



## Technical Report

### An Explanation of Common RFID Chips usage, their weakness and Protective Solutions

#### What is RFID and how does it work?

Radio Frequency Identification, is the technology that lets you simply wave your credit, debit, transport card, Access card or passport in front of a nearby scanner. RFID systems can be broken down by the frequency band within which they operate: low frequency (LF), high frequency (HF), and ultra-high frequency (UHF). There are also two broad categories of RFID systems these being passive systems and active systems.

It's a fairly simple concept. An electronic scanner sends a signal that an antenna in the card receives and uses to activate the RFID chip. In a passive system the RFID chip then uses the transmitted signal to power on, and reflect data back to the reader. Active systems have their own transmitter and power source (usually a battery) and broadcast their own signal to transmit the information stored on their microchips.

Unfortunately, criminals with minimal technical skills can construct their own RFID readers with a few simple supplies. These devices can steal your **private financial information** or your **electronic keys** quickly and silently - all the perpetrator needs to do is come near your wallet with the hidden card reader. And the worst part is the cards don't have an off switch.

#### How RFID Blocking Works

Our products protect information by creating an RFID shield that blocks the electromagnetic energy needed to power and communicate with RFID chipped items such as:

- Contactless Payment/Smart cards (including Oyster cards)
- Passports
- Electronic Access cards
- Keyless Car Tokens

There are two (2) primary RFID chips in use today for ID cards and access cards, and one for credit cards:

- LF - 125 KHz – older access and ID cards
- HF - 13.56 MHz – (ISO 14443) credit cards, newer access and ID cards

#### Access Control Cards

- The slower 125 KHz chip, is also the older chip.
- It is most often used in access cards and older ID Cards.
- Due to its low frequency, it is very hard to shield
- It also typically has very little in the way of protection built into the card.
- It is fairly easily copied and cloned

This 125 KHz type of chip is still widely used by government, military, industry & security agencies for access control and ID cards, not knowing of its weaknesses.





As new card encryption is developed, a whole criminal or scientific community works to ‘crack’ that new encryption! Mifare was cracked in 2008 and DESFire was cracked in 2011!

However, when apprised of these risks, many RFID users are dismissive of the issue, only because they fail to understand the ease with which their cards could be copied and cloned.

**With the increasing use of RFID chipped items, understanding and attitudes must change.**

RFID Secure Ltd has the perfect products to protect the most popular type of these cards -The HID Prox Card\*:

- **Secure Badgeholder® Classic™ with BloxProx™**
- **BloxProx™ Lite™**

These unique holders deploy ‘technological counter-measures’ – showing one number or numerical series to the unsuspecting scammer, while protecting the targeted ID or access card.

In the case of the Classic with BloxProx, the user need only squeeze the tabs together, exposing the ID or access card, and it is then read. When the tabs are released, the card is safe/inert again. (An effective on-off switch). This is available in a portrait version for hanging from a lanyard. We are developing both a landscape version and a clip-on pocket version.

In the case of the BloxProx Lite, one only needs to push the card out of the holder about an inch to present the card for reading. Then the card is ‘pulled’ back into the holder and the card is safe again. This is available in both portrait and landscape versions for hanging from a lanyard. We are developing a clip-on pocket version.

We are able to protect both the 13.56 MHz ISO 14443/15693 and EPC Gen 1/Gen 2 contactless smart cards and RFID tags as well as HID Proximity ‘tap and go’ 125 KHz ID/Access cards.

\*One version of this card, called a ‘clam shell’, is two pieces glued together, where the chip ‘floats’ between the two cards, making it almost impossible to shield in a badge holder. If one holds a credit card in one hand and the clamshell card in the other, the thickness will be apparent.





## 13.56 MHz – contactless payment cards

Most contactless smart card systems implement industry-standard security mechanisms, but readers can be modified to access information without authorization, so RFID blocking is essential to total security.

### **Credit Card Vulnerabilities**

Credit card readers can be easily purchased that will read the credit account number, expiration date, and in some cases even the name off your new RFID-enabled credit card. These readers can easily be concealed by electronic pickpockets so that someone can walk through a crowd, ride on a subway, escalator, or other crowded area and steal nearby credit card information without the card holder ever knowing it had happened.

The credit card company's response is that because you don't have the 3 digit code, you can't do anything with the information. That is incorrect however, as many telephone order merchants don't ask for the 3 digit code. Which? Magazine recently investigated this issue. They reported in the national news that they made a £3000 purchase in this way. In addition, information scanned from a smart card can be placed on any magnetic stripe card and used to make a purchase.

Increasingly consumers are being confronted with the realities of **electronic-pick-pocketing, identity theft** and **card clash** as they are issued credit and debit cards with RFID chips. Consumers are destroying their Contactless cards rather than take this risk.

There are increasing concerns reported over security with contactless cards. Purchases may not appear on a customer's account for some time after a card has been reported lost or stolen, leaving thieves free to keep using them at will. More worryingly a MoneySavingExpert.com investigation has also revealed that all the major banks' contactless cards can be used after cancellation.

The banking industry states that Cardholders are fully protected against fraud and would receive a full refund from their bank, however, the onus is on you to check your statements and report any fraudulent activity to your bank in order to apply for a refund. Furthermore the banking industry uses the clause, "**A full refund will be given IF the Cardholder has taken reasonable precautions to protect their card.**" Exactly what the 'reasonable precaution' is, remains unspecified.



News media outlets are increasingly telling the story of how "wireless" pick-pocketing of unprotected credit and debit cards or card clash at retail 'point of sale', can leave consumers feeling vulnerable, outraged, helpless and often financially worse off!

As of June 2016, there are a total of 92.1 m contactless cards in issue in the UK. On average, each contactless transaction is for £8.60.





## RFID Blocking Products

**RFID Secure Ltd** has a range of products to protect against this kind of theft and provide security for your finances & personal information with Secure Sleeve®, Secure Badgeholder® and Secure Wallet™ giving any item a safe and secure RFID blocking solution.

**Secure Sleeves** are RFID card protection sleeves for contactless payment and debit cards in your wallet. Slide the card into the sleeve and the sleeve back into your wallet. It's that simple. All our card sleeves are approved under FIPS 201 for protective use by the US Government. They have a “**Secure by Design**” Police Approval Specification for Identity Fraud Protection.

**Passport Sleeves** protect RFID enabled Passports from Identity Theft and other unauthorized activity. They have a “**Secure by Design**” Police Approval Specification for Identity Fraud Protection.

**Secure Wallets** and **Passport Wallets** from RFID Secure offer full protection for passports and contactless payment cards. Each pocket and compartment is protected, so that Protective Sleeves are not needed. They have a “**Secure by Design**” Police Approval Specification for Identity Fraud Protection.

## Brand Promotion

Promote your Company and protect your clients.

**Secure Sleeves** printed with your Identity and your core message enforce your Brand whilst demonstrating your commitment to Crime prevention.

Used as a promotion, these sleeves place your Company in your client's wallet!

Contact RFID Secure for details.

