MasterCard *SecureCode*

Merchant Implementation Guide

17 June 2014

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Summary of Changes, 17 June 2014

This document reflects changes effective since the last publication of this manual.

Description of Change	Where to Look
Added notes indicating that both the MasterCard Advance Registration Program and Maestro Advance Registration Program (MARP) are closed to new business and will be decommissioned on 1 June 2015.	Throughout document
Added references to the MasterCard Attempts Processing Service and the MasterCard Authentication History Server.	Throughout document
Added new appendix to provide an overview of the MasterCard requirements to support IVR Transactions in India.	India IVR Transations (SecureTelephone)

Summary of Changes, 3 January 2014

This document reflects changes effective since the last publication of this manual.

Description of Change	Where to Look
Updated email address for the MasterCard® *SecureCode*™ Customer Support Team to securecode_customer_support@mastercard.com.	Throughout document
References to *Maestro Global Rules* have been removed and/or replaced with references to the *MasterCard Rules* or the *Transaction Processing Rules*, whichever applies.	Throughout document
Updated the Customer Implementation Services contact information by region. Updated the URL of the MasterCard *SecureCode* Merchant FAQs and Program Identifier Guidelines.	MasterCard *SecureCode* Contact Information
Added content about the Account Status Inquiry.	Account in Good Standing
Updated the MasterCard Connect™ path by which customers may access the *MasterCard and Maestro Advance Registration Programs Participation Request Form* (Form 0900).	Participation Requirements for Merchants

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Chapter 1 SecureCode Merchant Implementation Overview

This section provides a general overview of the MasterCard® SecureCode™ Electronic Commerce program.

MasterCard and E-commerce

E-commerce transactions account for a significant and increasing share of MasterCard® gross dollar volume.

The number of remote transactions is increasing at a rate of more than 40 percent per year and growing. For this reason, it is important to position e-commerce and mobile commerce channels—web access from PCs, PDAs, mobile phones, and other wireless-enabled devices—to increase gross dollar volume profitability by using security and authentication solutions that authenticate cardholders. This reduces chargebacks and expenses that are associated with disputed transactions.

From a risk perspective, the current MasterCard electronic and mobile transaction environment closely resembles traditional mail order/telephone order (MO/TO) transactions. The remote nature of these transactions increases risk, resulting in more cardholder disputes, and associated chargebacks.

These factors increase costs to all parties for managing disputes and chargebacks. According to MasterCard data, more than 70 percent of all chargebacks for e-commerce transactions are associated with reason code 4837 (No Cardholder Authorization) or reason code 4863 (Cardholder Not Recognized), and are currently estimated at a cost of USD 34.00 per chargeback to the industry. These reason codes are used where the consumer denies responsibility for the transaction and the acquirer lacks evidence of the cardholder's authentication, or the consumer does not recognize the transaction.

Proving that the cardholder conducted and authorized the transaction in a virtual, non–face-to-face environment of electronic and mobile commerce has been extremely difficult. The MasterCard® *SecureCode*™ program is designed to provide the infrastructure for an issuer security solution that reduces problems associated with disputed charges, offering the opportunity to authenticate the cardholder at the time of purchase. Disputed charges affect all parties in a transaction—issuer, acquirer, cardholder, and merchant.

Maestro and E-commerce

Low credit card penetration in many countries has led to the use of inefficient payment forms like cash on delivery, check, and domestic transfer/automated clearing house (ACH).

MasterCard® *SecureCode*™ will allow Maestro® cards to be used for Internet purchases in a safe and secure environment. MasterCard *SecureCode* allows Maestro to be the first fully-authenticated global debit brand accepted on the Internet.

Unless otherwise stated by domestic country rules, all Maestro Internet transactions are guaranteed. Please note that a merchant can not accept Maestro transactions unless they support MasterCard *SecureCode*.

Grow Your Online Business

MasterCard® *SecureCode*™ offers flexible, robust, and easy to implement solutions for cardholder authentication. Because requirements vary from issuer to issuer, MasterCard places a premium on flexibility, enabling issuers to choose from a broad array of security solutions for authenticating their cardholders.

These solutions include password, EMV chip card-based approaches, or other solutions of their own choosing. Issuers should decide on their authentication strategy by balancing their view of risk against the cardholder experience.

At launch of MasterCard *SecureCode*, a "risk averse" strategy was visualized where every merchant transaction would be presented to the issuer for authentication and the issuer would ensure that the cardholder authenticated every transaction. As MasterCard *SecureCode* evolved, both retailers and issuers began practicing active risk management and now only those transactions deemed high-risk are authenticated. This risk-management is driving the adoption of dynamic solutions and resulting in a reduction in use of the initial static password solution.

MasterCard now formally supports this risk based approach for merchants.

The most common of these cardholder authentication solutions for MasterCard and Maestro® issuers has been the use of static or dynamic passwords. Dynamic password usage can be based on the Chip Authentication Protocol (CAP) that provides for the creation of a one-time use cardholder authentication password. This scenario is similar to what the cardholder experiences in the face-to-face environment using EMV chip card and personal identification number (PIN) and using the existing investments in EMV for new authentication purposes. This program provides a seamless integration of both EMV and 3-D Secure technologies that result in stronger authentication than traditional static password solutions. Currently, many new implementations take a risk-based approach to authentication and the use of dynamic codes, increasing both the strength of security while also improving the customer experience.

MasterCard *SecureCode* is the consumer- and merchant-facing name for all existing and new MasterCard cardholder authentication solutions. While these solutions may each appear quite different on the surface, these various approaches converge around the Universal Card Authentication Field™ (UCAF) mechanism and share a number of common features.

Two common features in all MasterCard cardholder authentication solutions include:

- MasterCard card or Maestro card cardholders are authenticated using a secure, unique, private code.
- The authentication data is transported from party-to-party via the MasterCard UCAF mechanism.

MasterCard *SecureCode* Program Platform

The MasterCard® *SecureCode*™ program platform is comprised of a number of layered components.

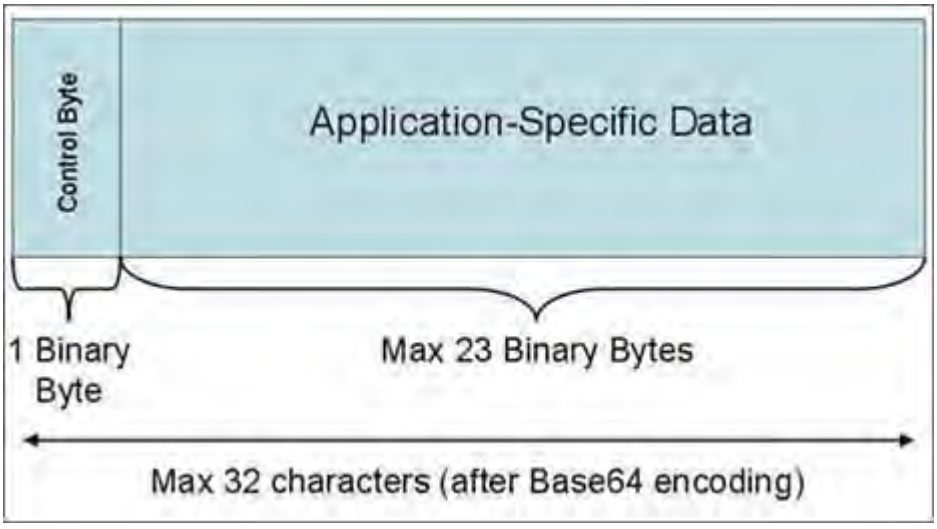
As described in the following sections, each of the components provides for specific authorization and authentication functionality during the processing of a MasterCard *SecureCode* transaction. When combined, the platform provides a mechanism for online merchants to receive a similar global payment guarantee to one that brick-and-mortar retailers enjoy with POS transactions.

What is UCAF and Its Structure?

Universal Cardholder Authentication Field™ (UCAF) is a standard, globally interoperable method of collecting cardholder authentication data at the point of interaction across all channels, including the Internet and mobile devices. This is also known as the Accountholder Authentication Value (AAV).

Within the MasterCard authorization networks (that is the Single Message and Dual Message System, and RSC) UCAF is a universal, multi-purpose data transport infrastructure that is used to communicate authentication information among cardholder, issuer, merchant, and acquirer communities. It is a variable length, 32-position field with a flexible data structure that can be tailored to support the needs of a variety of issuer security and authentication approaches.

The generic structure of UCAF is illustrated as follows:



The control byte contains a value that is specific to each security application. MasterCard is responsible for assigning and managing UCAF control byte values and the structure of UCAF application-specific data. Other solutions that use UCAF for authentication collection and transport will be assigned their own control byte value and the structure of the application-specific data will be tailored to support the specifics of the security protocol.

In most UCAF implementations, the application-specific data is defined as binary data with a maximum length of 24 binary bytes including the control byte. However, there are some restrictions in the various MasterCard authorization networks regarding the passing of binary data in the authorization messages. As a result, all UCAF data generated by Secure Payment Application™ (SPA) algorithm-based MasterCard® *SecureCode*™ implementations must be Base64 encoded at some point prior to being included in the authorization message. The purpose of this encoding is to produce a character representation that is approximately 33 percent larger than the binary equivalent. For this reason, the UCAF field is defined with a maximum length of 32 positions. For more information about Base64 coding, refer to the MasterCard *SecureCode* SPA Algorithm Specifications appendix.

The current MasterCard *SecureCode* control byte definitions include the following.

Usage	Base64 Encoded Value	Hexadecimal Value
3-D Secure SPA Accountholder Authentication Value (AAV) for first and subsequent transactions	j	x'8C'
3-D Secure SPA AAV for attempts	h	x'86'

What is an AAV?

The Accountholder Authentication Value (AAV) is a MasterCard® *SecureCode*™ specific token that uses the Universal Cardholder Authentication Field™ (UCAF) field for transport within MasterCard authorization messages.

It is generated by the issuer and presented to the merchant for placement in the authorization request. This AAV can be proof of a fully authenticated or an attempted authentication transaction.

In the case of a chargeback or other potential dispute processing, the AAV is used to identify the processing parameters associated with the transaction. Among other things, the field values will identify the:

- Issuer ACS that created the AAV. (This could be the Issuer ACS or, in the case of an attempt, the MasterCard Attempt processing server.)
- Sequence number that can positively identify the transaction for that location
- Secret key used to create the Message Authentication Code (MAC), which is a cryptographic method that ensures AAV data integrity, and binds the entire AAV structure to a specific PAN.

UCAF is the mechanism that is used to transmit the AAV from the merchant to issuer for authentication purposes during the authorization process.

What is a Merchant Plug-In

A merchant plug-in is a software application that is developed and tested to be compliant with the 3-D Secure protocol and interoperable with the MasterCard® *SecureCode*™ infrastructure.

The plug-in application is typically provided by a technology vendor and integrated with the merchant's commerce server. It serves as the controlling application for the processing of 3-D Secure messages.

As part of the MasterCard *SecureCode* infrastructure requirements, all merchant endpoints must implement application software capable of processing 3-D Secure messages. An endpoint is described as any merchant or merchant processor platform, which directly connects to the MasterCard *SecureCode* infrastructure.

NOTE

If a retailer has qualified and accepted a merchant for the MasterCard Advance Registration Program (MARP), then MasterCard will assign a static Accountholder Authentication Value (AAV) for use when the transaction is undertaken as MARP instead of standard MasterCard *SecureCode*. This value is passed in plain text in the Universal Cardholder Authentication Field™ (UCAF) field. For additional information, refer to the MasterCard Advance Registration Program Requirements appendix.

Chapter 2 3-D Secure Solution

This section provides an overview of the MasterCard implementation of 3-D Secure for MasterCard® cards and Maestro® cards, including cardholder enrollment and payer authentication.

3-D Secure Solution Overview

Cardholder authentication is the process of verifying cardholder account ownership during a purchase transaction in an online electronic commerce environment.

All MasterCard® *SecureCode*™ solutions define and provide a base level of security around performing this authentication process. For this solution specifically, MasterCard is deploying its own implementation of 3-D Secure under the MasterCard *SecureCode* program branding for MasterCard® and Maestro®. This implementation of 3-D Secure includes support for the Secure Payment Application™ (SPA) algorithm and Universal Cardholder Authentication Field™ (UCAF) without any changes to the 3-D Secure specification, messages, or protocol.

The components described herein are organized according to requirements that fall within the issuer, acquirer, and interoperability domains associated with the payment process.

- Issuer Domain—Systems and functions of the card issuing financial institutions and its customers.
  - Cardholder Browser
  - Related Cardholder Software
  - Enrollment Server
  - Access Control Server
  - Accountholder Authentication Value (AAV) Validation Server/Process
- Acquirer Domain—Systems and functions of the acquirer and its customers.
  - Merchant Plug-In
  - Signature Validation Server
- Interoperability Domain—Systems, functions, and messages that allow the Issuer Domain and Acquirer Domain to interoperate. These components will be globally operated and managed by MasterCard.
  - Directory Server
  - Certificate Authority
  - MasterCard Authentication History Server
  - Attempts Processing Server (Stand-In Authentication)

Components

Following is information about components related to the Issuer Domain, Acquirer Domain, and Interoperability Domain.

Issuer Domain

The Issuer Domain is comprised of the following components.

- Cardholder browser and related software
- Enrollment server
- Access control server
- Accountholder Authentication Value (AAV) validation server/process

Cardholder Browser and Related Cardholder Software

The Cardholder browser acts as a conduit to transport messages between the Merchant Server Plug-In (in the Acquirer Domain) and the Access Control Server (in the Issuer Domain). Optional cardholder software to support implementations such as chip cards may also be included.

Both the browser and related software are considered to be off-the-shelf components that do not require any specific modification to support 3-D Secure.

Enrollment Server

The purpose of the enrollment server is to facilitate the process of cardholder enrollment for an issuer's implementation of 3-D Secure under the MasterCard® *SecureCode*™ program. The server will be used to perform initial cardholder authentication, as well as administrative activities such as *SecureCode* resets and viewing 3-D Secure payment history. In some cases, the enrollment server and the access control server may be packaged together.

Access Control Server

The access control server serves two basic, yet vital, functions during the course of a MasterCard *SecureCode* online purchase. First, it will verify whether a given account number is enrolled in the MasterCard *SecureCode* program. Secondly, it will facilitate the actual cardholder authentication process.

AAV Validation Server/Process

This server or process will be used to perform validation of the cardholder authentication data received by the issuer's authorization system in the authorization messages. Issuers may perform their own validation or sign up for the MasterCard-hosted on-behalf service. To register for the MasterCard-hosted on-behalf service, send an email to your regional Customer Implementation Service team.

MasterCard recommends that issuers validate the AAV contained in the authorization message prior to the authorization decision. This is considered a best practice, although it is not required. With the implementation of the MasterCard Attempts Processing Service (Stand-In Authentication), issuers that perform self-AAV validation will continue to be able to validate AAV values generated by their Access Control Server (ACS) service. However, an issuer will not have the ability to validate an attempt AAV generated by the MasterCard Attempts Processing Service. Issuers that participate in the AAV validation on-behalf service will have all AAV values validated.

The server of the MasterCard Attempts Processing Service will generate an attempt AAV when:

- The Issuer's account ranges do not participate in MasterCard *SecureCode*.
- The Issuer's ACS responds negative to the merchant enrollment verification message (VERes = N) for unenrolled cardholders.
- The Issuer's ACS times out or is unavailable.

Under these circumstances, an issuer will not be able to validate a MasterCard generated attempts AAV. For security reasons, the keys will not be shared.

Acquirer Domain

The Acquirer Domain is comprised of the following components.

- Merchant plug-in (MPI)
- Signature validation server

Merchant Plug-In

The merchant server plug-in creates and processes payer authentication messages and then returns control to the merchant software for further authorization processing. The plug-in is invoked after the cardholder finalizes the purchase request, which includes selecting the account number to be used, and submitting the order but prior to obtaining authorization for the purchase.

Signature Validation Server

The signature validation server is used to validate the digital signature on purchase requests that have been successfully authenticated by the issuer. This server may be integrated with the merchant plug-in or may be a separately installed component.

Interoperability Domain

The Interoperability Domain is comprised of the following components.

- Directory server
- Certificate authority
- MasterCard Authentication History Server
- Attempts server

Directory Server

The MasterCard® *SecureCode*™ global directory server provides centralized decision-making capabilities to merchants enrolled in the MasterCard *SecureCode* program. Based on the account number contained in the merchant enrollment verification request message, the directory will first determine whether the account number is part of a participating MasterCard or Maestro® issuer's card range. It will then direct eligible requests to the appropriate issuer's access control server for further processing.

All implementations of this issuer platform **must** use the MasterCard *SecureCode* global directory server for processing MasterCard and Maestro® transactions.

Certificate Authority

The MasterCard Certificate Authority is used to generate and distribute all private hierarchy end-entity and subordinate certificates, as required, to the various components across all three domains.

These certificates include:

- MasterCard Root certificate (used for both MasterCard and Maestro)
- SSL Server and Client certificates issued under the MasterCard hierarchy for communication to the Directory Server and MasterCard Authentication History Server
- Issuer Digital Signing certificates issued under the MasterCard hierarchy for communication to the Directory Server and History Server

In addition, SSL certificates based on a public root hierarchy are required. These certificates are not issued by the MasterCard Certificate Authority and must be obtained from another commercially available certificate-issuing provider.

For more information, refer to the *MasterCard SecureCode—Production Procedures* manual.

MasterCard Authentication History Server

The History Server is a central repository of all authentication activity occurring within the issuer ACS for all transactions that occurred, including the PAReq and PARes details.

Attempts Server

The MasterCard *SecureCode* infrastructure supports this component server.

The MasterCard Attempt processing server provides the merchant with an Attempt Accountholder Authentication Value (AAV) when:

- The Issuer account range is not participating on the MasterCard *SecureCode* Directory Server.
- The Issuer sends a verify enrollment response with the value of an N (Cardholder not enrolled).
- The Issuer ACS is Unavailable or times out.

Issuers may choose to have their ACS provider to send a VEres=Y for non-enrolled cardholders, and then providing the PAres=A to avoid invoking the MasterCard Attempts Processing Service.

The AAV generated by the attempts Server service will be generated with MasterCard keys which will not be shared. An issuer can identify an AAV generated by the new MasterCard Attempts Processing Service by the ACS identifier in the base64 decoded version of the AAV.

3-D Secure Solution Message Types

The card range request/response, the verification request/response, the payer authentication request/response, and the payer authentication transaction request/response are all message types associated with the 3-D Secure Solution process.

Card Range Request/Response

Card Range Request/Response, also known as card range caching, is no longer a viable implementation. The MasterCard Attempts Processing Service generates a Stand-In Authentication for cardholders not enrolled, card ranges not participating, and Access Control Server (ACS) services not responding. This Attempts Accountholder Authentication Value (AAV) is only provided upon Merchant Plug-In (MPI) communication to the Directory Server for each transaction. This ensures proper processing by all parties.

Verification Request/Response

Message Pair: VEReq/VERes—The first step in the payer authentication process is to validate that the cardholder account number is part of an issuer's card range, which is participating in 3-D Secure.

The Verification Request/Response messages are sent from the Merchant Server Plug-In to the Directory to check card range eligibility. If the specified account number is contained within a MasterCard® *SecureCode*™ eligible card range, this message is then sent from the Directory to the Access Control Server (ACS) to check if the specific account number is enrolled and active to participate in 3-D Secure.

All merchants will need to call the directory server for every MasterCard *SecureCode* transaction to receive an Attempts Accountholder Authentication Value (AAV) or an AAV from the issuer's ACS provider. Upon implementation of the Attempts Service, MPI services will only see VERes message values of Y. The VERes will route the Merchant Plug-In (MPI) service via the cardholder's browser to either the cardholder's ACS Service or the MasterCard Attempts Processing Service for Stand-In authentication.

Payer Authentication Request/Response

Message Pair: PAReq/PARes—After determining that a cardholder is enrolled to participate in 3-D Secure, the actual process of payer authentication is performed for each online purchase.

The Payer Authentication Request/Response messages are sent from the Merchant Server Plug-In to the Access Control Server to initiate the actual authentication. At this point in the process, cardholders will be presented with an authentication window and asked to enter their *SecureCode* or one-time password (OTP).

The Access Control Server (ACS) will perform authentication and, if successful, generate an Accountholder Authentication Value (AAV). It is returned to the merchant within the PARes message. For successfully authenticated transactions and Attempts, this AAV must be sent by the merchant to the acquirer and forwarded to the issuer as part of the authorization request. ACS providers should provide AAV values for all attempts (PARes = A) when the cardholder is not enrolled or declines activation in addition to the fully authenticated (PARes = Y) transaction status.

Payer Authentication Transaction Request/Response

Message Pair: PATransReq/PATransRes—Following authentication, it may be desirable to centralize storage of authentication requests for later dispute processing.

The Payer Authentication Transaction Request/Response messages provide a record of this authentication activity sent from the Access Control Server (ACS) to the MasterCard Authentication History Server. All ACS service providers must support the PATransReq/PATransRes messages for the History Server.

The MasterCard® *SecureCode*™ global infrastructure supports the History Server. All ACS providers must support these messages.

Cardholder Enrollment

This section outlines the cardholder enrollment process for MasterCard® *SecureCode*™.

Cardholder Enrollment Process

Enrollment is the process whereby authorized MasterCard and Maestro® branded cardholders will activate their cards for a specific issuer's MasterCard® *SecureCode*™ program.

Part of the planning process for building a 3-D Secure infrastructure will involve determining exactly how this process will work.

The major component associated with enrollment is the enrollment server. It is responsible for driving the process under which the cardholder:

- Validates that their account number is designated as eligible to participate in MasterCard *SecureCode* by the card issuing financial institution.
- Is authenticated by the card issuing financial institution through the validation of secret questions, independently determined by each issuer participating in the program.
- Sets up and defines their MasterCard *SecureCode*.
- Performs functions such as profile administration (including *SecureCode* and email changes) and review of recent purchases.

Typically, the following steps are necessary to authenticate the cardholder:

1. The cardholder visits an issuer enrollment site. This may be accessible, for example, from the issuer's website or home banking system.
2. The cardholder is asked to provide issuer identified enrollment data. During this phase of the process, the cardholder is asked a series of secret questions to prove identity to the issuer if the issuer uses static password for authentication. Otherwise, the cardholders are pre-enrolled with a One-time password (OTP) solution.

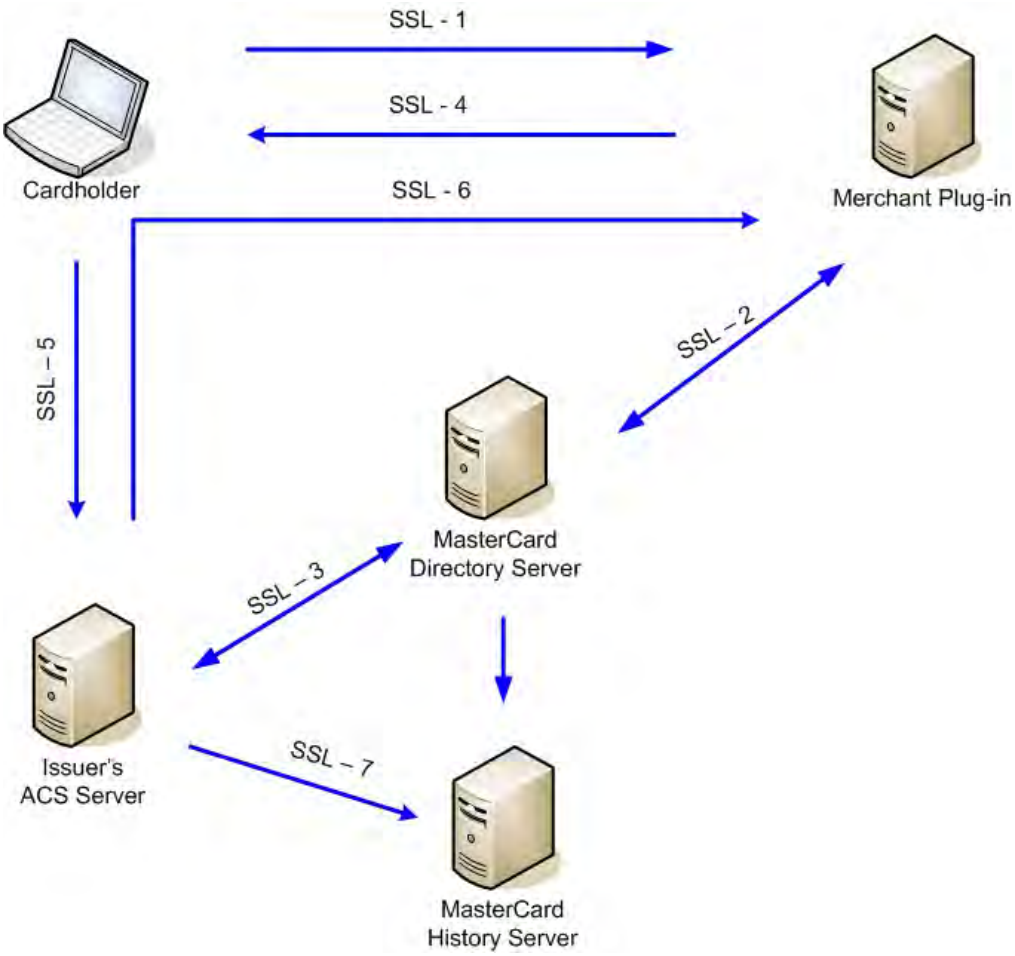
Cardholder Authentication

Following is information about the cardholder authentication process.

Sample Cardholder Authentication Process

The sample flow that follows assumes that the cardholder has already enrolled in the issuer's MasterCard® *SecureCode*™ program and obtained a *SecureCode* to use while shopping online at participating merchants.

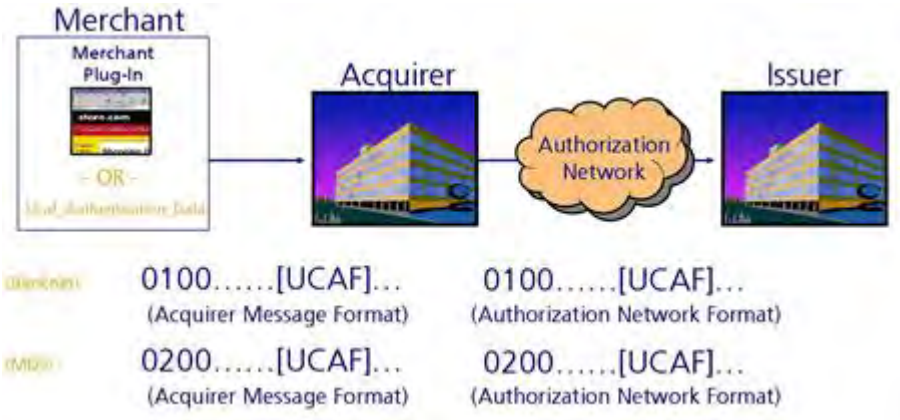
The figure below also assumes that all communication channels between the various components are properly secured using the Secure Socket Layer (SSL) protocol.



Link	Description
SSL-1	The cardholder shops at the merchant and, when ready to checkout, enters the appropriate payment information—including the account number.
SSL-2	The Merchant Plug-In queries the Directory to verify the enrollment status for a specific issuer using the verification request messages.
SSL-3	If the directory indicates that an issuer is participating, then the directory must forward a request to the issuer's Access Control Server to check the enrollment status of a specific cardholder. The configuration information in the Directory will indicate exactly which Access Control Server will perform the check. The resulting response will flow back over the same links to the Merchant Plug-In.
SSL-4	If the Access Control Server indicates that a specific cardholder is participating, the Merchant Plug-In creates the Payer Authentication Request message and sends it to the cardholder's browser.

Link	Description
SSL-5	The cardholder browser redirects the message to the appropriate Access Control Server to perform cardholder authentication. When the Access Control Server receives the Payer Authentication Request message, it causes the user authentication dialog to begin. This in turn causes a separate authentication window to appear to the cardholder that will facilitate the cardholder authentication process.
SSL-6	The Access Control Server authenticates the cardholder *SecureCode*, constructs the SPA AAV for MasterCard's implementation of 3-D Secure, and builds and digitally signs the Payer Authentication Response message. It is returned to the Merchant Plug-In, at which point the cardholder authentication window will disappear.
SSL-7	The Access Control Server sends PATransRec to the MasterCard Authentication History Server.

After cardholder authentication is complete, the merchant is required to pass the corresponding Secure Payment Application™ (SPA) Accountholder Authentication Value (AAV) to the acquirer via the Universal Cardholder Authentication Field™ (UCAF) within the authorization message. This value is then passed from the acquirer to the issuer as part of the authorization message.



When received by the issuer, the AAV can be validated as part of authorization request processing, as well as archived for use in potential cardholder disputes. Issuers will only be able to validate an Attempt or fully authenticated AAV generated by their own ACS. If the MasterCard Attempts Processing Service generates an AAV, it cannot be issuer validated. The MasterCard Attempts Processing Service uses a unique key that cannot be shared. For issuers wanting to ensure that all AAVs are validated, MasterCard offers the MasterCard-hosted on-behalf service. AAVs will also be generated by the MasterCard Attempts Processing Service for Stand-In Authentication when cardholders are not enrolled, card ranges are not participating in MasterCard *SecureCode*, or Access Control Server (ACS) services are not responding. This Attemtpts AAV can only validate through the MasterCard AAV Validation Service rather than through self-validation.

Sample Cardholder Authentication Flow

The following sample cardholder authentication flow is identical for both MasterCard and Maestro™ cardholders.

Enter Payment Information

The cardholder will shop at a merchant location just as they would today. After selecting the items to be placed into the shopping cart, the payment card information to be used for the transaction is entered.

Confirm and Submit Order

Once all of the payment and shipping information has been entered, the cardholder is typically given an opportunity to review the purchase one last time before submitting the order.

Enter *SecureCode*

Upon submitting the final order, the cardholder will be presented with an authentication window from their MasterCard card or Maestro card-issuing bank. At this point, the cardholder will enter his or her *SecureCode* value to perform authentication processing.

Purchase Completed

After validation of the cardholder *SecureCode* by the issuing bank, the authentication window will disappear and the authorization of the payment card will complete as usual.

Chapter 3 Merchants

This section provides a general overview of the various activities and requirements associated with building and maintaining the merchant components required to support MasterCard® SecureCode™.

Overview

The merchant activities and requirements for building and maintaining the merchant components for MasterCard® *SecureCode*™ are divided into five primary categories.

Category	Description
Infrastructure	Requirements related to installation of new hardware and software components.
Customization	Requirements related to customizing or configuring vendor products.
Operational	Requirements related to operating the components in a production environment, including any process oriented changes that may be required.
Accountholder Authentication Value (AAV) Processing	Requirements related to handling and processing of the AAV.
Global Infrastructure Testing Requirements	Requirements related to testing of MasterCard® *SecureCode*™ platform components.

NOTE

In this section, there are references to a merchant endpoint. This is the entity that is actually operating the Merchant Plug-In software. These may include, for example, individual merchants, hosting providers, and payment service providers. Not all merchants participating in the MasterCard *SecureCode* program are considered endpoints.

General Responsibilities

MasterCard requires all merchants to ensure that MasterCard *SecureCode* is not the only fraud management tool used to manage fraud. Additional options available within standard card processing such as CVC2, and Address Verification Service (AVS) (available in some territories) should also be used. Many suppliers now offer fraud monitoring systems that take other non-card information available for capture during the e-commerce shopping experience. Check with your acquirer or shopping cart/MPI vendor for options. If using a Service Provider to supply the checkout and MasterCard *SecureCode* experience, additional options are likely available.

Merchant Infrastructure

Following are the merchant infrastructure requirements for the installation of new hardware and software components that support MasterCard® *SecureCode*™.

Establishment of MasterCard *SecureCode* Operating Environment

All merchants participating in the MasterCard® *SecureCode*™ program are required to install or have access to a 3-D Secure v 1.0.2 or higher compliant Merchant Server Plug-In.

For a current list of vendors, go to:

- www.mastercard.us/merchants/securecode-vendors.html

Authorization System Message Enhancements

Following are enhancements to the Authorization System for supporting MasterCard® *SecureCode*™.

Passing the AAV in the Authorization Message

MasterCard requires that the Secure Payment Application™ (SPA) Account Authentication Value (AAV) returned to the merchant in the Payer Authentication Response (PARes) message be included in all successfully cardholder authenticated e-commerce transactions and Attempts Processing transactions from either the issuer's Access Control Server (ACS) provider or MasterCard Attempts Processing Service's "Stand-In" Authentication.

Merchants must ensure that they follow the message formatting requirements of their acquirer when generating Universal Cardholder Authentication Field™ (UCAF) related authorization requests.

Following are potential issues to consider.

MasterCard requires that the SPA AAV contained in the authorization from the acquirer to the issuer be Base64 encoded. Passing this data in binary format is not an option. Merchant plug-in software typically provides the SPA AAV returned in the PARes message already in this format. While some acquirers allow merchants to simply pass the Base64 encoded SPA AAV through in the authorization, others have varying requirements.

Depending on the specific merchant system and acquirer message formats, it may be necessary for the SPA AAV to be converted between ASCII and EBCDIC encoding prior to it being sent to the acquirer. Any such conversion must only be performed on the SPA AAV after it has been Base64 encoded. Any attempt to modify the binary representation of the SPA AAV will result in corruption of the data and the inability of the issuer to perform cardholder authentication verification processing.

The only exception to the Base 64 encoding requirement of an AAV is when MasterCard supplies this AAV to the merchant as a static code for use in Maestro Advanced Registration Program (MARP) transactions. This static AAV must be passed in plain text. For additional information on MARP, see Appendix D, MasterCard Advance Registration Program.

For more information about Base64 encoding, refer to Appendix B, MasterCard *SecureCode* SPA Algorithm Specifications.

While an authentication status of "A" is a valid PARes status response and will contain a SPA AAV, it is not considered to be a successful cardholder authentication. The AAV resulting from such a transaction is identified by a lower case "h" in the first position (Base64 encoded). Acquirers must ensure that transactions. All AAVs received as part of a PARes must be provided in the Authorization Request/0100 message by acquirers in DE 48 (Additional Data—Private Use), subelement 43 (3-D Secure for MasterCard *SecureCode*).

If questions arise, merchants should consult with their acquirers for more detailed information. Refer to the Merchant Processing Matrix for additional information.

AAV Usage

The AAV contained within a single authorization request must match the AAV value returned by the issuer for a single associated authentication request. Therefore, an AAV can be used only once in a single authorization message and must not be stored for reuse after receiving authorization.

E-Commerce Commerce Indicator

An electronic commerce indicator (ECI) flag is required to be present in all PARes messages sent by the issuer ACS to the merchant when the status field contains a value of **Y** or **A**.

As currently defined, the 3-D Secure protocol indicates that this ECI field be determined by each brand. As a result, MasterCard has adopted values that may be different from other participating payment brands. The ECI value is not the same as the Security Level Indicator (SLI). The Security Level Indicator is contained in the Authorization Request/0100 message in DE 48 (Additional Data—Private Use), subelement 42 (Electronic Commerce Indicators), subfield 1 (Electronic Commerce Security Level Indicator and UCAF Collection Indicator) with position 1 (Security Protocol) containing a value of 2 (Channel) and position 2 (Cardholder Authentication) containing a value of 1 (Cardholder certificate not used). Position 3 (UCAF Collection Indicator) varies based on the PARes status. If PARes is N, then the value should be 0 for non-SecureCode standard e-commerce transaction without liability sift. If PARes is Y, then the value should be 2 for fully authenticated. If the PARes is A or U, then the value should be 1 for merchant-only authentication (attempts), which carries a liability shift.

When these values are used within the MasterCard authorization and clearing systems, they are referred to as SLIs. Most, if not all, acquirers and payment processors have defined the ECI as a required field in their authorization request message formats. Each merchant must ensure that the MasterCard ECI value is properly translated to a valid value as defined in the appropriate acquirer or payment processor authorization message format. Failure to perform the appropriate translation may affect the ability to obtain successful authorizations.

MasterCard has currently defined two ECI values. The following table indicates the relationship between these values and the status field in the PARes message. The ECI value is not the same as the Security Level Indicator. The Security level indicator is contained in the Authorization Request/0100 message at DE 48, subelement 42, subfield 1 (Electronic Commerce Security Level Indicator and UCAF Collection Indicator) with position 1 (Security Protocol) containing a value of 2 (Channel), and position 2 (Cardholder Authentication) containing a value of 1 (Cardholder certificate not used). Position 3 (UCAF Collection Indicator) varies based on the PARes status. If PARes is N, then the value should be 0 for non-SecureCode standard eCommerce transaction without liability sift. If PARes is Y, then the value should be 2 for fully authenticated. If the PARes is A or U, then the value should be 1 for merchant only authentication (attempts) which carries a liability shift.

Any questions on translating MasterCard defined values for authorization should be directed to your acquirer or payment processor.

PARes Status Field	Description	MasterCard ECI Value
Y	Cardholder was successfully authenticated (SLI = 2)	02
A	Authentication could not be completed but a proof of authentication attempt was provided SLI = 1.	01
N	Cardholder authentication failed SLI = 0	Absent
U	Authentication could not be completed due to technical or other problems (SLI = 1)	Absent

NOTE

PARes status must correlate with the ECI and Security Level Indicator chart shown in the Processing Maxtrix. The ECI value and Security Level Indicator passed as part of the Authorization Request/0100 message are different values and are denoted in the Processing Matrix.

NOTE

MasterCard has additional definitions of SLIs that are not generated by the PARes received but that may need to be used by the merchant. Refer to the Merchant Processing Matrix section for additional information on SLIs. (SLI)

Recurring Payments

Only the initial authorization request for a recurring payment may be e-commerce transactions and may contain Universal Cardholder Authentication Field™ (UCAF) data.

Merchants must not provide UCAF data in any subsequent recurring payment authorizations as these are not considered electronic commerce transactions by MasterCard and are not eligible for participation in the MasterCard® *SecureCode*™ program.

With the following exception, Maestro® cards are not eligible to be used for recurring payments.

Recurring payments on Maestro cards issued in the Europe region are valid but subject to specific acceptance rules. For more information, refer to the *Transaction Processing Rules* document.

Maestro Considerations

The following requirements and activities are specific to merchant support of Maestro® cards as part of the MasterCard® *SecureCode*™ program. Contact your acquirer for a complete set of Maestro e-commerce acceptance requirements.

Required use of MasterCard *SecureCode*

Maestro rules require that all e-commerce merchants accepting Maestro cards must use MasterCard *SecureCode* for all transactions, or apply and be accepted for entry to Maestro Advanced Registration Program (MARP). See Appendix F, MasterCard Advance Registration Program for additional information.

Account Number Length Requirements

Maestro merchants must support cardholder account numbers that are 13–19 digits in length.

CVC2 and Maestro

Merchants should be aware that not every Maestro card in issuance has a CVC2 and this should be factored in during checkout design.

Maestro Acceptance Rules

For additional information about accepting Maestro in e-commerce and the rules pertaining to Maestro Acceptance, refer to the *Transaction Processing Rules* document.

Additional Maestro Propositions and Considerations in E-commerce when using MasterCard *SecureCode*

For additional information, refer to Appendix D, Maestro Considerations.

Customization

Following are merchant requirements for customizing or configuring vendor products in support of MasterCard® *SecureCode*™.

MasterCard *SecureCode* Program Identifier Usage Guidelines

Issuers and acquirers must adhere to the applicable usage guidelines.

Merchants are required to adhere to the applicable usage guidelines.

These guidelines are indicated in the *MasterCard SecureCode Program Identifier Guidelines* accessed using the following web address:

www.mastercard.com/us/merchant/security/what_can_do/pdf/SecureCode_logo_usage.pdf

Proof of adherence to these guidelines must be provided to MasterCard as a condition of successful completion of MasterCard® *SecureCode*™ merchant or service provider functional testing.

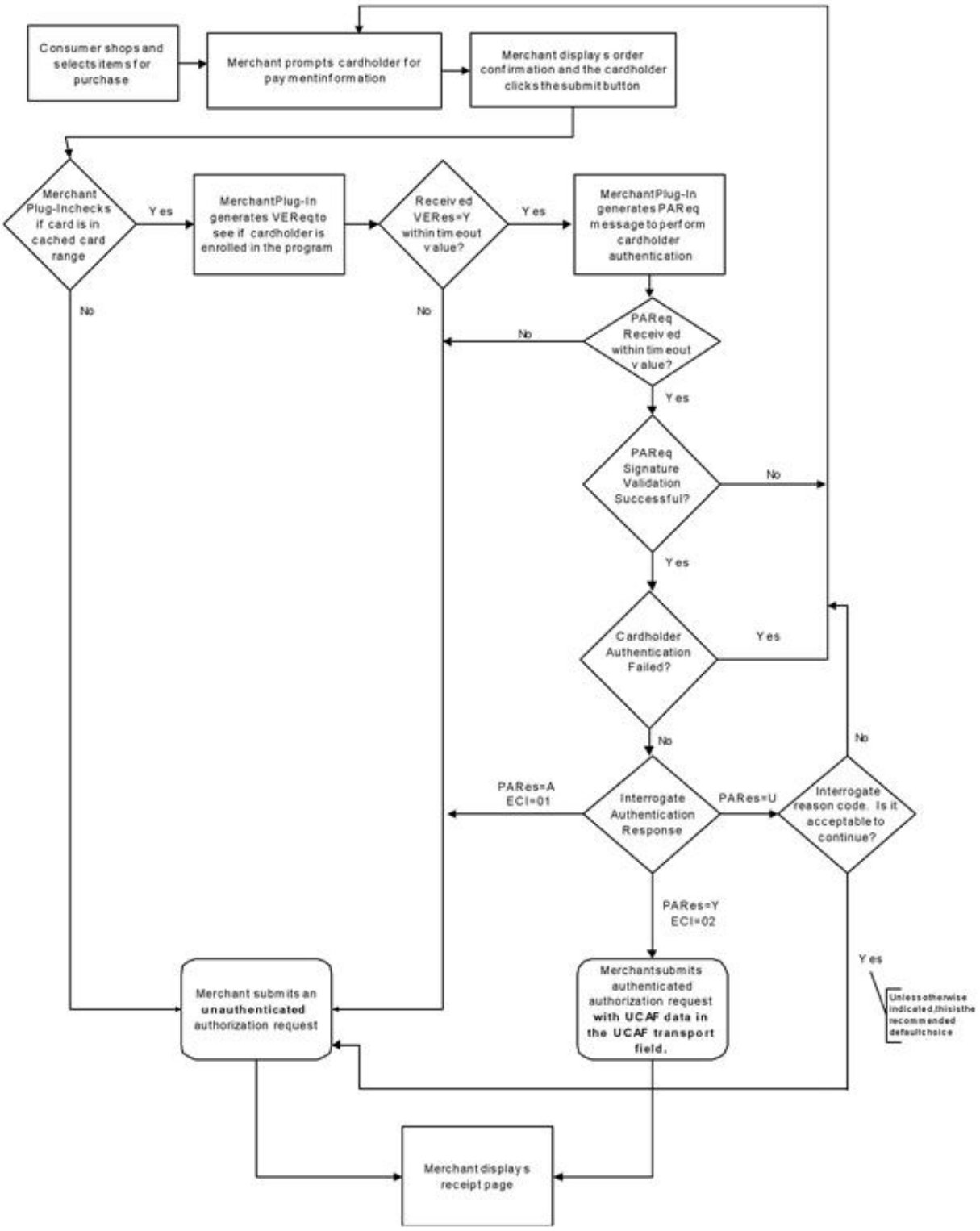
MasterCard highly recommends that all screenshots be provided for review as soon as possible in case changes are required.

A copy of the MasterCard *SecureCode* logo artwork, as well as any updates to the program identifier usage guidelines, is available for download at www.mastercardbrandcenter.com/us/getourbrand/index.shtml.

Integrated Support for Merchant Plug-In Processing

The following diagram depicts a sample high-level flow of a transaction through a merchant's e-commerce site that has integrated support for MasterCard® *SecureCode*™.

The following figure indicates merchant best practices regarding MasterCard *SecureCode* processing.



Consumer Message on Payment Page

MasterCard recommends the use of a consumer message on the payment page to further indicate merchant participation in the program.

Creation of Cardholder Authentication Window

The 3-D Secure protocol is designed so that the creation of the cardholder authentication window is performed by the merchant.

The actual content of the window is controlled by the issuer. There are two primary methods for creation of this window, however only one approach, inline windows, is now acceptable for deployment. and existing merchants are expected to convert to an inline window implementation.

NOTE

Previous implementation approaches based on pop-up authentication windows are no longer supported for new merchant implementations. As the requirement to cease using pop-up windows has been in place since 2005, any merchant that is found to support a pop-up window will be deemed as out of compliance with MasterCard® *SecureCode*™ and may have their facility terminated or may be liable for assessments. MasterCard recommends that merchants check their checkout process and speak to their service providers on this point.

Pop-Up Authentication Windows

MasterCard **prohibits** this type of implementation.

Inline Windows

Inline window implementations, which have proven to virtually eliminate the issues caused by pop-up authentication windows, are required for all new merchant implementations. Existing pop-up implementations must convert to inline windows. By presenting a full-page view, the MasterCard *SecureCode* authentication process appears to be a seamless part of the merchant checkout process, particularly when the merchant uses the "with frames" approach described in the following paragraphs.

With Frames

A frame implementation allows the merchant to display a branded header and explanation text that can assist cardholders who are new to the MasterCard *SecureCode* experience. In a frame implementation, only part of the full window is redirected to the issuer's access control server.

MasterCard provides the following guidelines and specifications for merchants that choose to implement the frames approach:

- The use of active HTML links in the branded header frame is not allowed. MasterCard recommends including a link below the header frame that directs the cardholder back to the checkout page in case of technical difficulties.
- The explanation text should be clear and concise. The text should not assume that the cardholder is already enrolled in MasterCard *SecureCode* and should not provide instructions that might conflict with the cardholder's issuer instructions.
- The merchant should ensure that the authentication window frame is fully visible and is not located too low in the page because of long text or large upper frame. A minimum space of 400 x 400 pixels is required for the ACS frame.
- Merchants must ensure that the "back" button functionality works properly and that cardholders will be routed back to the checkout page.

Without Frames

MasterCard research and feedback suggests that cardholders are uncomfortable with the without frames method, therefore it can cause a higher abandonment rate. The use of frames adds the sense of security that the cardholder is still at the merchant site and is not being "phished." MasterCard recommends that this approach is not used. Any merchant currently supporting this cardholder experience is encouraged to move to a "frame" experience.

TERMURL Field

The TERMURL is a field that is provided by the merchant to the issuer during the payer authentication request process.

This field provides the issuer with the merchant URL where the payer authentication response message is to be sent. The use of mixed HTTP and HTTPS frames typically results in a security box being presented to the cardholder. Depending on how the cardholder responds to this dialog, the current and all future attempts to transmit the PAReq message may fail.

NOTE

Merchants using inline authentication windows with frames must populate the TERMURL field with an HTTPS address.

Replay Detection

Many issuer access control servers attempt to detect replay attacks by not allowing a transaction with the same account ID and XID to be processed more than once.

Merchants must ensure that each Payer Authentication Request (PAReq) contains a unique combination of account ID and XID.

Merchant Server Plug-In Configuration

Following is server plug-in information for merchants.

Initialization of MasterCard Directory URL

Each merchant endpoint must configure the MPI software to communicate with the MasterCard® *SecureCode*™ Directory server.

Initialization of MPI Processing Timers

Following is information about cache expiration timers and transaction time-out timers.

Cache Expiration Timers

MasterCard recommends that merchants send a VEReq to the directory for each transaction rather than using caching to verify card range participation in the program. With the implementation of the MasterCard Attempts Processing Service's "Stand-In" Authentication, all merchants must send all VEReq to the Directory Server to ensure receipt of AAV value to include within the Authorization Request/0100 message.

Transaction Time-out Timers

Transaction time-out periods determine how long to wait for a response to a Verification Request message and a Payer Authentication Request message. In the case of PAReq/PARes processing specifically, the wait times may vary because of the requirement for cardholder interaction. In practice, however, many financial institutions are using existing consumer credentials (for example, home banking passwords) for the MasterCard *SecureCode* program. As such, issues related to time consuming functions such as forgotten passwords are minimized.

MasterCard recommends the following best practices regarding time-out values:

Function	Time-Out Values	Action if timer expires prior to receipt of response
Verify Enrollment Request	20 Seconds	Continue as if the cardholder is not enrolled in the program (for example VERes transaction status = "N"). This means the Authorization Request/0100 message should be sent with a Security Level Indicator of 211 (Merchant Only authentication transaction [liability shift applies]). With the implementation of the MasterCard Attempts Processing Service, this should not occur

Function	Time-Out Values	Action if timer expires prior to receipt of response
		unless the Directory Server is unavailable.
Payer Authentication Request	MasterCard requires that the merchant allow a minimum of five minutes for return of the PARes, and recommends that the merchant allow up to 10 minutes for return of the PARes.	Continue as if cardholder authentication failed (for example PARes transaction status = "N"). This means the Authorization Request/0100 message should be sent with a Security Level Indicator of 210 (non-*SecureCode* transaction [no liability shift]).

Initialization of MPI Processing Parameters

There are a number of MPI configuration parameters which, if not set properly, may cause 3-D Secure protocol violations.

All merchants must ensure that their implementation plans account for the following field restrictions:

- The merchant name within any applicable message must be less than or equal to 25 characters including spaces.
- The merchant URL field in the PAReq message must be fully qualified and, ideally, should be the URL of the merchant home page. Many ACS providers present this URL to cardholders, including an active HTML link that directs cardholders to this address.
- The merchant country code must be a valid, 3 digit, ISO 3166 country code.
- The purchase currency code must be a valid, 3 digit, ISO 4217 currency code.

TERMURL

Merchants must ensure that the TERMURL used for testing is modified to properly reflect the production environment. In addition, the TERMURL field must be fully-qualified.

Zero or Empty Parameters

Merchants must make sure that all parameters sent to the ACS are valid and, unless otherwise indicated by the 3-D Secure protocol, do not contain zero or empty data elements. For example:

1. The transaction amount should contain a non-zero amount. A Payer Authentication Request (PAReq) transaction amount of USD 0 is required to not authenticate transparently with Risk Based Authentication. This is because the Merchant Plug In (MPI) process being used is to actually authenticate the cardholder. This may occur when enrolling a card within an Online Wallet.

2. As defined by the protocol, the MD field must always be provided, even if it is not used.
3. If optional fields are not used, MasterCard recommends they be excluded from the message instead of using empty data elements.

Operational

Following are MasterCard® *SecureCode*™ operational guidelines for merchants.

Loading of MasterCard Root Certificates

Merchant endpoints are required to load all active and pending MasterCard Root hierarchy certificates.

This root will be required by the merchant plug-in to perform digital signature validation. It may also be required in order to establish SSL sessions using certificates based on the MasterCard private hierarchy.

NOTE

Currently, MasterCard has two active root certificates that must be loaded.

Loading of MasterCard SSL Client Certificate

Merchant endpoints are responsible for obtaining all necessary SSL client and server certificates for use by the MPI platform.

Individual merchants will be required to use a single MasterCard hierarchy SSL client certificate for their acquirer. If a processor is using the merchant plug-in, MasterCard does not require an individual certificate for each merchant. However, the processor will be required to use a separate and distinct client certificate for each applicable acquirer.

For more information about certificate requirements and procedures, see the *MasterCard SecureCode—Production Procedures* manual.

MPI Log Monitoring

Merchant endpoints should establish a policy of monitoring MPI logs for various authentication failure messages, including signature validation failures.

Repeated failures should be reported to the merchant's acquirer. Merchants should note that this could be an indication of issues surrounding the MasterCard® *SecureCode*™ implementation with possible loss of Liability Shift or cost benefits on these transactions.

MPI Authentication Request/Response Archival

Merchants, or merchant endpoints, should establish a policy for archival of authentication request and response messages.

MasterCard recommends that the archival period for this data be the same as the associated authorization transaction data, and should be a minimum of 180 days.

AAV Processing

The following processing steps are required by the 3-D Secure protocol and typically handled by the MPI. Any subsequent processing is the responsibility of the merchant.

Identification of SPA AAV Format in PARes

The CAVV algorithm field in the PARes message indicates the algorithm used to create the cryptogram contained in the CAVV field. All MasterCard Account Authentication Value (AAV) values will be identified with a value of 3 (MasterCard SPA Algorithm). This is the only value that is permitted for MasterCard and Maestro® card transactions.

Validation of Payer Authentication Response (PARes) Signature

All PARes messages returned to the merchant are digitally signed by the associated cardholder's issuer ACS using certificates provided by MasterCard or the Attempts Processing Server. The merchant is required to validate the signature prior to extracting the Secure Payment Application™ (SPA) AAV from the PARes message for inclusion in the authorization request sent to the acquirer.

The AAV value in the PARes must be considered unusable if the signature validation process fails.

Global Infrastructure Testing Requirements

All merchant endpoints are required to complete MasterCard® *SecureCode*™ functional testing. This includes execution of the MasterCard *SecureCode* System Test Agreement, when applicable, as well as remittance of applicable fees.

The purpose for this testing, which only encompasses cardholder authentication testing, is to ensure that merchant implementations meet minimum functional and brand requirements for participating in the MasterCard *SecureCode* program. Any additional authorization testing should be coordinated through the appropriate merchant acquirer or processor.

For additional information on the MasterCard *SecureCode* testing process, send a request via email to securecode_customer_support@mastercard.com.

MasterCard Site Data Protection Program

The MasterCard Site Data Protection Program (SDP) represents a critical piece in the MasterCard comprehensive approach to payment card security.

All merchants impacted by the SDP mandate must demonstrate compliance with the Payment Card Industry Data Security Standard (PCI-DSS) security requirements to their acquirer. For more information about SDP, contact your acquirer or visit www.mastercard.com/sdp.

MasterCard *SecureCode* Merchant Process and Liability Shift Matrix

The following table illustrates merchant behavior during various potential scenarios associated with MasterCard® *SecureCode*™ authentication request processing.

MasterCard *SecureCode* Processing Matrix

To access the MasterCard *SecureCode* Processing Matrix in a Microsoft® Excel® format that can be copied and used as needed, click here. This file can be saved to a local drive for later use.

Authentication Process									Authorization Process			
Authentication Scenario	VEReq Sent?	VERes Status	PAReq Sent?	PARes			Authorization Proccessing	Notes	CIS DE 48		Liability Shift (See Note)	
				Status	ECI	AAV			SE 42, SF 1	SE 43 (UCAF) AAV	Merchant-Only	Fully Authenticated
Auth Success	Yes	Y	Yes	Y	02	Yes	Yes		2-1-2	Yes	Yes	Yes
Auth Success (without AAV)	Yes	Y	Yes	Y	02	No	Yes		2-1-1	No	Yes	
Auth Failure (SecureCode failure)	Yes	Y	Yes	N	-	No	No	1	2-1-0	No	No	
Auth Failure (Signature verification incorrect)	Yes	Y	Yes	All	All	All	No	1	2-1-0	No	No	
Unable to Authenticate	Yes	Y	Yes	U	-	No	Merchant Optional	3	2-1-1	No	Yes	
Attempt	Yes	Y	Yes	A	01	Yes	Yes	2	2-1-1	Yes	Yes	
Attempt (without AAV)	Yes	Y	Yes	A	01	No	Yes		2-1-1	No	Yes	
Cardholder Not Participating	Yes	N -> Y	Yes	A	01	Yes	Yes	2	2-1-1	Yes	Yes	
Unable to Authenticate	Yes	U -> Y	Yes	A	01	Yes	Yes	2	2-1-1	Yes	Yes	
Cardholder Not Participating	Yes	N -> Y	Yes	A	01	Yes	Yes	2	2-1-1	Yes	Yes	
Error on DS	Yes	-	-	-	-	-	Yes		2-1-1	No	Yes	
Error on VEReq	Yes	-	No	-	-	-	Merchant Optional	3	2-1-1	No	Yes	
Error on VERes	Yes	Error	No	-	-	-	Merchant Optional	3	2-1-1	No	Yes	
Error on PARes	Yes	Y	Yes		Error		Merchant Optional	3	2-1-1	No	Yes	
Merchant Not SecureCode-enabled - OR - SecureCode Not Used for Transaction	-	-	-	-	-	-	Yes		2-1-0	No	No	

CIS DE 48 (Additional Data—Private Use) Components

These indicators, as listed in the table above, map to MasterCard Authorization specification requirements for acquirers and issuers. DE 48, subelement 42 (Electronic Commerce Indicators), subfield 1 (Electronic Commerce Security Level Indicator and UCAF Collection Indicator) contains the Security Level Indicator and DE 48, subelement 43 (Universal Cardholder Authentication Field [UCAF]) contains the UCAF Data (AAV). Merchants must refer to the appropriate acquirer or payment processor message specifications for specific formatting requirements.

Merchant Risk-Based Approach

A merchant is not required to undertake MasterCard *SecureCode* on every transaction except when accepting Maestro®, as this is a requirement of the program. Any merchant that chooses not to use a *SecureCode* on any transaction should process on the basis of the last entry in the table above labeled "Merchant Not SecureCode-enabled OR SecureCode Not Used for Transaction" (SLI = 210).

Failed Authentication

A merchant may proceed with a transaction for which the authentication failed, but it must be on a *SecureCode* not used for transaction basis (SLI = 210). This transaction must not be submitted as merchant only and is not eligible for any liability shift. No AAV will be provided, and issuers are likely to decline the transaction if submitted. MasterCard reserves the right to undertake noncompliance proceedings against any merchant or acquirer deemed to be undertaking merchant-only transactions for failed authentications.

Liability Shift

A fully authenticated liability shift is in effect globally for all commercial and consumer cards.

Merchant-only liability shift is in effect globally for all consumer cards. Commercial cards carry merchant-only liability for all interregional transactions and are only excluded for intraregional transaction in the U.S. and Canada regions.

For more information, refer to the *Chargeback Guide*.

Notes

The following numbered items correspond with the numbers provided in the "Notes" column in the table above.

1. Best practices would suggest that fraud may be involved, and the merchant should prompt the consumer to try again or use a different form of payment. If the merchant decides to send for authorization, the transaction is not eligible for the liability shift.
2. The AAV associated with an attempt must be included in any subsequent authorization message.
3. The merchant should check the reason for the error message before deciding whether to proceed with the authorization. Not all reason codes may indicate a failure.

Appendix A Merchant Customer Service Guide

This section provides customer service staff with a general overview of the MasterCard® SecureCode™ service, along with an understanding of the consumer experience, in order to provide assistance to customers when needed. This publication is designed for customer service staff at e-retailers that support MasterCard SecureCode.

Frequently Asked Questions

A merchant should provide these frequently asked questions (FAQs) online and make them available to call center staff.

NOTE

All graphics in this document are samples. Actual consumer experiences may vary based on the specific implementation by the e-retailer and the card issuer.

Throughout this section, the term "card issuer" refers to the bank or financial institution that issued the MasterCard® card used by the consumer in the transaction.

MasterCard *SecureCode* FAQs

Following are answers to frequently asked questions about MasterCard® *SecureCode*™.

Question	Answer
What is MasterCard *SecureCode*?	Today, when a consumer makes a purchase from your website, there is no way to confirm the consumer's identity. MasterCard *SecureCode* is a service that provides a mechanism for the consumer's identity to be validated by the bank that issued the consumer's card. By doing so, it provides your business with the ability to obtain a payment guarantee similar to what is available in the physical point-of-sale world.
What is a *SecureCode*?	A *SecureCode* is a secret password, known only to the consumer, which is used to validate the consumer's identity. Depending upon the consumer's bank, the consumer may be asked to enter their "SecureCode," "SecureCode Password" or simply "Password." Regardless, all of these terms refer to the same thing.
What is the format of a *SecureCode*?	The format of a consumer's *SecureCode* will vary based on the security policy of the consumer's card-issuing bank. Typically, it will be a combination of between 4–10 letters and numbers. One-time password (OTP) solutions will likely be 6–8 digits.
Why is our website supporting MasterCard *SecureCode*?	MasterCard *SecureCode* gives your website a method to securely authenticate the identity of the consumer. In the online world, there is no signed sales receipt and, in the case of a disputed purchase, it is difficult for you to prove that a consumer made a particular purchase. In those instances, your business is liable for 'unauthorized purchase' fraud. By asking a consumer for a *SecureCode*, and obtaining confirmation from the consumer's card issuer, your business can obtain a guarantee against certain types of fraud. In addition, MasterCard consumer research has shown that consumers are more confident shopping at websites that support MasterCard *SecureCode*.

Question	Answer
How does our website support MasterCard *SecureCode*?	To participate in MasterCard *SecureCode*, your website has new functionality that works to connect consumers with the card issuer so that the consumer's identity can be validated each time a purchase is made. Your website group may have decided to purchase and operate Merchant Plug-in software from an outside vendor. Alternatively, your website may be communicating with a server that runs the software program. Depending on the implementation, there are times when consumers may be presented with vendor-specific error codes. Your technical support staff should consult with your vendor or service provider for a list of these codes.
What is a personal greeting?	The personal greeting is a message that the consumer creates when registering for the card issuer's MasterCard *SecureCode* program. This is only applicable for static password implementations. As more issuers move to dynamic OTP solutions, personal greetings may no longer be present. During an online purchase, the Personal Greeting will appear in the pop-up box from the card issuer. For the consumer's assurance, the Personal Greeting verifies that the consumer is communicating with, and submitting the *SecureCode* to, the card issuer.
What is the difference between authentication and authorization?	Authentication is the process of validating a consumer's identity prior to completing the purchase. MasterCard *SecureCode* is a cardholder authentication program. Authorization is the process of obtaining approval from the credit card issuing bank for a specific purchase.
How does MasterCard *SecureCode* work?	First, a consumer must register and create a *SecureCode*. Each time an online purchase is made at a participating e-retailer, a window will automatically appear asking for the *SecureCode*. MasterCard requires this window to be part of the existing browser display and does not permit the use of pop-up windows for cardholder authentication purposes. The exact implementation is controlled by your website. After reviewing the details of the purchase and confirming that the Personal Greeting is correct, the consumer simply enters the appropriate *SecureCode* to complete the purchase. When the consumer correctly enters the *SecureCode*, the card issuer confirms the authorized user of that card and provides your website with a piece of data, called the accountholder authentication value (AAV), which proves that the authentication was successful. This value must be added to the credit card authorization request to prove that authentication was performed. If a consumer does not enter the correct *SecureCode*, the card issuer cannot confirm the identity, and no authentication token is provided. In this particular instance, the online merchant should ask the consumer for an alternative form of payment.

Question	Answer
What is the difference between a pop-up and an inline authentication window?	The MasterCard *SecureCode* program is designed so that the merchant is responsible for creating the authentication window and the card issuer is responsible for the content of this window. Merchants create an inline window, which will appear as part of the current browser session. MasterCard no longer permits the use of a pop-up window for cardholder authentication because of the prevalence of pop-up blocking software.
How does our website know if a card is protected by MasterCard *SecureCode*?	When a consumer uses a card that is enrolled in MasterCard *SecureCode* at your website, the MasterCard *SecureCode* software (the merchant plug-in, or MPI) automatically makes an inquiry to MasterCard, which will check with the consumer's card-issuing bank. If the consumer is participating, the card issuer will open up a secure dialog with the consumer. This dialog will enable confirmation of the identity of the consumer and, assuming the correct *SecureCode* is entered, guarantee the purchase to the merchant.
Who knows the consumer's *SecureCode*?	The *SecureCode* value is known only by the consumer and the consumer's card-issuing bank. The dialog during which the consumer enters the *SecureCode* value takes place with the issuing bank only. No other parties, including your website or MasterCard, are involved in this process. Your website is simply notified of the result of this process via the MasterCard *SecureCode* software.
What are the Consumer's System Requirements for MasterCard *SecureCode*?	MasterCard *SecureCode* works with most browsers. If the consumer has any difficulty performing authentication, he should contact his card issuer's customer service by calling the phone number on the back of his card.
How does a consumer enroll in the MasterCard *SecureCode* Program?	Refer to the Cardholder Enrollment section for information.
What information is contained in the MasterCard *SecureCode* authentication window?	The authentication window is similar to the receipt that consumers sign in a store. It includes details such as where the purchase is being made and how much money is being spent. The actual content of this window is provided by the consumer's card issuing bank based on information provided by your website.
Will the authentication window appear if the consumer never enrolled in the MasterCard *SecureCode* Program?	There are two situations where the authentication window may appear—both of which are related to the enrollment process. • A *SecureCode* has been selected by one authorized user and not communicated to the other authorized users on the account. For example, husband and wife. Most card issuers do provide the ability for each authorized user of the card to individually enroll and establish his/her own *SecureCode*. In that case, the *SecureCode* value for either user may complete the authentication process. • The card issuer tries to enroll the consumer using Activation During Shopping. Refer to Activation During Shopping in this chapter for more information. Activation During Shopping will only occur if the issuer has selected static password as their authentication method for cardholders. If a dynamic OTP

Question	Answer
	solution is used, the Activation During Shopping step will not occur.
What happens if the consumer does not know their *SecureCode*?	It varies by card-issuing bank but consumers are usually given three chances to successfully enter the *SecureCode*. An invalid attempt will result in a prompt to the consumer to try again. In the event that a consumer forgets the *SecureCode*, most card issuers provide an alternative mechanism to complete the authentication process. Typically, there is a "Forgot my SecureCode" link that the consumer can click to obtain assistance. After the allowable number of tries has been exceeded, the card-issuing bank may prompt the consumer with a series of questions to authenticate his identity—for example, last four digits of social security number, birth date, signature panel code on card, and more. If this information is successfully validated, a successful authentication response will be returned to your website. If not, the account will most likely be locked to prevent any further authentication attempts at your website and also at other participating websites. Refer to Authentication—Forgotten MasterCard *SecureCode* in this chapter for additional information.
What happens if authentication fails?	The result of a failed authentication depends on how your particular website has been set up. At some websites, a failed authentication will cause the e-retailer to request a different payment method before allowing the purchase to proceed. In other cases, the transaction may be submitted for authorization as a non-MasterCard *SecureCode* transaction. Refer to Authentication—Failed in this chapter for additional information.

Cardholder Enrollment in the MasterCard *SecureCode* Program

Eligible cardholders of MasterCard® and Maestro® cards activate a card for use in the MasterCard® *SecureCode*™ program through an enrollment process.

The following bullets are related to the weaker static password authentication option. The stronger one-time password (OTP) authentication approach requires much less screen development and more time spent on the OTP delivery mechanism and communication. Additional feature of Risk Based Decision authentication also improves the enrollment/authentication approach.

This process typically occurs in one of two ways:

- Traditional Cardholder Enrollment—The cardholder will need to go to his issuing bank's website to enroll, prior to going shopping.
- Activation During Shopping—The cardholder will activate his account during a purchase.

It is important to remember that all enrollments are between the authorized cardholders and their card-issuing banks. MasterCard is not involved in the enrollment process.

Traditional Cardholder Enrollment

This type of enrollment typically takes place at a website designated by the bank that issued the card. For example, it may be the bank's home page or home banking system.

In a typical example:

1. The consumer will be asked to provide enrollment data. During this phase of the process, the consumer will be asked a series of questions to prove identity to their bank. This may include asking for information such as the last four digits of the consumer's social security number, birth date, or the signature panel code from the back of the credit card.
2. The answers to the questions will be validated either in-house at the bank or through a third party processor such as a credit bureau.
3. If the consumer answers the questions correctly, the consumer is considered authenticated and will be allowed to establish the *SecureCode* for that particular MasterCard account number. The *SecureCode* will be stored by the card issuer for use later on during online purchases at participating e-retailers.

Activation During Shopping

Unlike the traditional enrollment process, Activation During Shopping (ADS) does not require the consumer to visit an enrollment website before shopping. This type of enrollment, which has proven to be very successful, takes place during the shopping process. When an eligible consumer goes to checkout, the card-issuing bank will ask a series of questions—similar to the traditional enrollment process. Providing the correct answers will result in both a successful enrollment and a successful authentication response returned to your website. Refer to Consumer Buying Scenarios in this chapter to for a sample shopping scenario.

Consumer Buying Scenarios

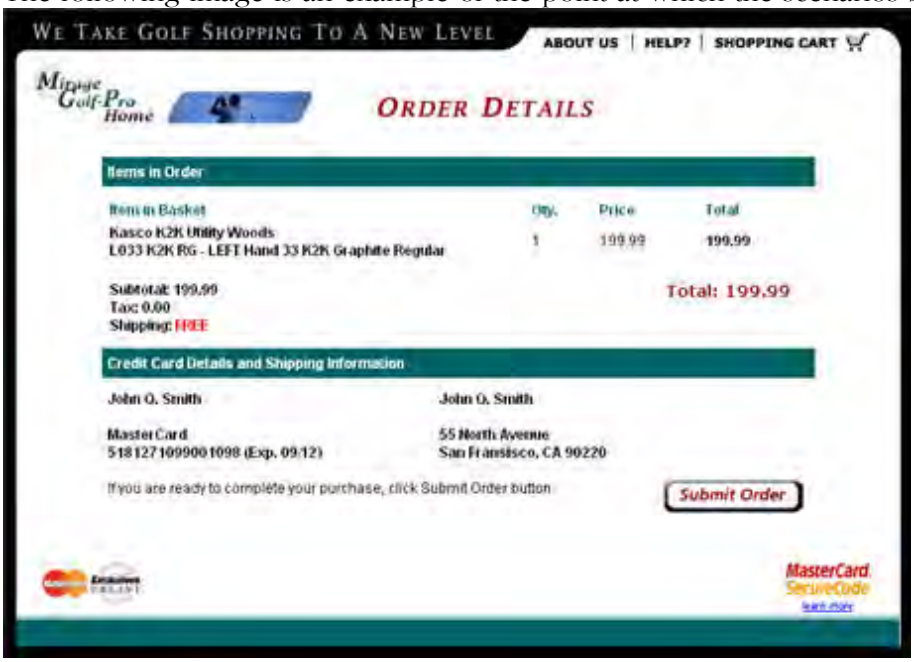
This section provides sample screen shots of consumer scenarios that may be encountered while shopping at your website.

The following details apply to each of the buying scenario examples.

Authentication:

- Occurs after the consumer elects to submit the order but prior your site actually initiating a request to authorize the transaction.
- Begins at the point where the e-retailer is asking for final confirmation of the purchase.

The following image is an example of the point at which the scenarios begin.



Actual screen content may vary from the samples depicted.

Authentication—Successful

In this scenario, the consumer is presented with the authentication window. After entering the proper *SecureCode*, a message will be returned to your website indicating the authentication was performed successfully.

At this point, your website will send the fully authenticated authorization request to MasterCard for approval. An approved response for qualified requests will result in a payment guarantee to your company.

Authentication—Forgotten *SecureCode*

In this scenario, usually associated with static password authentication solutions, the consumer is presented with the authentication window, but does not remember the *SecureCode*.

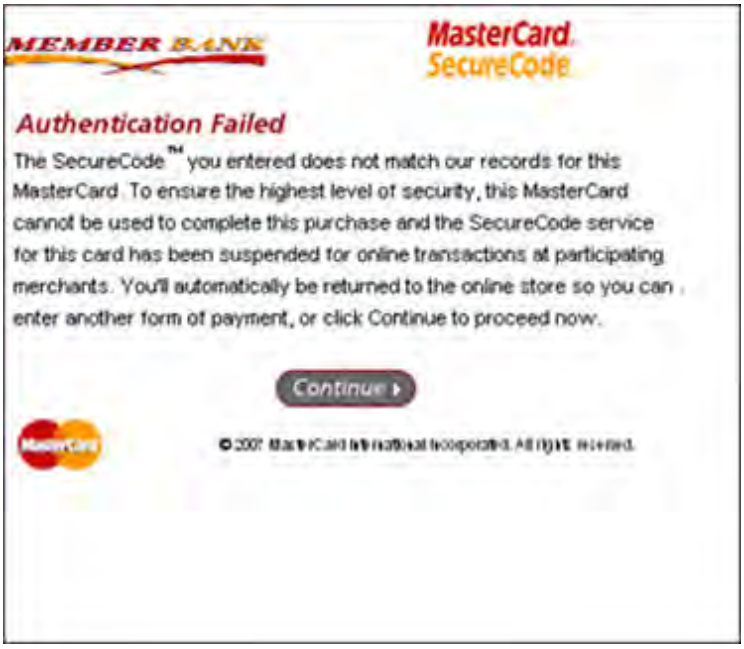
In response to not knowing his or her *SecureCode*, the consumer clicks **Forgot Your SecureCode?** on the Enter Your SecureCode screen and the following screen appears.

A financial institution may decide to tell the consumer that they must call the bank's customer service department for additional help and will return a failed authentication response to the merchant. In other cases, financial institutions will prompt the consumer to answer a series of secret questions. Providing the proper answer to these questions will permit the consumer authentication process to complete successfully.

Authentication—Failed

In this scenario, the consumer is presented with the authentication window, but enters an incorrect *SecureCode*.

Each subsequent attempt to enter an invalid value will result in an error message on the authentication window.



After a predetermined number of attempts, the card-issuing bank may optionally lock the account and present the consumer with a display indicating that authentication has failed. In addition, the display may give information on how to obtain help in order to reset the *SecureCode* value for next time.

Once the account has been locked, it may not be used for shopping at any participating e-retailer. The consumer must use the facilities provided by their card-issuing financial institution to reset the *SecureCode*. These may include the bank's customer service and/or MasterCard® *SecureCode*™ enrollment site.

Activation During Shopping (ADS)

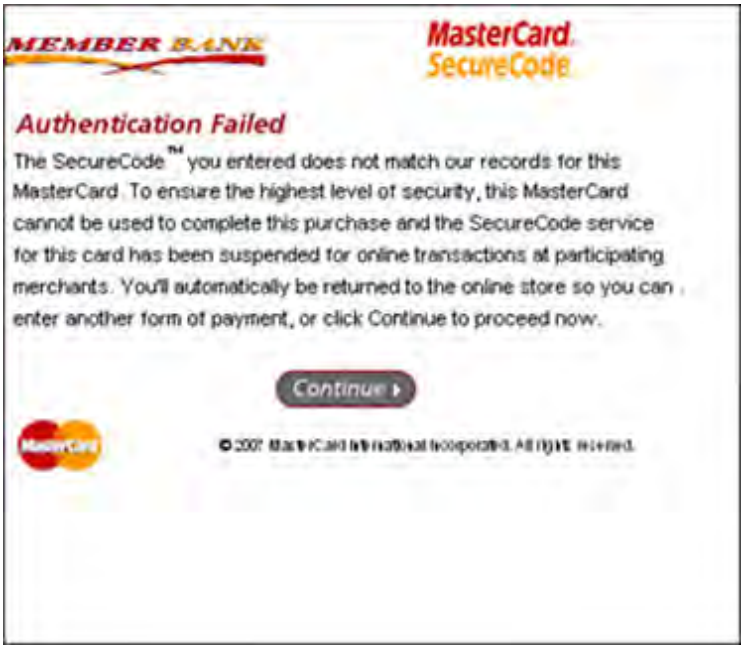
In this scenario, associated with static password authentication solutions, the consumer is presented with the authentication window, but the consumer has never enrolled in the MasterCard® *SecureCode*™ program.

Instead of being provided with a window to enter the *SecureCode*, the consumer is provided with a window to enroll in the program and authenticate their identity for the current transaction. This window will typically ask a series of secret questions.

If correct answers are provided to the questions, the merchant will be returned a status indicating that the consumer was successfully authenticated just as if a valid *SecureCode* had been entered.

If the incorrect responses are provided to the questions, the consumer will be given at least one more opportunity to provide the appropriate answers.

If the consumer chooses not to enroll in the program at the current time, a message will be displayed indicating that the purchase will continue without a *SecureCode* value. To your website, this means the credit card authorization will be unauthenticated.



If the incorrect responses are provided too many times, or if the issuer requires enrollment and the cardholder declines to enroll, the merchant will be notified that consumer authentication has failed. In this particular case, merchants may either request an alternative form of payment or proceed with a non-MasterCard® *SecureCode*™ authorization request.

Activation During Shopping—Opt Out of Enrollment

In this scenario, the consumer opts not to enroll in the program at the current time.

Instead of providing answers to the questions on the window, the consumer clicks the Do Not Continue link.

At this point in time, the e-retailer will be notified that the consumer declined to enroll in the program. In this particular case, the e-retailer should proceed with an unauthenticated authorization using the current card number. The PARes should equal A and contain an Attempts AAV. This Attempts AAV must be provided in the Authorization Request/0100 message in DE 48 (Additional Data—Private Use), subelement 43 (3-D Secure for MasterCard *SecureCode*) with subelement 42 (Electronic Commerce Indicators) containing 211 (Merchant Only authentication transaction [liability shift applies]) for the Security Level indicator denoting a Merchant Only Authentication. Liability shift for the merchant is enforced for this type transaction.

MasterCard recommends that card issuers give cardholders at least three chances to enroll in the MasterCard® *SecureCode*™ program. If the cardholder does not enroll after three chances, some card issuers will not give the cardholder the ability to opt-out of their MasterCard *SecureCode* program, and will, in fact, lock the account and present the consumer with a display indicating that authentication has failed. Once the account has been locked, it may not be used for shopping at any participating e-retailer. The consumer must use the facilities provided by his card issuer financial institution to enroll in MasterCard *SecureCode*. These may include the bank's customer service center, its MasterCard *SecureCode* enrollment site, or both.

Appendix B MasterCard *SecureCode* SPA Algorithm Specifications

This section contains the layout of the Accountholder Authentication Value (AAV) to be used by issuers participating in MasterCard® SecureCode™, as well as an overview of Base64 encoding.

AAV Layout

The format of the Accountholder Authentication Value (AAV) is defined and described in the Secure Payment Application™ (SPA) Algorithm for the MasterCard Implementation of 3-D Secure publication.

This is a licensed publication available only to MasterCard members or any non-member that has successfully executed the MasterCard® *SecureCode*™ license agreement.

Base64 Encoding

The following overview of Base64 encoding is taken from RFC1521 "MIME (Multipurpose Internet Mail Extensions) Part One: Mechanisms for Specifying and Describing the Format of Internet Message Bodies".

For more detailed information, open the following page:

www.ietf.org/rfc/rfc1521.txt?number=1521

Introduction

Base64 encoding is designed to represent arbitrary sequences of octets in a form that need not be humanly readable. The encoding and decoding algorithms are simple, but the encoded data are consistently about 33 percent larger than the un-encoded data.

A 65-character subset of US-ASCII is used, enabling 6 bits to be represented per printable character. The extra 65th character, "=", is used to signify a special processing function.

The encoding process represents 24-bit groups of input bits as output strings of four encoded characters. Proceeding from left to right, a 24-bit input group is formed by concatenating three 8-bit input groups. These 24 bits are then treated as four concatenated 6-bit groups, each of which is then translated into a single digit in the Base64 alphabet. When encoding a bit stream via the Base64 encoding, the bit stream must be presumed to be ordered with the most-significant-bit first. That is, the first bit in the stream will the high-order bit in the first byte and the eighth bit will be the low-order in the first byte, and so on.

Each 6-bit group is then used as an index into an array of 64 printable characters. The character referenced by the index is placed in the output string. These characters, identified by Base64 Alphabet., are selected so that they are universally representable. The set excludes characters with particular significance to SMTP (for example: ".", CR, LF).

Base64 Encoding Examples

The following examples will perform the beginning steps of Base64 encoding of an Accountholder Authentication Value (AAV) control byte field. The encoding process for the remainder of the AAV will follow the same process.

The decoding process will simply work in reverse.

AAV Control Byte hexadecimal "8C" (Successful Cardholder Authentication)

Displaying hexadecimal 8C in its binary equivalent gives the following:

1 0 0 0 1 1 0 0

The data is then broken down into three 24-bit segments, which are interpreted as four 6-bit segments for encoding. In this case, the first 6 bits equal:

1 0 0 0 1 1

Converting this to its decimal equivalent yields the following:

(1*25) + (0*24) + (0*23) + (0*22) + (1*21) + (1*20)

32 + 0 + 0 + 0 + 2 + 1

Decimal 35 = Base64 j

AAV Control Byte hexadecimal "86" (Attempted Cardholder Authentication)

Displaying hexadecimal 86 in its binary equivalent gives the following:

1 0 0 0 0 1 1 0

The data is then broken down into three 24-bit segments, which are interpreted as four 6-bit segments for encoding. In this case, the first 6 bits equal:

1 0 0 0 0 1

Converting this to its decimal equivalent yields the following:

(1*25) + (0*24) + (0*23) + (0*22) + (0*21) + (1*20)

32 + 0 + 0 + 0 + 0 + 1

Decimal 33 = Base64 h

Base64 Alphabet

The following is the Base64 alphabet used to encode the Accountholder Authentication Value (AVV).

Decimal Value	Encoding	Decimal Value	Encoding	Decimal Value	Encoding	Decimal Value	Encoding
0	A	1	B	2	C	3	D
4	E	5	F	6	G	7	H
8	I	9	J	10	K	11	L
12	M	13	N	14	O	15	P
16	Q	17	R	18	S	19	T
20	U	21	V	22	W	23	X
24	Y	25	Z	26	a	27	b
28	c	29	d	30	e	31	f
32	g	33	h	34	I	35	j
36	k	37	l	38	m	39	n
40	o	41	p	42	q	43	r
44	s	45	t	46	u	47	v
48	w	49	x	50	y	51	z
52	0	53	1	54	2	55	3
56	4	57	5	58	6	59	7
60	8	61	9	62	+	63	/
(pad)	=						

Appendix C MasterCard *SecureCode* Contact Information

This section contains names, areas of responsibility, and contact information for MasterCard personnel who can assist customers with e-commerce enrollment, testing, and implementation issues.

MasterCard *SecureCode* Contact Information

This section contains contact information for MasterCard personnel who can assist customers with e-commerce enrollment, testing, and implementation issues.

Area of Responsibility	Contact Information
Completed and signed enrollment forms	Send all completed and signed enrollment forms to: securecode_customer_support@mastercard.com
Maestro®	**Customer Operations Services** **U.S., Canada, Caribbean, Latin America, and South Asia/Middle East/Africa regions** **Phone:** 800-999-0363 (Inside U.S.) 636-722-6176 (Outside U.S.) 636-722-6292 (Spanish Language Support) **Fax:** 636-722-7192 **Email:**securecode_customer_support@mastercard.com **Europe region** **Phone:** +32-2-352-54-03 **Email:**css@mastercard.com **Customer Implementation Services** **Asia/Pacific region** **Email:** cis_ap_support@mastercard.com **Middle East/Africa region** **Email:** cis_mea_support@mastercard.com **Europe region** **Email:** cis_europe_support@mastercard.com **Canada and U.S. regions** **Email:** cis_northamerica_support@mastercard.com **Latin America and the Caribbean region** **Email:** cis_lac_support@mastercard.com
Program Management Support Pricing/Billing	securecode_customer_support@mastercard.com
Support	securecode_customer_support@mastercard.com

MasterCard *SecureCode* Online Resources

For additional information about MasterCard® *SecureCode*™, visit one of the following websites:

- MasterCard Security Resources
- MasterCard *SecureCode* 360 Webinars
- Consumer Website
- MasterCard *SecureCode* Vendor List
- MasterCard *SecureCode* Frequently Asked Questions
- Merchant Website
  - Merchant Frequently Asked Questions
  - Program Identifier Guidelines

Additional references are available on MasterCard Connect™ in English, Spanish, and Portuguese under **Library> Publications> SecureCode**.

Appendix D Maestro Processing Considerations

This section contains detailed information about specific processing issues associated with Maestro® and MasterCard® SecureCode™. Merchants should contact their acquirer for specific authorization and clearing requirements.

Account in Good Standing

An account in good standing transaction is a request by a merchant to check the authenticity of a Maestro® account number.

Unlike other Maestro transactions, Account in Good Standing is not a financial transaction. It does not perform a value check or guarantee that the customer has sufficient funds to cover the purchase. The objective is to satisfy the merchant's primary concern to ensure that the Maestro card number being provided by the customer is not counterfeit.

Merchants must not confuse an Account in Good Standing transaction with a pre-authorization transaction used for self-service pumps at petrol/gas stations. These transactions are used to guarantee a block of funds up to the amount in the transaction, provided it is followed within 20 minutes by a completion transaction.

An account in good standing transaction is a standard authorization message with the following specific data content requirements.

Data Element	Value
DE 4 (Amount, Transaction)	One unit of purchase currency
DE 61 (Point-of-Service [POS] Data), subfield 7 (POS Transaction Status)	4 = Preauthorized Request

These data elements must be used by the acquirer when placing an Account in Good Standing transactions. Each acquirer is responsible for determining how this transaction is supported in the point of interaction message defined for the merchant to acquirer interface.

For Credit, there is the Account Status Inquiry, which is a non-financial request that allows acquirers to validate aspects of the cardholder account. Some ACS providers will also use this message to verify cardholder enrollment such as CVC, AVC, and expiry date. Additional details can be found in the *Customer Interface Specification* manual.

Data Element	Value
DE 3 (Processing Code)	00 = Purchase
DE 4 (Amount, Transaction)	Must be zero
DE 48 (Additional Data—Private Use), subelement 82 (Address Verification Service Request)	52 = AVS and authorization Request 0100
DE 48 (Additional Data—Private Use), subelement 92 (CVC 2)	CVC2 from signature panel if applicable
DE 61 (Point-of-Service [POS] Data), subfield 7 (POS Transaction Status)	8 =Account Status Inquiry Service

Appendix E India IVR Transations (SecureTelephone)

This section provides an overview of the MasterCard requirements to support IVR Transactions in India.

Overview

Following the successful deployment of 3-D Secure (SecureCode) for all domestic electronic commerce transactions, the banking authority of India, Reserve Bank of India (RBI), has defined a mandate that requires a similar two-factor authentication process to also be rolled out for IVR transactions.

As there was no technology or precedent of authenticating an IVR transaction with two-factor authentication, MasterCard has worked with IVR vendors to utilize existing investments in technology, process and infrastructure to build a framework and specification using the 3-D Secure protocol. As owner of the 3-D Secure Protocol, Visa has published a country-specific (India) specification that defines a number of additional data elements in the existing 3-D Secure messages.

For more information, refer to the Visa document *3-D Secure Functional Requirements—Extensions for Mobile and IVR Transactions* in India v1.1.

Data Extensions to the Existing 3-D Secure Protocol

As detailed in the 3-D Secure Functional Requirements—Extensions for Mobile and IVR Transactions in India v1.1, the Verify Enrollment Request (VEReq), Verify Enrollment Response (VERes), and PAReq messaging within the 3-D Secure protocol have been extended to allow the Merchant plug-in (MPI) and Issuer Access Control Server (ACS) to convey the additional transaction related elements that identify an IVR transaction, as opposed to an electronic commerce transaction.

UCAF Transport in MasterCard Authorization Messages

MasterCard has designated specific subelements within DE 61 (Point-of-Service [POS] Data) and DE 48 (Additional Data–Private Use) for the identification of SecureTelephone Order and transport of Universal Cardholder Authentication Field™ (UCAF)-related data and associated indicators in authorization messages.

These subelements will be used to support and identify IVR transactions within the authorization message. Support for SecureTelephone Order within the authorization message was mandated as part of the 7.2 Banknet release.

The subelements are described in the following sections. Refer to the *Customer Interface Specification* manual for additional information regarding authorization message formatting.

SecureTelephone—DE 61—Point-of-Service (POS) Data, subelements 4, 7, and 10. The following subelement values are to correctly identify an IVR (SecureTelephone Order) DE 61.

Position	Value	Description
4—POS Cardholder Presence	3	Cardholder Not Present, Phone/ARU Order
7—POS Transaction Status	2	SecureCode Phone Order
10—Cardholder-Activated Terminal Level	MUST NOT BE 6	Authorized Level 6 CAT:Electronic Commerce

MasterCard *SecureCode*—Security Level Indicator (DE 48, subelement 42)

The SecureCode Security Level Indicator contains the fields representing the security protocol and cardholder authentication type associated with the transaction.

MasterCard requires that DE 48 (Additional Data—Private Use), subelement 42 (Electronic Commerce Indicators) be included and properly populated for all electronic commerce and SecureTelephone (IVR) transaction authorizations.

Please note that only Fully authenticated IVR transactions (Security Level Indicator 2 [UCAF data collection is supported by the merchant, and Universal Cardholder Authentication Field™ {UCAF} data is present in DE 48, subelement 43 [Universal Cardholder Authentication Field {UCAF}]) are applicable to SecureTelephone order (IVR) transactions.

The required DE 48 (Additional Data—Private Use), subelement 42 (Electronic Commerce Indicators), subfield 1 (Electronic Commerce Security Level Indicator and UCAF Collection Indicator) values for SecureTelephone order (IVR) are provided in the table below.

Position	Value	Description
1—Security Protocol	2	Channel
2—Cardholder Authentication	1	Cardholder certificate not used
3—UCAF Collection Indicator	0	UCAF data collection is not supported by the merchant
	1	UCAF data collection is supported by the merchant, and UCAF data may be available (DE 48, subelement 43 may be present for MasterCard *SecureCode*)
	2	UCAF data collection is supported by the merchant, and UCAF data must be present (DE 48, subelement 43)

Universal Cardholder Authentication Field (DE 48, subelement 43)

The Universal Cardholder Authentication Field™ (UCAF) contains the encoded MasterCard® *SecureCode*™ issuer-generated authentication data (collected by the merchant) resulting from all MasterCard *SecureCode* fully authenticated transactions.

UCAF is a standard, globally interoperable method of collecting cardholder authentication data at the point of interaction. Within the MasterCard authorization networks, UCAF is a universal, multipurpose data transport infrastructure that is used to communicate authentication information between cardholders, merchants, issuers, and acquirers. It is a variable length (maximum 32 characters) field with a flexible data structure that can be tailored to support the needs of issuer security and authentication approaches.

NOTE

All acquirers and issuers must ensure that they can send and/or receive contents in this field up to the maximum length of 32. Note that applications utilizing this field, such as MasterCard *SecureCode*, may provide contents that are less than the maximum length. For MasterCard *SecureCode* specifically, this field will be 28 positions. This field should NOT include any padding to meet the maximum length of 32 bytes.

What is an AAV?

The Accountholder Authentication Value (AAV) is a MasterCard® *SecureCode*™ specific token that uses the Universal Cardholder Authentication Field™ (UCAF) field for transport within MasterCard authorization messages.

It is generated by the issuer and presented to the merchant for placement in the authorization request. This AAV can be proof of a fully authenticated or an attempted authentication transaction.

In the case of a chargeback or other potential dispute processing, the AAV is used to identify the processing parameters associated with the transaction. Among other things, the field values will identify the:

- Issuer ACS that created the AAV. (This could be the Issuer ACS or, in the case of an attempt, the MasterCard Attempt processing server.)
- Sequence number that can positively identify the transaction for that location
- Secret key used to create the Message Authentication Code (MAC), which is a cryptographic method that ensures AAV data integrity, and binds the entire AAV structure to a specific PAN.

UCAF is the mechanism that is used to transmit the AAV from the merchant to issuer for authentication purposes during the authorization process.

Sample IVR Transaction Flow

An example of a SecureTelephone order (IVR) transaction is as follows.

1. Cardholder calls the merchant to order items, and finalize purchase.
2. Merchant collects all necessary data, including the cardholder's primary account number (PAN) and phone information.
3. The merchant's modified IVR-MPI creates a Verify Enrollment Request (VEReq) message with the IVR extensions, including the following data:
   a. Format of Phone number or Device ID
   b. Cardholder Phone number or Device ID
   c. PAReq channel—DIRECT
   d. Shopping Channel—IVR
   e. Available Authentication Channels
4. The MasterCard Directory Server will forward the VEReq message to the appropriate Issuer IVR-ACS, to validate that the PAN is enrolled in the service.
5. The issuer IVR-ACS responds to the MasterCard Directory with confirmation of enrollment and the Verify Enrollment Response (VERes) message including the ACS web address is returned to the Merchant IVR-MPI.
6. IVR-MPI generates a PAReq message with the IVR extension, and sends to the appropriate Issuer IVR-ACS.
7. ACS receives and processes the PAReq message—IVR extensions may be used by the Issuer ACS in the authentication process.
8. Upon successful validation of the cardholder (or using data contained in the extended PAReq), the issuer ACS will generate the PARes message and forward to Merchant IVR-MPI.
9. IVR-MPI receives PARes and proceeds with authorization request.

MasterCard *SecureCode* Compliance and Functional Testing

MasterCard has developed vendor compliance testing, as well as issuer and merchant functional testing, to ensure vendor products and member and merchant implementations are compliant and successfully interoperate with all MasterCard® *SecureCode*™ platforms and infrastructure.

All vendors, merchant endpoints, and issuers are required to complete the designated testing process prior to launch. More information regarding testing is available from securecode_customer_support@mastercard.com.

Appendix F MasterCard Advance Registration Program Requirements

This section introduces the MasterCard Advance Registration Program (MARP) and identifies the program requirements.

MasterCard Advance Registration Program

The MasterCard Advance Registration Program (MARP) was introduced for Maestro® in 2008, and for MasterCard in 2010.

NOTE

MARP is closed to new business and will be decommissioned 1 June 2015. For more details, refer to *Europe Region Operations Bulletin* No. 2, 3 February 2014.

MARP Merchant Use of MasterCard *SecureCode*

The MasterCard Advance Registration Program (MARP) enables enrolled merchants to authenticate e-commerce transactions.

NOTE

No new merchants are allowed to enroll in MARP. Effective 30 April 2014, MasterCard will be withdrawing MARP. For more details, refer to the *Europe Region Operations Bulletin* No. 2, 3 February 2014.

- The merchant invites the customer to register on its website by choosing a username and password, or similar credentials acceptable to MasterCard, and must provide the customer with the option to register a MasterCard® or Maestro® card account number for use in future e-commerce transactions.
- For the first MasterCard or Maestro e-commerce transaction, the merchant must request MasterCard® *SecureCode*™ authentication before submitting the transaction for authorization. If that transaction is subsequently authorized by the issuer, it is guaranteed to the acquirer or its merchant, regardless of whether the issuer or cardholder participates in MasterCard *SecureCode* as determined by the merchant request.
- If the first MasterCard or Maestro e-commerce transaction for the cardholder registered with the merchant is authorized by the issuer, the merchant can skip the MasterCard *SecureCode* authentication on subsequent transactions by the same customer using the same MasterCard or Maestro card account. In that case, the merchant will populate:
  - Data Element (DE) 48, (Additional Data Private Use, subelement 32 (MasterCard Assigned ID) in the Authorization Request/0100 message with an ID assigned by MasterCard.
  - DE 48, subelement 43 (3-D Secure for MasterCard SecureCode) in the Authorization Request/0100 message with a MasterCard-assigned static Account Authentication Value (AAV).
  - DE 48, subelement 42, position 3 (UCAF Collection Indicator) in the Authorization Request/0100 message with a value of 3.
  - Private data subelement 0052 (Electronic Commerce Security Level Indicator) subfield 3 (UCAF Collection Indicator) in the clearing record submitted to GCMS for processing (where applicable) with a value of 3.

  - The PDS 176 (MasterCard Assigned ID) in the clearing record submitted to GCMS for processing with an ID assigned by MasterCard.

- If the merchant populates the Universal Cardholder Authentication Field™ (UCAF) with the static AAV assigned by MasterCard, and populates the UCAF Collection Indicator with the value of 3, and the issuer authorizes the transaction, the issuer will have a right to charge back the transaction for reason of fraud.
- If a registered cardholder uses a different MasterCard or Maestro card account number for a transaction, the merchant must request MasterCard *SecureCode* authentication before submitting the transaction for authorization.
- Based on a risk assessment, the merchant always has the option of requesting MasterCard *SecureCode* authentication for any MasterCard or Maestro transaction, in which case the transaction will be governed by existing MasterCard *SecureCode* and Chargeback rules. For instance, for consumer cards acquired in the Europe region, if the transaction is subsequently authorized by the issuer, it is guaranteed to the acquirer or its merchant, regardless of whether the issuer or cardholder participates in MasterCard *SecureCode* as determined by the merchant request.

Issuer Participation in MARP

Any Maestro® issuer that supports e-commerce is required to support the static Accountholder Authentication Value (AAV) in authorization until 1 June 2015, at which time MasterCard will discontinue the Maestro Advance Registration Program (MARP). For more details, refer to *Europe Region Operations Bulletin* No. 2, 3 February 2014.

Issuers must meet existing Europe region requirements to support Maestro e-commerce transactions.

Requirements can be found in the *Authorization Manual* and, if applicable, the *GCMS Reference Manual* available on the Publications page on MasterCard Connect™.

Appendix G MasterCard Extensions for the Brazil Market

This section provides specifications related to extensions that support Brazil domestic processing. These extensions allow passing of data from the merchant to the issuer in 3-D Secure messages.

Brazil Market Extensions

This section provides specifications related to extensions that support Brazil domestic processing. These extensions allow passing of data from the merchant to the issuer in 3-D Secure messages.

These extensions will be used in both the VEReq and PAReq messages.

- Card Account Type
- Mobile Phone Number
- Merchant Category Code
- Transaction Type

The VEReq and PAReq are extended to allow the Merchant Plug In (MPI) to pass the additional transaction-related elements to the Access Control Server (ACS) specified below.

Field Definitions for Brazil Market Extensions in VEReq and PAReq

Element Name	Description	Format and Values
Extension Id	visa.3ds.brazil_market	
brazilmcc	Merchant Category Code,provided by the merchant	Length 1–4, Numeric digits
brazilaccounttype	Account Type as selected by the cardholder during checkout.	Length1–2, Numeric digits • 00 (NOT APPLICABLE) • 01 (CREDIT) • 02 (DEBIT)
brazilmobilenumber	Mobile number (as entered by the cardholder during checkout)	Length 1–25, Numeric digits
braziltransactiontype	Transaction Type, provided by the merchant	Length 1–2; Numeric Digit • 00 (Goods/Service Purchase) • 03 (Check Acceptance) • 10 (Account Funding) • 11 (Quasi-Cash Transaction) • 28 (Prepaid Activation & Load)

NOTE

The critical attribute must be set to "false" for all Extension fields defined in this protocol extension specification.

Message Sample of Brazil Market Extensions in VEReq

```
<Extension id="visa.3ds.brazil_market" critical="false">
<brazilmcc>Brazil MCC</brazilmcc>
<brazilaccounttype>Brazil Card Account Type</brazilaccounttype>
<brazilmobilenumber>Brazil Cardholder Mobile Number</brazilmobilenumber>
<braziltransactiontype>Brazil Transaction Type</braziltransactiontype>
</Extension>
```

Message Sample of Brazil Market Extensions in PAReq

```
<Extension id="visa.3ds.brazil_market" critical="false">
<brazilmcc>Brazil MCC</brazilmcc>
<brazilaccounttype>Brazil Card Account Type</brazilaccounttype>
<brazilmobilenumber>Brazil Cardholder Mobile Number</brazilmobilenumber>
<braziltransactiontype>Brazil Transaction Type</braziltransactiontype>
</Extension>
```