPLE TECHNOLOGIES

Kiosk manufacturers and software providers selling to a diverse market must be able to accommodate a variety of different RFID and smartphone applications for different buyers and markets. There are more than 60 major RFID card transponder technologies in use around the world, each with its own data formats, communication frequencies and security capabilities. Kiosk manufacturers may also want to accommodate both RFID and smartphone-based mobile applications using a single reader.

Most RFID readers can only read a few different card technologies, and some are created by card manufacturers to read only their own technologies. This means that kiosk manufacturers wishing to expand their market opportunities may have to stock different readers for different customers. This creates both sales and inventory management challenges. Salespeople must discover the card types being used by prospects before placing an order to determine which part to use or whether their card technology can be accommodated at all. For large companies using more than one card technology, there may not be a single reader in inventory that can read all of their card types. Kiosk manufacturers and software developers intending to sell internationally or to multinational customers face additional challenges, since most RFID readers are only certified for use in a few countries or regions.

SOLUTION: ELATEC Universal RFID Readers

ELATEC RFID readers are "universal"; some can read more than 60 card technologies, including HF and LF RFID as well Near Field Communication (NFC) and Bluetooth Low Energy (BLE) technologies increasingly used with mobile devices. They are also certified for use in as many as 110 countries. This means they can accommodate virtually any card technology an end-user may have in place, providing a single part number solution that simplifies sales and inventory management. Sales or customer support staff can simply scan an example card from the end-user to identify the technologies they are using. Final configuration can be completed on installed readers, so kiosk manufacturers can usually stock one version of their system for all potential customers.

CHALLENGE: MEETING SECURITY REQUIREMENTS

Kiosks used in corporate or medical environments (such as industrial or pharmaceutical vending machines or HR kiosks) generally require higher levels of security than consumer applications. Reliable, secure user identification is critical to ensure that only employees with the right credentials can access kiosk goods or services.

RFID cards are generally more secure than other access control measures. Employees are less likely to share a picture ID card than a password or PIN, and cards can be quickly deactivated from a central system if they are lost or compromised or if an employee is terminated. They can also utilize cryptographic keys to further increase security.

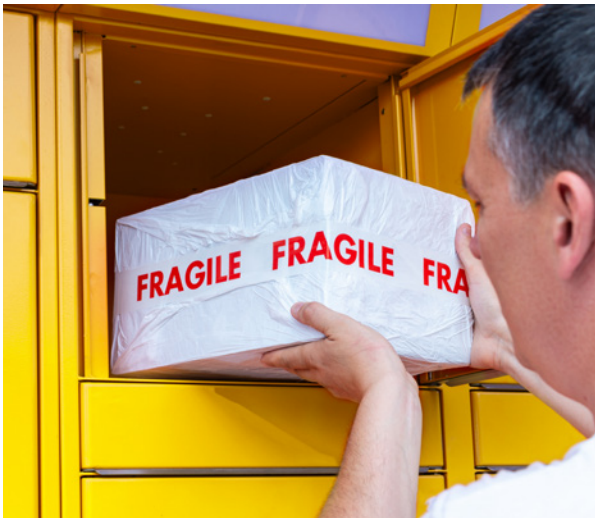
Solution: Secure Access with ELATEC

ELATEC readers support advanced encryption technologies. The readers act as mini-computers that can be programmed to meet nearly any encryption scheme, including advanced cryptographic methods requiring a higher computing load. These may include the use of multiple or hierarchical keys and symmetrical cryptographic methods. ELATEC readers can also facilitate multi-factor authentication with the help of Secure Access Modules (SAM). The readers support multiple SAM slots that help in integrating these modules. This enables the readers to perform cryptographic computations using SAM as well as facilitate key management in a more secure way. Customized encryption schemes can be programmed in advance by ELATEC. For even higher security, kiosk manufacturers or software providers can program the readers themselves, so even ELATEC will not possess the encryption key.

CHALLENGE: CHANGING MARKET REQUIREMENTS

The kiosk market has become increasingly sophisticated and complex as smart, connected kiosks join the growing "Internet of Things" (IoT) environment. Businesses want to be able to take advantage of the benefits of connected kiosks while maintaining privacy, confidentiality and security. In addition, some kiosk applications currently relying on membership or corporate RFID cards are likely to switch to smartphone-based BLE and NFC authentication solutions. RFID readers will need to adapt to support these evolving functionality requirements.

Most readers are limited in both their current functionality and potential upgradability. Kiosk manufacturers and software developers may find themselves "locked in" to current functionality and security capabilities around user identification, authorization and access control by their RFID reader solution. Addressing emerging market opportunities in this case would require physically replacing the RFID readers in their systems. This limits the shelf life of their products and their ability to respond to customer needs.



SOLUTION: ELATEC Readers are "Future Proof"

ELATEC readers have a robust open API that makes them highly adaptable and practically "future proof." The readers can be programmed to enable unique functionality for sophisticated IT solutions and support mobile access control technologies such as BLE and NFC. The API is powerful and flexible, so manufacturers will be able to reconfigure their existing readers to address new opportunities and requirements in the future that have not yet been imagined. This vastly increases the shelf life of both installed systems and inventory. And since they can be easily reconfigured after installation, manufacturers will be able to respond to new customer requirements and maintain customer loyalty.

THE ELATEC ADVANTAGE FOR THE KIOSK INDUSTRY

ELATEC's powerful, flexible reader technology gives kiosk manufacturers and software providers a real competitive advantage, both now and in the future.

+ **Expand internationally:** ELATEC readers are certified for sale in as many as 110 countries globally.
+ **Maximize market opportunities:** ELATEC readers support every major card technology available, more than 60, including both HF and LF, as well as mobile access control solutions via BLE and NFC.
+ **Reduce total lifecycle costs:** ELATEC readers simplify inventory management with a virtual single part number solution and can be easily and remotely updated or reconfigured without replacing inventory.
+ **Deliver customer advantage:** ELATEC readers reduce configuration expenses, extend product life, and support advanced functionality and security requirements, providing meaningful product differentiation for kiosk manufacturers and software developers.
+ **Prepare for the future:** With ELATEC, you'll be ready for whatever comes next. Our readers can be reconfigured to address emerging opportunities and customer requirements.

For more information, contact an ELATEC Applications Specialist in your region.

elatec.com

EMEA
Puchheim, Germany
+49 89 552 9961 0
sales-rfid@elatec.com

AMERICAS
Palm City, Florida, USA
+1 772 210 2263
americas-info@elatec.com

ASIA
Shenzhen, China
+86 158 1759 1668
apac-info@elatec.com

AUSTRALIA
Sydney, Australia
+61 449 692 277
apac-info@elatec.com

JAPAN
Tokyo, Japan
+81 355 799 276
japan-info@elatec.com