

EMV—Learning the Basics



EMV stands for EuroPay® MasterCard® Visa®, the three entities that originally worked together to create worldwide standards for the chip card to ensure global interoperability. Today, EMV has more members, including Discover®. EMV is a payment method that combines a plastic card with an integrated circuit chip (ICC). The primary purpose for using an EMV chip card is to help reduce card theft by including a mechanism to validate the identity of the user.

An EMV card uses the ICC to hold the account number and other sensitive data instead of using a magnetic stripe. The chip also contains logic for transaction processing and risk management. It is important to note that this data is not encrypted; it is all in clear text. For more information on how to secure your POS for use of EMV cards, see, [“3 POS Changes To Support EMV.”](#)

EMV adoption around the world has been a gradual process over several decades. The U.S. is one of the last countries to adopt EMV cards, and will need to modify many of its payment processes to fit into the EMV model. Additionally, EMV cards are more expensive to produce – about 22 cents per card, vs. 1.5 cents for a magnetic stripe card.

Here’s the basic process for how EMV cards are used:

1. Cards are inserted, not swiped

EMV cards are inserted into the payment device, which is referred to as “dipping.” When the card is inserted it undergoes an authentication and application selection process (e.g., “should this transaction be processed as a credit, debit, or ATM transaction?”). Then the device asks for a card authentication called the CVM (card verification method). Authentication can be PIN entry (most secure), signature, or none. This requirement is programmed onto the card, so some cards may require a PIN and some may not. Note that “signature” means signing a paper receipt, not a digital signature. Dipping an EMV card is unlike the “swipe” that cardholders are accustomed to today – the cardholder must not remove their card from the card entry device when “dipped” until this information is exchanged and the transaction is processed.

2. PIN or Signature?

Chip & PIN and Chip & Signature are both methods used with EMV cards. Chip & PIN is similar to PIN debit, like what is used at an ATM. Of course, the obvious difference is validating who you are by PIN entry vs. a signature. Both options offer enhanced security against counterfeiting compared to traditional magnetic stripe cards. The difference with Chip + PIN is that it protects against lost and stolen. Payment card issuers will ultimately decide which CVM they will use. If the card issuer allows multiple options, the payment application will automatically prompt for the selected CVM. Chip & PIN is more widely used internationally, and in some cases is the only method allowed.

3. Better authorization security

EMV authorization differs from magnetic stripe authorization. Magnetic stripe authorization transactions are “one way,” meaning the data on the stripe is read by a payment entry device, then packaged and sent on for processing the transaction. EMV on the other hand is “two-way.” Data is exchanged between the ICC chip and the payment entry device to verify that the card is not fraudulent, and then the transaction information is processed. The verification step allows for fraudulent transactions to be stopped before they are processed.

EMV is not the end-all solution for secure payments. If you would like to learn more about EMV, see, [“Do I Need EMV?”](#) If you are not yet familiar with EMV, begin with, [“What is EMV?”](#) Also, learn what you may need to do to upgrade your POS system for EMV by reading, [“3 POS Changes to Support EMV.”](#)

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