Welcome to

V.I.P. System SingleConnect Service SMS ATM Processing Specifications

This revised manual is part of a two-volume set intended for technical and systems professionals responsible for implementing the SingleConnect ATM Service, and for those managing their individual ATM programs after they are installed.

This volume of processing specifications contains information about the V.I.P. SingleConnect ATM Service, message types, processing considerations, security responsibilities, related services, and connection options.

A companion volume, the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications,* describes message formats, field descriptions, codes, and file specifications.

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Also included is a questionnaire that allows you to evaluate this manual. Please complete and return the questionnaire to us. You may also write to us at the address printed on the back of the questionnaire or e-mail us at any time. Our e-mail address is buspubs@visa.com. Your opinion is important to us.

Effective: 31 March 2001

SMS ATM
Processing Specifications

SingleConnect Service

V.I.P. System

Effective: 31 March 2000

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About This Manual

The *V.I.P. System SingleConnect Service SMS ATM Processing Specifications* manual contains specifications for the V.I.P. SingleConnect ATM Service, a component of Visa's V.I.P. SingleConnect Service. The SingleConnect ATM Service is an optional service available to issuers and acquirers worldwide.

This manual contains:

- Suitable technical detail for Visa and Plus issuers and acquirers to plan the systems development efforts needed to implement the SingleConnect Service for ATM transaction processing.
- Information about online financial processing of ATM transactions.

The first three chapters describe the service and processing requirements from a business and functional perspective. The next group of chapters contains detailed information about message types, processing considerations, security responsibilities, related services, and connection options. The next two chapters address SingleConnect ATM issuers who also process deferred clearing transactions, and Visa/Plus acquirers who are considering making CPS/ATM or SingleConnect ATM changes to their systems.

A companion volume, the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications,* contains detailed specifications for message formats, field descriptions, codes, and files.

Audience

The information in this manual is intended for technical and systems professionals responsible for implementing the SingleConnect ATM Service, and for those managing the individual ATM after they are installed. All new Visa/Plus acquirer endpoints are required to use the SingleConnect ATM service.

Organization of This Manual

This manual contains the following chapters:

Chapter 1, Service Overview—Provides a high-level description of the V.I.P. SingleConnect Service and and the features and services that make up the SingleConnect ATM service.

Chapter 2, SingleConnect ATM Transactions—Describes the ATM transactions, transaction sets, and methods for maintaining message integrity.

Chapter 3, Service Participation Requirements—Summarizes the requirements and options for SingleConnect ATM participants, from both an issuer and acquirer perspective.

Chapter 4, Message Types and Flows—Provides descriptions and message flow diagrams for each type of SingleConnect ATM transaction.

Chapter 5, Multicurrency Support—Explains how currency conversion is handled.

Chapter 6, Stand-In and Card Verification Value Processing—Provides a detailed description of stand-in and card verification services available to SingleConnect ATM participants.

Chapter 7, Security—Identifies security responsibilities for ATM issuers and acquirers.

Chapter 8, Routing—Contains information about ATM routing and routing tables.

Chapter 9, Settlement and Reconciliation—Contains information on settlement and reconciliation services, daily settlement reports, the daily settlement schedule, and funds transfer.

Chapter 10, Member-to-Visa Connection Options—Contains information on connectivity requirements and options.

Chapter 11, Considerations for Dual-Message Acquirers—Provides information for acquirers who are considering changing their systems to process CPS/ATM or single message transactions.

Appendix A, ATM Processing Integration—Contains a description of how SingleConnect ATM participants can format and process all ATM transactions without distinguishing between Visa ATM and Plus ATM transactions.

Document Conventions

Table 1 shows the document conventions used in this manual.

Table 1: Document Conventions

Document Convention	Purpose in This Guide
ALL UPPERCASE LETTERS	Drive letters, subdirectory names, file names; system names, statuses, modes, and states.
EXAMPLE	Identifies an example of what the accompanying text describes or explains.
IMPORTANT	Highlights important information in the text.
italics	Document titles; emphasis; variables.
“text in quote marks”	Section names referenced in a chapter.
Note:	Provides more information about the preceding topic.

V.I.P. System Documentation Descriptions for Visa International

The first three manuals in this series, *V.I.P. System Overview*, *V.I.P. System Services* and *V.I.P. System Reports*, apply to both BASE I and SMS processing.

There are two manuals specific to the BASE I System—*BASE I Processing Specifications* and *BASE I Technical Specifications.*

There are six SingleConnect manuals specific to the Single Message System—three processing specifications and three technical specifications for ATM, Interlink, and POS.

Table 2: Description of International V.I.P. System Manuals (1 of 3)

General Information	**V.I.P. System Overview** Provides basic descriptions of the VisaNet network and its components, connections, processing concepts, requirements, and options. Contains descriptions of V.I.P., access methods, BASE I and Single Message Systems, issuer and acquirer responsibilities, and Visa Interchange Center operations. Also provides a brief introduction to V.I.P. services. Doc ID 0851-01
	V.I.P. System Reports Provides sample reports for V.I.P. System services, BASE I and Single Message System processing. Doc ID 0852-01
	V.I.P. System Services Provides complete information about V.I.P. System services available for BASE I and SMS users. Service descriptions include basic information, processing requirements, options, features, key message fields, and message flows. Doc ID 0853-01

Table 2: Description of International V.I.P. System Manuals (2 of 3)

BASE I	**V.I.P. System BASE I Processing Specifications** Describes V.I.P. transaction processing in the BASE I System environment, including message types, processing considerations, security responsibilities, related services, and connection options. Doc ID 0847-01
	V.I.P. System BASE I Technical Specifications - Volume 1 Documents technical specifications of V.I.P. transaction processing in the BASE I System environment. Companion volume to the *V.I.P. System BASE I Processing Specifications* and describes the fields for BASE I. Doc ID 0844A-01
	V.I.P. System BASE I Technical Specifications - Volume 2 Documents technical specifications of V.I.P. transaction processing in the BASE I System environment. Companion volume to the *V.I.P. System BASE I Processing Specifications* and describes the message formats and file specifications for BASE I. Doc ID 0844B-01
Interlink	**V.I.P. System SingleConnect Service SMS Interlink Processing Specifications** Contains information about Interlink, including message types, processing considerations, connection options, security responsibilities, related services, and reports. Doc ID 0837-02
	V.I.P. System SingleConnect Service SMS Interlink Technical Specifications Companion volume to the *V.I.P. System SingleConnect Service SMS Interlink Processing Specifications*. Describes message formats, field descriptions, and file specifications for Interlink. Doc ID 0838-02

Table 2: Description of International V.I.P. System Manuals (3 of 3)

SMS ATM	**V.I.P. System SingleConnect Service SMS ATM Processing Specifications** Contains information about Single Message System ATM processing, including message types, processing considerations, connection options, security responsibilities, and related services. Doc ID 0839-02
	V.I.P. System SingleConnect Service SMS ATM Technical Specifications Companion volume to the *V.I.P. System SingleConnect Service SMS ATM Processing Specifications*. Contains information about message formats, field descriptions, and file specifications for ATM. Doc ID 0840-02
SMS POS	**V.I.P. System SingleConnect Service SMS POS (Visa & Visa Electron) Processing Specifications** Contains information about Single Message System POS processing, including message types, processing considerations, connection options, security responsibilities, related services, and reports. Doc ID 0835-02
	V.I.P. System SingleConnect Service POS (VISA & VISA Electron) Technical Specifications - Volume 1 Companion volume to the *V.I.P. System SingleConnect Service POS (VISA & Electron) Reference Guide Processing Specifications*. Describes the fields for Visa POS and Visa Electron. Doc ID 0848-01
	V.I.P. System SingleConnect Service POS (VISA & VISA Electron) Technical Specifications - Volume 2 Companion volume to the *V.I.P. System SingleConnect Service POS (VISA & Electron) Reference Guide Processing Specifications*. Describes message formats and file specifications for Visa POS and Visa Electron. Doc ID 0849-01

Sources of Information for These Specifications

This section lists the primary sources for the information contained in the *V.I.P. System SingleConnect Service SMS ATM Processing Specifications.* The information from these sources has been analyzed, rewritten, and reorganized, when necessary. Technical staff and service experts reviewed and verified these updates. In addition, this new manual incorporates all comments received from members and Visa staff, where appropriate.

Existing Manuals

The following manuals from the existing V.I.P. documentation set were used as sources for the *V.I.P. System SingleConnect Service SMS ATM Processing Specifications*:

V.I.P. SingleConnect Service ATM Reference Guide, Processing Specifications

V.I.P. System Single Message System Processing Specifications (U.S.)

Technical Letters

The *V.I.P. System SingleConnect Service SMS ATM Processing Specifications* includes information from the following technical letters:

September 1996 V.I.P. System Business Enhancements,
Publication DS-9603107, including update bulletins

April 1997 V.I.P. System Business Enhancements,
Publication DS-9609124

September 1997 V.I.P. System Business Enhancements,
Publication DS-9703014, including update bulletins

March 1998 VisaNet Business Enhancements,
Publication DS-9709037

September 1998 VisaNet Business Enhancements,
Publication DS-9803012, including update bulletins

April 1999 VisaNet Business Enhancements,
Publication DS-9810095, including update bulletins

June 2000 VisaNet Business Enhancements,
Publication 4301-01

October 2000 VisaNet Business Enhancements
Publication 4602-01

Obtaining Report Samples

Visa offers a variety of reports to members. Many of these reports clarify and track service processing. The following documents provide report samples:

VisaNet Settlement Service (VSS) Reference Guide, Volume 2, Reports

VisaNet Settlement Service (VSS) User's Guide, Volume 2, Reports

V.I.P. System Reports

Members can contact their Visa representatives to discuss reporting options or to obtain additional samples.

For More Information

Visa provides documentation to support Visa products and services. For many of the services described in this manual, Visa has developed implementation guides that contain region-specific details about signing up for a service, selecting options, and installing, testing, and operating the service. Members can ask their Visa representatives for regional guides.

Related Publications

Additional information specific to the ATM program can be found in the *VISA/Plus International ATM Member Guide*. This manual contains information about the Visa/Plus International ATM Program. It includes an overview of the program, its business requirements, optional services, risk management, processing options, certification procedures, and back office management.

The other publications listed in this section provide additional information about the V.I.P. SingleConnect ATM Service, as well as related Visa systems, regulations, and services not covered in this manual. Use the following guidelines to receive any of the listed publications, to be added or removed from distribution lists, or to inquire about other publications:

- Members and third-party processors in Visa regions outside of the U.S. can contact their Visa representatives.
- Visa staff located outside of the U.S. and in Miami can contact their regional representatives.
- U.S. members and third-party processors can contact the Visa U.S.A. Member Publications department by sending an e-mail to PUBS@visa.com.
- U.S.-based Visa staff (except those in Miami) can send an e-mail request to Docline. Docline distributes VisaNet documentation and attempts to locate other publications distributed elsewhere within Visa.

To inquire about VisaNet documentation or submit changes and additions, contact VisaNet Technical Publications by sending an e-mail to buspubs@visa.com. Visa staff can send an e-mail to Business Publications.

Operating Regulations

Operating regulations for the six Visa regions are published in the following manuals:

Visa Asia-Pacific Regional Operating Regulations

Visa Canada Regional Operating Regulations

Visa Central and Eastern Europe, Middle East and Africa Regional Operating Regulations

Visa European Union Regional Operating Regulations

Visa International Operating Regulations. Copies beginning May 2000 include Visa Smart Debit and Visa Smart Credit.

Visa Latin America and Caribbean Regional Operating Regulations

Visa U.S.A. Inc. By-Laws and Operating Regulations

V.I.P. SingleConnect Service Documentation

In addition to this manual, Visa provides international members with the following manuals to support SingleConnect processing:

V.I.P. SingleConnect Service Processing Overview—This overview helps new or prospective participants to evaluate the impact of SMS on their systems and operations.

V.I.P. System SingleConnect Service SMS ATM Technical Specifications—This manual contains detailed technical information about message formats, field descriptions, file specifications, country codes, currency codes, reject codes, and file error codes.

V.I.P. System SingleConnect Service SMS POS (Visa & Visa Electron) Processing Specifications—This manual contains information about the SingleConnect POS Service and its support of the Visa and Visa Electron POS card program. The manual includes information about message types, processing considerations, security responsibilities, related services, and connection options.

V.I.P. System SingleConnect Service SMS POS (Visa & Visa Electron) Technical Specifications—This manual contains detailed technical information about message formats, field descriptions, file specifications, country codes, currency codes, reject codes, and file error codes.

V.I.P. System SingleConnect Service SMS Interlink Processing Specifications—This manual contains information about the SingleConnect Interlink Service and its support of Interlink transactions. It includes information about message types, processing considerations, security responsibilities, related services, and connection options.

V.I.P. System SingleConnect Service SMS Interlink Reference Guide, Technical Specifications—This manual contains detailed technical information about message formats, field descriptions, file specifications, country codes, currency codes, reject codes, and file error codes.

BackOffice Adjustment System (BOAS)

For information on BOAS, refer to the following manuals:

BOAS Administration and Technical Guide

Using BOAS with the BASE II System

Using BOAS with the Single Message System

Risk Management Services

For more information on risk management services, refer to:

Cardholder Risk Identification Service User's Guide

Fraud Reporting System User's Guide

Risk Identification Service User's Manual

Security

For information on data and system security, refer to the following documents:

Card Technology Standards Manual

Consolidated PIN Security Standards Requirements

Single Message System (SMS) Dynamic Key Exchange Service Announcement and Specifications, September 1998

VisaNet Access Points (VAPs)

For information about VAPs, refer to one of the following sets of documentation. The VAP Release 10.23 documentation is for PS/2 architecture. The VAP Release 11 documentation is for PCI and ISA architecture.

VAP Release 10.23 Documentation

VAP Computer Based Training User's Guide

VAP Interface Specifications: BASE II & Other File Processing

VAP Interface Specifications: V.I.P. Processing

VAP Messages & Troubleshooting

VAP Operator's Guide

VAP Software Library

VAP Systems Guide

VAP Release 11 Documentation

VAP Release 11 Interface Specifications: BASE II & Other File Processing

VAP Release 11 Interface Specifications: V.I.P. Processing

VAP Release 11 Maintenance, Messages, & Troubleshooting Guide

VAP Release 11 Operator's Guide

VAP Release 11 Software Library

*VisaNet Image Gateway Image Interface Technical Specification*s

VisaNet Image Gateway User's Guide

Visa Smart Debit and Visa Smart Credit (VSDC) Documentation

Visa provides the following manuals to describe the functions and features of the Visa Smart Debit and Visa Smart Credit chip technology program.

Visa Smart Debit and Visa Smart Credit Service Description—This manual provides a high-level description of the features and benefits of a VSDC program.

Visa Smart Debit and Credit Planning Guide—This manual assists members in planning their VSDC program and migration strategy to competitively position themselves for the future.

Visa Smart Debit and Credit Member Implementation Guide for Issuers—This manual provides guidelines for issuers involved in the implementation of new VSDC programs.

Visa Smart Debit and Credit Member Implementation Guide for Acquirers—This manual provides guidelines for acquirers involved in the implementation of new VSDC programs.

Miscellaneous Products, Systems, and Services

For information on miscellaneous systems and services relevant to V.I.P., refer to:

Card Verification Value (CVV) Member Implementation Guide

Cardholder Reporting System User's Guide

Visa Image Exchange Workstation (VIEW) User's Guide

V.I.P. SingleConnect Service File Delivery—Direct Access Service (DAS) Technical Specifications

VisaNet Settlement Service (VSS) Reference Guide, Volumes 1 and 2

VisaNet Settlement Service (VSS) User's Guide, Volume 1, Specifications

VisaNet Settlement Service (VSS) User's Guide, Volume 2, Reports

V.I.P. System Reports

VisaNet Test System (VTS) User's Manual

VTS2000 User's Guide

Service Overview 1

The V.I.P. SingleConnect Service allows members worldwide to process automated teller machine (ATM) transactions, as well as POS (point-of-sale and point-of-service) transactions, using one connection to VisaNet.

This connection supports *online financial processing,* in which a single online financial message can be used for authorization, clearing, and settlement. The connection can also be used for exception and administrative messages.

The V.I.P. SingleConnect Service can provide quicker settlement and faster clearing, and therefore reduced risk, when compared to traditional BASE I/ BASE II transaction processing. The V.I.P. SingleConnect Service also provides compatibility with some non-Visa networks and other types of transactions that require single-message settlement.

The V.I.P. SingleConnect Service supports the following cards in all regions (except as noted):

- Visa cards
- Cards bearing the Plus mark
- Visa Electron cards
- Cards bearing the Interlink or Visa Interlink mark (Asia Pacific and U.S. regions only)
- Some non-Visa cards

Support of non-Visa products varies by region and country and is not described in this manual.

Understanding the SingleConnect Service, which allows an issuer or acquirer to send and receive all VisaNet messages through the Single Message System (SMS), requires a basic understanding of VisaNet and the interaction of its system components.

This chapter contains information that provides a groundwork for understanding the SingleConnect information in this manual, including:

- A brief description of the VisaNet network and its major systems
- An overview of SMS message processing and SMS SingleConnect transactions
- Brief summaries of related services

A complete overview of VisaNet and the V.I.P. System appears in the *V.I.P. System Overview*.

The VisaNet Network

The V.I.P. SingleConnect Service is available through Visa's Single Message System (SMS), which is a subsystem of VisaNet, the Visa transaction processing network. The term VisaNet applies to all components of the network, from the hardware, software, and communications facilities that connect the Visa network with members' systems and other networks to the systems that perform all transaction processing and system services.

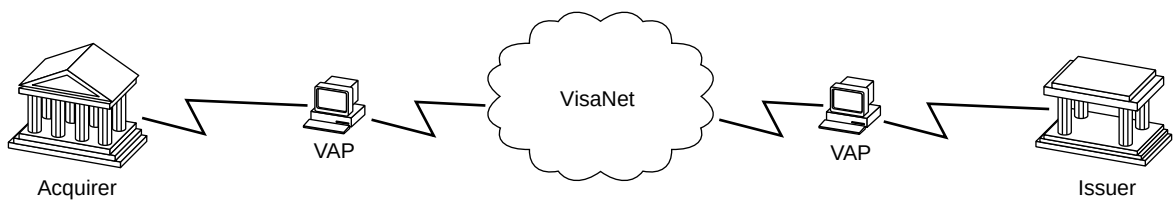
NOTE: *Some readers may have seen online financial processing referred to as single-message processing; Visa's preferred terminology distinguishes between the Single Message System and the SingleConnect Service (which is processed through the Single Message System).*

VisaNet routes transactions between acquirers and issuers through its global transaction processing network. Two of the VisaNet processing facilities, OCE and OCW, house SMS as a component of the VisaNet Integrated Payment (V.I.P.) System, Visa's main transaction processing system. Members are connected to VisaNet through VisaNet Access Points (VAPs).

Most acquirers and issuers communicate with the V.I.P. System through a Visa-supplied VAP. Message control and interface functions are performed by the V.I.P. Subsystem in the VAP.

Figure 1–1 illustrates the VisaNet network. SMS is a subset of the V.I.P. System, which is part of VisaNet.

Figure 1–1: The VisaNet Network



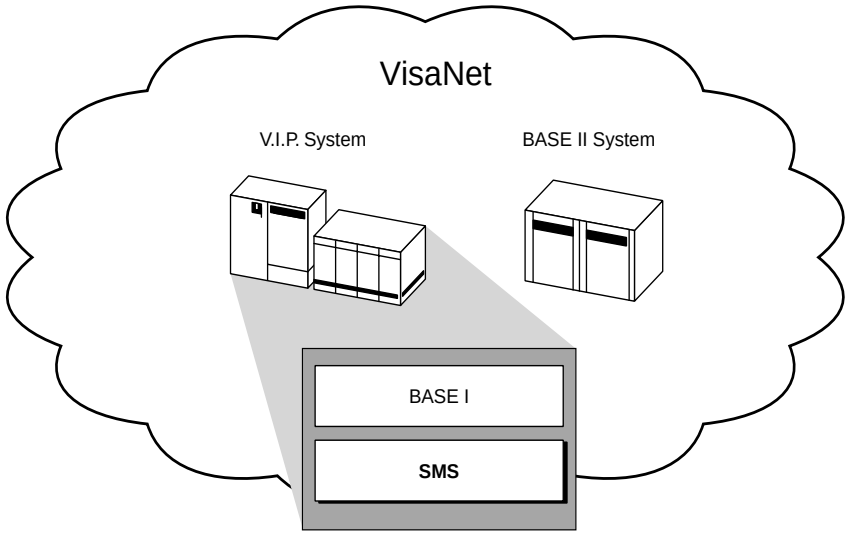
VisaNet Systems

The VisaNet network contains two main transaction processing systems.

- The VisaNet Integrated Payment (V.I.P.) System, with two components:
  - The Single Message System (SMS), which supports single-message processing.
  - The BASE I System, which supports dual-message processing.
- The BASE II System, which provides dual-message clearing and settlement functions.

Figure 1–2 shows BASE I and SMS residing within the V.I.P. System, which is part of the VisaNet network, along with BASE II.

Figure 1–2: The VisaNet Software System Components



Visa members and processors may choose to have all of their transactions processed by SMS (through the SingleConnect Service), or use different processing methods for different Visa products.

For example, a member or processor can use BASE I and BASE II processing for transactions belonging to one product (such as Visa or Visa Electron POS) and use SMS processing for transactions belonging to another product (such

as Visa/Plus ATM). Or, a member or processing center can have a Visa/Plus ATM acquirer connection to SMS and a Visa/Plus ATM issuer connection to BASE I/BASE II.

NOTE: *SingleConnect endpoints must use the V.I.P. ISO message format and observe all rules for its use.*

A bridge between BASE I and SMS makes it possible for BASE I and SingleConnect users to communicate with each other.

VisaNet Integrated Payment (V.I.P.) System

The V.I.P. System is the primary online transaction switching and processing system for all transactions that enter VisaNet. The V.I.P. System provides the Common Member Interface, BASE I, and SMS functionality to members and other users worldwide.

Both the BASE I and SMS components use files of member-supplied cardholder data and processing parameters to perform online processing. Both systems interface to several offline systems, including BASE II and the BackOffice Adjustment System (BOAS).

NOTE: *BOAS is available at the region's discretion. This manual does not provide details about BOAS. For information about this system, see the "For More Information" section of the About This Manual chapter for a list of BOAS documents.*

The following subsections introduce various access methods and describe the functions of each of the main V.I.P. software components, which are BASE I and SMS.

The Common Member Interface and Other Access Methods

The Common Member Interface (CMI) is an access method that allows V.I.P. members to use the same communication line to send and receive both SMS and BASE I messages.

CMI processing in V.I.P. routes messages to their BASE I or SMS destinations, depending on the type of processing requested, and the processing network in cases where the message specifies a network.

Besides the CMI, access methods available to V.I.P. members are:

- BASE I only
- SMS only

These methods allow members to communicate with only one component of V.I.P.—BASE I or SMS but not both.

Single Message System (SMS)

In the SingleConnect environment, SMS provides single-message authorization and clearing. In addition, SMS supports settlement through the VisaNet Settlement Service (VSS).

Single-message processing uses one message that contains both authorization and clearing information, which are processed simultaneously. Single messages carry all information needed to post a transaction to an account and to enable clearing and settlement. These messages are commonly known as "full financials."

All SingleConnect Service participants are connected to SMS. Only the SMS component performs single-message processing.

VisaNet, which supports settlement and funds transfer processing for SMS, handles settlement and funds transfer as an automatic followup to SMS transaction processing. VSS performs settlement as a separate process that delivers its results through advices and reports. For an illustration of the relationship of VSS to SMS and BASE II, see the "VisaNet Settlement Service (VSS)" section later in this chapter.

SMS supports SingleConnect ATM transactions for:

- Visa and Visa Electron.
- Plus.
- Some non-Visa products.

SMS supports SingleConnect POS transactions for:

- Visa and Visa Electron. For more information, refer to the *V.I.P. System Single Connect Service SMS POS (Visa & Visa Electron) Processing Specifications*.
- Interlink and Visa Interlink. For information about Interlink processing, refer to the *V.I.P. System SingleConnect Service SMS Interlink Processing Specifications*.
- Some non-Visa products.

Because SMS processes online full financial transactions in one message format (V.I.P. ISO), SingleConnect participants need to maintain and support only a single system interface. All processing occurs through a single connection to V.I.P.

BASE I System

BASE I is a message processing system for authorization request messages. Authorization request messages are the first messages sent in dual-message processing. BASE I provides authorization services for acquirers that use *dual-message processing*. Dual-message processing uses two separate message cycles to complete a transaction.

In the first message cycle, the acquirer submits an authorization request to BASE I. This request contains authorization information. The issuer sends an authorization response message through VisaNet to the acquirer.

In the second message cycle, dual-message acquirers submit a message to BASE II. The second message contains clearing and settlement information for offline processing.

This manual discusses only those aspects of BASE I that relate to transactions involving SMS. Refer to the About This Manual chapter for a complete list of BASE I manuals.

BASE II System

BASE II provides dual-message clearing functions. Dual-message acquirers submit second-cycle messages for processing offline by BASE II. Message data is then passed to VSS, which settles with the issuer and acquirer. For more information about VSS, see the "VisaNet Settlement Service (VSS)" section later in this chapter.

The BASE II System clears batch deferred clearing transactions. These are financial transactions that are held by the member, grouped together, and sent as a batch to VisaNet for clearing and settlement processing at a later time. Settlement occurs through VSS.

VisaNet Settlement Service (VSS)

VSS consolidates settlement functions for the Single Message System (SMS) and the BASE II System in one service. Members and processors receive SMS and BASE II settlement information in a standardized set of reports. VSS provides flexibility in defining financial relationships, selecting reports and report destinations, and establishing funds transfer points.

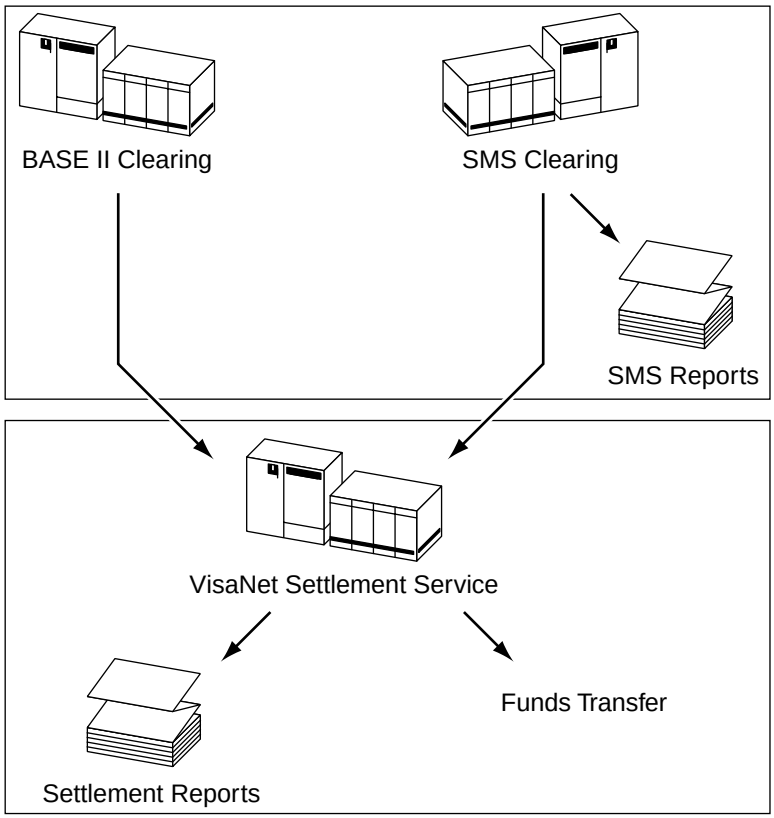
Visa processes interchange transactions for SMS and BASE II through separate systems. Both SMS and BASE II perform their own clearing functions. VSS performs the settlement functions for SMS and BASE II in one centralized service. Clearing and settlement are defined as follows:

- Clearing is the process of collecting an individual transaction from one member or processor and delivering it to another.

- Settlement is the process of calculating and determining the net financial position of each member for all transactions that are cleared.

The VSS clearing and settlement process is shown in Figure 1–3.

Figure 1–3: VisaNet Settlement Service (VSS) Process



Transaction Processing Summary

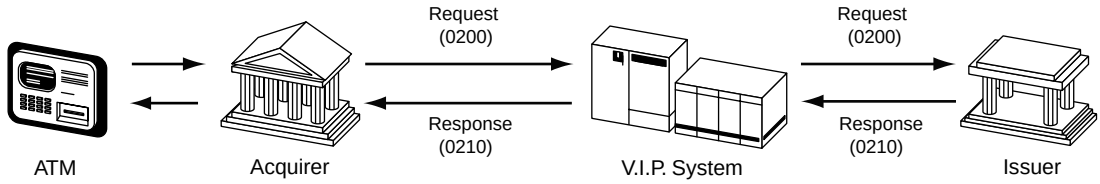
The following is a brief description of how a typical online financial ATM transaction with a Personal Identification Number (PIN) flows from the acquirer to the issuer and back, what occurs when the issuer system is not available, and what happens at the end of the processing day.

Online Transaction Flow

Figure 1–4 illustrates how an online financial ATM transaction is processed. Although not all online financial transactions require a PIN, ATM and Interlink transactions always require PIN verification. (The flow for an Interlink transaction is similar, as is a POS transaction without a PIN, but the steps relating to PINs are omitted.)

1. The cardholder inserts a card into an ATM and enters the Personal Identification Number (PIN).
2. The ATM creates a formatted electronic message and forwards it to the acquirer. The request includes the transaction type, transaction amount, encrypted PIN, acquirer's identification, and full Track 2 (magnetic stripe) data.
3. The ATM acquirer creates an 0200 financial request message, logs the event, and forwards the message to VisaNet.
4. V.I.P. logs and tracks the message, performs any applicable message content editing, and initiates service functions such as currency conversion, if needed, or PIN verification. (PIN verification may be performed by either V.I.P. or the issuer, at the issuer's option.) V.I.P. then routes the message to the issuer or processes the message in stand-in according to issuer availability and predetermined switching and stand-in-processing (STIP) parameters.
5. The issuer verifies the PIN, if necessary, checks the transaction amount against the account's available balance, and then checks daily activity limits and other controls, if any. The issuer logs the message and, for approved messages, reduces the cardholder's available balance by the amount of the transaction. The issuer creates an 0210 financial response message based on the processing results and sends it to VisaNet.
6. V.I.P. logs the response and forwards it to the acquirer.
7. The acquirer logs the financial response and forwards it to the ATM to complete the transaction. The acquirer ensures the response is successfully delivered. If approved, V.I.P. settles the transaction after the next settlement cutoff time.

Figure 1–4: Typical ATM Online Message Flow



Stand-In Processing (STIP)

Although the V.I.P. SingleConnect ATM Service is designed to have transactions authorized online by the issuer, provisions are made to continue processing when the issuer's system is not available due to hardware, software, or communications failure.

VisaNet stands in when the issuer is not available or does not respond within the prescribed time limit. VisaNet stand-in processing (STIP) approves or declines transactions for the issuer based on previously established parameters.

VisaNet can also perform PIN verification and check the Exception File for special processing requirements. The Exception File contains positive and negative account records listed by issuer. It is used by STIP to determine if any special conditions must be considered to make an authorization decision.

While performing stand-in processing, VisaNet also can verify the Card Verification Value (CVV) to detect any alteration of magnetic stripe data.

For each SingleConnect ATM transaction handled by STIP, VisaNet creates an advice for the issuer detailing the request and the STIP response. Issuers recover these advices by signing on to advice recovery.

See Chapter 6, Stand-In and Card Verification Value Processing, for more information about stand-in processing (STIP) and the CVV Service.

For detailed information about the Exception File, refer to the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*.

End-of-Day Processing

At settlement cutoff, VisaNet uses its transaction log files to determine issuer and acquirer settlement positions and prepares daily reports and raw data files. Raw data files contain detailed information about the day's messages for a given participant. Similarly, issuers and acquirers use their internal transaction logs to account for the day's work and prepare daily reports or files to reconcile to the reports and files from VisaNet. The final step in the settlement process is funds transfer, during which funds are collected from settlement entities with net debit positions and paid to settlement entities with net credit positions.

VisaNet provides V.I.P. SingleConnect Service participants with a raw data file of all transactions. Members can use this file to match transactions on a one-to-one basis to their systems' records, identify any mismatched transactions, and calculate settlement totals.

Each member's ATM operations staff reconciles data between VisaNet and the member, as well as the sponsored member or processor. The data from VisaNet is compared against the member's internal transaction data to identify any discrepancies.

VisaNet includes a reporting facility that produces daily and monthly reports for issuers and acquirers that subscribe to the V.I.P. SingleConnect Service. The reports fall into two broad categories:

- Transaction detail reports.
- Settlement summary reports.

Transaction detail reports contain detail about the day's message activity. Each transaction is included on the detail reports including the settlement disposition. Reconciliation totals also are included.

Settlement summary reports contain summary information about the day's work. Totals are provided for the various components including both interchange totals and fee totals.

For more information about the settlement and reconciliation processes, see Chapter 9, Settlement and Reconciliation, and the VisaNet Settlement Service manuals.

V.I.P SingleConnect ATM Service

The V.I.P. SingleConnect ATM Service enables members worldwide to process all of their ATM transactions through one interface to SMS.

Visa first offered online financial ATM processing in 1987 in the U.S. region. Online financial processing availability expanded worldwide in 1994. Today, Visa's ATM program supports both SMS and dual-message acquirers and issuers.

SingleConnect Acquirers and Issuers

SingleConnect acquirers and issuers connect to the Single Message System and process all transactions as full financials. A member or processor may have acquirer or issuer connections to SMS, or it may have both acquirer and issuer connections to SMS.

New ATM acquirers of Visa, Visa Electron, and Plus cards are required to connect to SMS. Existing ATM acquirers must participate in the SingleConnect Service or the Custom Payment Service/ATM by 1 October 2003.

Dual-Message Acquirers and Issuers

Dual-message acquirers and issuers connect to the BASE I/BASE II Authorization and Clearing and Settlement System. All ATM transactions are processed as authorizations with deferred clearings.

Dual-message issuers have the option of participating in Custom Payment Service/ATM (CPS/ATM). Existing dual-message acquirers must participate in CPS/ATM or the SingleConnect Service by 1 October 2003.

Features of CPS/ATM include linking related messages, expanded ATM data, and clearing transactions within three days. The CPS/ATM Service requires the presence of the Authorization Characteristics Indicator (ACI) and Transaction Identifier in the authorization transaction. For consistency, the use of the fields has been incorporated into the V.I.P. SingleConnect ATM Service.

For more information on the CPS/ATM Service, see the *Visa/Plus International ATM Member Guide.*

Available Services

This section identifies the VisaNet services available to SingleConnect ATM participants.

ATM-Only Services

ATM Format Conversion Service

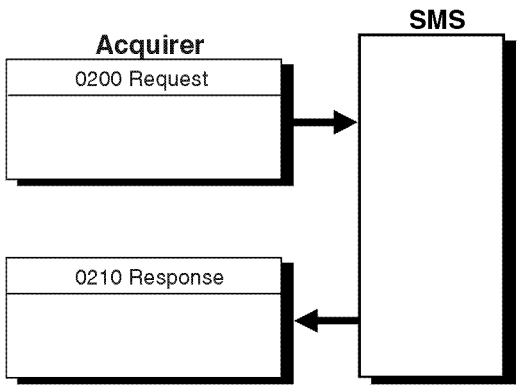
The ATM Format Conversion Service enables SingleConnect issuers to receive ATM transactions from dual-message acquirers as full financial messages (0200s).

In the ATM environment, acquirers can choose to submit transactions using the single-message or dual-message mode.

In the single-message mode, the acquirer sends ATM transactions as financial requests (0200), which are authorized, cleared, and settled as single online financial messages.

Figure 1–5 illustrates the flow of an ATM transaction from a SingleConnect acquirer's perspective.

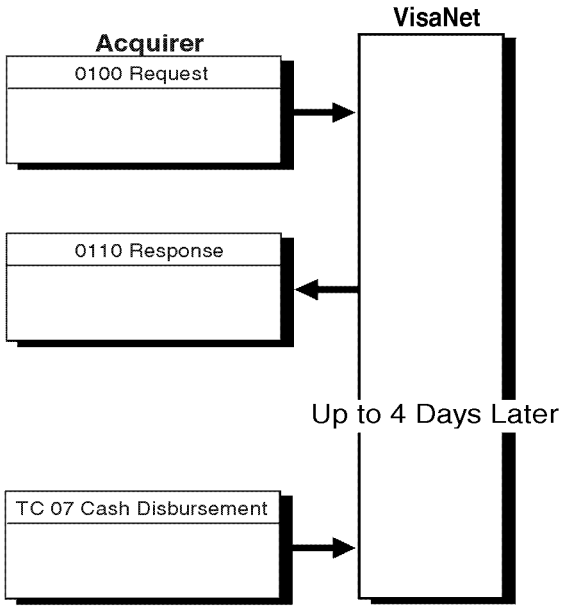
Figure 1–5: SingleConnect Acquirer Transaction Flow



In the dual-message mode, the acquirer sends ATM transactions as authorization requests (0100), followed up to four days later by deferred clearing records (TC 07).

Figure 1–6 illustrates the flow of an ATM transaction from a dual-message acquirer's perspective.

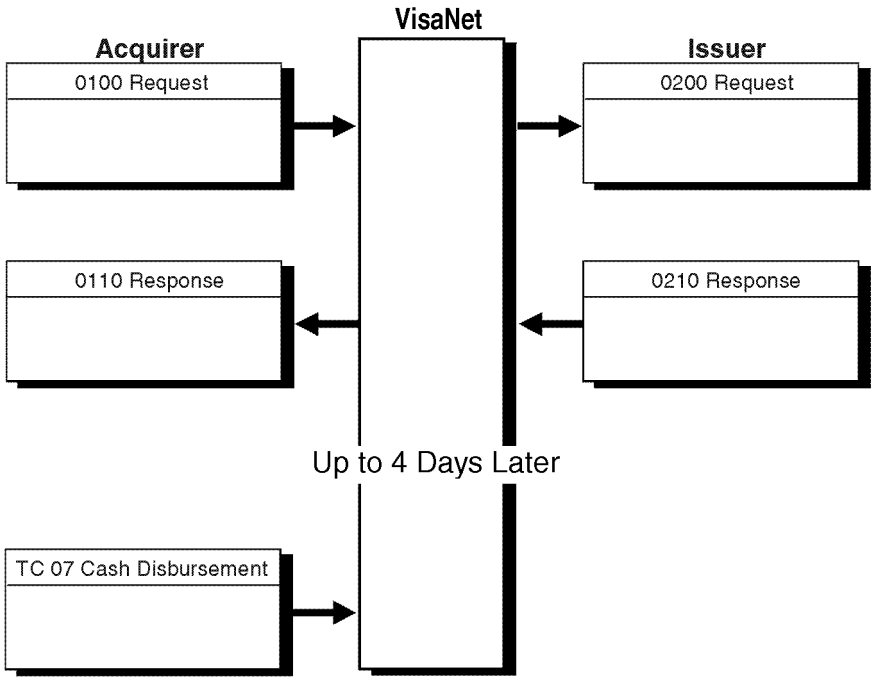
Figure 1–6: Dual-Message Acquirer Transaction Flow



VisaNet converts authorizations from dual-message acquirers into V.I.P. formatted financial transactions for delivery online to SingleConnect issuers through the ATM Format Conversion Service.

Figure 1–7 illustrates the flow of an ATM transaction from a dual-message acquirer to a SingleConnect issuer using the ATM Format Conversion Service.

Figure 1–7: ATM Format Conversion From Dual-Message Acquirer to SingleConnect Issuer



SMS manages the matching and reconciliation of all messages that are converted. Associated messages (for example, chargebacks, chargeback reversals, and representments) also are managed through this service.

In addition to converting the message format, SMS augments the transaction with the necessary data elements required to ensure that the receiving SingleConnect issuer can process the message like any other full financial message.

Visa/Plus ATM Transaction Processing Integration

SingleConnect participants that want to format and process *all* ATM transactions without distinguishing between Visa ATM and Plus ATM transactions can do so by changing the coding for fields 44, 59, 63.3, and 63.5. For details, see Appendix A, ATM Processing Integration.

Routing Tables and Services

Routing refers to decisions relating to sending transactions from the acquirer to VisaNet, and from VisaNet to the issuer. As a rule, Visa assumes responsibility for routing a request to its proper destination. Acquirers do not have to determine how the transaction will be routed to the issuer.

Visa provides a variety of routing services that enable issuers and acquirers to route their transactions precisely as they specify. Most of the routing services that Visa provides are optional. Issuers can designate an alternate path for routing particular transaction types. For example, ATM transactions can be routed differently than POS transactions; exception transactions can be routed differently than financial transactions.

In addition to the following discussion, refer to Chapter 8, Routing.

Routing Tables

Visa provides routing tables for Visa and Plus ATM acquirers, who are required to use the Visa and Plus routing tables or the Combined Visa/Plus Routing Table.

Priority Routing Service

The Priority Routing Service is an option available to all SingleConnect ATM acquirers that support multiple card programs on the Single Message System. This service enables acquirers that accept more than one card brand (or mark) to assign each of them a priority. Prioritization allows V.I.P. to determine the actual network and set of program rules to use for each transaction.

Alternate Routing

This service allows acquirers and issuers to choose separate routing for certain transaction types, including exception items and other back office transactions. Issuers and acquirers may designate their primary processing center to process online original transactions and one or more alternate processing centers to process exception and back office transactions.

Split Routing

Three Split Routing services are available to SingleConnect ATM issuers:

- ATM Account Type Split Routing—This service is available for SingleConnect issuers that process ATM transactions. Issuers can specify that V.I.P. route ATM transactions based on the account the cardholder selects when using a multipurpose card at an ATM. Issuers can specify up to three endpoints: one for deposit (checking and savings), one for credit account processing, and one for nonspecified accounts.

- ATM/POS Split Routing—This service enables issuers to separate message traffic into ATM and POS transaction routes.
- PIN/No-PIN Split Routing—This service enables issuers to separate POS message traffic requiring PINs from message traffic not requiring PINs (called "No-PIN transactions").

Online Request Services

Visa offers the following online request services for SingleConnect ATM participants.

Card Verification Value Service

The Card Verification Value (CVV) Service, which is mandatory for Visa cards in all regions, protects issuers and acquirers from fraud losses associated with counterfeit Visa cards. The CVV Service allows issuers to detect invalid cards, before transactions are authorized, by checking the content on the magnetic stripe of the cards.

NOTE: *CVV refers to the value encoded on the card; the CVV Service refers to the Visa verification service available through the V.I.P. System.*

The CVV Service depends upon acquirers providing complete, unaltered magnetic stripe data in 0100 authorization messages and 0200 financial messages. V.I.P. or the SingleConnect issuer cannot perform CVV calculation when either the issuer or acquirer is not participating in the service or if the magnetic stripe was not read.

The CVV service is optional for Plus issuers connected to VisaNet. For details about this mandatory service for Visa cards, refer to Chapter 6, Stand-In and Card Verification Value Processing.

Card Verification Value 2 Service

The Card Verification Value 2 (CVV2) Service is a card verification tool designed to reduce fraud losses when the Visa card is not present. Issuers must imprint a 3-digit security number (the CVV2) on the back of Visa cards, in accordance with applicable operating regulations.

Although a CVV2 value is never passed in ATM transactions, ATM issuers (including issuers of Plus cards) can optionally use CVV2 numbers for purposes of card activation, address changes, voice response unit (VRU) cardholder validation, and other bank customer service options to ensure that the cardholder has the "real" card in hand.

Automatic Cardholder Database Update

The Automatic Cardholder Database (Auto-CDB) Update Service controls an issuer's exposure to fraud by automating the listing of problem accounts. Auto-CDB enables SingleConnect issuers to update the SMS Exception File through authorization response messages, and improves the accuracy of cardholder information available to VisaNet for stand-in (STIP) processing.

Auto-CDB is an optional service available to Visa issuers. For more information, refer to Chapter 6, Stand-In and Card Verification Value Processing.

PIN Verification Service

The PIN Verification Service (PVS) provides full-time or stand-in verification of personal identification numbers (PINs) used for ATM transactions. A *personal identification number* is a secret code that identifies a cardholder at an ATM. An ATM transaction requires the cardholder to enter a PIN.

At the issuer's option, SMS can verify PINs on behalf of the issuer, at all times or only when the issuer is unavailable. When SMS verifies PINs, it intercepts all requests, verifies the PINs, and passes the requests to the issuer or the SMS stand-in processor (STIP), as appropriate, for processing. To use the PIN Verification Service, an issuer must supply PIN data either on track 2 of the card's magnetic stripe or in a PIN Verification File.

For more information on the PIN Verification Service, refer to Chapter 7, Security.

Dynamic Key Exchange Service

The Dynamic Key Exchange (DKE) Service is an optional service that enables ATM acquirers and issuers to change Data Encryption Standard (DES) cryptographic keys with Visa through the use of online messages.

Working keys are used to encrypt and de-encrypt customer PINs when they are transmitted between the SingleConnect participant and VisaNet. A SingleConnect participant can periodically change acquirer or issuer or both working keys by exchanging online messages with VisaNet. Two options are available:

- A participant can request new working keys at any time.
- A participant can request in advance that VisaNet automatically create new working keys on a daily basis.

To ensure that the participant and VisaNet are using the same keys, the participant must acknowledge successful receipt of a new key.

For more information about this service and related topics, see Chapter 4, Message Types and Flows, and Chapter 7, Security.

Risk Services

Visa offers the following tools to issuers and acquirers that enable them to minimize their exposure to fraud. Most of the risk services are optional.

Fraud Reporting System

The Fraud Reporting System (FRS) helps members report, track, and analyze fraudulent transactions. FRS consolidates fraud information, helping members detect fraud patterns and reduce losses.

Members are required to electronically report confirmed fraud transactions on all Visa cards. Acquirers and issuers must comply with the fraud reporting rules as defined in the Visa operating regulations.

SingleConnect Visa ATM acquirers and issuers must be able to create online Fraud advices. (Online Fraud Reporting is not available for Plus messages.)

For information on the Online Fraud Reporting Service, refer to Chapter 6, Stand-In and Card Verification Value Processing.

Cardholder Risk Identification Service

The Cardholder Risk Identification Service (CRIS) is a Risk Management service that provides transaction scoring and reporting to alert issuers of potentially fraudulent activity on Visa accounts. The service uses neural networks and risk-scoring models to analyze individual transactions worldwide through VisaNet.

The neural networks recognize specific fraudulent patterns and discriminate between low- and high-risk transactions. Additionally, Visa continually updates the neural network risk-scoring models to account for changing fraud patterns for each region.

CRIS is an optional service available to Visa ATM issuers. This service is not available for Plus messages.

For more information, refer to Chapter 6, Stand-In and Card Verification Value Processing.

Additional Services

This section includes additional services available to SingleConnect members.

Multicurrency Service

The VisaNet Multicurrency Service supports authorization, clearing, and settlement processing in international currencies. SingleConnect ATM issuers and acquires must participate in this service. (Multicurrency processing is not required for issuers whose cardholder billing and settlement currencies are U.S. dollars.)

For details, refer to Chapter 5, Multicurrency Support.

SMS Advice Retrieval Service

The SMS Advice Retrieval Service enables issuers to use online connections to recover all types of advices from the SMS Advice File. Such advices are used to communicate information related to STIP, CRIS, Fraud, BASE II, funds transfer, fee collections/disbursements, and so on.

Members can elect to have advices from BASE II endpoints held by Visa until a certain time of day, in order to manage the volume of advices efficiently. This option is explained in the following section, "Flexible Times for Online Delivery of Advices from BASE II Endpoints."

Flexible Times for Online Delivery of Advices from BASE II Endpoints

To manage the volume of advices from BASE II endpoints efficiently, members can specify times for retrieving these advices from online queues. The flexible timing options described in this section apply to all advices received online from acquirer or issuer BASE II endpoints.

With implementation of the flexible timing options, advices from BASE II endpoints are available to SMS issuers shortly after clearing BASE II. To facilitate different members' processing needs, SMS issuers can specify one of the following options at the BIN or processor level:

- Define a specific delivery time for advices from BASE II endpoints.
- Retrieve advices from BASE II endpoints as soon as they become available to V.I.P., currently as early as noon Pacific standard time.
- Retrieve advices from BASE II endpoints at the standard system default time.

For more information about these options, contact your Visa representative.

Visa Smart Debit and Visa Smart Credit

Visa Smart Debit and Visa Smart Credit (VSDC) is a chip-based solution that allows members to combine the functionality of Visa's debit and credit products with the strategic flexibility of chip technology. VSDC offers a suite of optional risk control features that can be tailored to the transaction type, market segment or to the individual cardholder. These features are available only through chip technology.

VSDC provides issuers with the ability to securely modify chip controls without card reissuance. Visa provides members with a phased approach to incorporate chip technology while building the chip infrastructure. VSDC offers enhanced control and security over magnetic stripe technology, and worldwide interoperability through the use of the *EMV Integrated Circuit Card Specifications for Payment Systems*.

For a full description of VSDC, refer to the *Visa Smart Debit and Visa Smart Credit Service Description*, which provides a high-level description of the features and benefits of a VSDC program. To plan a VSDC program and migration strategy, refer to *Visa Smart Debit and Credit Planning Guid*e.

Fees and Charges

This section describes fees and charges assessed for the V.I.P. SingleConnect ATM Service. These fees and charges are collected either daily through the daily settlement process or monthly through Visa's monthly billing process.

Member-to-Member Fees

A fee, such as a cash disbursement fee, is a vehicle for passing costs between members. For ATM transactions, fees are paid by issuers to acquirers. Cash disbursement fees are settled daily through the settlement process.

Cash Disbursement Fees

Three categories of cash disbursement fees apply to SingleConnect ATM transactions:

- Domestic Cash Disbursement Fees—Fees paid by issuers to acquirers for transactions acquired and issued in the same country
- Intraregional Cash Disbursement Fees—Fees paid by issuers to acquirers for transactions acquired and issued in different countries of the same Visa region
- Interregional Cash Disbursement Fees—Fees paid by issuers to acquirers for transactions acquired and issued in different Visa regions. These are also referred to as International ATM Cash Disbursement Fees.

In this context, "transaction country" is the country in which the transaction takes place, and "issuing country" is the country of the issuer of the card used in the transaction.

If no domestic cash disbursement fee has been established, the intraregional cash disbursement fee applies. If no intraregional cash disbursement fee has been established, the interregional (international) cash disbursement fee applies.

International ATM cash disbursement fees are based on a tiered pricing scheme. The issuer pays a fixed cash disbursement fee for each international Visa/Plus ATM cash disbursement. The acquirer receives a fee based on the tier for which it qualifies.

The three tiers are:

- Tier I—Basic ATM Service.
- Tier II—Enhanced ATM Functionality and Service.
- Tier III—International ATM SuperSite Location.

The qualification requirements for each tier are contained in the *Visa/Plus International ATM Member Guide.*

ATM cash disbursement fees are settled daily. An acquirer receives Tier I or Tier II fees through the settlement process. An acquirer with Tier III transactions receives the difference between the Tier II and Tier III fees monthly from Visa.

Account Transfer Fees

Account transfer fees are established by each region as applicable to each domestic market.

Balance Inquiry and Decline Fees

Balance inquiry and decline fees are assessed to issuers and paid to acquirers. These fees are settled monthly.

Fees Assessed by Visa

Some fees are passed between a member and Visa.

Currency Conversion Fees

Currency conversion fees are assessed by Visa when the transaction currency (currency disbursed at the ATM) and the issuer's cardholder billing currency (currency posted to the cardholder's account) are different. The fees are assessed and settled daily.

See Chapter 5, Multicurrency Support, for more information on currency conversion.

International Outgoing Interchange (IOI) Fees

IOI fees are assessed by Visa to the sender of a transaction when a transaction is acquired outside of the card issuer's country. IOI fees may vary by Visa region. The fees are usually calculated as a percent of the transaction amount.

Charges Assessed by Visa

A charge is a vehicle used to bill members for Visa processing costs. There are *single transaction charges* and *service charges*. A charge can be issuer- or acquirer-unique or it can apply to both members. The charge paid by the member is credited to the member's Visa region. Charging requirements vary by region and are subject to approval by the regional board. Each region establishes the specific criteria by which its charges are assessed.

Processing Charges

Transaction switching charges are assessed by Visa to both issuers and acquirers for transactions processed through VisaNet. These charges, which may vary by transaction type, are billed monthly.

Administrative and Service Charges

Administrative and service charges include:

- Cardholder Database Residency Charges—These fees are for items maintained on the Exception File and the PIN Verification File.
- Cardholder Database File Update Charges—These fees are for updates made to the Exception File and the PIN Verification File.
- Access and Use Fees—These fees are for Visa direct-connect members and processors.
- Settlement and Reconciliation Charges—These fees are for additional funds transfers over and above the single transfer per VisaNet endpoint per day, which can be made at no charge.

Most administrative and service charges are billed monthly.

See the applicable Visa operating regulations for detailed descriptions of fees and charges.

Reporting Fees and Charges

Visa reports fees and charges on both a daily and monthly basis. V.I.P. SingleConnect Service charges are passed by the individual transaction processing systems to the Integrated Billing System (IBS), which consolidates them for reporting to members. Visa also reports administrative and service charges, such as monthly VisaNet Access Point (VAP) access charges. Transaction charges are accumulated daily and billed monthly. Charges that have been settled by other Visa systems are included in the reports to provide a complete accounting of Visa charges for the member. IBS reports are produced monthly.

Daily Fee Reporting

Reimbursement fees and currency conversion fees are listed on the daily reconciliation summary reports. Fees and charges assessed by Visa are reported on the daily settlement reports.

Monthly Reporting and the Integrated Billing System (IBS)

Processing charges reported monthly include administrative and service charges. IBS reports are produced monthly, and include accumulated daily charges.

The IBS reports all member-to-Visa charges on a monthly basis, accumulating daily charges for this billing. Categories that are reported include:

- Processing charges.
- Administrative and service charges.

Visa Integrated Billing Statement

Every SingleConnect participant receives a Visa Integrated Billing Statement, which is produced monthly to give members a unified picture of the Visa products and services they use. Charges for authorization, clearing and settlement, single-message processing, and all other Visa services are reported in the statement. All single-message processing and administrative charges are listed on the statement, including those collected through the daily settlement process.

SingleConnect ATM Transactions 2

This chapter identifies the transactions supported for the SingleConnect ATM Service, gives a brief description of each transaction type, and explains how ATM participants maintain message integrity for all transactions.

Most SingleConnect ATM transactions are initiated by cardholders at ATMs. Other transactions are initiated by the acquirer or issuer. Some transactions are system-generated; others are initiated in the issuer or acquirer back office.

Transaction Types

Table 2–1 lists all of the SingleConnect ATM transactions and their corresponding groups.

Table 2–1: ATM Transaction Types (1 of 3)

Transaction Type	Message Type	Visa ATM/ Plus	Visa ATM Only
Cardholder Transactions			
ATM Cash Disbursement	0200	✔	
Account Transfer (domestic only)	0200	✔	
Balance Inquiry	0200	✔	
System-Generated Transactions			

Table 2–1: ATM Transaction Types (2 of 3)

Transaction Type	Message Type	Visa ATM/ Plus	Visa ATM Only
Reversal	0420	✔	
Cash Disbursement Adjustment	0220	✔	
Exception Transactions (can be submitted using BOAS)			
Adjustment	0220	✔	
Chargeback	0422	✔	
Chargeback Reversal	0422	✔	
Representment	0220	✔	
Fee-Related Transactions			
Acquirer Generated Fee Collection/Funds Disbursement	0220		✔
Issuer Generated Fee Collection/Funds Disbursement	0422		✔
Reconciliation Transactions	0500/0520	✔	
File Maintenance Transactions			
Online File Maintenance	0302	✔	
Automatic Cardholder Database Update (Auto CDB)	0322		✔
Administrative Transactions			
Free Text Message	0600	✔	
Funds Transfer	0620	✔	

Table 2–1: ATM Transaction Types (3 of 3)

Transaction Type	Message Type	Visa ATM/ Plus	Visa ATM Only
CRIS Alerts	0620		✔
Online Fraud Reporting	9620		✔
Network Management Transactions	0800	✔	

For details about message types, see Chapter 4, Message Types and Flows. For details about message formats and field descriptions, refer to the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*.

Cardholder Transactions

The following transactions are initiated by a cardholder at an ATM.

ATM Cash Disbursement—The cash disbursement is the basic ATM transaction illustrated in Figure 1–4 of Chapter 1. Both issuers and acquirers must support it.

Account Transfer (Domestic Only)—The account transfer is an ATM request to transfer funds between a cardholder's two accounts at the same financial institution.

Balance Inquiry—Balance inquiry transactions allow cardholders to check their balances at ATMs. The inquiry is initiated when the card is read electronically and the PIN is entered.

If the issuer system cannot be reached, VisaNet stand-in processing responds that the issuer is not available. If the issuer is available and supports balance inquiries, the account balance is returned to the acquirer for display or printing in the currency of the ATM.

Acquirers in the U.S. region must support balance inquiries; support of this transaction is optional for all other participants.

System-Generated Transactions

The following transactions are system-generated:

- Reversals
- ATM cash disbursement adjustment-misdispense transactions

The following subsections describe system-generated transactions that SMS supports for ATM.

Reversal

Acquirers and Visa use reversals to reverse approved cash disbursements that were not completed as requested. Reversals must immediately follow the transactions being reversed.

A reversal transaction can be initiated by an ATM, an acquirer's host system, or V.I.P. A reversal transaction is system-generated.

Issuers and acquirers must match reversals to the corresponding financial transactions by using tracing data, as discussed in the "Message Integrity" section later in this chapter.

A reversal transaction must occur on the same calendar day as the transaction being reversed.

Acquirer-Generated Reversals—Acquirers generate a reversal in the following circumstances:

- When the cardholder cancels the financial transaction or when the transaction is cancelled for any other reason.
- To reverse a prior request when the acquirer's system did not receive a response, received a late response, or is unable to forward an approval response to the ATM.
- When the ATM fails to dispense funds or when a completion message is not received from the ATM.
- When a communications failure prevents transmission of a reversal request, as described in this section. The acquirer system stores the reversal and then forwards it to VisaNet when communications are restored.

V.I.P.-Generated Reversals—V.I.P. generates reversal advices in the following circumstances:

- When a reversal is received from an acquirer but the issuer is not available. In this case, V.I.P. responds to the acquirer and stores a reversal advice for later delivery to the issuer.
- When an approval response cannot be delivered to an acquirer. In this case, V.I.P. generates a reversal request for the issuer and a reversal advice for the acquirer.

Cash Disbursement Adjustment

There are three situations in which an SMS ATM acquirer uses a debit or credit cash disbursement adjustment:

- Partial Dispense or Misdispense—The amount dispensed from the ATM does not match the previously approved financial transaction amount.
- Late Completion—The acquirer receives an approval and passes it to the ATM. The acquirer cannot confirm that the transaction completed successfully, so it reverses the transaction. After the reversal is processed, the acquirer determines the transaction actually completed at the ATM.
- Partial Dispense Detected, Previously Reversed (Plus Only)—After the transaction is reversed, the acquirer determines that a partial dispense occurred at the ATM.

  Both acquirers and issuers must support this transaction.

Exception Transactions

The following transactions are used to correct errors that occur at the point of transaction or in a participant's system:

- Adjustment (back office)
- Chargeback
- Chargeback reversal
- Representment

Issuer systems must be able to electronically create chargebacks and chargeback reversals, and receive adjustments and representments. Acquirer systems must be able to electronically receive chargebacks and chargeback reversals, and create adjustments and representments.

Adjustments, chargebacks, and representments must be submitted in accordance with the applicable Visa operating regulations.

Adjustment (Back Office)—An acquirer generates an adjustment to the cardholder's account for an original transaction in order to correct an error found during ATM balancing. The adjustment can be either a debit or a credit (because the cardholder's account was charged either less or more than the actual amount agreed on at the time of the transaction).

Chargeback—A chargeback transaction is used to credit a cardholder's account for the transaction amount under certain conditions.

An issuer can create a chargeback when:

- A cardholder disputes a transaction.
- The issuer itself disputes a transaction.

Chargeback Reversal—An issuer generates a chargeback reversal to cancel a prior chargeback transaction that was sent in error to the acquirer.

Representment—An acquirer generates a representment to debit a cardholder's account when the validity of a chargeback can be disproved.

The representment must be for the exact amount of the chargeback.

Exception Handling—Acquirers and issuers need a way to create the required electronic exception transactions. One way is to use Visa's BackOffice Adjustment System (BOAS), a stand-alone PC software package that communicates to Visa through a VisaNet Access Point (VAP).

Another way is for the issuer or acquirer to include the needed data entry and transaction creation functions in its own system.

For SingleConnect ATM participants that choose to do the development themselves, a key consideration is the data source for creating exception transactions. Either of the following approaches can be used:

- Store transaction data for later lookup, as needed, during the creation of exception transactions
- Include transaction data on routine reports, then key-enter all needed data as the exception transaction is created.

Developing and maintaining a database may require more development work, but creating exception transactions is less labor intensive and less error prone. The second approach may require less development effort, but requires more manual work to create electronic exception transactions.

Fee-Related Transactions

There are two types of fee-related transactions for ATM, both of which have financial value:

- Fee Collections—These transactions are used to collect miscellaneous fees.
- Funds Disbursements—These transactions are used to remit miscellaneous fees.

These transactions can be submitted by an issuer, an acquirer, or VisaNet and do not require authorization. Because authorization is not required and fee-related transactions cannot be declined, they are always processed as advices. Visa issuers and acquirers must support fee-related transactions.

These transactions are not available to Plus issuers and acquirers.

Reconciliation Transactions

VisaNet uses reconciliation transactions to provide cumulative financial totals to issuers and acquirers when requested and at the end of the day. These reconciliation totals are used by SingleConnect participants to verify processing totals throughout the day. Receipt of reconciliation messages is optional for issuers and acquirers.

Members also can initiate an online message at any time to receive the previous day's end-of-day totals or current reconciliation totals.

File Maintenance Transactions

File maintenance transactions are used by issuers that subscribe to one or both of the following optional services:

- PIN Verification Service
- Exception File Service

There are two types of file maintenance transactions:

- File Update—This transaction is used to update the issuer's entries on the PIN Verification File or the Exception File. An update advice also is provided to Automatic Cardholder Database Update (Auto-CDB) Service participants.
- File Inquiry—This transaction is used to review the issuer's entries on the PIN Verification File or the Exception File.

File maintenance transactions can be submitted as individual messages or in batch mode.

For details about online file maintenance messages, refer to Chapter 4, Message Types and Flows, and the Message Formats chapter of the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*. Batch file maintenance specifications are located in the Files appendix of the technical specifications.

Administrative Transactions

Administrative messages, which are initiated by an ATM participant's operations staff, are used to request or convey information between participants.

ATM administrative messages consist of:

- Free Text Messages—These messages are used to provide or request information of a general nature for ATM transactions. Because these messages contain free-text, not codes, they can be routed to a printer, for manual evaluation, or documented on a report.

  Administrative free text messages must be supported by all issuers and acquirers.

- Funds Transfer—These messages are used to send the day's final funds transfer totals after completion of settlement and reconciliation.

- CRIS Alerts—These messages notify subscribing issuers of cardholder accounts with levels of risk equal to or above subscriber-defined thresholds.

- Online Fraud Reporting—These messages are used to report fraud transactions that VisaNet passes to the Fraud Reporting System.

Network Management Transactions

Network management transactions are used for communicating information about system status between Visa and members. They are also used to initiate various types of failure recovery and reconciliation activities.

Network management transactions are used to perform the following functions:

- Sign-On—Issuers and acquirers use this function to notify VisaNet that they are available to send and receive messages.
- Sign-Off—Issuers and acquirers use this function to notify VisaNet that they are not available.
- Recovery Sign-On—Issuers and acquirers use this function to request delivery of advice messages.
- Recovery Sign-Off—Issuers and acquirers use this function to indicate that they do not want to receive advice messages.
- Reconciliation Request—Issuers and acquirers use this function to request the current or previous day's processing totals.
- Echo Test—Issuers, acquirers, and VisaNet use this function to confirm the availability of the communications link between the member's host system and VisaNet.
- Dynamic Key Exchange—Issuers, acquirers, and VisaNet use this function to update working keys online. See Chapter 7, Security, for information about keys.

Both acquirers and issuers must support all of these functions, except the reconciliation request and the dynamic key exchange, which are optional.

VSDC Transactions

To see how ATM transactions are processed by the Visa Smart Debit and Visa Smart Credit (VSDC) product, refer to the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications.* For additional information about VSDC, refer to sources listed in Chapter 1, Service Overview.

Message Integrity

Maintaining message integrity is a basic requirement of V.I.P. SingleConnect Service processing. Message integrity assures V.I.P. SingleConnect Service participants that all other participants have followed the rules, and that a participant can act on a message or transaction as defined—for example, a completed transaction was actually completed and a cancelled transaction was, in fact, cancelled.

Ensuring message integrity requires that all participants keep track of incoming and outgoing messages and generate reversals for transactions that cannot be completed. This process involves transaction tracing, transaction control, and transaction sets.

For example, transaction tracing can be accomplished by using the message type and one or more other key data elements to match request and response messages, to match reversals to original transactions, and to tie a transaction, such as a chargeback, to the original transaction.

Key data elements include:

- Transmission date and time.
- Systems trace audit number.
- Transaction identifier.
- Acquiring institution ID.
- Retrieval reference number.
- Original data elements.

Transaction Sets

VisaNet uses transaction sets to manage all authorizations and financial messages. A transaction set consists of related messages. It enables the acquirer to establish relationships between messages and allows VisaNet and the issuer to identify those relationships. A transaction set provides all three parties with the controls needed to post accounts in real time and update settlement accumulators.

A transaction set consists of one or more transactions. A transaction consists of one or more system transactions. A system transaction is a pair of messages: a request and response, or an advice and advice response.

Within a given transaction set, SMS allows only certain transactions, and within a given transaction, SMS allows only certain system transactions.

Table 2–2 shows the valid ATM transaction sets, and within each set, the allowable transactions and valid system transactions. System transactions are, from left to right, the original request, reversal, chargeback, chargeback reversal, and representment.

Note that this table shows all transactions permitted in a transaction set, not those that would be present for a typical transaction set. If a transaction completes satisfactorily under normal conditions, the set contains only the original submission.

Table 2–2: Visa ATM and Plus Transactions

Transaction Set	Allowable Transactions	System Transactions				
		Request	Reversal	Chargeback	Chargeback Reversal	Represent-ment
ATM Cash Disburse-ment	Cash Disbursement	✔	✔	✔	✔	✔
	Cash Disbursement Adjustment	✔		✔	✔	✔
	BackOffice Adjustment	✔		✔	✔	✔
Balance Inquiry	Balance Inquiry	✔				

Consistency Rules

The acquirer must use messages that are consistent for a transaction set. VisaNet enforces these rules by comparing an incoming message with previous messages containing the same key data elements. In general, VisaNet rejects any message that is out of context or out of sequence.

VisaNet performs consistency editing to prevent invalid, out-of-context messages from being sent to an issuer.

Message Validity

A transaction set cannot include invalid transactions. For example, a cash disbursement transaction set cannot include a balance inquiry.

A transaction cannot be processed with invalid system transactions. For example, a cash disbursement adjustment cannot be reversed.

In addition, the function of a response must correspond to the function of the request. For example, a reversal response to a cash disbursement request is not valid.

Transaction Sequence

Within a transaction set, transactions must be processed in a logical sequence. For example, in a cash disbursement transaction set containing an adjustment, the original cash disbursement must precede the adjustment.

Account Number Consistency

Within a transaction set, all messages requiring an account number must contain the same account number. If the first message in a transaction set contains an account number, the same account number must be used in all subsequent messages that require an account number.

Amount Consistency

The value in Field 4—Amount, Transaction must be identical in all request/response pairs that require an amount.

All transactions within a transaction set must contain the same transaction amount except for chargebacks, chargeback reversals, representments, and adjustments. Chargeback reversals and representments must be for the same amount as the chargebacks.

The requirement for amount consistency has the following impacts:

- Approvals must be for the amounts requested.
- Reversals must always be for the full amounts.

Processing Duplicate Messages

A duplicate message has the same message type and key data elements (Acquiring Institution ID, Retrieval Reference Number, Trace Number, Transmission Date and Time, and Transaction Identifier) as a prior message. V.I.P. processes duplicates as follows:

- If processing of the original request was completed (a response was sent), V.I.P. responds to the acquirer with a response code of "94" (duplicate transmission) in field 39 and, optionally, includes the original response value in field 44.11. In this case, V.I.P. does not involve STIP or the issuer. V.I.P. logs the request and response.
- If processing of the original request is still in progress, V.I.P. logs the duplicate, then discards it. (V.I.P. assumes that the original will be completed; therefore the duplicate is not needed.)

Service Participation Requirements 3

This chapter summarizes the required and optional functionality for acquirers and issuers that participate in the V.I.P. SingleConnect ATM Service. Other chapters of this manual contain supporting detail.

General Requirements

Participating acquirers and issuers must meet certain processing and operations requirements. Both issuers and acquirers also have a variety of connection, service, and processing options from which to choose when developing their individual SingleConnect ATM programs.

Acquirers and issuers must be able to send and receive the transactions described in this chapter.

Members must have their connections to VisaNet certified by Visa and must successfully complete the Visa certification process. Once certified, they can begin initiating and receiving SMS transactions. Alternatively, members can designate third-party processors to complete the certification process and process SMS transactions on their behalf.

All ATM acquirers and issuers must:

- Use the VisaNet standard V.I.P. ISO message format and observe all rules for its use.
- Ensure message integrity by keeping track of incoming and outgoing messages and generating reversals for transactions that cannot be completed.

- Participate in the Visa online Multicurrency Service and be able to receive multicurrency fields in online messages and raw data files if the raw data option is selected. (Multicurrency processing is not required for issuers whose cardholder billing and settlement currencies are U.S. dollars.)
- Use VisaNet Access Point (VAP) Software Release 10.2 or higher.
- Complete technical certification prior to participation in the service. The certification process covers all relevant message types, raw data, and reports. Online certification services are available from your Visa representative.
- Comply with all applicable Visa operating regulations.
- Support exception processing, as specified later in this chapter.
- Support the mandatory use of Personal Identification Numbers (PINs) and meet the PIN processing requirements specified in Chapter 7, Security.
- Participate in the Card Verification Value (CVV) Service, which is mandatory for Visa cards in all regions. The CVV service is optional for Plus issuers connected to VisaNet. Refer to Chapter 6, Stand-In and Card Verification Value Processing, for more information.
- Participate in the Fraud Reporting System (FRS) and be able to create 9620 advice messages. (Not available for Plus messages.) For more information, see Chapter 4, Message Types and Flows.
- Participate in the VisaNet Settlement Service (VSS).

Online Transaction Processing Requirements

Transaction types that must be supported by all issuers and acquirers are specified in Table 3–1.

Table 3–1: Required Transaction Types (1 of 2)

Transaction Type	Visa ATM/ Plus	Visa ATM Only
Cash Disbursement	✔	
Reversal	✔	
Cash Disbursement Adjustment	✔	
Adjustment (back office)	✔	

Table 3–1: Required Transaction Types (2 of 2)

Transaction Type	Visa ATM/ Plus	Visa ATM Only
Chargeback	✔	
Chargeback Reversal	✔	
Representment	✔	
Fee-Collection/Funds Disbursement		✔
Administrative Free Text Message	✔	
Online Fraud Reporting		✔
Network Management Transactions	✔	
Responses to all transactions	✔	

U.S. issuers must support balance inquiries. Balance inquiries are optional for all other participants.

All financial and nonfinancial transactions should be logged, whether approved or declined, for reconciling to Visa settlement positions.

Acquirer System Requirements

The following additional capabilities must by supported by SingleConnect ATM Service acquirers.

PIN Security

PIN security must be assured from the moment the cardholder enters the PIN until the transaction leaves the acquirer's system. Each ATM acquirer must be capable of accepting and translating encrypted PINs and performing key management.

See Chapter 7, Security, for more information on transactions that may include a PIN and standards for PIN security.

Exception Processing

Automated exception processing must be supported. This includes the ability of the acquirer's system to initiate adjustments and representments and the ability to accept chargebacks and chargeback reversals. The Visa BackOffice Adjustment System (BOAS) is an option that can be used to meet this requirement. BOAS is available at the region's discretion.

ATM Routing Tables

Visa and Plus acquirers are required to use the Visa and Plus routing tables or the Combined Visa/Plus routing tables. Arrangements for receiving the tables can be made through an acquirer's Visa representative.

Acquirer Service Options

Additional services and capabilities that can be used by ATM acquirers are listed in Table 3–2.

Table 3–2: ATM Acquirer Options (1 of 2)

Options	Restrictions	References
Visa/Plus ATM Transaction Processing Integration (recommended)	n/a	Appendix A, ATM Processing Integration
Optional message types: • Account transfer (domestic only) • Balance inquiry • Reconciliation	n/a	Chapter 4, Message Types and Flows
Currency Precision Service		Chapter 5, Multicurrency Support
Dynamic Key Exchange	n/a	Chapter 7, Security
Choice of routing tables	n/a	Chapter 8, Routing
Priority Routing Service	n/a	Chapter 8, Routing
Choice of settlement options	n/a	*Visa Settlement Service (VSS) User's Guide*
Choice of detail reports	n/a	*Visa Settlement Service (VSS) User's Guide*

Table 3–2: ATM Acquirer Options (2 of 2)

Options	Restrictions	References
Visa BackOffice Adjustment System (BOAS)	Available at region's discretion	Chapter 10, Member-to-Visa Connection Options
Choice of one or more VAP options	n/a	Chapter 10, Member-to-Visa Connection Options
Choice of report delivery options	n/a	Chapter 10, Member-to-Visa Connection Options
Receipt of raw data files	n/a	Files appendix of *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*
Visa Smart Debit and Visa Smart Credit (VSDC)	For Visa ATM acquirers	*Visa Smart Debit and Credit Planning Guide* *Visa Smart Debit and Credit Member Implementation Guide*

Issuer System Requirements

Issuer systems are required to respond to SMS messages sent from VisaNet. In addition, issuers need to:

- Send chargebacks, administrative messages, and network management messages.
- Send online file maintenance messages.
- Receive transaction requests and approve or decline them according to internally defined parameters. Responses must occur within a specified issuer response time or VisaNet processes them using stand-in processing (STIP).
- Receive and process advices from STIP.
- Issue cards in accordance with all applicable Visa operating regulations.
- Support PIN processing requirements as defined in Chapter 7, Security.

In addition, all Visa cards must support the Card Verification Value 2 (CVV2) Service. However, CVV2 values are not passed in ATM transactions. For more information, see Chapter 6, Stand-In and Card Verification Value Processing. The CVV2 requirement does not apply to Plus cards.

SingleConnect ATM Service issuers must support the capabilities specified in the following sections.

PIN Verification

Each ATM issuer must provide PIN verification capability or subscribe to the Visa PIN Verification Service (PVS).

Issuers that support ATM traditionally use online PIN but may elect to add offline PIN functionality through Visa Smart Debit and Visa Smart Credit (VSDC). For more information, refer to the *Visa Smart Debit and Visa Smart Credit Service Description*.

Exception Processing

Automated exception processing must be supported. This includes the ability of the issuer's system to initiate chargebacks and chargeback reversals, and the ability to accept adjustments and representments. Issuers can meet this requirement by using the Visa BackOffice Adjustment System (BOAS). BOAS is available at the region's discretion.

Stand-In Processing Parameters

All issuers must supply Visa with parameters to use when the issuer system is unavailable or does not respond to request messages within the required time limit and SMS makes processing decisions on behalf of the issuer.

The time limit may vary by issuer but must be within 30 seconds.

Depending on the Visa card product, the parameters can be as simple as specifying that VisaNet should decline all authorizations if the issuer system cannot be reached.

ATM Format Conversion Service

All issuers must participate in the ATM Format Conversion Service, which enables SingleConnect issuers to receive ATM transactions from dual-message acquirers as full financial messages (0200s). For more information about this service, see Chapter 1, Service Overview.

SMS Advice Retrieval Service

All issuers must participate in the SMS Advice Retrieval Service, which enables issuers to use online connections to recover all types of advices from the SMS Advice File.

For information on recovering advices, see Chapter 4, Message Types and Flows, and Chapter 6, Stand-In and Card Verification Value Processing.

Issuer Options

Additional services and features that can be used by ATM issuers are listed in Table 3–3.

Table 3–3: ATM Issuer Options (1 of 2)

Options	Restrictions	References
Visa/Plus ATM Transaction Processing Integration (recommended)	n/a	Appendix A, ATM Processing Integration
Optional message types: • Account transfer (domestic only) • Balance inquiry • Reconciliation messages	n/a	Chapter 4, Message Types and Flows
Optional issuer fee for currency conversion	n/a	Chapter 4, Message Types and Flows
Currency Precision service	n/a	Chapter 4, Message Types and Flows
STIP processing: • PIN Verification Service • Exception File Service • Modulus-10 Check Digit Verification • Transaction activity limits • Negative account control • Expiration date requirement • PIN-retry limits	n/a	Chapter 6, Stand-In and Card Verification Value Processing
Cardholder Risk Identification Service (CRIS) and online CRIS alerts	Not available for Plus	Chapter 6, Stand-In and Card Verification Value Processing
Card Verification Value (CVV)	Optional for Plus issuers connected to VisaNet; required for all Visa cards	Chapter 6, Stand-In and Card Verification Value Processing

Table 3–3: ATM Issuer Options (2 of 2)

Options	Restrictions	References
Flexible Times for Online Delivery of BASE II Advices	n/a	Chapter 1, Service Overview
Automatic Cardholder Database Update (Auto-CDB)	For Visa ATM issuers	Chapter 6, Stand-In and Card Verification Value Processing
Dynamic Key Exchange	n/a	Chapter 7, Security
Account Selection Routing	n/a	Chapter 8, Routing
Choice of settlement options	n/a	*VisaNet Settlement Service (VSS) User's Guide*
Choice of detail reports	n/a	*VisaNet Settlement Service (VSS) User's Guide*
Visa BackOffice Adjustment System (BOAS)	Available at region's discretion	Chapter 10, Member-to-Visa Connection Options
Choice of one or more VAP options	n/a	Chapter 10, Member-to-Visa Connection Options
Choice of report delivery options	n/a	Chapter 10, Member-to-Visa Connection Options
Receipt of raw data files	n/a	Files appendix of *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*
Visa Smart Debit and Visa Smart Credit (VSDC)	For Visa ATM issuers	*Visa Smart Debit and Credit Planning Guide* *Visa Smart Debit and Credit Member Implementation Guide*

Message Types and Flows 4

This chapter describes the message flows for SingleConnect ATM transactions. It explains which message types are used and how messages are exchanged. Each flow description includes a diagram showing which messages are passed between the acquirer, issuer, and SMS.

This chapter contains two sections:

- Standard Processing—This section describes the flows for the following transactions processed under standard conditions:
  - Cardholder Transactions
  - System-Generated Transactions
  - Exception Transactions
  - Fee-Related Transactions (Visa Only)
  - Reconciliation Transactions
  - File Maintenance Transactions
  - Administrative Transactions
  - Network Management Transactions
- Exception Conditions—This section describes the flows for the following transactions when an endpoint is not available, responds late, or fails to respond:
  - Financial Transactions
  - Reversals
  - Exception Transactions

Standard Processing

This section describes the following transactions processed under standard conditions.

- Cardholder Transactions
  - Cash Disbursements
  - Balance Inquiry
  - Account Transfer (Domestic Only)
- System-Generated Transactions
  - Reversal
  - Cash Disbursement Adjustment
- Exception Transactions
  - Adjustments (Back Office)
  - Chargebacks
  - Chargeback Reversal
  - Representments
  - Fee-Related Transactions (Visa Only)
- Reconciliation Transactions
  - Requested Reconciliation Advices
  - Automatic Reconciliation Advices
- File Maintenance Transactions
  - Online File Maintenance
  - Automatic Cardholder Database Update
- Administrative Transactions
  - Free Text Message
  - Funds Transfer Message
  - Online Fraud Reporting
- Network Management Transactions
  - Sign-On and Sign-Off Messages
  - Echo Test Messages
  - Recovery Sign-On and Sign-Off Messages
  - Dynamic Key Exchange

Cardholder Transactions

The following flow diagrams and descriptions illustrate the flows for ATM transactions initiated by the cardholder.

Cash Disbursements

An ATM cash disbursement is a request to authorize, post, and settle a transaction for the withdrawal of cash from an ATM. The withdrawal can come from a cardholder's checking, savings, or credit card account.

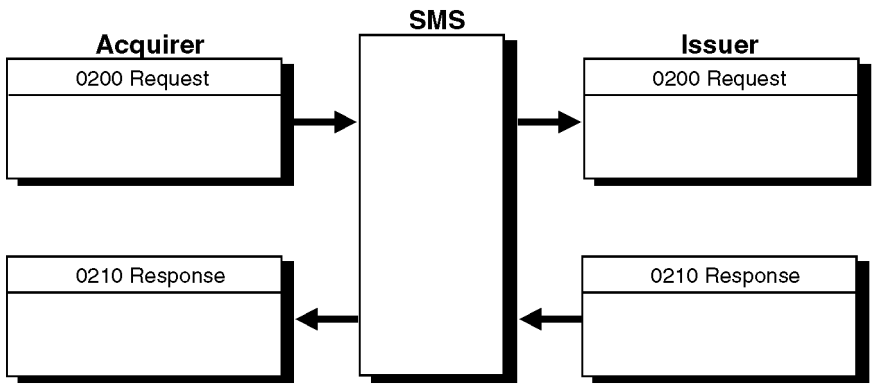
Approved cash disbursements have financial impact on cardholder accounts. They result in the updating of system settlement totals for both the acquirer and issuer.

A standard cash disbursement transaction consists of two messages:

- An 0200 request generated by the acquirer
- An 0210 response sent by the issuer

Figure 4–1 illustrates the standard flow of a cash disbursement transaction.

Figure 4–1: Cash Disbursement Transaction Flow



Balance Inquiry

A balance inquiry requests that a savings, checking, or credit card account balance be displayed at an ATM. Support of this transaction is optional for SingleConnect participants, except in the U.S. region, where support is required.

The issuer returns an amount in Field 54—Additional Amounts of an 0210 response message. Amounts are displayed in the currency of the ATM.

If the balance is a negative amount, the issuer returns zeros.

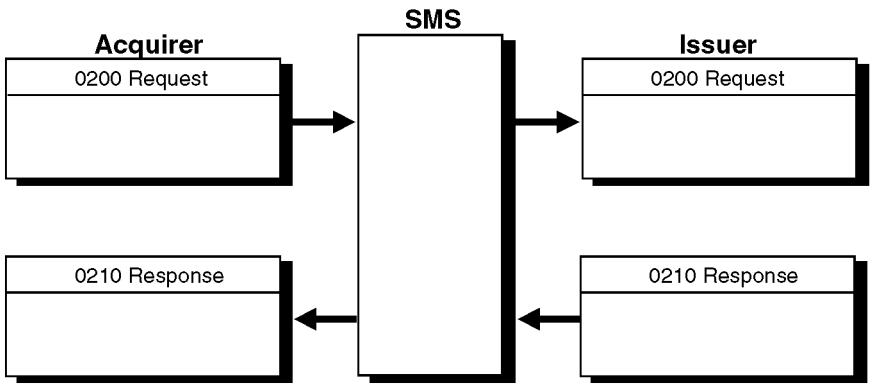
A balance inquiry has no financial interchange value and cannot be reversed.

To distinguish the balance inquiry from other 0200 requests, a value of 30 is placed in the first two positions of Field 3—Processing Code.

If STIP returns a decline decision on behalf of the issuer, STIP does not create an advice for the issuer.

The standard flow of a balance inquiry transaction is illustrated in Figure 4–2. It consists of a balance inquiry request (0200) originated by the acquirer, followed by a balance inquiry response (0210) generated by the issuer.

Figure 4–2: Balance Inquiry Transaction Flow



Account Transfer (Domestic Only)

An account transfer is a request to transfer funds between a cardholder's two accounts at the same financial institution. ATM account transfers are currently available for domestic transactions only.

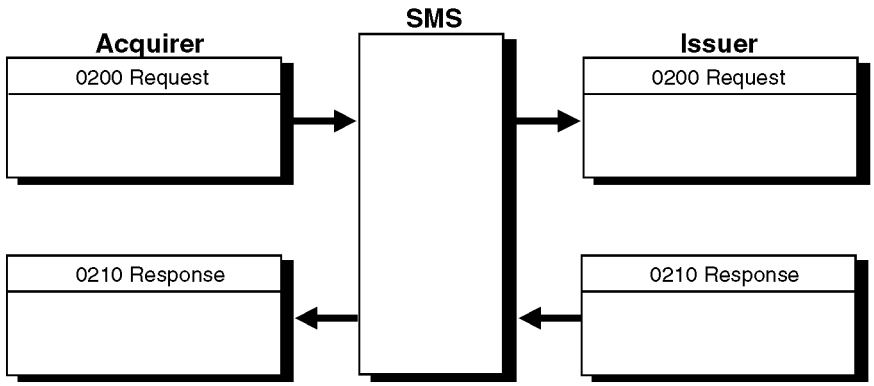
This transaction is strictly between the cardholder and issuer. Because there is no settlement between the acquirer and the issuer, this transaction cannot be adjusted, charged back, or re-presented. An account transfer can be reversed if it is necessary to cancel the cardholder charge when the acquirer cannot deliver the response to the ATM.

STIP cannot process an account transfer on behalf of an unavailable issuer, but checks the account against the Exception File. STIP reponds and creates an advice if a decline or pickup code is on file.

To distinguish the balance inquiry from other 0200 requests, a value of 40 is placed in the first two positions of Field 3—Processing Code.

The standard flow of an account transfer transaction is illustrated in Figure 4–3. It consists of an account transfer request (0200) originated by the acquirer, followed by an account transfer response (0210) generated by the issuer.

Figure 4–3: Account Transfer Transaction Flow



System-Generated Transactions

System-generated transactions consist of reversals and cash disbursement adjustments.

Reversal

A reversal voids a financial transaction. Either SMS or the acquirer can generate a reversal.

Cash disbursements and account transfers are reversed by 0420 reversal advices. Balance inquiries and adjustments (both cash disbursement adjustments and back office adjustments) cannot be reversed.

Only full reversals are supported by SMS. Partial dispenses must be processed as cash disbursement adjustment transactions.

Reversals can have settlement impact. An acquirer-generated reversal of a declined transaction has no settlement impact.

An acquirer uses 0420 reversal advices for the following reasons:

- A previously approved financial transaction (0200) is cancelled:
  - By the cardholder.
  - For any other reason.

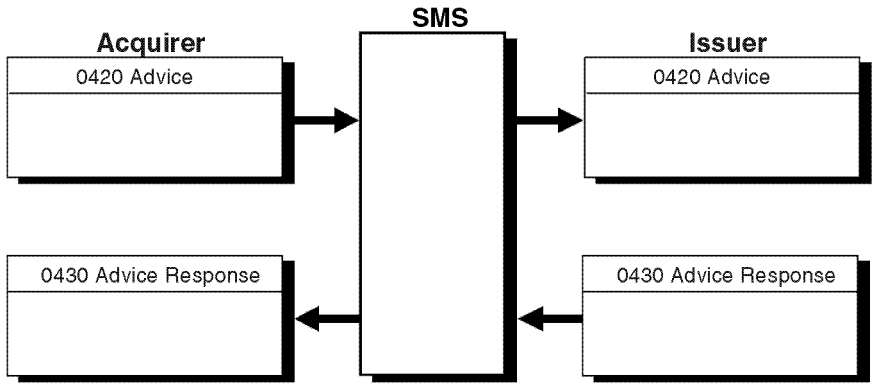
  Message reason code 2501 applies to such advices.
- The acquirer does not receive a response to an 0200 request and does not know if the request was approved or declined (message reason code 2502).
- The acquirer cannot send the approval of an 0200 request to the ATM (message reason code 2502).
- The acquirer receives an approval response from SMS after it has been timed out by its host or the ATM (message reason code 2502)
- The acquirer receives approval of an 0200 request and sends it to the ATM but does not receive a completion message from the ATM (message reason code 2503).
- The ATM fails to dispense funds when a transaction was approved by SMS (message reason code 2502).

SMS uses 0420 advices when it cannot return 0210 approvals to an acquirer or cannot forward a reversal request to an issuer.

A reversal cannot be declined or reversed. On receipt of a reversal, the issuer should release its hold on funds or reverse the posted transaction from the cardholder's account and from its settlement totals. Reversals are generated to prevent errors in settlement and reconciliation and to enable an issuer to adjust any service charges to the cardholder's account.

Figure 4–4 illustrates a standard reversal transaction flow.

Figure 4–4: Reversal Transaction Flow



Cash Disbursement Adjustment

A cash disbursement adjustment is used to adjust the value of an ATM withdrawal, usually within a minute or two of the original transaction. The adjustment can be for a debit or credit amount. Cash disbursement adjustments are used under the following circumstances:

- Partial Dispense or Misdispense—Reason Code 2002

  The amount dispensed by the ATM did not match the amount approved by the issuer. A credit or debit adjustment for the difference is needed so that the cardholder's account can be debited or credited.

- Late Completion—Reason Code 2102 (Visa) or 2201 (Plus)

  The acquirer received an approval and passed it to the ATM, but could not confirm that the transaction completed, and therefore reversed the transaction. After the reversal was processed, the acquirer determined that the transaction actually completed at the ATM.

- Partial Dispense Detected, Previously Reversed—Reason Code 2202 (Plus Only)

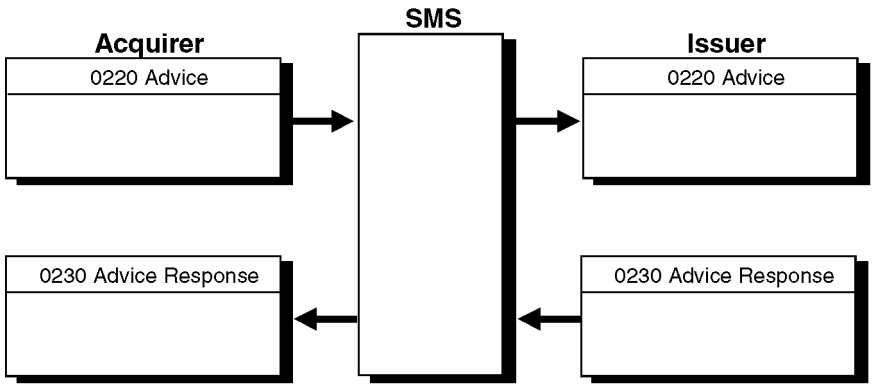
  The acquirer reversed the transaction; after the reversal was processed, the acquirer determined that a partial dispense had occurred at the ATM.

For debit adjustments, the first two positions of Field 3—Processing Code must contain a value of 02, and for credit adjustments the first two positions of Field 3—Processing Code must contain a value of 22.

Acquirers cannot reverse adjustments, but issuers can charge them back, and acquirers can re-present adjustments. Under normal conditions, the acquirer sends an 0220 adjustment advice to the issuer, and the issuer acknowledges with an 0230 advice response.

Figure 4–5 illustrates a cash disbursement adjustment transaction flow.

Figure 4–5: Cash Disbursement Adjustment Transaction Flow



Exception Transactions

The following exception transactions are supported for the SingleConnect ATM Service:

- Adjustments (Back Office)
- Chargebacks
- Chargeback Reversals
- Representments

Adjustments (Back Office)

A back office adjustment is used by acquirers when a processing error has been identified, typically through the reconciliation process. For example, during reconciliation an ATM misdispense or duplication of a transaction is discovered. Adjustment advices are entered by the acquirer's operations staff, not by the ATM.

There are two types of adjustment transactions:

- Debit adjustments (processing code 02*xxxx*) are used when an ATM dispensed more than the actual transaction amount.
- Credit adjustments (processing code 22*xxxx*) are used when one of the following conditions applies:
  - An ATM dispensed less than the actual amount.
  - The cardholder was charged for an invalid transaction.

The acquirer has the option of entering adjustments using the BackOffice Adjustment System (BOAS). The issuer can receive adjustments through BOAS.

Only one adjustment can be issued for a transaction.

To distinguish the adjustment from other transactions, the message reason code in field 63.3 must be 2004 (Acquirer Error Correction) for ATM transactions.

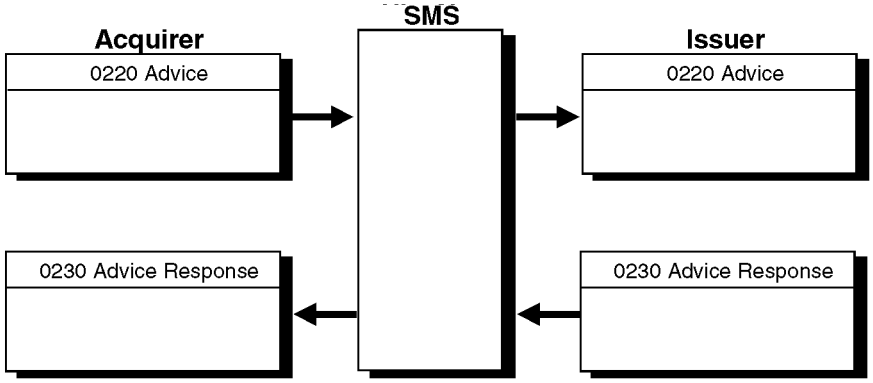
An 0220 adjustment advice is sent by the acquirer. An 0230 advice response is returned by the issuer or STIP to acknowledge to the acquirer that the adjustment advice was successfully received. An issuer cannot decline an adjustment, although it can charge it back if chargeback/return rights exist. The approval by the issuer indicates the adjustment has been received; it does not indicate that the issuer is in agreement with the adjustment.

The acquirer cannot reverse an adjustment. Issuers can return invalid debit adjustments or credit adjustments through chargeback transactions, and acquirers can re-present adjustments.

If an adjustment transaction times out (that is, an 0230 advice response is not received), the acquirer must resend the adjustment unchanged with the same tracing elements.

Figure 4–6 illustrates a standard (back office) adjustment transaction flow.

Figure 4–6: Adjustment (Back Office) Transaction Flow



Chargebacks

An issuer uses a chargeback to return a previously accepted financial transaction to an acquirer. Issuers have the right to charge back to the acquirer posted transactions that are disputed by the cardholder or identified as invalid by the issuer. Chargebacks must adhere to applicable Visa operating regulations.

Chargebacks must be submitted within a set number of calendar days from the origination date of the transaction being charged back. The set number of days varies by the type of chargeback and is within 45 to 180 calendar days of the original transaction.

The chargeback amount should be for the original amount and should not include optional issuer fees. The chargeback amount can be for the original amount or less. Partial chargebacks are allowed when the cleared amount exceeds the authorized amount.

The issuer has the option of entering chargebacks using the BackOffice Adjustment System (BOAS). The acquirer can elect to receive chargebacks through BOAS.

The chargeback flows from the issuer to the acquirer—the opposite direction from other financial transactions. The response by the acquirer acknowledges that the chargeback was successfully received and processed. The response does not signify that the acquirer is in agreement with the request.

Acquirers use representments to return invalid chargebacks.

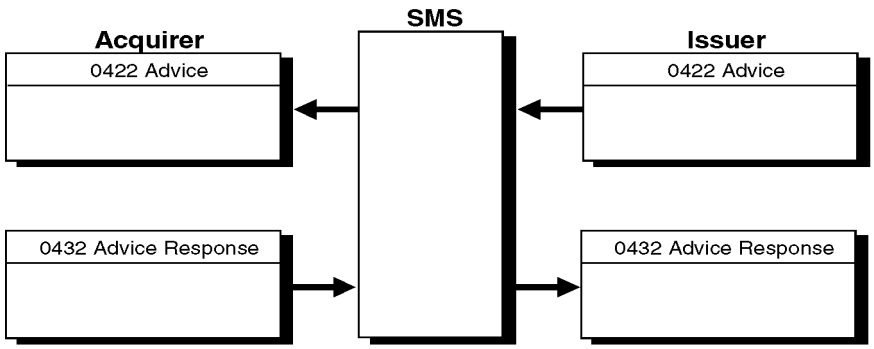
If the chargeback times out at the issuer, the issuer should resend the chargeback transaction unchanged.

A chargeback can be distinguished from other messages of the same message type by the value of 17 in Field 25—Point of Service Condition Code. Reasons for chargebacks are identified in Field 63.3—Message Reason Code.

Only one chargeback transaction can be processed for a cardholder transaction.

Figure 4–7 illustrates a chargeback transaction flow.

Figure 4–7: Chargeback Transaction Flow



Chargeback Reversal

Chargeback reversals are used by issuers to cancel chargebacks that were sent in error to acquirers. Chargeback reversals have settlement impact.

An issuer sends an 0422 advice to an acquirer to reverse in full a chargeback that was sent in error. If SMS cannot deliver the advice to the acquirer, it stores the advice for later recovery by the acquirer.

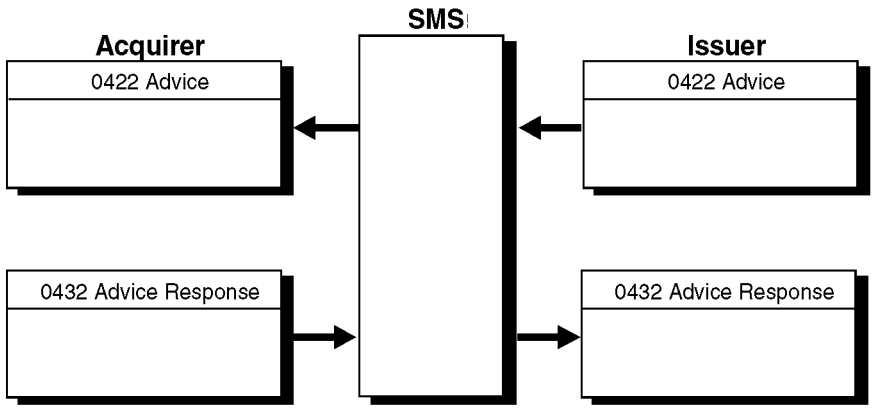
If the chargeback reversal times out at the issuer, the issuer should resubmit the transaction.

A chargeback reversal must contain the value of 54 in Field 25—Point of Service Condition Code.

Under standard conditions, the acquirer receives an 0422 chargeback reversal advice from the issuer and acknowledges with an 0432 advice response.

Figure 4–8 illustrates a chargeback reversal transaction flow.

Figure 4–8: Chargeback Reversal Transaction Flow



Representments

An acquirer uses a representment to resubmit a transaction that was charged back by an issuer. An acquirer can resubmit to the issuer any item that was previously charged back by the issuer. Representments must adhere to applicable Visa operating regulations.

The acquirer has the option of entering representments using the BackOffice Adjustment System (BOAS). The issuer can elect to receive representments through BOAS.

A representment cannot be reversed or declined.

An approval response from the issuer or STIP acknowledges that the request was received, not that the issuer agrees with the request.

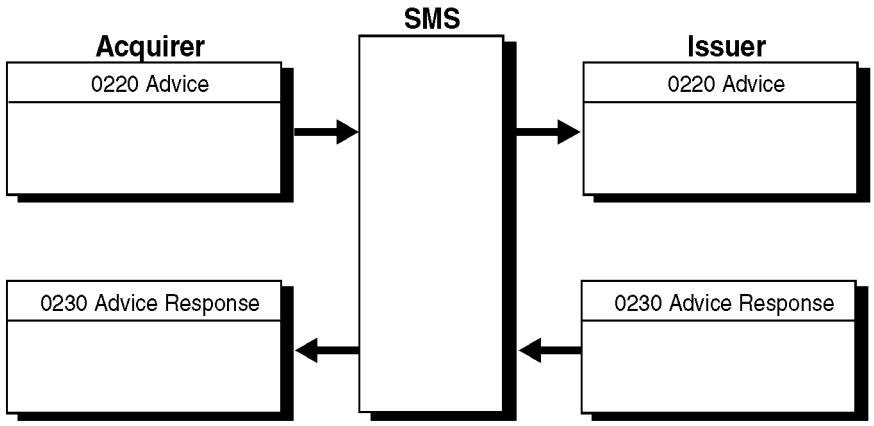
If the representment times out at the acquirer, the acquirer should resend the representment unchanged.

A representment can be distinguished from other messages of the same message type by a code of 13 in Field 25—Point of Service Condition Code. Reasons for representments are identified in Field 63.3—Message Reason Code.

An acquirer sends an 0220 representment advice to the issuer. The issuer acknowledges with an 0230 advice response.

Figure 4–9 illustrates a representment transaction flow.

Figure 4–9: Representment Transaction Flow



Fee-Related Transactions (Visa Only)

A fee-related transaction is a fee collection or funds disbursement transaction. It is used to collect or remit miscellaneous fees such as recovered card rewards. SMS supports fee-related transactions for Visa ATM but not Plus.

Acquirers use 0220 advices to send fee-related transactions to issuers. Issuers use 0422 advices to send fee-related transactions to acquirers. These advices contain all the information needed for settlement. SMS uses 0220 advices to send fee-related transactions to issuers and 0422 advices to send fee-related transactions to acquirers. The BackOffice Adjustment System (BOAS) supports both 0220 and 0422 fee messages.

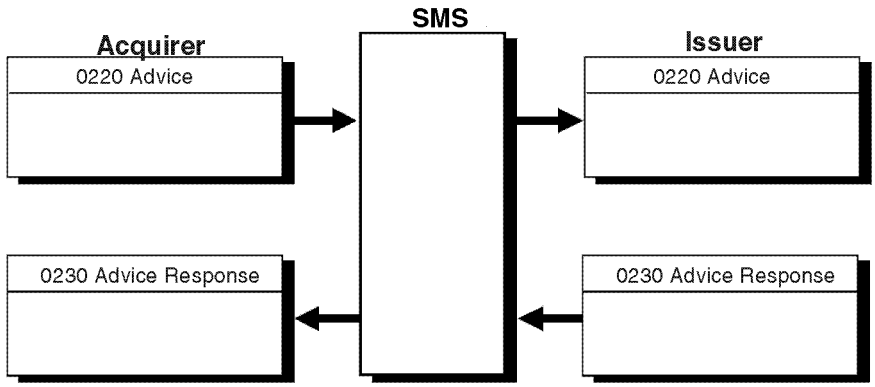
Fee transactions usually do not relate directly to cardholder transactions, and therefore do not result in postings to cardholders' accounts. They are financial in nature, however, and update settlement totals for the sender and receiver. Because fee-related transactions do not require authorization and cannot be declined, they are always processed with advice message types.

The value in Field 3—Processing Code of a fee collection must be 19*xxxx*. The value in Field 3—Processing Code of a funds disbursement must be 29*xxxx*. These values are used to distinguish fee-related transactions from other transactions with the same message types.

For acquirer-initiated fee-related transactions, the acquirer sends 0220 fee-related advices to the issuer, and the issuer acknowledges with 0230 advice responses.

Figure 4–10 illustrates an acquirer-initiated fee-related transaction flow.

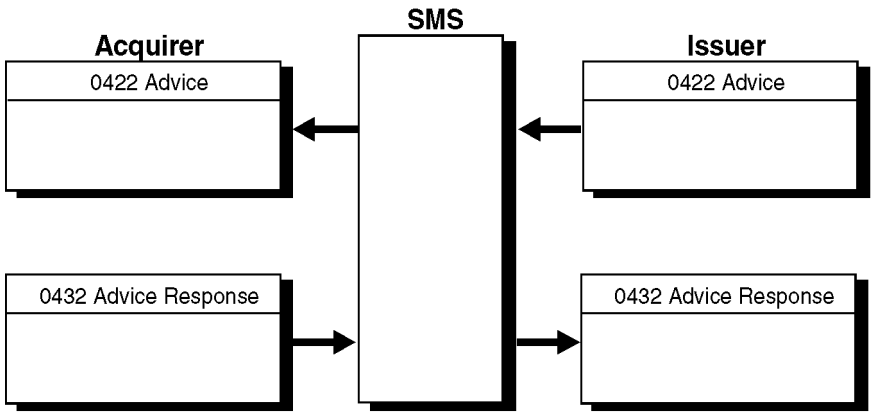
Figure 4–10: Fee-Related Transaction Flow (Acquirer-Initiated)



For issuer-initiated fee-related transactions, the issuer sends 0422 fee-related advices and the acquirer acknowledges with 0432 advice responses.

Figure 4–11 illustrates an issuer-initiated fee-related transaction flow.

Figure 4–11: Fee-Related Transaction Flow (Issuer-Initiated)



Reconciliation Transactions

Reconciliation messages are used to provide issuers and acquirers with current gross interchange totals.

Issuers and acquirers can request and receive cumulative reconciliation advices from Visa at any time. In addition, SMS can send advices automatically at the end of a settlement day (see "Automatic Reconciliation Advices" subsection later in this chapter).

Throughout the day, SMS accumulates counts and amounts of transactions that have an effect on a participant's financial positions. Totals are available for the current and previous days.

The following subsections describe processing for requested advices and automatic advices.

Requested Reconciliation Advices

Members can initiate an online totals message at any time requesting that SMS create issuer and acquirer reconciliation totals. An 0800 network management message is used to request totals, with the value in Field 70—Network Management Information Code indicating either of the following:

- 270—Cumulative totals of the current day, from start of processing to the time of the request for the reconciliation advice
- 280—Previous day's totals (useful when totals are not available at end-of-day cutoff)

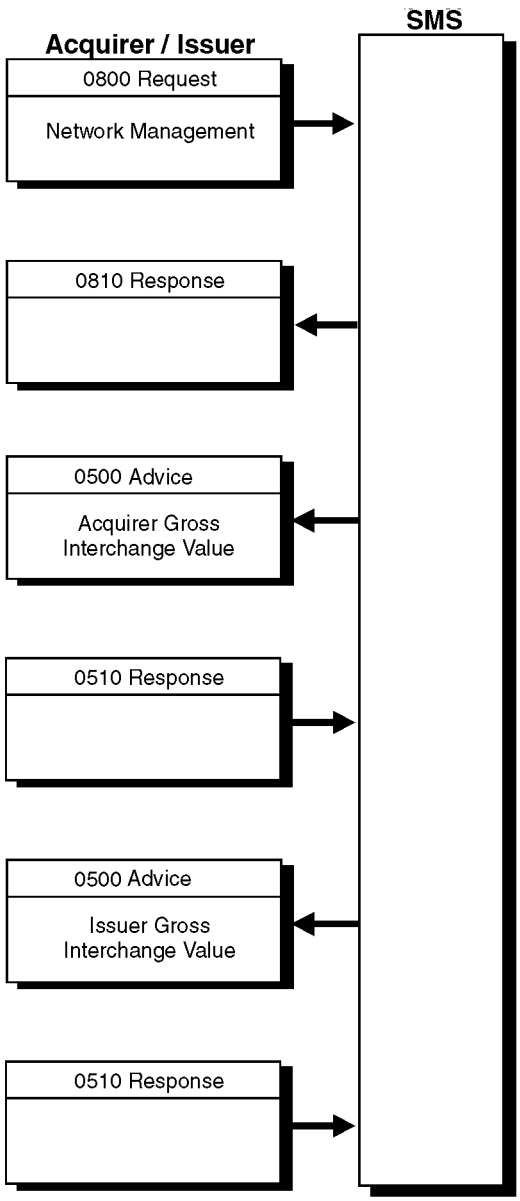
SMS responds to the 0800 message with an 0810 message and then provides the acquirer or issuer with two 0500 messages:

- One contains the Acquirer Gross Interchange Value (acquirer totals plus acquirer STIP totals, if applicable)
- The other contains the Issuer Gross Interchange Value (issuer totals plus acquirer STIP totals, if applicable)

The member responds to each of these messages with 0510 responses.

Figure 4–12 illustrates the reconciliation transaction process.

Figure 4–12: Reconciliation Transaction Flow



Automatic Reconciliation Advices

SMS uses 0520 advice messages to send end-of-day reconciliation totals to acquirers and issuers. The reconciliation totals are provided for the Settlement ID contained in Field 99—Settlement Institution ID Code.

These advices are created automatically and contain the counts and amounts accumulated by SMS for approved, settled transactions.

Each 0520 advice contains one of the following:

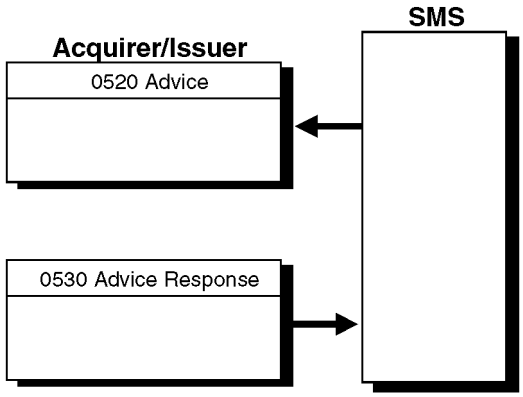
- Acquirer Totals—The value of approved requests and advices sent from the acquirer, as well as chargebacks, chargeback reversals, and fee collection/funds disbursements received from SingleConnect issuers.
- Issuer Totals—The value of chargebacks, chargeback reversals, and fee collection/funds disbursements, as well as approved requests and advices originated by a SingleConnect acquirer.
- Acquirer Stand-In Totals—The value of SMS-generated reversal advices stored by SMS for the acquirer to recover
- Issuer Stand-In Totals—The value of STIP and SMS-generated advices stored by SMS for the issuer to recover

The acquirer or issuer acknowledges with an 0530 response message.

Receipt of 0520 advices is optional; they can be sent at the end of day or not at all. The option to receive 0520 messages is set up at Visa when a participant first certifies. Participants can change this option by contacting their Visa representatives. Members must sign on to advice recovery mode to receive advices.

Figure 4–13 illustrates an automatic reconciliation transaction flow with an 0520 optional advice message.

Figure 4–13: Reconciliation Transaction Flow (With an 0520 Optional Advice Message)



File Maintenance Transactions

This section covers two types of file maintenance transactions: online file maintenance and Automatic Cardholder Database (Auto-CDB) Update.

Online File Maintenance

File-related messages are used by issuers to update or review the cardholder records in the Exception and PIN Verification Files.

An issuer uses an 0302 request to:

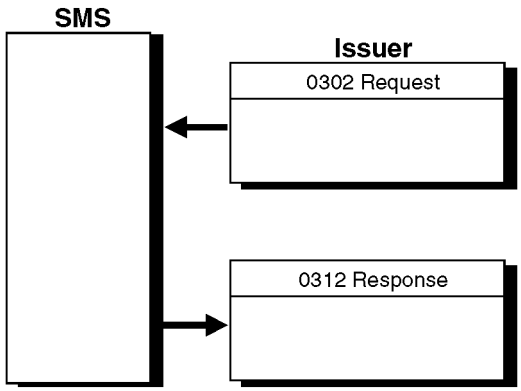
- Update cardholder records.
- Inquire about a specific cardholder record.

An 0302 request is used to query or update both the Exception and PIN Verification Files. SMS does not create advices for undeliverable 0302 requests.

The issuer sends an 0302 request to SMS, and SMS responds with an 0312 response. Because SMS does not create any file-related advices, the issuer must resend the request later if it does not receive an 0312 response from SMS.

Figure 4–14 illustrates a file maintenance transaction flow.

Figure 4–14: File Maintenance Transaction Flow



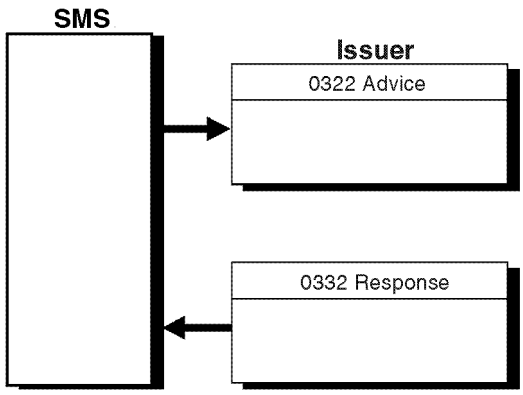
Automatic Cardholder Database Update

Issuers participating in Automatic Cardholder Database Update (Auto-CDB) receive advices of Exception File additions or updates.

See Chapter 6, Stand-In and Card Verification Value Processing, for more information.

Figure 4–15 illustrates a file maintenance transaction flow for Auto-CDB.

Figure 4–15: File Maintenance Transaction Flow for Auto-CDB (Visa Only)



Administrative Transactions

There are three types of administrative transactions:

- Free text message
- Funds transfer message
- Online fraud reporting

The following subsections describe each of these transactions.

Free Text Message

A free text message is an administrative message used to convey information from a sender to a receiver. Acquirers and issuers can communicate with each other and get general information from each other by sending free text messages. The originating center submits an 0600 request to the destination center and receives an 0610 response from the destination center. This response contains no text reply. If the text from the originating center's 0600 request requires a text reply, the destination center must initiate an 0600 text message with the reply.

SMS accepts free text messages for the destination member when the destination is unavailable. The system stores an 0620 advice in the advice queue to be recovered by the destination member. The 0620 advice requires an 0630 response.

The BackOffice Adjustment System (BOAS) supports these messages.

Figure 4–16 and Figure 4–17 illustrate free text message transaction flows for acquirer to issuer and issuer to acquirer.

Figure 4–16: Free Text Message Transaction Flow (Acquirer to Issuer)

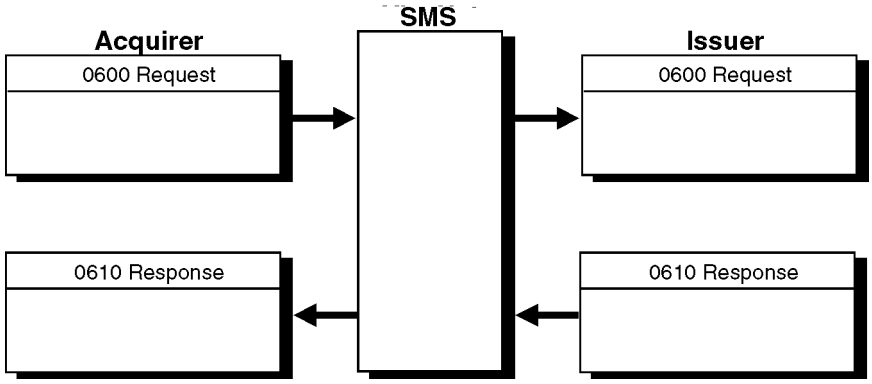
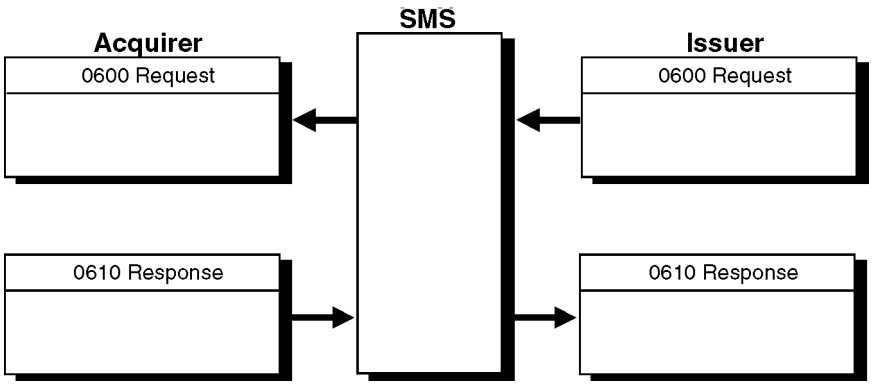


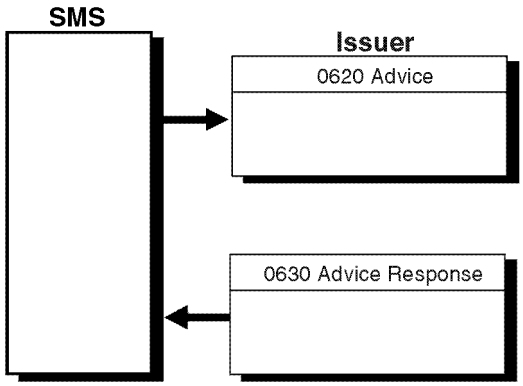
Figure 4–17: Free Text Message Transaction Flow (Issuer to Acquirer)



Cardholder Risk Identification Service (CRIS) participants may receive online alerts through advice recovery. CRIS alerts are not supported for Plus messages.

Figure 4–18 illustrates a free text message transaction flow from SMS to an issuer.

Figure 4–18: Free Text Message Transaction Flow—CRIS (SMS to Issuer)

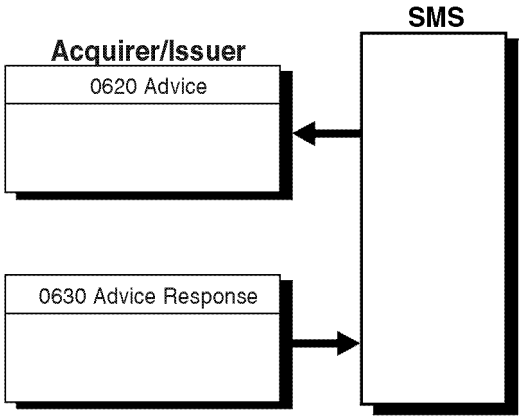


Funds Transfer Message

SMS uses 0620 advices to send the day's final funds transfer totals after completion of settlement and reconciliation. Field 48—Funds Transfer Totals (usage 6) contains the settlement totals for the day, including subfields with acquirer, issuer, and net funds transfer totals. The funds transfer message advises the amount to be transferred to or from the Settlement Account for the Settlement ID contained in Field 99—Settlement Institution ID Code. An 0630 advice response is required for each 0620 request. Members must sign onto advice recovery mode to receive funds transfer messages.

Figure 4–19 illustrates a funds transfer message transaction flow.

Figure 4–19: Funds Transfer Message Transaction Flow



Online Fraud Reporting

The Online Fraud Reporting capability is required for issuers and acquirers and allows certified members to report fraud transactions to the Fraud Reporting System (FRS) using online messages. Online Fraud Reporting is not available for Plus messages.

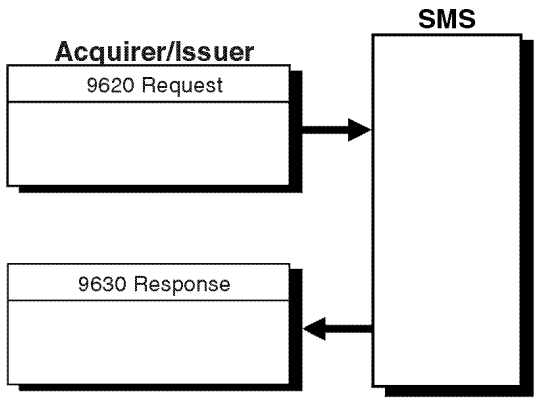
Members can send fraud notifications through the BackOffice Adjustment System (BOAS).

SMS passes the fraud advices to FRS. The fraud transactions are reported to members on the FRS reports. Failure to comply with the fraud reporting rules as defined in the Visa Operating Regulations can result in the loss of chargeback rights and in potential fines and penalties.

Issuers and acquirers can use 9620 requests to report confirmed fraud transactions. When SMS receives a 9620 request from the member, it generates a 9630 response.

Figure 4–20 illustrates a fraud reporting message transaction flow.

Figure 4–20: Fraud Reporting Message Transaction Flow



Network Management Transactions

An acquirer or issuer uses network management messages to:

- Sign on to and sign off from the system network.
- Perform an echo test of the communication line. (SMS also uses 0800 messages to perform echo tests.)
- Start and stop recovery of advices.
- Solicit the gross interchange totals accumulated for a settlement entity (shown in the reconciliation message flows earlier in this chapter).
- Perform online dynamic key exchange.

Sign-On and Sign-Off Messages

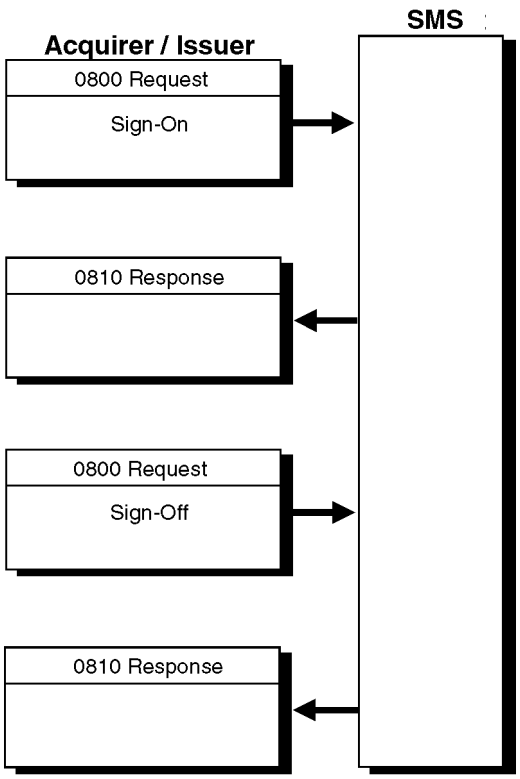
Each network endpoint must sign on to identify itself to the network. An endpoint can sign on as both an acquirer and issuer. An endpoint signs on to notify SMS that it is ready to send and receive messages. Conversely, an endpoint signs off to notify SMS that it is not available. Endpoints use the network management requests and responses (0800 and 0810) with a value of 071 (to sign on) or 072 (to sign off) in Field 70—Network Management Information Code.

Issuers and acquirers typically sign off for planned maintenance activity or to attend to software or hardware malfunctions.

Issuers are signed off by VisaNet after 10 consecutive time-outs. Issuers do not receive a sign-off message from VisaNet, and must send a sign-on message to begin receiving transactions.

Figure 4–21 illustrates a sign-on and sign-off message transaction flow.

Figure 4–21: Sign-On and Sign-Off Message Transaction Flow

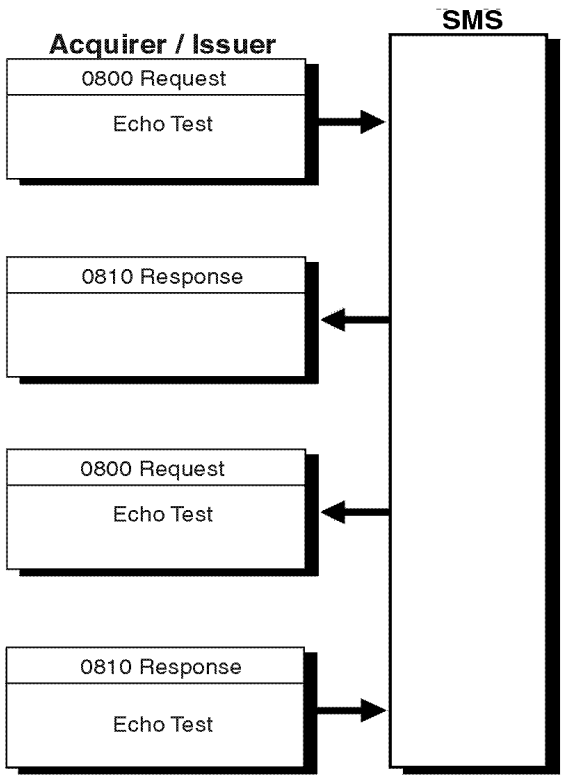


Echo Test Messages

Network management requests and responses (Message Types 0800 and 0810, respectively) are sent by issuers, acquirers, or SMS to perform echo tests. The value in Field 70—Network Management Information Code in an echo test request is set to 301. Echo tests confirm the availability of the communications link between the acquirer or issuer and SMS.

Figure 4–22 illustrates an echo test message transaction flow.

Figure 4–22: Echo Test Message Transaction Flow



Recovery Sign-On and Sign-Off Messages

These messages are used by issuers or acquirers to request and receive advices for transactions that were processed by STIP because there was no response, a late response, or the issuer or acquirer was not available to respond. Acquirers and issuers must sign onto advice recovery mode to receive 0520 automatic reconciliation advices. Network management requests and responses (Message Types 0800 and 0810, respectively) are used with a value of 078 (for sign-on recovery) or 079 (for sign-off recovery) in Field 70—Network Management Information Code.

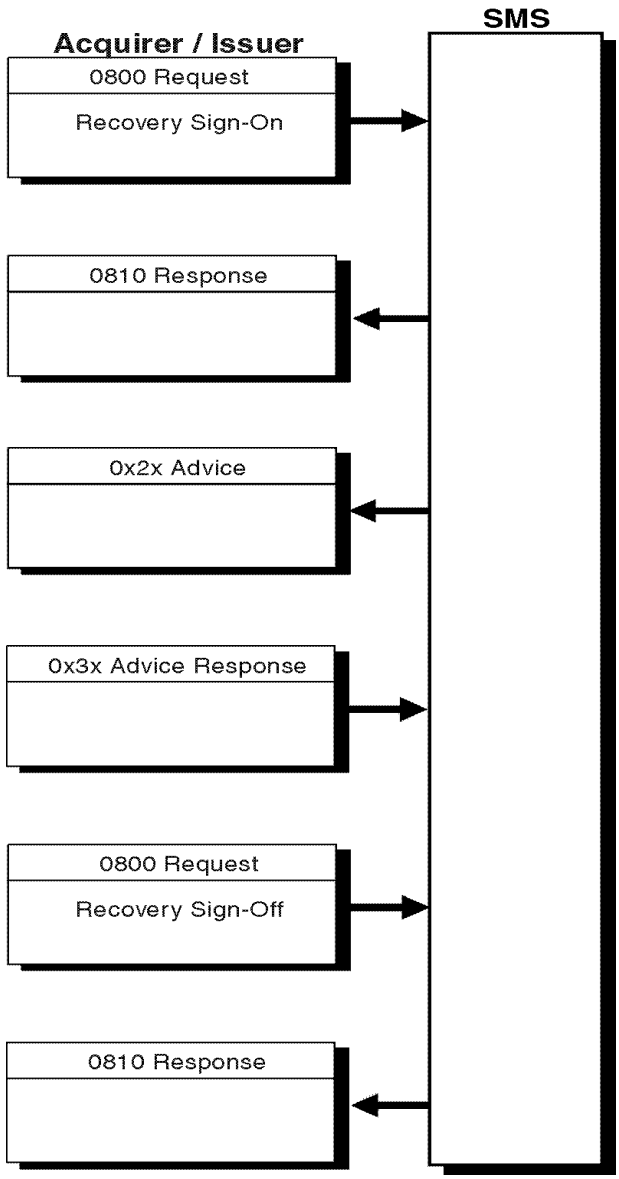
Acquirer and Issuer Recovery

After an issuer or acquirer signs onto advice recovery mode, SMS sends all of the advices (0*x*2*x* messages) that STIP authorized while the issuer or acquirer was unavailable. The issuer or acquirer has the option of remaining signed on to recovery or signing off recovery.

Typically, an issuer or acquirer remains signed onto advice recovery mode so that any transactions processed by STIP are obtained by its system as soon as possible.

Figure 4–23 illustrates a recovery sign-on and sign-off message transaction flow.

Figure 4–23: Recovery Sign-On and Sign-Off Message Transaction Flow



Dynamic Key Exchange

The Dynamic Key Exchange (DKE) Service is an optional Visa service for SingleConnect members that periodically want to change acquirer and issuer Data Encryption Set (DES) encryption working keys through the exchange of online 0800/0810 messages.

The following fields in the 0800 request are used in the key exchange service:

Field 7—Transmission Date and Time

Field 11—Trace Number

Field 33—Forwarding Institution Identification Code

Field 39—Response Code

Field 48—Additional Data, Private, usage 14 (Dynamic Key Exchange Working Key Check Value)

Field 53—Security Related Control Information

Field 63.1—Network ID Code

Field 70—Network Management Information Code

Field 96—Message Security Code

Members use 0800 requests to request and deliver new working keys for PIN encryption; 0810 responses are used to acknowledge their receipt. The trace number (in Field 11) is assigned by the 0800 message originator, which can be a participating acquirer or issuer, or SMS. It must be returned unchanged in the 0810 response. If a new request has to be re-sent, its trace number comes from the original request. The message originator must indicate which key is to be changed in Field 53—Security Related Control Information.

Acquirers can begin using the new key after sending the 0810 response to SMS. For acquirers supporting a single working key, SMS has the option of processing messages with the new or old key for five minutes. After five minutes, all acquirer-generated messages must have PINs encrypted with the new working key.

For issuers, SMS begins using the new key upon receiving the 0810 response (in which the value in Field 39—Response Code is 00). For an issuer supporting a single working key, it immediately updates its copy of the key upon receiving the 0800 request from SMS. SMS continues sending messages with the old key until it receives the 0810 response. Therefore, single-key issuers must keep a copy of the old key until SMS begins using the new one.

For members automatically receiving new working keys on a daily basis, SMS always sets the PIN algorithm identifier (Field 53—Security Related Control Information, positions 3 and 4) to the alternate key. If SMS encounters PIN block errors during standard message processing, SMS returns Response

Code 81—Cryptographic Error Found in PIN in the 0800 request and initiates an automatic acquirer key change. If the issuer encounters a PIN block error during verification, it returns Response Code 81 in the 0810 response. SMS then initiates an automatic working issuer key change.

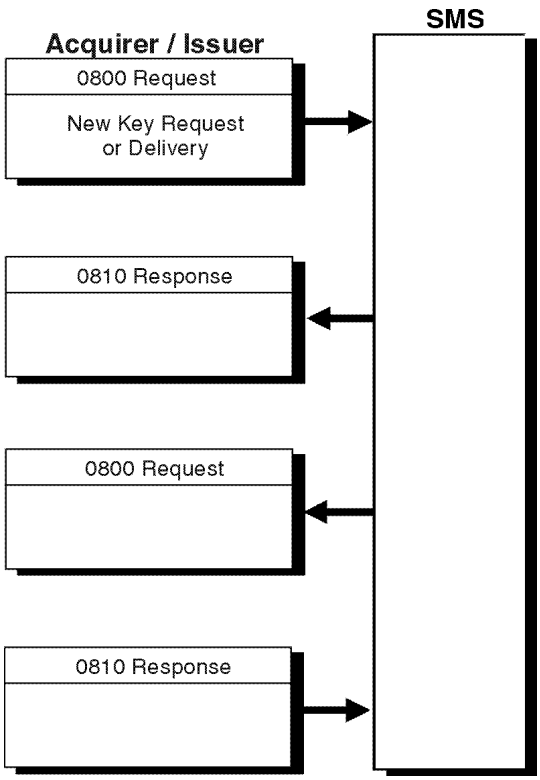
SMS has a 10-second time-out for all dynamic key exchange messages containing new working keys. If the member does not respond within 10 seconds, SMS makes a second delivery attempt. If the member still fails to respond, SMS cancels the key exchange attempt.

An 0800 online message includes a 4-digit key check value (in field 48, usage 14) to verify receipt of the new cryptographic key. Members should compare the four check digits returned from their security module with the check value in the message.

If the key check value (KCV) does not match or if the member encounters a security module error while attempting to translate the new key for storage, the member should return a response code of 06 in field 39. This response indicates that the new cryptographic key has not been received properly.

Figure 4–24 illustrates a dynamic key exchange message transaction flow.

Figure 4–24: Dynamic Key Exchange Message Transaction Flow



Exception Conditions

This section describes the transaction processing that occurs when an endpoint:

- Is not available.
- Fails to respond.
- Responds late.

IMPORTANT

Members must sign on to advice recovery mode to receive advices.

Exception conditions can apply to the following transactions:

- Financial Transactions
  - Issuer Unavailable
  - Issuer Fails to Respond
  - Issuer Responds Late
  - Approval Response Cannot Be Delivered to the Acquirer
  - Decline Response Cannot Be Delivered to the Acquirer
- Reversals
  - Reversal—Advice Response Cannot Be Delivered to the Acquirer
  - Reversal—Issuer Unavailable
  - Reversal—Unsolicited
- Exception Transactions
  - Adjustment or Representment—Issuer Unavailable
  - Adjustment or Representment—Acquirer Unavailable After Advice
  - Chargeback—Acquirer Unavailable
  - Chargeback—Issuer Unavailable After Chargeback

The following subsections describe processing procedures for each of these conditions.

Financial Transactions

Exception conditions for financial transactions include the following situations:

- Issuer unavailable
- Issuer fails to respond
- Issuer responds late
- Approval cannot be delivered to acquirer
- Decline cannot be delivered to acquirer

Issuer Unavailable

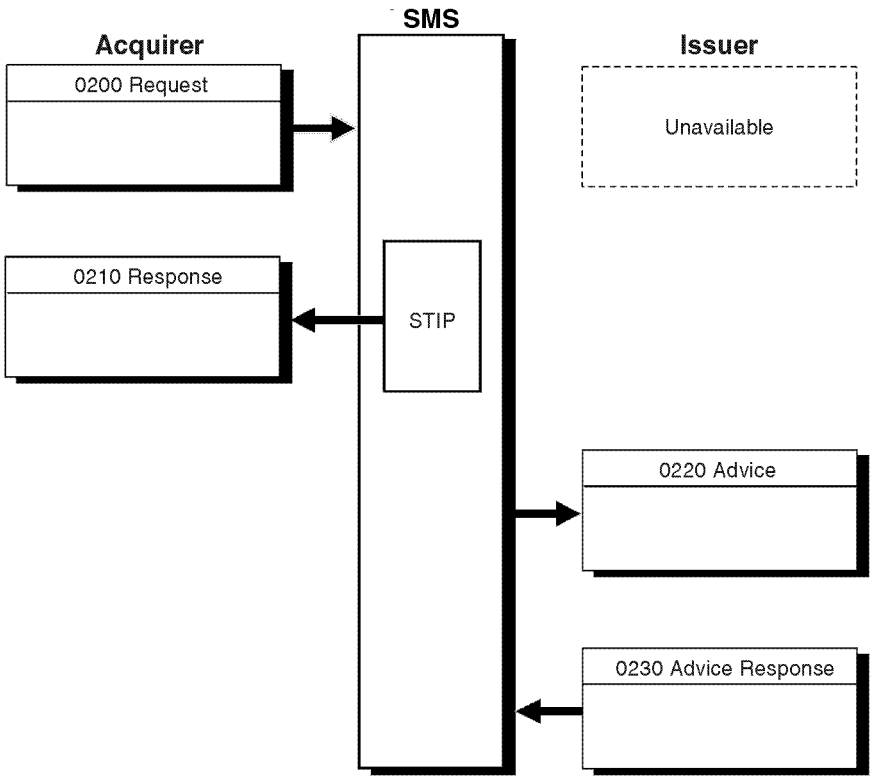
If the issuer is unavailable, STIP responds to the 0200 request and creates an 0220 advice for the issuer to recover and post. This advice reflects both the request and the STIP reply.

If the account is listed on the Exception File with a decline code, STIP returns a decline response to the acquirer. When the issuer recovers the 0220 advice, it acknowledges with an 0230 advice response.

SMS responds with Response Code 91—Destination Unavailable in Field 39—Response Code if the 0200 request was for a balance inquiry or account transfer.

Figure 4–25 illustrates stand-in processing for an issuer that is unavailable to send a response to an acquirer's authorization request.

Figure 4–25: Issuer Unavailable Transaction Flow

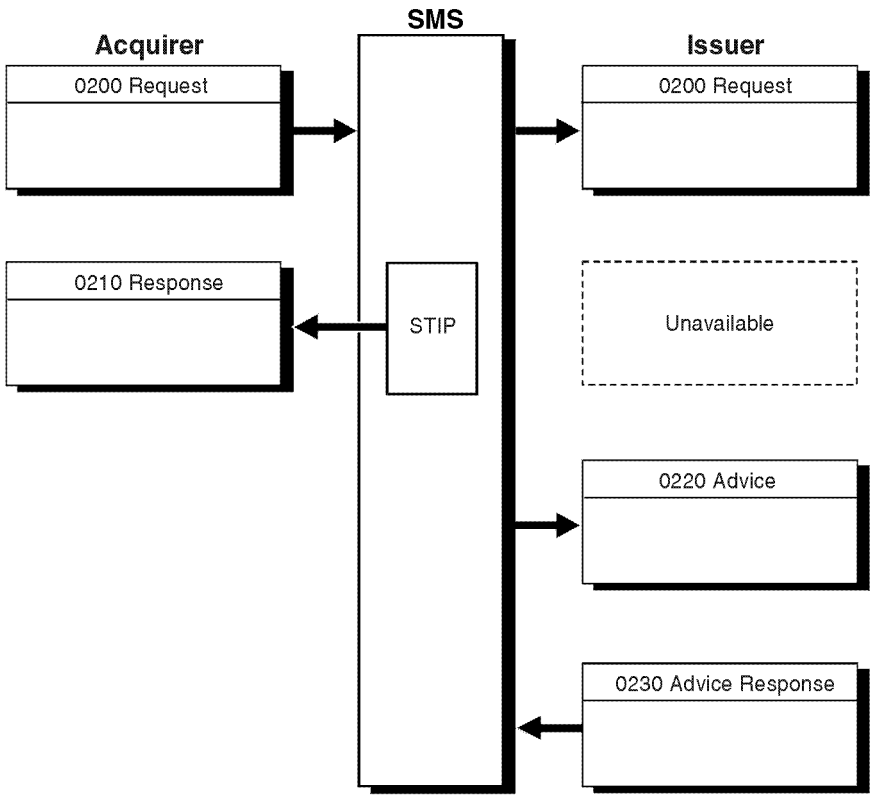


Issuer Fails to Respond

If an issuer receives a request and then becomes unavailable and fails to respond within the required time limit, SMS times out the issuer and passes the transaction to STIP. The 0220 advice notifies the issuer that STIP has responded to the financial request on the issuer's behalf.

Figure 4–26 illustrates STIP standing in when the issuer has received the request but is unable to respond before a timeout has occurred.

Figure 4–26: Issuer Fails to Respond Transaction Flow



Issuer Responds Late

If an issuer is available but does not respond within the required time limit, SMS times out the issuer and sends the transaction to STIP. STIP processes the transaction on behalf of the issuer and sends an 0210 response to the acquirer. Simultaneously, SMS sends an 0220 advice to the issuer.

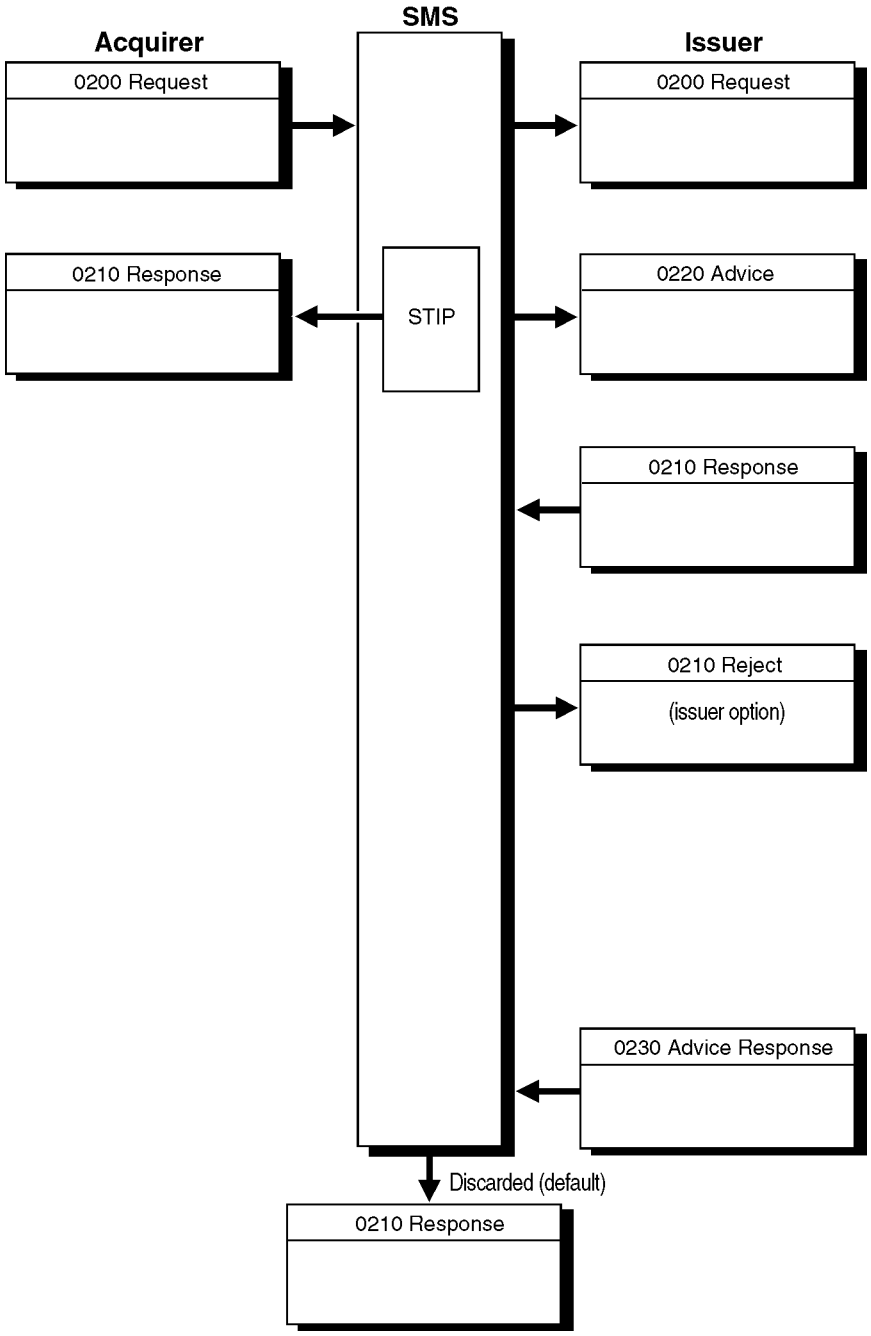
When SMS receives an 0210 response from the issuer *after* the transaction has already been processed by STIP, SMS will do one of the following:

- Reject the 0210 response with a reject code of 515 (late response) in the reject header. This is an issuer-selected option.
- Discard the 0210 response. This is the default option.

Because the 0220 advice is approved or denied based on the issuer's parameters, the STIP financial impact to the cardholder's account may be different than that of the issuer's 0210 response.

Figure 4–27 illustrates STIP standing in when the issuer has received the request but responds late.

Figure 4–27: Issuer Responds Late Transaction Flow



Approval Response Cannot Be Delivered to the Acquirer

If SMS cannot return an 0210 approval response to the acquirer because the acquirer is unavailable, SMS reverses the transaction by creating an 0420 advice that is immediately sent to the issuer, and creates and stores an 0420 advice for the acquirer to recover. When the acquirer recovers the advice, it responds with an 0430 acknowledgment.

Unless the acquirer has already received a reversal advice from SMS, the acquirer should send an 0420 reversal advice to SMS after determining that an 0210 response has not been received.

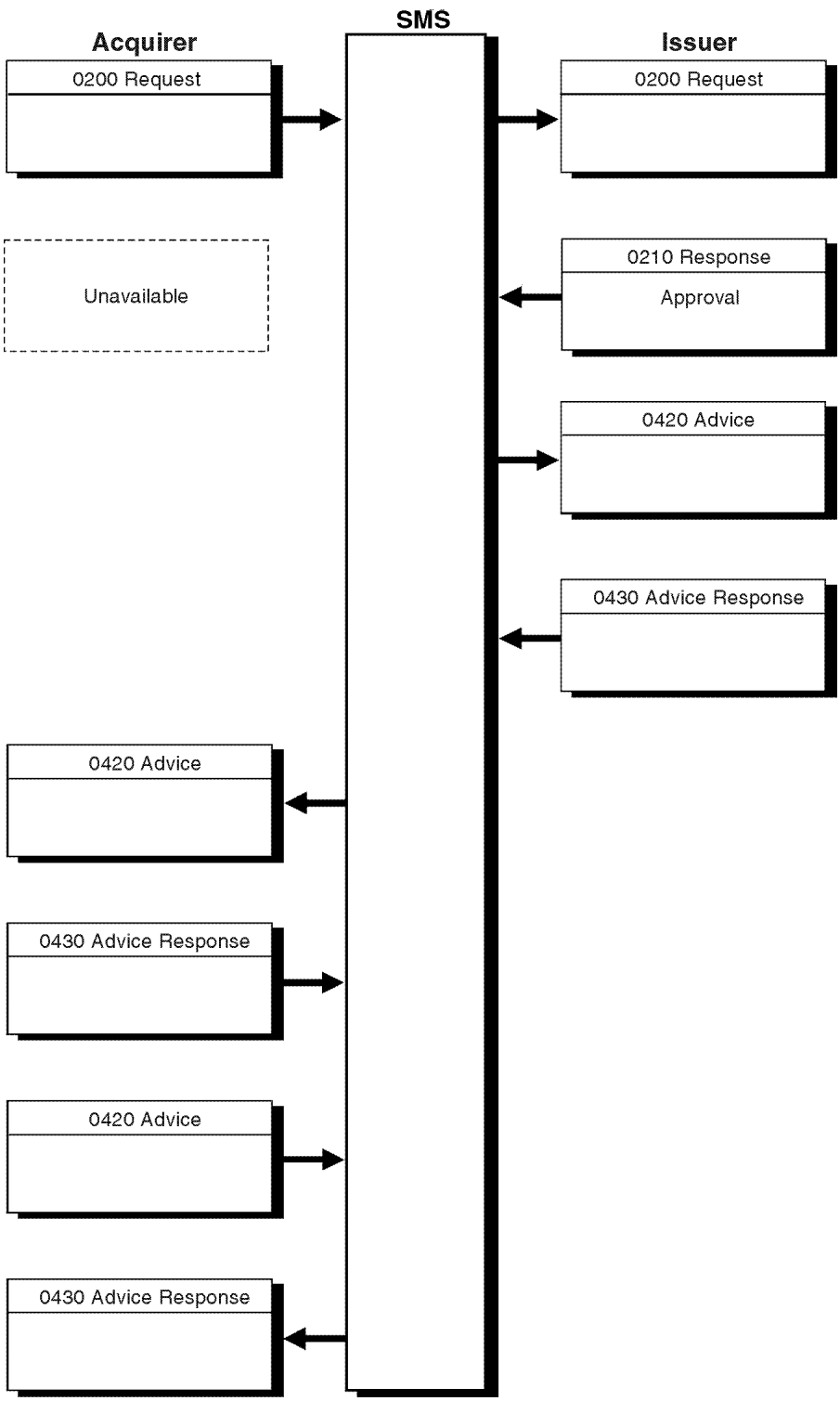
The acquirer should send the 0420 reversal advice because there is no way for the acquirer to know whether SMS reversed the 0200 or whether the 0210 approval response simply never made it back to the acquirer's system in time.

If SMS has not reversed the 0200 already, then the acquirer's 0420 will be treated like a normal reversal and will go through to the issuer.

SMS returns an 0430 response with a response code indicating the transaction has already been reversed.

Figure 4–28 illustrates the transaction flow of an approval that cannot be delivered to the acquirer.

Figure 4–28: Approval Response Cannot Be Delivered to the Acquirer Transaction Flow



Decline Response Cannot Be Delivered to the Acquirer

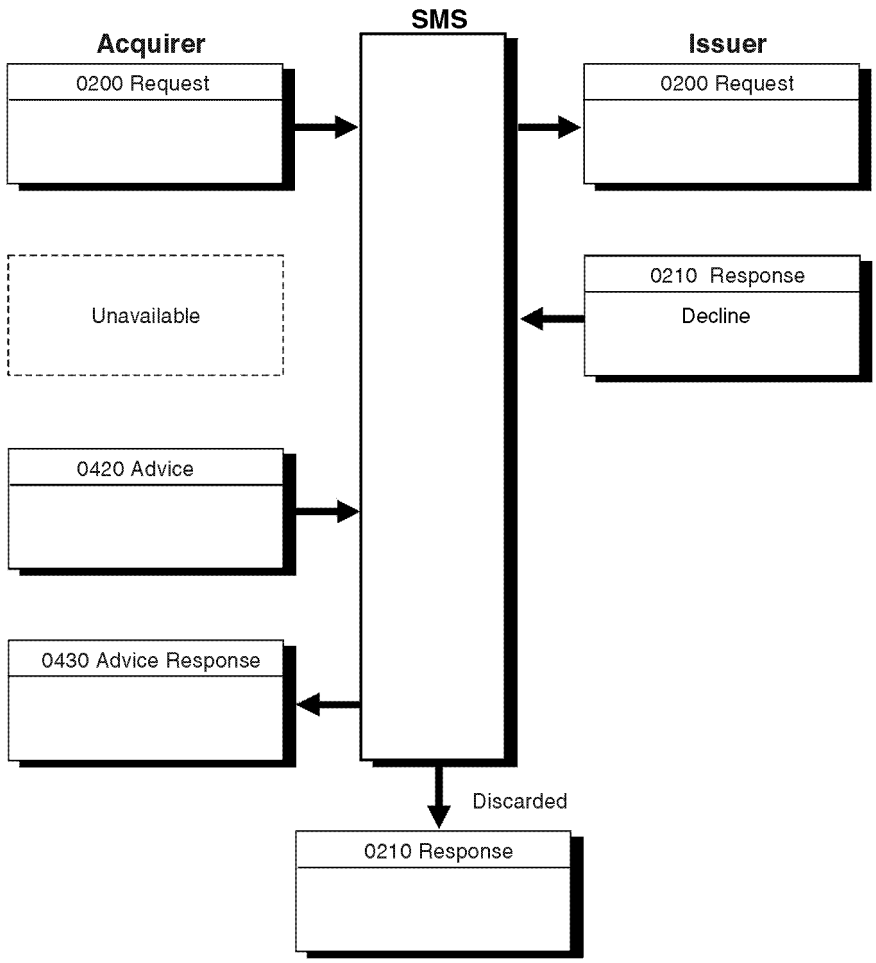
If SMS cannot return an 0210 decline response to the acquirer because the acquirer is unavailable, SMS logs and discards the undeliverable 0210 response.

The acquirer must send an 0420 reversal advice to SMS after determining that an 0210 response has not been received. SMS acknowledges with an 0430 advice response that contains an approval response code. SMS also sets the Gross Interchange Value (GIV) Update Flag to zero, indicating that the reversal has no financial impact.

Because the 0200 message was declined, a reversal to the issuer is not necessary.

Figure 4–29 illustrates the transaction flow of a decline response that cannot be delivered to the acquirer.

Figure 4–29: Decline Response Cannot Be Delivered to the Acquirer Transaction Flow



Reversals

Exception conditions for reversals include the following situations:

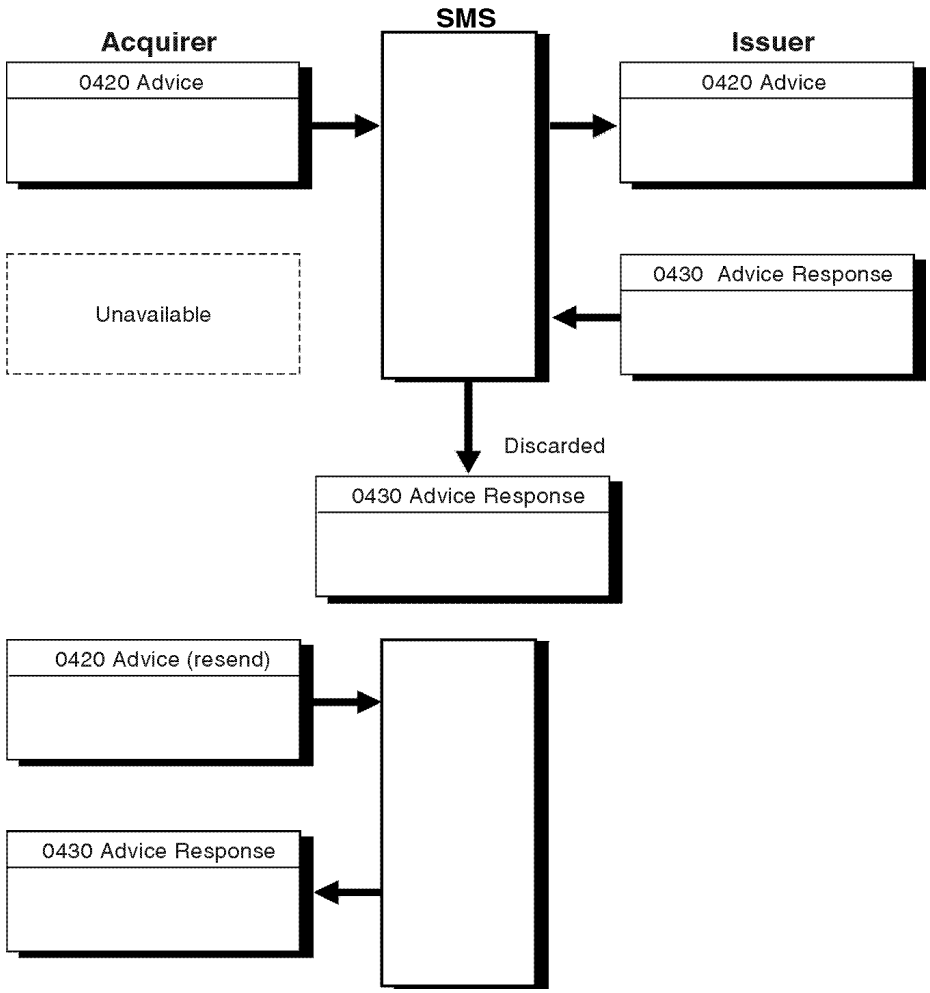
- Reversal advice response cannot be delivered to acquirer
- Reversal with issuer unavailable
- Reversal that is unsolicited

Reversal—Advice Response Cannot Be Delivered to the Acquirer

If SMS cannot forward an 0430 advice response to the acquirer because the acquirer is unavailable, SMS logs and discards the advice response. When the acquirer becomes available, it must resend the 0420 advice. SMS acknowledges with an 0430 advice response.

Figure 4–30 illustrates the transaction flow of an advice that cannot be delivered to the acquirer.

Figure 4–30: Reversal—Advice Response Cannot Be Delivered to the Acquirer Transaction Flow

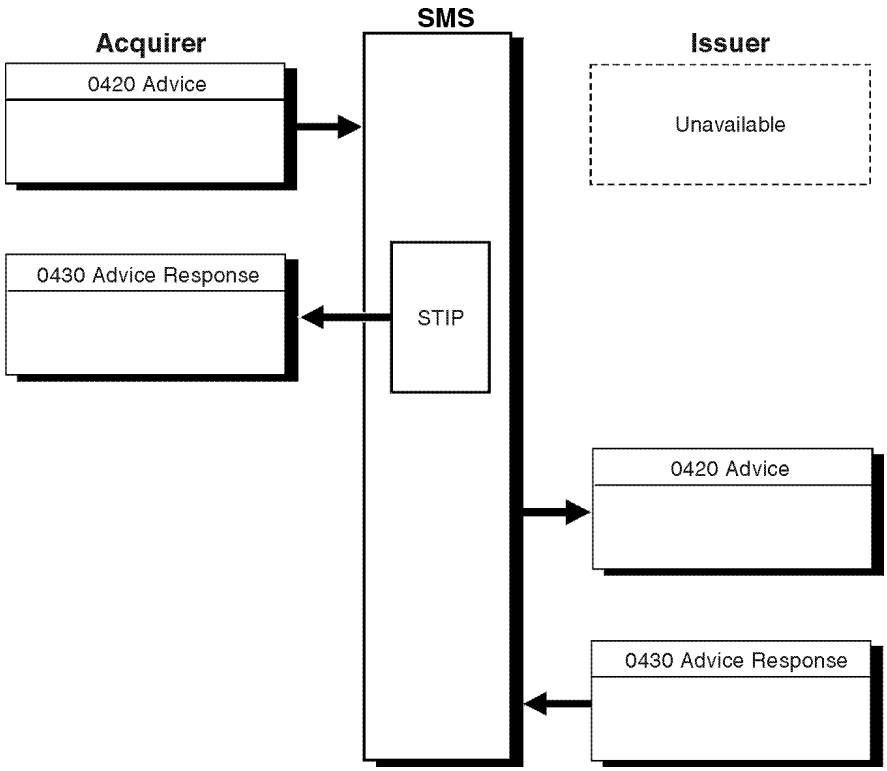


Reversal—Issuer Unavailable

If the issuer times out or is unavailable, SMS responds to the acquirer, then stores an 0420 advice for recovery by the issuer. The issuer acknowledges with an 0430 response.

Figure 4–31 illustrates the transaction flow of a reversal when the issuer is not available.

Figure 4–31: Reversal—Issuer Unavailable Transaction Flow

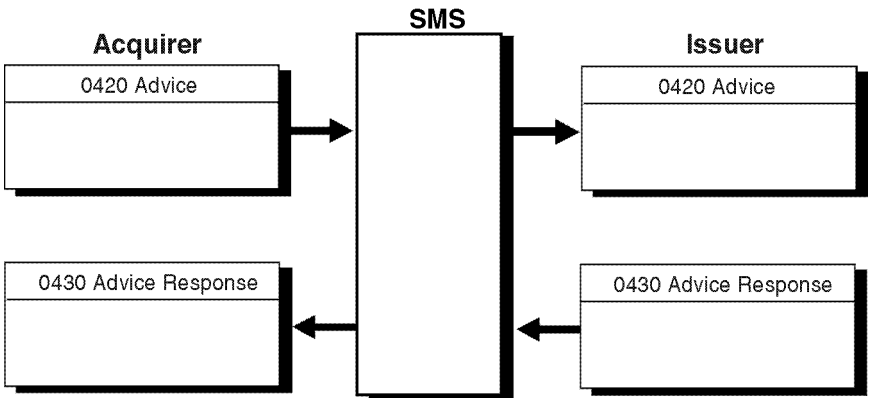


Reversal—Unsolicited

If SMS receives an 0420 reversal request that does not match an earlier financial transaction, SMS approves the request as a nonfinancial transaction (by using the GIV—Gross Interchange Value—flag in Header Field 5) and responds to the acquirer with an 0430 response message. It then stores an 0420 advice for recovery by the issuer. The issuer acknowledges with an 0430 advice response. The transaction has no financial impact.

Figure 4–32 illustrates the transaction flow for an unsolicited reversal.

Figure 4–32: Reversal—Unsolicited Transaction Flow



Exception Transactions

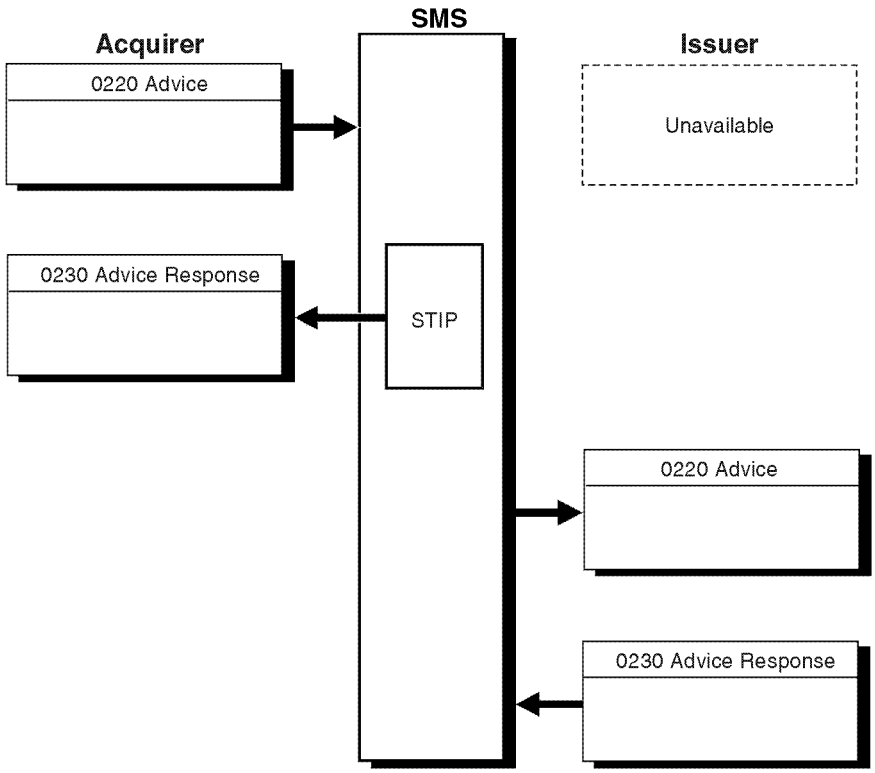
The following exception transactions include STIP and some other transaction processing performed when either the issuer or acquirer is unavailable.

Adjustment or Representment—Issuer Unavailable

If the issuer is unavailable, STIP authorizes the adjustment or representment advice and responds to the acquirer. STIP builds and stores an 0220 advice for issuer recovery.

Figure 4–33 illustrates an adjustment or representment transaction flow when the issuer is unavailable.

Figure 4–33: Adjustment or Representment—Issuer Unavailable Transaction Flow

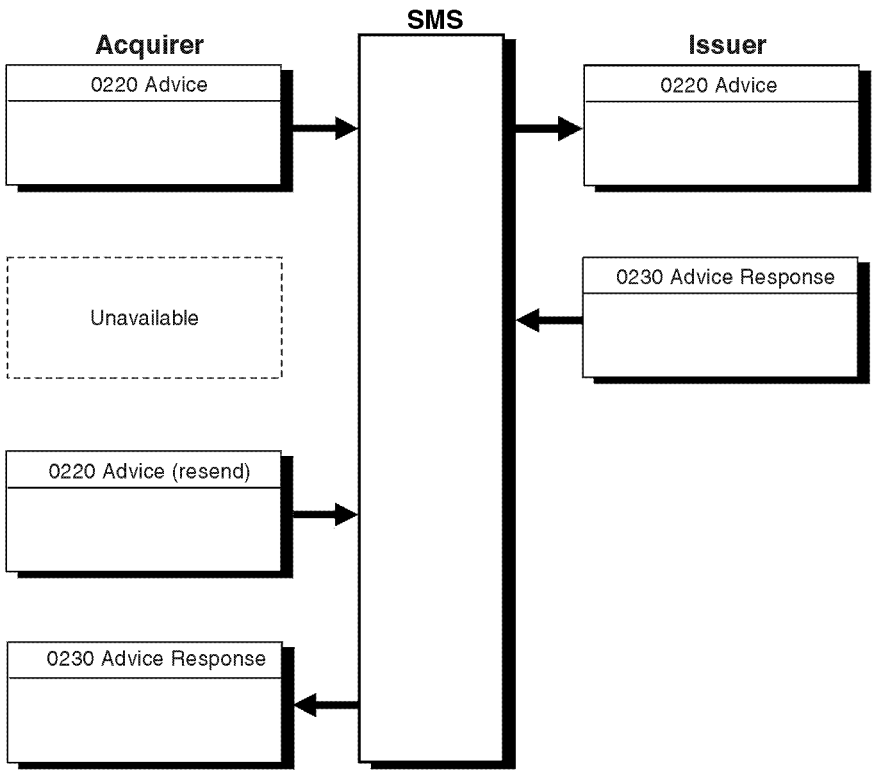


Adjustment or Representment—Acquirer Unavailable After Advice

If the acquirer becomes unavailable after sending an 0220 adjustment or representment advice and cannot receive the response, the acquirer must resend the 0220 advice unchanged. SMS recognizes the duplicate advice and builds a response to the acquirer as though the duplicate advice were the original transaction.

Figure 4–34 illustrates an adjustment/representment transaction flow when the acquirer is unavailable after sending the advice.

Figure 4–34: Adjustment or Representment—Acquirer Unavailable After Advice Transaction Flow

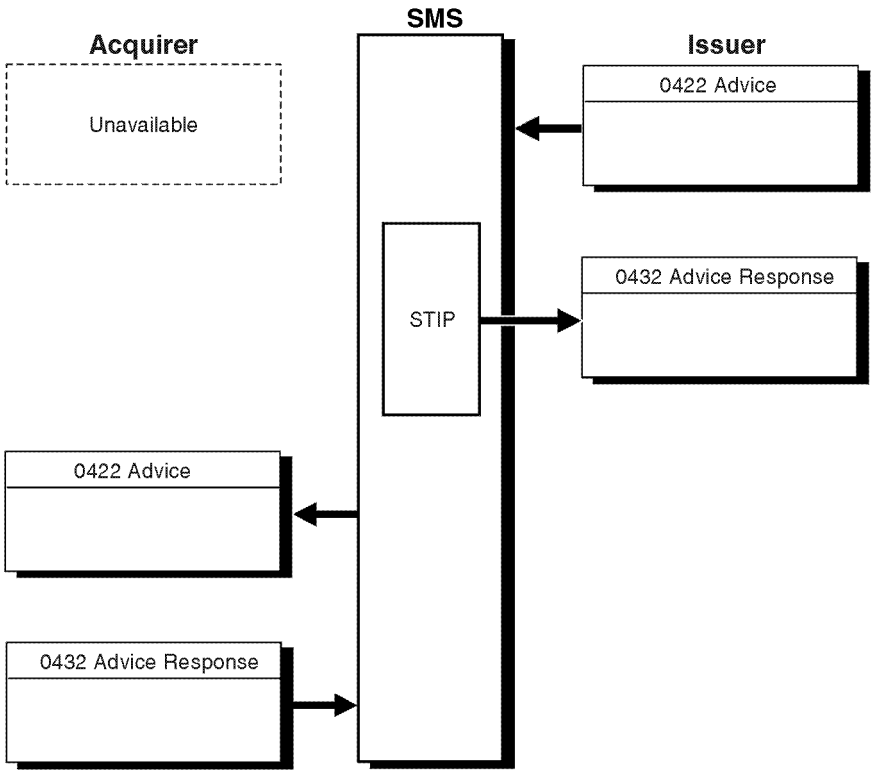


Chargeback—Acquirer Unavailable

If the acquirer is unavailable when the issuer sends a chargeback, STIP authorizes the transaction, responds to the issuer, and builds and stores the chargeback advice for the acquirer to recover.

Figure 4–35 illustrates STIP authorizing a chargeback.

Figure 4–35: Chargeback—Acquirer Unavailable Transaction Flow

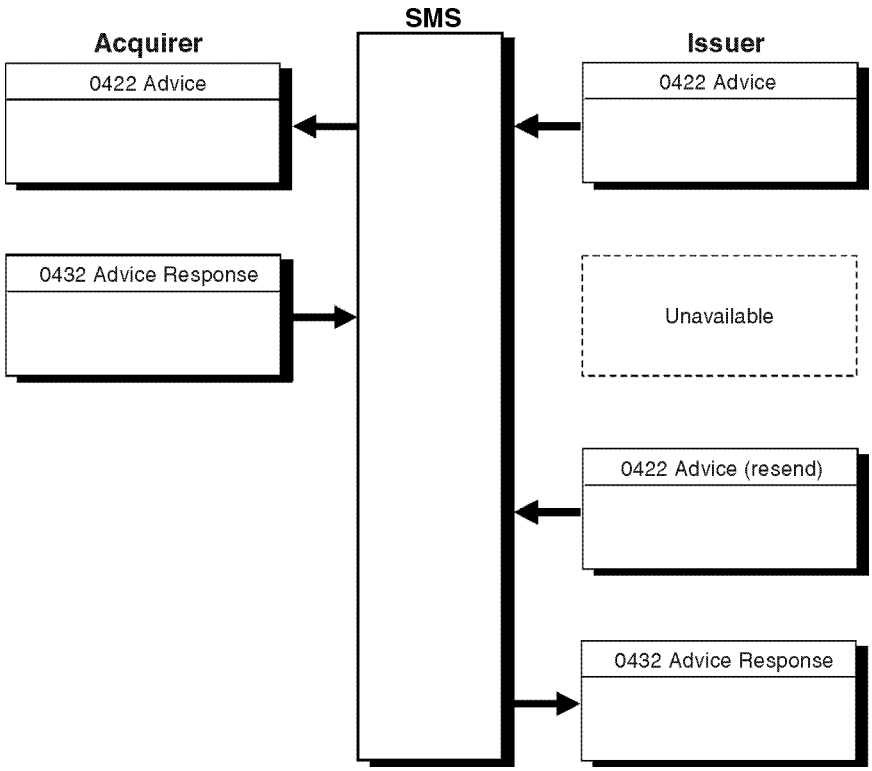


Chargeback—Issuer Unavailable After Chargeback

If the issuer becomes unavailable after sending an 0422 chargeback advice and before receiving the response, the issuer must resend the chargeback unchanged. Upon receiving the resent 0422 advice, SMS recognizes that the original request was processed and forwards to the issuer the 0432 advice received from the acquirer in response to the original request.

Figure 4–36 illustrates the transaction flow of an issuer unavailable after a chargeback.

Figure 4–36: Chargeback—Issuer Unavailable After Chargeback Transaction Flow



Multicurrency Support 5

Multicurrency support is required for all ATM acquirers and all SingleConnect ATM issuers except those whose cardholder billing currency and settlement currency are U.S. dollars.

The V.I.P. SingleConnect Service features full multicurrency support for international ATM transactions. The Visa Multicurrency Service includes:

- Automatic conversion from the transaction currency to the currency of the cardholder's account.
- Automatic conversion from the transaction currency to the acquirer's settlement currency (if the two are different).
- Automatic conversion from the currency of the cardholder's account to the issuer's settlement currency (if the two are different).

The transaction currency is generally the currency of the country in which a transaction takes place. The cardholder billing currency is generally the currency of the country in which the account is domiciled.

SMS messages contain several multicurrency fields supporting the various amounts involved in currency exchange calculation. These fields contain the following data:

- The transaction amount in the transaction currency
- The transaction amount in the cardholder billing currency
- The settlement amount
- The conversion rates
- The date of the conversion rate table used by SMS

Participating members receive these standard multicurrency fields in their online messages, reports, and raw data.

For nonparticipating members, transaction and settlement amounts appear in online messages, raw data, and reports in U.S dollars only. Nonparticipating members that migrate to the Multicurrency Service have the advantage of using the additional information.

Currencies

SMS determines applicable currencies for a given transaction as follows:

- The acquirer indicates the *transaction currency* in the request message. For an ATM cash disbursement transaction, this is the currency that was dispensed at the ATM.
- SMS determines the issuer's currencies based on the first several digits of the Primary Account Number (PAN), which is read from the magnetic stripe on the card used for the transaction. These initial digits, called the BIN, are used to locate issuer-supplied data, including the *cardholder billing currency* and the *issuer's settlement currency*, on SMS databases.
- SMS determines the *acquirer's settlement currency* based on the acquirer ID in the request message. This ID is used to locate acquirer-supplied data on SMS databases.

SMS supports transaction and cardholder billing currencies recognized by the International Organisation for Standardisation (ISO). Some of these currencies are also supported as settlement currencies. For the current list of supported currencies, see the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*.

How Currency Conversion Works

There are three components of the currency conversion calculation used by SMS:

1. A base rate (wholesale or government-mandated rate)
2. A Visa currency conversion fee
3. An optional issuer fee (positive or negative percentage)

For example, for a transaction acquired in U.S. dollars for an Australian cardholder on a given day, the components might be as follows:

1. Base rate = 1.25
2. Visa currency conversion fee = 1%
3. Optional issuer fee = .25%

The base rate of 1.25 means 1.25 Australian dollars for each U.S. dollar.

For a transaction of US$100, a cardholder for this issuer would be charged AU$126.56. This is calculated as follows:

1. US$100 x 1.25 = AU$125.00
2. + Visa 1% = AU$1.25 = AU$126.25
3. + issuer .25% = AU$.31 = AU$126.56

The wholesale rate is determined daily based on the cost to Visa of buying and selling currencies in the foreign exchange markets. The Visa currency conversion fee for interregional transactions is currently 1%. The Visa currency conversion fee for intraregional transactions can vary by region.

Issuers can elect to charge an optional issuer fee to the cardholder for transactions that require currency conversion. The optional issuer fee is maintained in SMS databases by issuer BINs. This optional fee is calculated at the time of currency conversion using the percentage rate established by the issuer.

The same conversion rates are used in all VisaNet systems that support multicurrency processing.

SMS performs currency conversion in calculating settlement amounts when the acquirer's settlement currency is not the same as the transaction currency or the issuer's settlement currency is not the same as the cardholder billing currency. This currency calculation uses only the base rate.

NOTE: *There is no settlement amount for nonfinancial transactions and currency conversion fees are not charged to the issuer. However, to accurately reflect funds availability, conversion fees are included when SMS converts balance inquiry amounts for the acquirer.*

What the Issuer Receives

When SMS performs currency conversion, as described in the "How Currency Conversion Works" section, the issuer receives the following. (The values are from the same example.)

- The transaction amount and currency code (US$100)
- The cardholder billing amount and currency code (AU$126.56)
- The settlement amount and currency code (AU$125.00)

Another amount, the Visa currency conversion fee (AU$1.25 in this example), is identified in raw data as the Conversion Fee. The settlement amount plus the currency conversion fee is charged to the issuer. The difference between this total and the cardholder billing amount—the optional issuer fee (in this example, AU$.31)—is revenue for the issuer.

The issuer also receives the currency conversion rate used for the cardholder billing amount, and the currency conversion rate used for the settlement amount.

Variations

The effective rate used by SMS to perform currency conversion varies based on the type of transaction, as follows:

- For the following transactions, SMS uses the currency conversion procedure described in the "How Currency Conversion Works" section of this chapter with the current day's base rate plus the Visa currency conversion fee and the optional issuer fee:
  - Cash disbursement
  - Adjustment (back office)
  - Representment
- For the following transactions, all of which follow an earlier transaction of the same transaction set, SMS uses *the base rate that was in effect at the time of the earlier transaction*, plus the Visa currency conversion fee and the optional issuer fee:
  - Cash disbursement adjustment

    For a partial dispense, misdispense, or late completion transaction, SMS uses the same rate as for a cash disbursement transaction.
  - Reversal

    If the reversal transaction is initiated within three days of the original transaction, SMS uses the same rate as for the original transaction. If the reversal is initiated more than three days after the original transaction and the new currency rate is not yet available, SMS still uses the same rate as for the original transaction.
- For chargebacks, SMS uses the base rate in effect on the day of the chargeback—*without* calculating the currency conversion fee and optional issuer fee. The amount of the chargeback in the acquirer's currency is usually the same as the amount of the original transaction.

- For the following transactions, SMS uses the base rate in effect on the date of the transaction, and *subtracts* the Visa currency conversion fee and the optional issuer fee to accurately reflect the buying power of the amount in the response:
  - Balance inquiry
  - Cash disbursement with balance information

  EXAMPLE

  A base rate of .8 is used when converting Australian dollars to U.S. dollars. The Visa currency conversion fee is 1%. Using the following calculation, a cardholder's available balance of AU$500.00 would be enough for a US$395.00 purchase at the current rate:

  1. Available balance = AU$500.00 x .8 = US$400.00
  2. Less currency conversion fee of 1% = US$4.00 = US$396.00
  3. Less issuer fee if .25% = US$1.00 = US$395.00

See the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications* for details on field descriptions and message formats.

Decimal Places in Amounts

Currencies are defined as having zero, two, or three minor units of currency. For example, the U.S. dollar has two minor units of currency (the two positions to the right of the decimal point); the Japanese yen has no minor units.

In online transactions processed by SMS, amounts have an implied decimal point preceding the right-most zero, one, two, or three digits to handle these minor units of currency. Based upon the definition, a numeric value of 6789 is interpreted as 6.789 (three minor units of currency), 67.89 (two minor units of currency), or 6789 (no minor units of currency). The list of currency codes in the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications* indicates the number of implied decimal points in the amount fields.

Although SMS supports up to three significant decimal places in amount fields in online messages, the third digit is assumed to be zero. Therefore, the user of a currency with three decimal places must:

1. Round the amount to a two-place accuracy, or replace the third decimal position with zero when generating amount fields.
2. Be able to receive two-place accuracy in any amount field supplied by SMS.

For example, the amount 9.246 can be rounded to either 9.250, or the third digit can be dropped for a value of 9.240.

Currency Precision Service

Multicurrency Service participants can also participate in the Currency Precision Service, which uses Field 63.13—Decimal Positions Indicator to indicate how many decimal positions are in the message's amount fields. The field accommodates three different values for transaction, settlement, and cardholder amounts. SMS checks them against the Currency Table. The values allowable in Field 63.13 are shown in Table 5–1.

Table 5–1: Field 63.13 Values

Value	Number of Decimal Positions
00	No decimal positions
01	One decimal position
02	Two decimal positions
03	Three decimal positions
99	Decimal positions do not apply

Adding a Decimal Position

If the number of decimal positions specified in field 63.13 is less than that in the Currency Table, SMS adjusts the applicable amount fields.

EXAMPLE

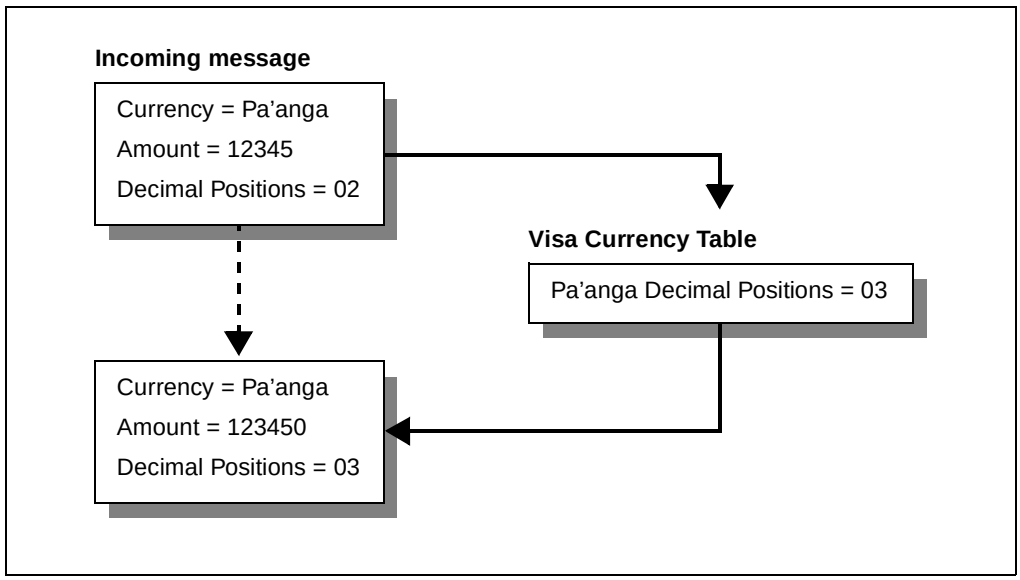
An acquirer sends a transaction amount of 12345 and places 02 in positions 1 and 2 of the Decimal Positions Indicator field. However, the Currency Table indicates that the currency has three decimal positions. Visa reports the amount as 123450 and sends the issuer a transaction amount of 123450.

A participating issuer also receives a Decimal Positions Indicator with 03 in positions 1 and 2 of the field. A nonparticipating issuer receives 123450 in Field 4—Amount, Transaction, but no Decimal Positions Indicator in the request.

The acquirer receives the transaction amount 123450 and 03 in positions 1 and 2 of the Decimal Positions Indicator field. Settlement amount is based on 123450. All reports

and raw data reflect the transaction amount 123450. An example of decimal position conversion—one position is shown in Figure 5–1.

Figure 5–1: Adding a Decimal Position—Conversion Example



Removing a Decimal Position

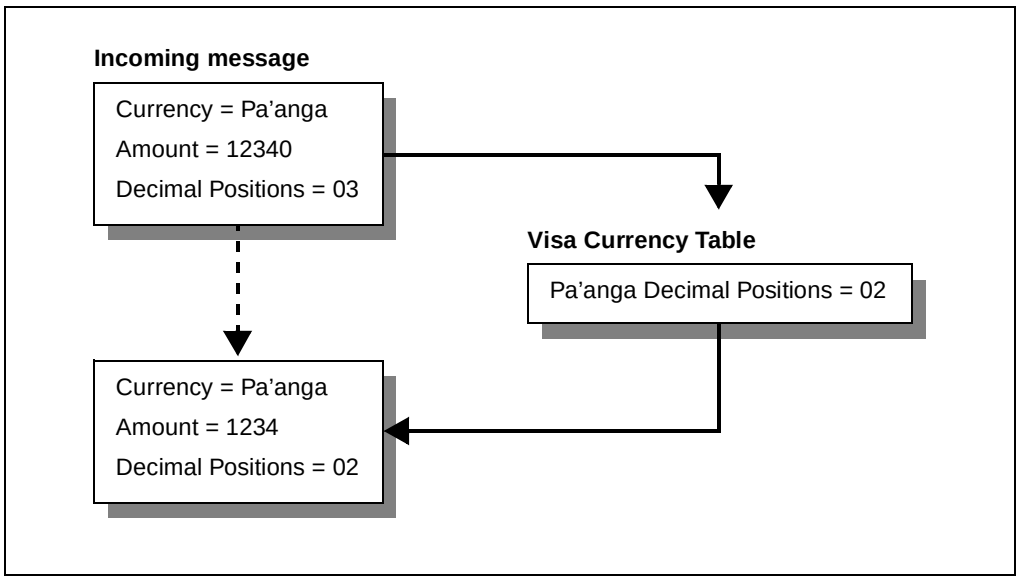
If the number of decimal positions specified in field 63.13 is greater than that in the table, the last digit (which must be zero) is removed.

EXAMPLE

An acquirer sends a transaction amount 12340 with 03 in the transaction amounts subfield of the Decimal Positions Indicator, but the Currency Table indicates the currency has two decimal positions (see Figure 5–2).

The issuer receives 1234. A participating issuer also receives a Decimal Positions Indicator with 02 in the transaction amounts subfield. Nonparticipating issuers receive 1234 but no Decimal Positions Indicator. Settlement amount is based on 1234. All reports and raw data reflect 1234.

Figure 5–2: Removing a Decimal Position—Conversion Example



The Currency Precision Service is only available to SingleConnect participants using the Multicurrency Service. Plus acquirers and issuers participating in this service must be directly attached to SMS.

Members Not Participating in the Multicurrency Service

Although participation in the Multicurrency Service is not currently required for issuers whose cardholder billing and settlement currencies are U.S. dollars, Visa supports currency conversion for all international transactions in that:

- The participating member will not be aware that the nonparticipating member is not receiving the multicurrency data fields.
- The nonparticipating acquirer can receive the country code of the issuer in Field 20—PAN Extended, Country Code.
- The nonparticipating issuer can identify the country of the acquirer from the value in Field 19—Acquiring Institution Country Code.

Multicurrency Field Flows

This section gives examples of the content and processing of amount-related fields for online multicurrency support of SingleConnect ATM transactions. The examples assume that both the acquirer and issuer participate in the Multicurrency Service. In each case, the examples show:

1. The fields the message originator must provide.
2. The processing performed by SMS.
3. The fields forwarded to the message recipient.

Examples are:

- Cash Disbursement with Balance Information (Figure 5–3)
- Adjustment (Figure 5–4)
- Representment (Figure 5–5)
- Balance Inquiry (Figure 5–6)
- Reversal (Figure 5–7)
- Chargeback (Figure 5–8)

The amounts contained in reconciliation messages (0500 and 0520) are in the settlement currency of the issuer or acquirer receiving the message. Settlement currencies can differ from the local transaction currency, for an acquirer, and from the cardholder billing currency, for an issuer.

Each example in this section assumes that the ATM has a local currency of Japanese yen, the cardholder is billed in Australian dollars, the acquirer receives the settled amount in U.S. dollars, and the issuer settles in Australian dollars.

The currency codes used are:

036 = Australian dollars

392 = Japanese yen

840 = U.S. dollars

The following fields are used in the multicurrency flows:

Field 3—Processing Code

Field 4—Amount, Transaction

Field 5—Amount, Settlement

Field 6—Amount, Cardholder Billing

Field 9—Conversion Rate, Settlement

Field 10—Conversion Rate, Cardholder Billing

Field 16—Date, Conversion

Field 49—Currency Code, Transaction

Field 50—Currency Code, Settlement

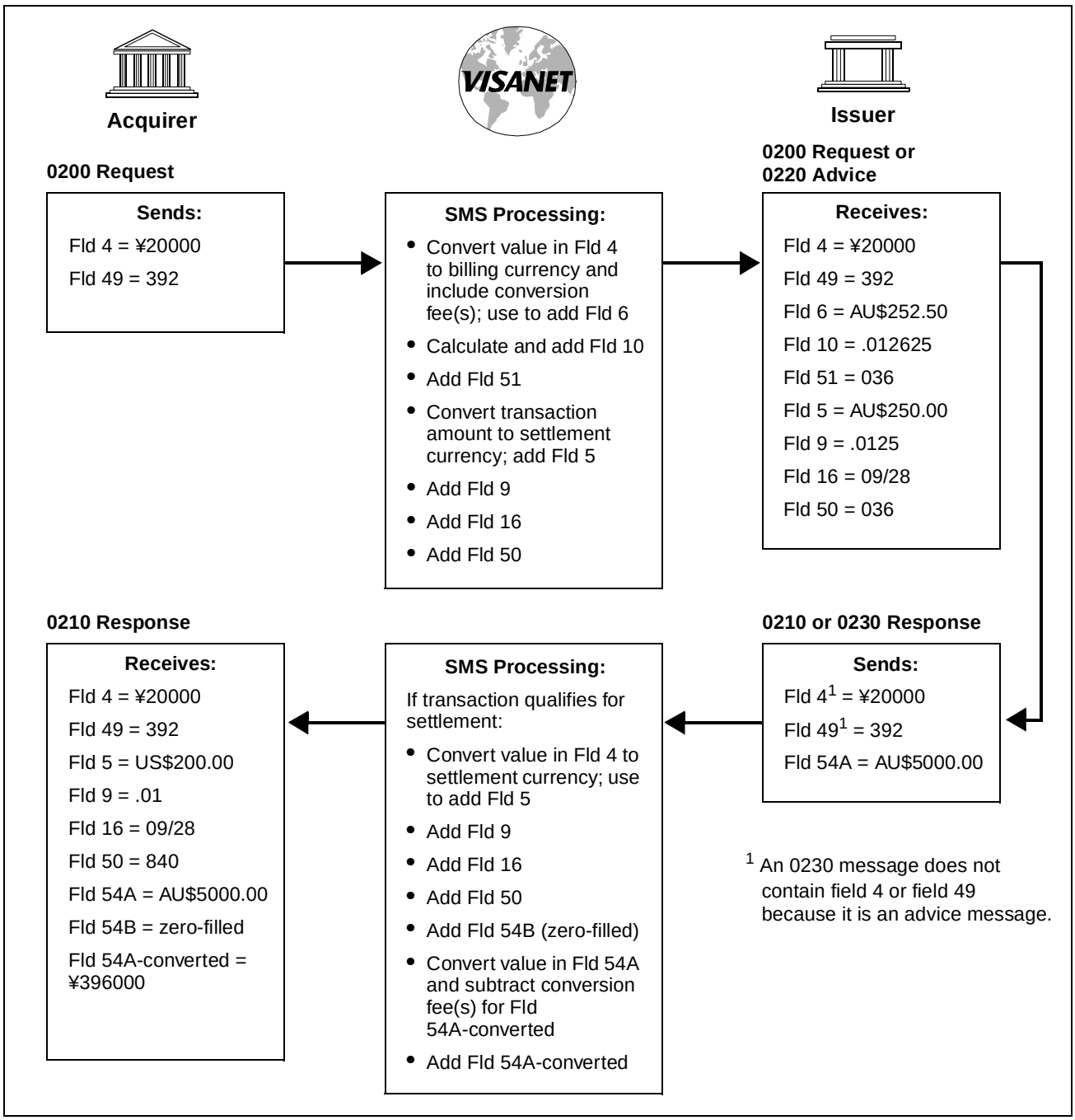
Field 51—Currency Code, Cardholder Billing

Field 54—Additional Amounts

Field 54 is used for account balance information. It contains the following information for up to four different balance amounts: account type, amount type, currency code, and sign.

The issuer provides account balance information in the first amount field and optionally in the second amount field, both in the cardholder billing currency. SMS converts the first amount and (if present) the second amount to the transaction currency and sends the converted amounts to the acquirer in the third and fourth amount fields, respectively. In the following examples, these amounts are referred to as fields 54A, 54B, 54A-converted, and 54B-converted.

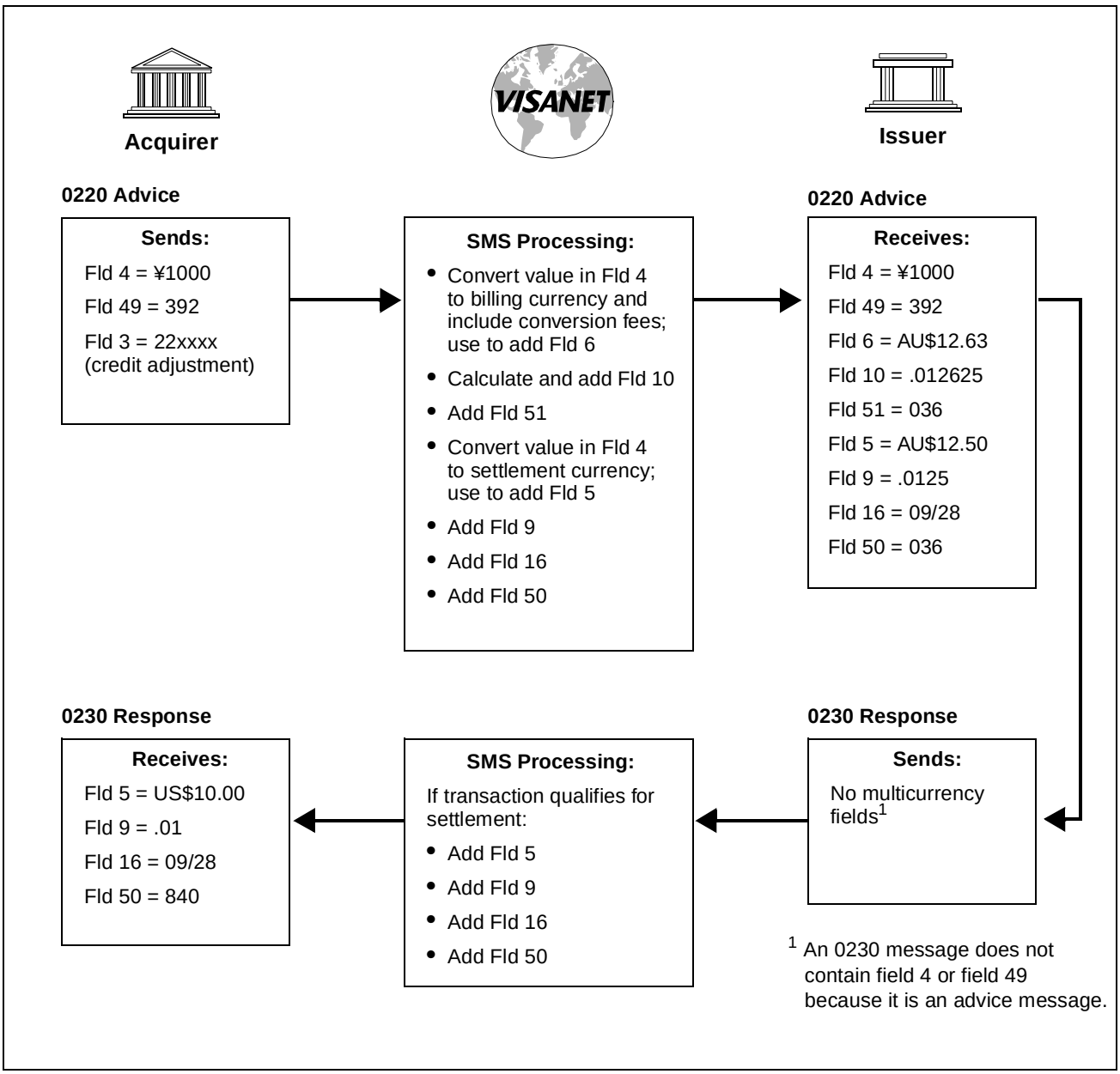
Figure 5–3: Cash Disbursement with Balance Information



For this example, ¥100 = US$1.00 and AU$1.25 = US$1.00.

If field 54B is not provided, the acquirer receives it zero-filled and does not receive field 54B-converted. See Figure 5–6 for a more detailed example of all components of field 54. Account balance information contained in field 54 is optional.

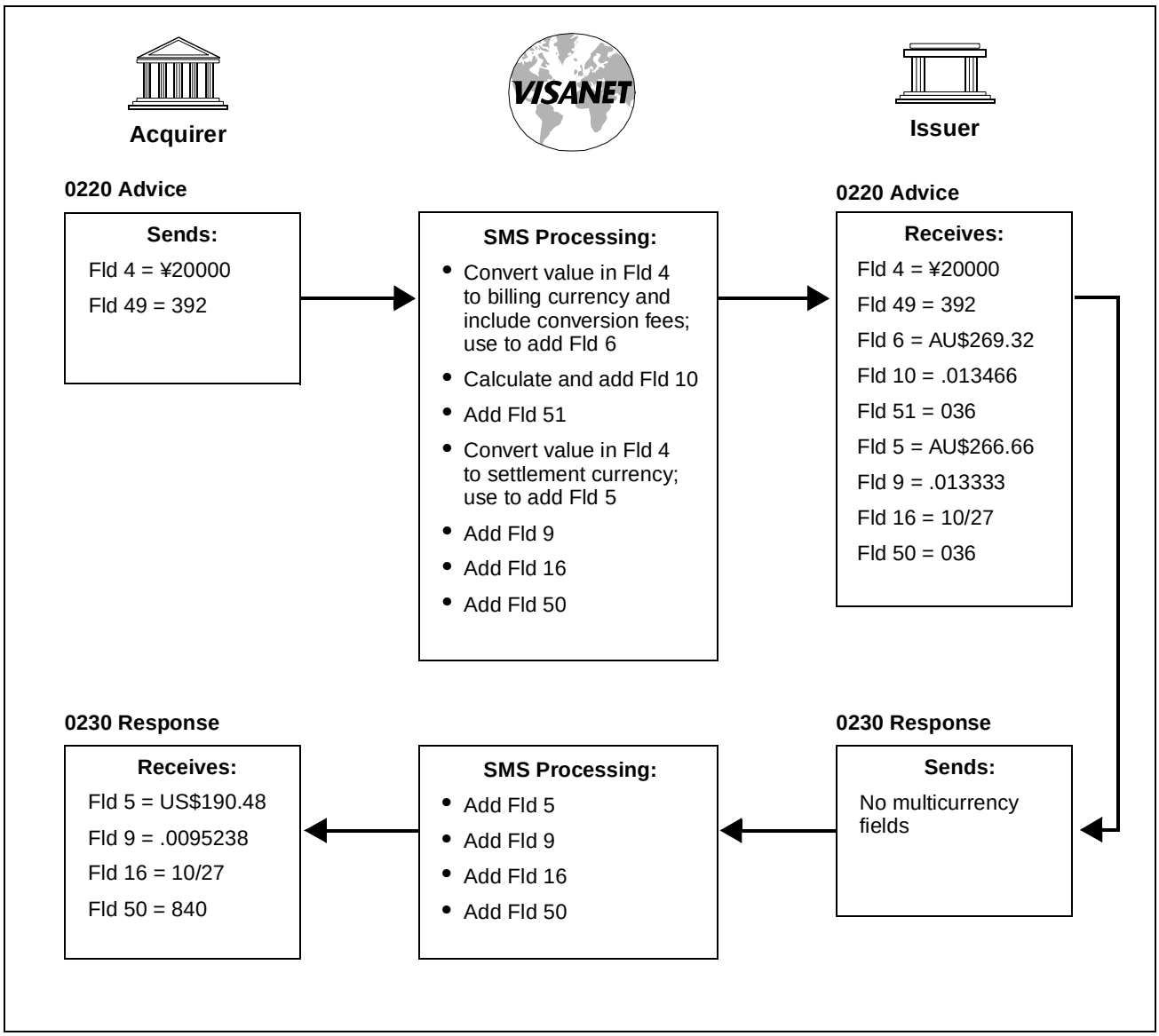
Figure 5–4: Adjustment



For this example, ¥100 = US$1.00 and AU$1.25 = US$1.00.

Currency conversion rates used for a back office adjustment can be different from the rates used for the original transaction. The rates used for an adjustment resulting from a cash disbursement adjustment are the same as the rates used for the corresponding cash disbursement.

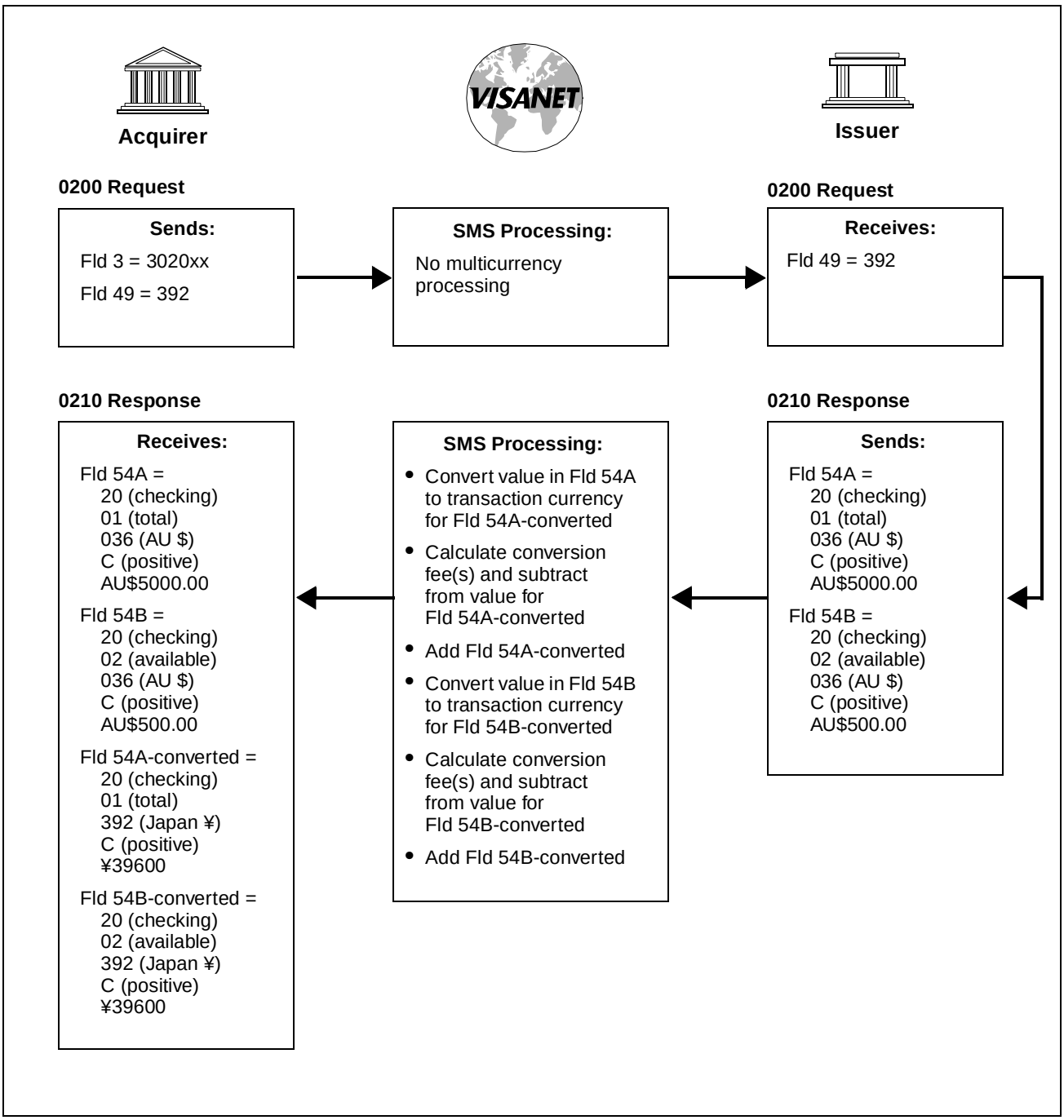
Figure 5–5: Representment



For this example, ¥105 = US$1.00 and AU$1.40 = US$1.00.

This example illustrates that the currency conversion rates used for a representment can differ from the rates used for the corresponding chargeback. (See the rates used in the chargeback example in Figure 5–8.)

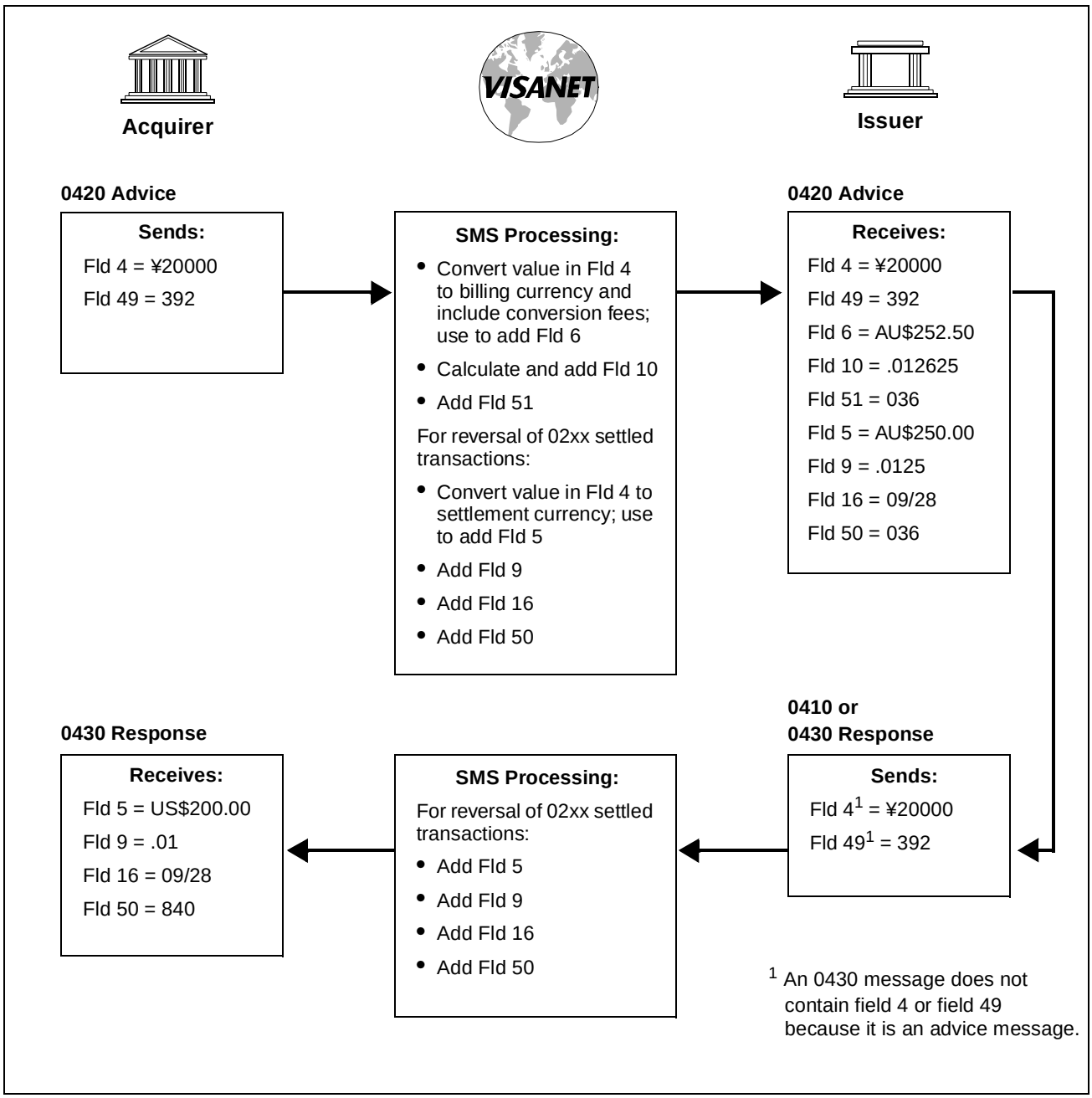
Figure 5–6: Balance Inquiry



For this example, ¥100 = US$1.00 and AU$1.25 = US$1.00.

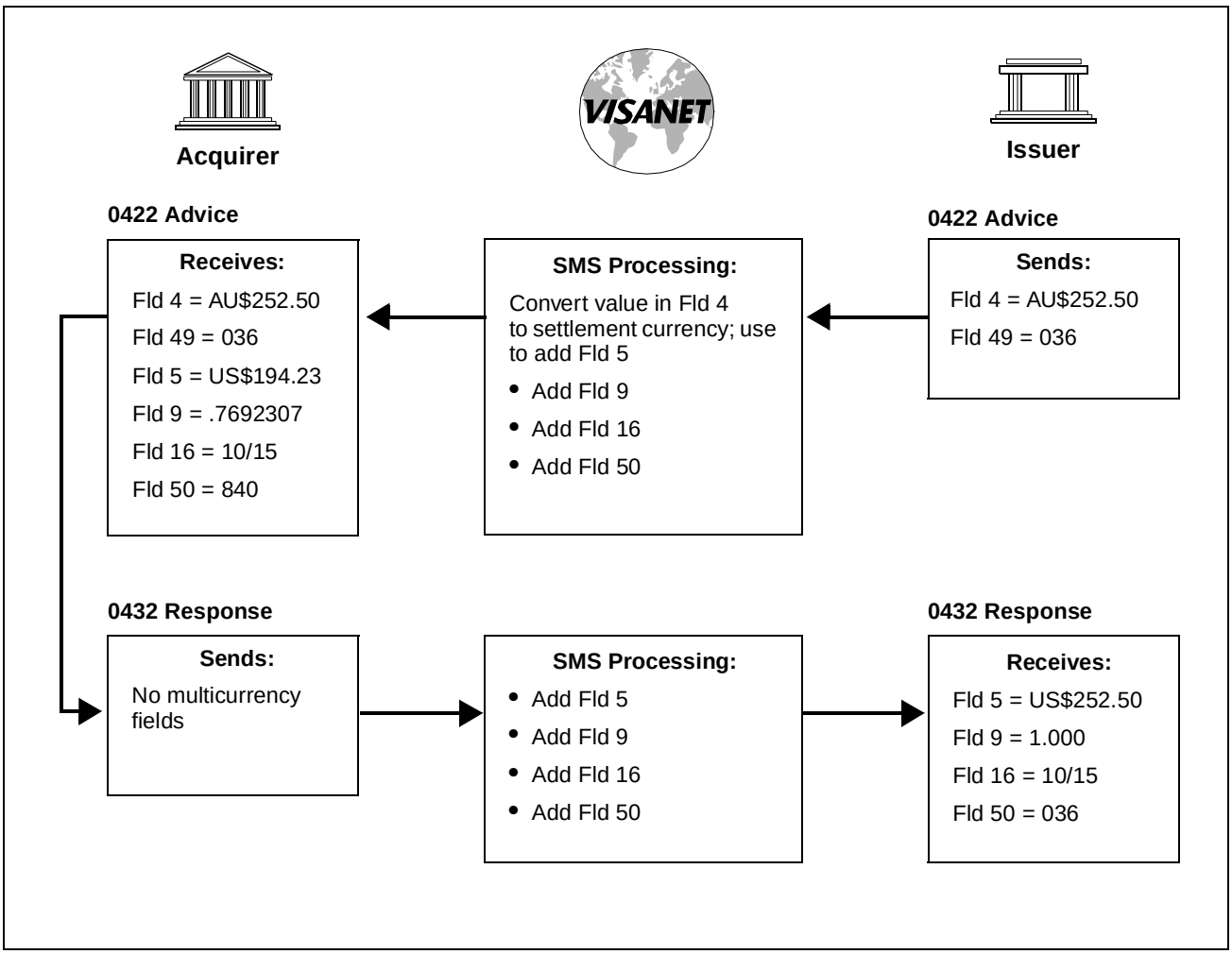
Fields 54A, B, A-converted, and B-converted contain the following components: (1) account type, (2) amount type, (3) currency code, (4) amount and sign, and (5) amount. If field 54B is not provided in the response, the acquirer receives it zero-filled and does not receive field 54B-converted.

Figure 5–7: Reversal



For this example, ¥100 = US$1.00 and AU$1.25 = US$1.00.

Figure 5–8: Chargeback



For this example, ¥110 = US$1.00 and AU$1.30 = US$1.00.

The issuer provides the chargeback amount in the cardholder billing currency as it was received in field 6 of the original request or advice.

This example illustrates that the currency conversion rates for a chargeback can differ from the rates used for the original cash disbursement. (See the rates used in the cash disbursement transaction example in Figure 5–3.)

Stand-In and Card Verification Value Processing 6

This chapter includes discussions of:

- Stand-in processing.
- Advice recovery for acquirers and issuers.
- The Card Verification Value (CVV) services.
- Other risk services.

Stand-In Processing (STIP)

When an issuer is not available, SMS acts as a backup processor and authorizes or declines ATM transactions on the issuer's behalf. This V.I.P. function is referred to as *stand-in processing*, or STIP.

All issuers specify the stand-in processing parameters to be used by SMS.

These parameters are specified even if the issuer elects to have SMS decline all transactions.

When an acquirer is not available to receive issuer-generated transactions such as chargebacks, SMS acts as a backup processor and accepts the transactions on the acquirer's behalf.

Conditions Requiring Stand-In Processing

STIP processes financial requests (0200) and reversal advices (0420) destined for an issuer under the following conditions:

- The line to the issuer is not available.
- The issuer is signed off.

- The issuer does not respond within a specified time limit.
- The issuer is in recovery-only status.
- The issuer has been signed off by SMS due to 10 consecutive time-outs.
- The request is a reversal, the original transaction was approved by STIP, and the STIP advice of the original has not been recovered by the issuer.
- The issuer responds with Response Code 91—Destination Unavailable (an issuer option).

Issuer STIP Options

The options that issuers can specify for STIP are the following:

- Setting transaction activity limits for card ranges and individual cardholders, such as:
  - Number of approved transactions for a particular account in one day (count)
  - Total value of approved transactions for this account in one day (amount)
- Using positive account controls through the Exception File for accounts that have VIP (very important person) status
- Using negative account controls through the Exception File for cards requiring pick-ups or declines
- Using modulus-10 check digit verification
- Checking Personal Identification Numbers (PINs)
- Requiring a valid card expiration date
- Establishing PIN retry limits (if PIN checking is specified)
- Using Card Verification Value (CVV) services
- Having STIP decline all transactions when the issuer is not available

STIP Authorization Processing

This section explains how STIP processes financial transactions. Reversals are covered later in this chapter.

STIP uses up to four tests to check financial transactions:

- Edit check
- Exception File check

- PIN check
- Activity check

Not all tests are done for all transactions:

- Balance inquiries are checked against the Exception File but are not tested for activity.
- PIN checking is performed only if specified by the issuer.

STIP approves financial requests unless it finds a negative condition. If the request passes all tests, STIP responds with an approval and creates an advice for later recovery by the issuer. STIP also updates the Activity File to reflect approvals made during the day.

If STIP finds a negative condition during any test, it assigns a decline response code to the request. This code is returned in Field 39—Response Code of the response, unless STIP finds a more serious decline condition in a subsequent test. If several response codes are assigned, STIP returns the code reflecting the most serious decline reason.

STIP rejects messages that contain consistency or syntax errors.

For balance inquiries and account transfers, STIP assumes that requests are to be declined with Response Code 91—Destination Unavailable. If, however, the account is listed on the Exception File with a different decline code, STIP returns that code instead.

Edit Check

STIP edits the account number in Field 2—Primary Account Number for all requests. STIP also performs check-digit verification and checks the expiration date when specified by the issuer. STIP uses the date in Field 14—Date, Expiration or takes the date from the magnetic stripe data in Field 35—Track 2 Data.

The values in the account number, date, and time limit fields must meet syntax and consistency requirements. For example, if a request contains an incorrectly formatted expiration date or the date is not present, the request is rejected.

Account Number

The account number must have a valid modulus-10 check digit (if specified by the issuer). The account number length must be valid for the range or ranges of numbers serviced by the issuer. If the check digit or length is invalid, STIP assigns Response Code 14—Invalid Account Number, No Such Number as the decline response. STIP does not perform Exception File, PIN, or activity checks once the account number is determined to be invalid.

Expiration Date

STIP performs this edit if specified by the issuer.

Visa cards must contain standard data in track 2. If a card expiration date is present in the request, the date must not be expired. For a missing or expired date, STIP assigns Response Code 54—Expired Card or Expiration Date is Missing to the request. If the date is valid and there are no edit failures for other reasons, STIP assigns Response Code 00—Approved to the request.

ATM issuers must use a value not greater than 20 years from the issue date or the value of 4912 in Field 35—Track 2 Data to designate a nonexpiring card.

Exception File Check

The Exception File contains account numbers that require special handling. Each Exception File record consists of an account number, a purge date, and an action code or cardholder spending limits, or both.

Members can update the Exception File in batch or online mode. In batch mode, members prepare a tape containing the desired Exception File updates and send it to Visa. See *V.I.P. System SingleConnect Service SMS ATM Technical Specifications* for detailed information. SMS edits the updates for critical data such as account numbers and purge dates, then applies the updates to the Exception File.

Cash Disbursement Transactions

STIP checks cash disbursements against the Exception File to determine if an action code or cardholder spending limits are on file for the cardholder's account.

If no record is found—If the account is not on file, STIP performs the standard activity check.

If an action code is found—If STIP finds an action code for the account, it assigns that code to the request. The codes allowed in Exception File records are:

04 = Pick up (nonfraud).

05 = Do not honor.

07 = Pick up, special condition (fraud).

11 = Approval for VIP (very important person)—A nonstandard activity check is needed. See the "Nonstandard Activity Checking" section of this chapter for more information.

41 = Lost card; pick up (fraud).

43 = Stolen card; pick up (fraud).

If cardholder spending limits are found—STIP uses one of the following checks:

- If the Exception File contains limits but no action code, STIP uses the limits in the Exception File to check activity instead of the basic cardholder spending limits. STIP also checks the transaction limit and daily limits.
- If the Exception File contains limits and Action Code 11—Approval for VIP, STIP uses the limits in the Exception File for activity checking. STIP does not check the transaction limit and daily limits.
- If the file contains Action Code 11—Approval for VIP but no limits, STIP does not perform any cardholder activity checking.

Balance Inquiries

STIP checks balance inquiries against the Exception File to determine if a special decline or pickup code is on file.

- If the account is not on file, STIP assigns Response Code 91—Destination Unavailable.
- If the account is listed with a specific code, STIP assigns that code to the transaction.

STIP ignores records containing Action Code 11—Approval for VIP or activity limits, or both, for balance inquiries.

PIN Check

For users of the PIN Verification Service (PVS), STIP proceeds after the PIN is decrypted and verified by SMS. If a PIN is invalid, STIP checks to determine if the incorrect-PIN limit has been exceeded.

For this test, STIP maintains a count of consecutive invalid-PIN requests that it encounters on the current day for a given account number. STIP processing is based on the current PIN-incorrect count, as follows:

- The count (not including the current attempt) does not exceed the limit:
  - If the PIN is valid, STIP clears the count to zero.
  - If the PIN is invalid, STIP increases the count by one. It then compares the updated count to the limit. If the updated count now exceeds the limit, STIP assigns Response Code 75—Allowable Number of PIN Entry Tries Exceeded to the request.
- The count (not including the current attempt) exceeds the limit:
  - STIP assigns Response Code 75—Allowable Number of PIN Entry Tries Exceeded and does not update the count.

– Once a count exceeds the limit, STIP continues to assign Response Code 75—Allowable Number of PIN Entry Tries Exceeded to all subsequent requests for the rest of the day. The cardholder is not able to complete any more transactions requiring a PIN for the rest of the day. The cardholder can retry the next day after STIP clears PIN counts at the end of the current day.

NOTE: *The PIN Verification Service also can be used on a subscription basis for checking all PINs for an issuer, in addition to the STIP check.*

For more information on the use of PINs and the PIN Verification Service, refer to Chapter 7, Security.

Activity Check

This section describes the activity checking procedures that STIP performs when it receives a request. This section does not apply to ATM balance inquiries and account transfers.

STIP checks cardholder activity using the contents of the Exception File and the following issuer-specified activity limits:

- Transaction limits
- Daily limits
- Cardholder spending limits

The activity check determines whether or not approval of the request will cause the card usage to exceed these limits.

The activity check is based on activity accumulated daily in the Activity File. The accumulated totals are reset to zero every 24 hours. The Activity File contains only STIP approvals.

Standard Activity Checking

The standard activity check involves comparing:

- The amount of a request with the transaction limit.
- The request plus today's STIP approvals with the daily transaction count and amount limits.
- The request plus today's STIP approvals with the basic cardholder spending limits.

If the request exceeds the transaction limit, or approval of the request would cause total activity to exceed the daily or cardholder spending limits, STIP declines the request.

STIP performs the standard activity check on all requests it receives for processing unless the issuer has specified nonstandard activity checking on that account number, as explained in the following section, "Nonstandard Activity Checking."

Nonstandard Activity Checking

STIP can perform nonstandard activity checking on accounts that the issuer has listed in the Exception File as high-risk or low-risk accounts. If STIP finds an action code listed in the Exception File, it checks the limits in the Exception File instead of the standard activity limits. Refer to the "Exception File Check" section of this chapter for more information.

When Activity Is Not Checked

STIP does not perform the activity check in some cases because it is not needed to reach an authorization decision. The activity check is not done in the following cases:

- The request (for example, a credit adjustment transaction) results in a credit to the cardholder's account.
- The account is listed in the Exception File and the record contains Action Code 11—Approved for VIP, but there are no cardholder spending limits, indicating that activity checking is not required.
- STIP already assigned a decline response code during editing, the Exception File check, or the PIN check.

Excessive Activity

The amounts and counts must be less than or equal to all applicable limits. If activity is over the limit, the STIP response code indicates:

- The amount limit is exceeded (Response Code 61—Exceeds Approval Amount Limit)
- The count limit is exceeded (Response Code 65—Exceeds Withdrawal Frequency Limit)

If both conditions are true, STIP assigns Response Code 61—Exceeds Approval Amount Limit.

Assigning a Response Code

After editing the transaction and checking the Exception File, PIN, and activity, STIP assigns the appropriate response code to return in the response message.

If only one code was assigned to a request, STIP returns that code in the response message.

EXAMPLE

If STIP assigns a Response Code 54—Expired Card or Expiration Date Is Missing during the edit, and finds no other decline conditions in subsequent tests, STIP returns the same Response Code 54 in the response message.

If STIP assigns Response Code 00—Approved or Response Code 11—Approval for VIP and finds no decline conditions, STIP returns Response Code 00 in the response message. STIP never returns Response Code 11 in response messages to acquirers.

If STIP assigns more than one decline code, STIP returns the most serious decline code.

EXAMPLE

If STIP assigns a Response Code 54—Expired Card or Expiration Date Is Missing, Response Code 55—Incorrect PIN, and Response Code 04—Pick up Card–Non-Fraud to the request, STIP puts Response Code 04 in the response message because it is the most serious of the three.

The response code severity is ranked in the following order: 14, 43, 07, 41, 04, 75, 05, 55, 61, 65, 54, 86, 91, 00, with 14 ranked as most severe. The response codes are listed in the "Field 39" section of the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications.*

Updating the Activity File

When STIP approves a financial transaction, STIP updates the transaction totals in the cardholder's activity record. Balance inquiries do not affect activity totals. For financial requests and reversals, STIP updates:

- The count and amount totals for the approved request.
- The cardholder's grand totals.

Also, as explained earlier, PIN counts are updated as needed when the PIN is verified.

The accumulated activity totals either increase or decrease, depending on the value in Field 3—Processing Code in the request. Processing codes defined as having a debit value increase the totals, while credit processing codes decrease the totals. In reversals, debit processing codes decrease the totals, while credit processing codes increase the totals. For a description of Field 3—Processing Code, refer to the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications.*

Activity counts and amounts are never reduced to less than zero. If a credit adjustment exceeds the activity totals, STIP resets the activity record to zero.

Creating an Advice

When STIP responds to a financial transaction, it always creates an advice for the issuer.

A STIP advice contains all the data from the acquirer's request, except the PIN. The PIN field, Field 52—PIN Data, is zero-filled in the advice. (The zeros in field 52 notify the issuer that a PIN is present in the request.)

In addition to data from the acquirer's request, a STIP advice contains:

- STIP response code (in Field 39—Response Code).
- The reason STIP processed the request (in Subfield 63.4—STIP/Switch Reason Code).
- A value of 1 in the Advices-Created-By flag in the message header. (This value indicates STIP created the advice while standing in for the issuer.)
- Settlement flags in the message header of the advice. (STIP sets these flags as needed to indicate the settlement impact.) For more information, see the Message Structure and Header Field Specifications chapter of the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*.

Advices remain on file until the issuer signs on to recovery status using an 0800 network management message.

Reversal Processing

Reversals cannot be declined. When STIP receives a reversal, it always approves the reversal and creates an advice for the issuer. STIP, however, edits the reversal for validity. STIP checks the reversal for proper syntax and consistency, and searches for the corresponding financial request being reversed. If the original transaction is found, STIP updates the activity records and the reversal has financial impact. If the financial record is not found, activity records are not updated, and the reversal has no financial impact. The issuer may still receive Response Code 00—Approved.

Updating the Activity File

When STIP approves a reversal, it updates the cardholder's activity record if the reversal has settlement impact. For example, ATM counts and amounts are decreased for a valid reversal of a cash disbursement transaction. The cardholder's grand totals also are decreased accordingly.

When a reversal has a credit effect on the cardholder's account, activity counts and amounts on file are never set to less than zero.

Creating an Advice

When STIP responds to a reversal, it creates an 0420 advice for the issuer to recover. The 0420 advice contains data from both the undeliverable reversal and the STIP response.

The Advices-Created-By flag of the 0420 message header contains a value of 1, indicating that STIP created the advice while standing in for the issuer. STIP also sets the settlement flags in the message header of the advice as needed to indicate the settlement impact. In addition, the 0420 advice also contains a reason code in Subfield 63.4—STIP/Switch Reason Code. For more information, see the Message Structure and Header Field Specifications chapter of the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*.

Advices remain on file until the issuer signs on to recovery status using an 0800 network management message.

Acquirer Stand-In Processing

STIP also provides stand-in processing for an acquirer when the acquirer is unable to receive issuer-generated messages including chargebacks, fee collection/funds disbursement, and text messages. Stand-in processing occurs under the following conditions:

- The line to the acquirer is not active.
- The acquirer is signed off.
- The acquirer does not respond within a specified time limit.

SMS accepts the transaction on the acquirer's behalf and stores the transaction for the acquirer to receive through the advice recovery process. The advices contain information from the original issuer-generated request and include Field 63.4—STIP-Switch Reason Code.

Table 6–1 shows the advices the acquirer can receive.

Table 6–1: Acquirer Advices

Issuer-Generated Request	STIP Advice to Acquirer
Chargeback (0422)	Chargeback (0422)
Chargeback Reversal (0422)	Chargeback Reversal (0422)
Text Message (0600)	Text Message Advice (0620)

Table 6–1: Acquirer Advices

Issuer-Generated Request	STIP Advice to Acquirer
Fee Collection or Funds Disbursement (0422)	Fee Collection or Funds Disbursement (0422)

Recovering Advices

An issuer or acquirer controls advice recovery by changing its network status maintained by SMS.

To start and stop the recovery of advices from SMS, acquirers and issuers use 0800 messages.

Table 6–2 shows the recommended values in the 0800 messages to sign on to and off of advice recovery status.

Table 6–2: Signing On and Off Advice Recovery Status

Station Type	Field 70 (Sign on)	Field 70 (Sign off)
Common interface link V.I.P. message format	078	079

A station can be in normal signed-on mode, in advice-recovery mode, or in both modes concurrently.

- Normal status—If the station is signed on to normal status, it can receive and send real-time messages, but cannot receive advices from SMS.
- Recovery-only status—If the station is signed on to recovery status, SMS sends advices as they are stored. The station cannot initiate messages other than the acknowledgment of advices or sign-on messages.
- Normal and recovery status—If the station is signed on to both normal and recovery status, it can send and receive real-time messages and receive stored advices.

Timing of Recovery Status

Other than the system-induced advice recovery, there are no system requirements that dictate when or how often advices should be recovered. An acquirer or issuer can recover advices throughout the day or only during certain periods as it sees fit.

When an issuer designs its system, however, it should consider the impact of STIP authorization on advice recovery processing. STIP advices reflect authorization decisions that can affect the available funds in a cardholder's account. If the issuer restricts advice recovery to only certain periods, it may find that account balances are insufficient to cover the total value of issuer-approved and STIP-approved transactions.

Also, both issuers and acquirers should recover advices after a downtime condition, as advices from SMS can affect settlement accumulators as well as issuers' cardholder account balances.

Advice Recovery Flows

SMS keeps the following categories of advices until they are recovered by the issuer or acquirer:

- STIP processing advices
- SMS reversal advices
- Reconciliation totals advices
- Funds transfer totals messages
- BASE II transaction advices
- CRIS alerts (if member participates)

As previously stated, acquirers and issuers use 0800 messages to start and stop advice recovery from SMS. The flow that follows shows advice recovery by an issuer. A comparable flow is used for recovery by an acquirer.

➤ **To Sign On to Recovery Status:**

1. To initiate advice recovery, the issuer sends an 0800 request, containing the applicable Network Management Information Code (078).
2. SMS replies with an 0810 response.

➤ **To Recover the Advices:**

1. SMS then sends the highest priority advice on file.
2. The issuer replies with the appropriate acknowledgment.

SMS continues to send advices, one at a time, in priority order. If the issuer does not acknowledge an advice, SMS resends the advice until acknowledgment occurs.

➤ To Stop Advice Recovery:

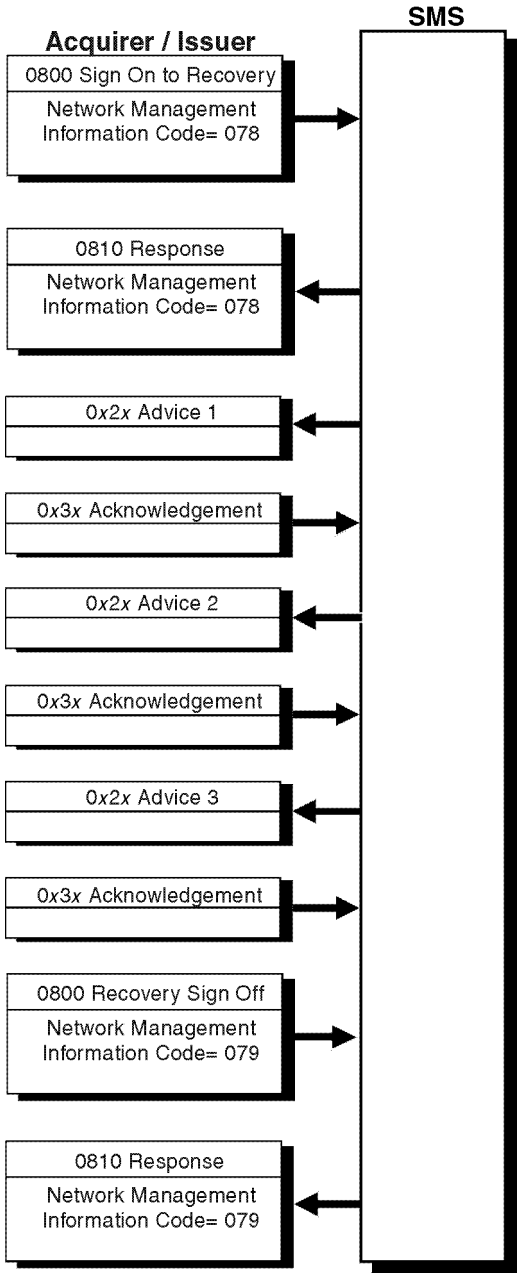
1. The issuer sends an 0800 message containing the applicable Network Management Information Code 079.
2. SMS replies with an 0810 response.

Figure 6–1 shows the message flow for advice recovery.

IMPORTANT

The member should remain signed on during this process.

Figure 6–1: Advice Recovery Flow



Advice Flags in the Message Header

To provide additional information, Field 9—Message Status Flags in the message header contains three bits that are used as advice-related flags. SMS sets flags, and the issuer or acquirer can examine them during incoming message processing. For more information, see the Message Structure and Header Field Specifications chapter of the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*.

Card Verification Value (CVV) Service

The Card Verification Value Service is a risk control service that provides protection for issuers and acquirers against magnetic stripe counterfeit.

Participation in CVV is mandatory for all issuers of Visa card products and optional for Plus issuers. All Visa card products must be encoded with CVVs. All acquirers must ensure that the magnetic stripe data in financial requests is complete and unaltered.

The CVV is a unique check value calculated from the data encoded in the magnetic stripe using an algorithm established by Visa. The CVV is calculated using a secure cryptographic process and a key known only to the issuer and optionally to Visa. Because the CVV is not embossed or printed on the card, it can only be read from the magnetic stripe. Issuers utilizing CVV for magnetic stripe verification of ATM transactions must place the CVV on track 2.

Because Visa and Plus ATM acquirers are required to provide full track 2 data to issuers, many issuers rely on receiving the full track 2 to validate PINs using PIN offset or checking the PIN verification value (PVV). Similarly, an issuer can encode CVV on track 2 and verify the value on every ATM transaction.

Visa issuers and Plus issuers directly attached to VisaNet have the additional option of participating in the Card Verification Value Service, through which VisaNet, at the member's option, performs the verification function, either for all transactions or in stand-in mode only.

There are some differences between the Visa CVV Service and the Plus CVV Service. These differences are explained in the "Comparison of the Plus and Visa CVV Services" section of this chapter.

The CVV Service described in this manual is tailored to ATM transactions. See the *Card Verification Value (CVV) Member Technical Guide* and the Card Processing Standards in the *Card Technology Standards Manual* for information on CVV requirements for POS transactions.

NOTE: *In this description, CVV refers to the value encoded on the card; CVV Service refers to the verification services available from VisaNet.*

A transaction is eligible for CVV checking when:

- Both the acquirer and the issuer are CVV participants.
- The transaction contains "90" in Field 22—Point of Service (POS) Entry Mode Code (Plus acquirers may submit the value "90" or "02").
- The expiration date on the card is within the issuer's designated range for CVV checking.

When a transaction is processed, either VisaNet or the issuer's host system calculates the CVV and compares it to the one encoded on the magnetic stripe. The CVV can fail CVV validation for any one of the following reasons:

- Fraudulent card
- Inaccurate reading or transmission of track 2 data
- Incorrect encoding of CVV, such as an incorrect position or wrong key

VisaNet performs CVV validation on cash disbursements, balance inquiries, and account transfers. Transactions *not* CVV-validated by VisaNet are reversals, cash disbursement and back office adjustments, chargebacks, chargeback reversals, representments, administrative messages, and file updates.

Issuers who do not participate in the CVV Service may *not* exercise the Magnetic-Stripe Counterfeit Transaction Chargeback (chargeback reason code 62).

Acquirers are subject to Magnetic-Stripe Counterfeit Transaction Chargebacks if any of the following conditions are true:

- Acquirer is not participating
- Acquirer is participating but the transaction did not carry full, unaltered magnetic stripe data
- Acquirer is participating but transaction does not indicate the magnetic stripe data is full and unaltered

Issuer Processing Options

CVV checking is performed according to issuer specified options as follows:

- Visa CVV validation
- Receiving CVV results
- CVV default response codes

Visa CVV Validation

Four Visa CVV validation options are available, depending on whether the issuer will be conducting the CVV tests, or if Visa will be conducting the CVV tests on the issuer's behalf.

The issuer processing options are as follows.

ALL—VisaNet performs the CVV verification on all transactions and if the CVV validation fails, forwards the results to the issuer in the request message. The CVV verification results can be used with other risk management results to determine the appropriate response.

This option allows issuers to participate in the CVV Service without having to build a data encryption facility to conduct the tests.

ALL RESPOND—VisaNet performs the CVV verification on eligible transactions. If the CVV validation fails, VisaNet responds to the acquirer using the issuer's CVV default response code (or a more severe response code determined by the stand-in processor, if applicable). VisaNet also creates an advice informing the issuer of the CVV results.

Since VisaNet responds to the acquirer with the issuer's CVV default response code, the issuer does not have the option to fully integrate this information with other risk control decisions.

(This option is not available in all regions. Contact a Visa representative for more information.)

STIP ONLY—The issuer performs CVV verification for all normal processing. VisaNet conducts CVV verification when the issuer's system is unavailable. VisaNet performs normal stand-in processing and conducts the CVV test. If the CVV validation fails, VisaNet responds to the acquirer with the issuer-provided CVV default response code, and indicates that the CVV validation failed in the advice to the issuer.

NONE—The issuer validates all CVVs. If the issuer is unavailable, STIP does not check the CVV. In this case, the CVV fails.

Receiving CVV Results

Whenever VisaNet performs CVV validation, VisaNet informs the issuer of the results of the validation by placing a value in either the original request message or in an advice message. The issuer has the choice to receive CVV results in either of the following fields:

- Field 39—Response Code

  If the issuer chooses to receive CVV results in Field 39—Response Code, the issuer receives the value "82" (CVV Validation Failure) when the CVV fails validation. If the CVV passes validation, the issuer receives no notification.

- Field 44.5—CVV Results Code

  If the issuer chooses to receive CVV results in Field 44.5—CVV Results Code, the issuer receives a value indicating either positive or negative notification of the CVV results:

  1 = the transaction failed CVV validation.

  2 = the transaction passed CVV validation.

  Blank (or not present) = the CVV was not tested; either the card was not encoded, or a system error prevented CVV validation.

The issuer can also optionally send the CVV results of tests conducted by VisaNet or the issuer in field 44.5 of the response message.

If the issuer returns field 44.5 in the response, the CVV results will be available to acquirers who have elected to receive this information.

CVV Default Response Codes

The issuer needs to inform VisaNet of the CVV default response code to be used when the CVV fails validation. The CVV default response code is used by VisaNet when it responds to the acquirer on the issuer's behalf. This applies to issuers when stand-in processing is required.

The issuer chooses one of the following default response codes:

00 = approve (not recommended for issuers using the ALL RESPOND option)

04 = pick up

05 = decline

NOTE: *The response code in field 39 of advice messages may not be the same one that was sent to the acquirer. To preserve field 39 for the issuer, Visa recommends that issuers receive CVV results in field 44.5.*

CVV Processing

Table 6–1 summarizes the processing that occurs for each transaction type for issuers participating in the CVV Service.

Table 6–1: CVV Transaction Processing Summary (1 of 2)

Transaction Type	For Participating Issuers		
	VisaNet Processing—Issuer Unavailable	**VisaNet Processing—Issuer Available**	**Issuer Processing**
Cash Disbursement (0200)	VisaNet performs CVV validation for STIP ONLY, ALL and ALL RESPOND options. If the CVV is invalid, VisaNet responds to the acquirer with the issuer's default response code. The advice to the issuer contains CVV results in field 44.5 or field 39 (results in field 39 are sent to the issuer only if the CVV fails and there is no higher failure detected by STIP).	VisaNet performs CVV validation for issuers that have selected the ALL and ALL RESPOND options. The message to the issuer contains CVV results in field 44.5 or field 39 (results in field 39 are sent to the issuer only if the CVV fails). ALL RESPOND option: If the CVV test fails, processing follows the description in the Issuer Unavailable column.	Two options apply: • Issuers that have selected the STIP ONLY option perform CVV validation (if the issuer is available). • Issuers that have selected the NONE option peform all CVV valiidation. If the issuer is unavailable, STIP does not check the CVV. In this case, the CVV fails. Available Issuers perform standard authorization processing, taking into consideration the CVV results. At the issuers option, the issuer provides CVV results in field 44.5.

Table 6–1: CVV Transaction Processing Summary (2 of 2)

Transaction Type	For Participating Issuers		
	VisaNet Processing—Issuer Unavailable	**VisaNet Processing—Issuer Available**	**Issuer Processing**
Balance Inquiry and Account Transfer (0200)	VisaNet does not perform CVV validation. VisaNet responds with a response code of 91, unless the STIP finds a card pick-up condition, in which case the response code will be 04.	VisaNet performs CVV validation for issuers that have selected the ALL and ALL RESPOND options. The message to the issuer contains CVV results in field 44.5 or field 39 (results in field 39 are sent to the issuer only if the CVV fails). ALL RESPOND option: If the CVV test fails, processing follows the description in the Issuer Unavailable column.	Issuers that have selected the STIP ONLY option or the NONE option perform CVV validation (if issuer is available). Issuer performs standard balance inquiry processing, taking into consideration the CVV results provided by VisaNet. At the issuer's option, the issuer provides CVV results in field 44.5
Reversals (0400, 0420) Adjustments (0220)	VisaNet does not perform CVV validation.	VisaNet does not perform CVV validation since CVV was validated on the original transaction.	The issuer receives 90 and, if it has the capability, it may perform CVV validation for its own monitoring purposes. Issuer may not deny the reversal or adjustment based on the CVV validation results. The response to VisaNet should not include the CVV results in field 44.5.

NOTE: *Nonparticipating issuers may perform their own CVV validation if they have CVV on their cards.*

Issuer Requirements

The issuer who participates in the CVV Service is responsible for calculating and encoding the CVV on track 2 of the magnetic stripe and for providing Visa with the keys used for calculating the CVV.

Calculating and Encoding the CVV

Participating issuers are required to encode the CVV on track 2 of the magnetic stripe according to the Visa-established standard for calculating the three-digit CVV, and placing it on the magnetic stripe. The three-digit CVV can be generated by using a Visa Security Module (VSM) which is interfaced with the issuer's host system. If the issuer does not have a VSM, it can use its own program to generate the CVV, using the algorithm for computing the CVV.

Additional standards are included in this chapter in "Placement of the CVV" because current Visa CVV documentation, the *Card Technology Standards Manual*, defines standards for encoding track 2 only for 13-digit and 16-digit account numbers. With the introduction of the Plus CVV Service, track 2 data with encoded CVVs may contain account numbers with lengths from 12 to 19 digits.

Start Date for Service

The issuer must supply Visa with the expiration date of the first cards carrying the CVV. Any card with an earlier expiration date will not be tested for CVV. This allows VisaNet to process only those accounts that actually carry the CVV.

Placement of the CVV on Track 2

The issuer must identify the location of the CVV on track 2 of the magnetic stripe. Its location is given as the displacement from the end of the Service Code field. The placement of the CVV is used to determine that enough data is received in the magnetic stripe to contain the CVV and to locate the CVV for processing.

CVV Working Keys

The issuer must provide Visa with a pair of Data Encryption Standard (DES) keys to be used to generate and verify the CVV for track 2. The issuer sends these keys to Visa under the issuer's existing Zone Control Master Key (ZCMK). See Chapter 7, Security, for more information.

Visa recommends that the issuer not use the same verification keys for CVV as those used for PIN Verification Value (PVV) with the PIN Verification Service. If the common keys were compromised it would affect both the issuer's PVVs and CVVs.

Issuer Verification

CVV verification is done by VisaNet when:

- The issuer is not available (STIP ONLY option).
- The issuer has selected the ALL and ALL RESPOND options.

CVV verification is done by the issuer when the issuer has selected the STIP ONLY option or the NONE option and the issuer is available to process the transaction. Issuers performing their own CVV verification must follow these important procedures.

- Issuers must be able to receive the value "90" in Field 22—POS Entry Mode Code.
- If the CVV is present and the value in field 22 is "90", CVV verification should be performed, depending on the issuer's parameters.
  - If the CVV is valid:
    - The response should be based on the normal authorization criteria.
    - Field 44.5—CVV Results Code should contain the value "2" (transaction passed CVV validation).
  - If the CVV is invalid:
    - A Pick Up Card (04) or Decline (05) response code should be generated.
    - Field 44.5—CVV Results Code should contain the value "1" (transaction was checked for CVV and failed validation).
- If the value in field 22 is "02", the issuer can perform CVV verification because for ATM transactions the full, unaltered magnetic stripe is required to be transmitted.

Acquirer Processing Options

Plus ATM acquirers may choose one of two values to submit in Field 22—POS Entry Mode Code. Both Visa and Plus acquirers have the option to receive CVV results.

Use of POS Entry Mode

Plus ATM acquirers may submit the value "90" or "02" in Field 22—POS Entry Mode Code indicating that the acquirer has transmitted the complete, unaltered magnetic stripe. For ATM transactions, the values "90" and "02" are identical in meaning.

(This option is not available in all regions. For example, a value of "90" is required in the Asia-Pacific region. Contact a Visa representative for more information.)

NOTE: *To ensure consistency for acquirers across multiple products, Plus acquirers are strongly encouraged to insert a value "90" in field 22. Unless the value "90" is present in ATM transactions originating from a BASE I acquirer, the Plus CVV Service will not be able to validate the CVV on behalf of the issuer.*

Receiving CVV Results

In the event of terminal or line problems, acquirers have the option to receive Field 44.5—CVV Results Code in the response message. If the issuer does not provide the results in field 44.5, the results will not be available to the acquirer. Results will be provided to the participating acquirer when transactions have been processed in stand-in.

When requesting CVV results, the acquirer will receive a value as shown in Table 6–2.

Table 6–2: CVV Request Results Values

Value	Explanation
Blank or not present	Transaction was not CVV tested or the results were unavailable.
1	Transaction was checked for CVV and failed validation.
2	Transaction passed CVV validation.

Acquirer Requirements

An acquirer who participates in the CVV Service must send the entire *unaltered* contents of the track data for all online magnetic-stripe-read transactions, indicate that the complete stripe has been sent, and be able to handle any resulting reject responses.

ATM acquirers must participate in the CVV Service to qualify for Tier II interchange rates. Participating ATM acquirers are protected against the Magnetic-Stripe Counterfeit Transaction Chargeback (chargeback reason code 62).

Participating acquirers must provide a positive indication that the complete, unaltered magnetic stripe is included in the authorization request.

- The value “90” in the first two positions of Field 22—POS Entry Mode Code, is used to indicate the presence of the complete and unaltered magnetic stripe contents in the request.
- The entire, unaltered contents of track 2 must be present in field 35 if field 22 contains the value “90”.

Comparison of the Plus and Visa CVV Services

Table 6–3 summarizes the differences between the Plus CVV Service and the Visa CVV Service.

Table 6–3: Plus and Visa CVV Differences

Plus CVV Service	Visa CVV Service
Acquirers may send the value “02” or “90” (strongly encouraged) in field 22. (This option is not available in all regions.)	Participating acquirers are required to place the value “90” in field 22 to indicate complete, unaltered magnetic stripe data is supplied.
No chargebacks permitted for counterfeit magnetic stripe.	Chargebacks are permitted for counterfeit magnetic stripe when the issuer is a CVV participant.
The CVV must be encoded on track 2, and may be optionally encoded on track 1 if track 1 is used.	The CVV must be encoded on both track 1 (for POS) and track 2.
Plus and Visa ATM acquirers are already required to certify that they transmit the complete and unaltered track 2 data and do not need to recertify to participate in the Plus CVV Service.	Acquirers are required to certify that their systems transmit the complete track 2 data.
Proprietary cards are supported if the cards are encoded according to Visa encoding standards.	No support for proprietary cards.
The Plus CVV Service allows the issuer to receive the results of CVV verification performed by Visa in field 39 or 44.5. Field 44.5 is recommended.	Issuer is informed of the results of the CVV verification. An 82 in field 39 indicates an invalid CVV.
The Plus CVV Service allows the issuer to choose from three default response codes (the referral default response code is not allowed): • 00 — approve • 04 — pick up • 05 — decline	The Visa CVV Service allows the issuer to choose the following default response codes: • 00 — approve • 01 — refer to issuer (for POS) • 04 — pick up • 05 — decline

CVV Certification

Both acquirers and issuers must be certified to participate in the CVV Service.

Issuers must certify that their cards are encoded correctly, that the appropriate keys have been established for STIP processing, and that they can perform CVV verification according to processing requirements. Depending on which processing option is selected by the issuer, the issuer certifies its capability to:

- Perform online validation of CVV.
- Accept either Response Code 82 (incorrect CVV) in Field 39—Response Code or Field 44.5—CVV Results Code.
- Accept POS Entry Mode Code value "90" and the full magnetic stripe information in the financial request.
- Provide verification of CVV results in Field 44.5—CVV Results Code.

Once certification is accomplished, the issuer or acquirer enters a monitoring period, where Visa monitors CVV values and system responses to ensure that the participant is supporting the requirements for CVV processing. Only after the monitoring process has verified that the participant supports these requirements does the acquirer or issuer become a full participant of the service. For details on the monitoring process, see the *Card Verification Value (CVV) Member Implementation Guide.*

Placement of the CVV

The CVV must be encoded on track 2 of the magnetic stripe.

track 2 has a maximum length of 40 characters and contains the following information:

- Start Sentinel
- Primary Account Number (PAN)
- Field Separator
- Country Code (only on valid track 2 with Primary Account Number beginning with 59)
- Expiration Date
- Service Code
- PIN Verification Value (optional)
- Discretionary Data
- End Sentinel
- LRC (Longitudinal Redundancy Check)

Start Sentinel, End Sentinel, and LRC are used by the magnetic stripe readers on terminals to ensure that they have correctly read the entire track. track 2 data in Field 35 must not include Start Sentinel, End Sentinel, and LRC. Excluding these three fields, 37 characters are available for encoding by the issuer.

The CVV may be placed anywhere within the discretionary data. The length available for discretionary data will depend upon three other fields, the length of the Primary Account Number, the possible requirement to include the Country Code, and the option of encoding the PIN Verification Value.

Examples of track 2 data are shown in Table 6–4.

Table 6–4: Examples of Track 2 Data

Field	Example 1	Example 2
Primary Account Number	16 digits	19 digits
Field Separator	1 character	1 character
Expiration Date	4 digits	4 digits
Service Code	3 digits	3 digits
PIN Verification Value	5 digits	5 digits
Discretionary Data	8 digits available for placement of CVV	5 digits available for placement of CVV

CVV Displacement

To participate in the CVV Service, the issuer must inform Visa of the CVV location by indicating the number of positions it is displaced from the Service Code field (the number of positions between the last position of the Service Code field and the first position of the CVV). The first position of the displacement is referenced as position zero.

The following examples illustrate the placement of the CVV in the discretionary data.

CVV Displacement Example 1

As shown in Table 6–5, the CVV has been encoded at a displacement of 8 from the Service Code. In this example, a PVV is also encoded on track 2. The CVV has been encoded in the fourth position (displacement 8) of the discretionary

data, although CVV could start at displacement 5 through 10 as well, since CVV must be three contiguous digits within the discretionary data.

Table 6–5: CVV Displacement Example 1

Digit	PVV	PVV	PVV	PVV	PVV	DD	DD	DD	CVV	CVV	CVV	DD	DD
Displacement	0	1	2	3	4	5	6	7	8	9	10	11	12

CVV Displacement Example 2

As shown in Table 6–6, the CVV has been loaded at a displacement of 5 from the Service Code. In this example, a PVV is also encoded on track 2. The CVV has been encoded in the first position (displacement 5) of discretionary data, although CVV could start at displacement 6 or 7 as well, since CVV must be three contiguous digits within the discretionary data.

Table 6–6: CVV Displacement Example 2

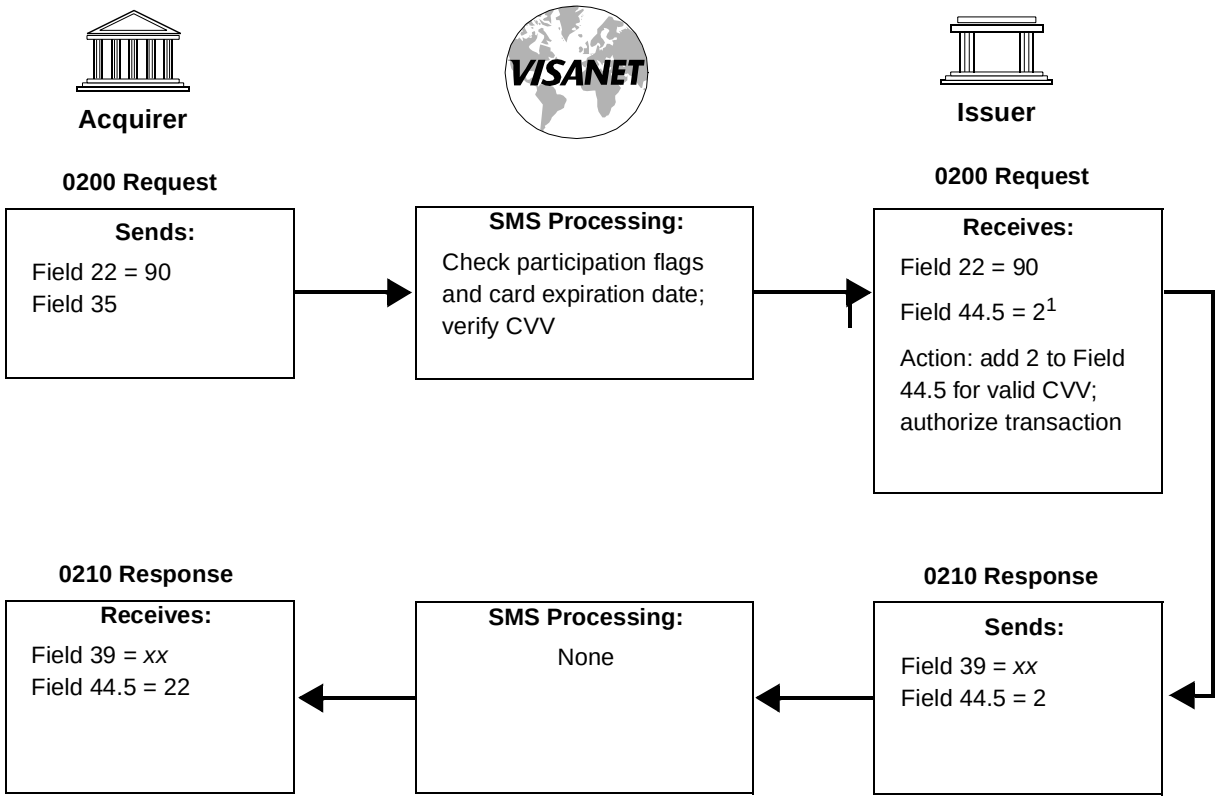
Digit	PVV	PVV	PVV	PVV	PVV	CVV	CVV	CVV	DD	DD
Displacement	0	1	2	3	4	5	6	7	8	9

CVV Flow

The flow shown in Figure 6–3 is an example of a transaction where:

- VisaNet validates the CVV.
- The CVV is valid.
- The issuer has selected field 44.5 to receive the CVV results and then incorporates the results in authorization decisions.
- The acquirer elects to receive the CVV results in field 44.5.

Figure 6–3: CVV Flow Example



[1] Only if the issuer has opted to receive the CVV Results Code in field 44.5.
[2] Only if the acquirer is certified to receive the CVV Results Code in field 44.5.

Card Verification Value 2 (CVV2) Service

The CVV2 Service is a card verification tool designed to reduce fraud losses when the card is not present. Issuers can imprint a 3-digit security number (the CVV2) on the back of ATM cards, in accordance with applicable operating regulations.

Although a CVV2 value is never passed in ATM transactions, ATM issuers (including issuers of Plus cards) can optionally use CVV2 numbers for purposes of card activation, address changes, voice response unit (VRU) cardholder validation, and other bank customer service options to ensure that the cardholder has the "real" card in hand.

Other Risk Control Services

The following risk control services are also available for SingleConnect members:

- Fraud Reporting System (FRS)
- Automatic Cardholder Database Update (Auto-CDB)
- Cardholder Risk Identification Service (CRIS)

These services are described in the following sections. In addition, the Visa Smart Debit and Visa Smart Credit (VSDC) product, which provides additional risk control features, is briefly described in Chapter 1, Service Overview.

Online Fraud Reporting Service

The online fraud reporting capability is optional and allows members to report fraud transactions using online messages. Fraud notifications can also be sent through the BackOffice Adjustment System (BOAS).

Acquirers are required to report fraud activity when the acquirer determines that the issuer did not exist at the time of the transactions, the account number fails a modulus-10 check digit test, or because of other situations as discussed in the Visa Operating Regulations. Issuers must report all confirmed fraud activity. Failure to comply with the fraud reporting rules as defined in the Visa Operating Regulations can result in the loss of chargeback rights and potential fines and penalties.

SingleConnect issuers and acquirers use 9620 advices to report confirmed fraud transactions. SMS holds these requests until end-of-day processing when they are forwarded to the Fraud Reporting System. When SMS receives a 9620 advice from the member, it generates a 9630 response.

The following fields are key Fraud Reporting message fields:

- Field 63.9—Fraud Data. This field is mandatory in 9620 advices and identifies the type of fraud being reported. It also designates whether the transaction is being added, modified, or deleted in the Fraud Transaction File.
- Field 70—Network Management Information Code. Acquirers use a value of 940. Issuers use a value of 941.
- Field 125—Additional POS Information, Usage 3. This field usage contains further information about the fraud transaction. Information includes the type of fraud notification, whether the transaction was authorized, a fraud reporting sequence number, the postal code, and fraud investigative status.

For more information, refer to the *Fraud Reporting System User's Guide*.

Automatic Cardholder Database Update Service

The Automatic Cardholder Database Update Service (Auto-CDB) is a real-time service that monitors accounts receiving Pick-Up Card responses and adds them to the Exception File with Pick-Up Card status automatically. Participation in Auto-CDB is optional.

The following messages apply:

- 0210 Financial Transaction Response—When issuers specify the pickup action code (04, 07, 41, or 43) in field 39 and the account is not already listed on the Exception File with a pickup status, SMS updates the Exception File and sends an 0322 advice.
- 0322 File Update Advice—This message notifies the issuer that the Exception File was updated; it includes all information in the updated exception record. A value of 9030 in Field 63.4—STIP/Switch Reason Code indicates an Auto-CDB advice.

  Field 91—File Update Code (with a value of 1, 2, 3, or 5) also appears in the 0322 advice and must not contain the value 4. It is not returned in 0332 responses.
- 0332 File Update Advice Response—Issuers must generate an 0332 response to acknowledge receipt of the 0322 advice.

Cardholder Risk Identification Service

Visa's Cardholder Risk Identification Service (CRIS) is an innovative transaction scoring and reporting service that employs neural network technologies to develop risk scoring models that identify fraudulent transaction patterns. Issuers can use CRIS as a stand-alone fraud detection system or as a complement to their internal fraud detection methods. The CRIS system scans the V.I.P. System log files and a brief history of

transactions of each cardholder to examine approximately 80 different criteria to determine the risk level of each authorization. The alert process notifies issuers of transactions with the highest probability of fraud. These alerts are then electronically sent to issuers throughout the day for further investigation.

The CRIS System can deliver alerts to issuers as reports sent through public networks such as CompuServe and G.E. Information Services or online as advice messages through VisaNet. All of these methods are available to SingleConnect issuers.

For alerts delivered online, CRIS sends a file of alerts to VisaNet up to 144 times a day. VisaNet formats the alerts into 0620 Administrative Advice Messages and places them in the issuers' advice message files. The issuers may recover these alerts at any time.

Issuers acknowledge receipt of the advices by responding with 0630 Administrative Advice Response Messages. The 0630 response messages are matched to their corresponding 0620 CRIS alert messages.

Key fields in these advices are:

- Field 48—Additional Data, Private, usage 29 (CRIS Alert, Part 1), which contains the CRIS alert type and the CRIS transaction risk score.
- Field 70—Network Management Information Code, which contains a value of 0174 to identify the message as a CRIS alert.
- Field 125—Supporting Information, usage 1 (CRIS Alert, Part 2) contains additional data, such as an indication of whether or not the original transaction passed the CVV check.

Issuers interested in subscribing to CRIS or current CRIS subscribers who wish to receive their alerts online should contact their Visa representative.

Security 7

This chapter contains an overview of security standards for Personal Identification Number (PIN)-based financial transaction interchange. These standards apply to all organizations acquiring or processing transactions containing PINs.

The PIN discussion also contains:

- A description of the minimum acceptable standards for all branded services provided by any interchange network.
- An outline of the minimum acceptable standards for securing PINs and encryption keys.
- Procedures to help all participants in the retail electronic payment system establish assurances that cardholders' PINs are not compromised.

Security considerations not directly related to financial transaction interchange are beyond the scope of this document.

In addition to the applicable SingleConnect bylaws and operating regulations, SingleConnect participants are also governed by the security standards and requirements in:

- *Consolidated PIN Security Standards Requirements.*
- *Card Technology Standards Manual.*

This chapter reflects the information in the *Consolidated PIN Security Standards Requirements*, but does not include the forms.

The information provided in this chapter, however, cannot substitute for the specific rules in the manuals listed in this section. For help getting copies of the security manuals and related information, contact your Visa representative.

PIN Security Overview

The PIN is a common convention used to verify the cardholder at the point of transaction. The value of the PIN as a means of verifying the identity of the cardholder is dependent exclusively on the secrecy of the PIN from the moment it is created, to the instant it is entered into the interchange system, and through the verification process used by the issuer.

Ensuring the confidentiality of the cardholder's PIN throughout the interchange cycle requires adherence to a set of recognized security standards to ensure the cryptographic protection of the cardholder's PIN. Such protection requires the implementation of specific controls to achieve the intended level of security by all participants. The standards described in this manual are the minimum acceptable standards for all branded services provided by any interchange network processing PIN-based transactions.

Failure to adhere to the specific controls and standards increases the risk of compromise to cardholder PINs. Such compromise would result in tangible dollar losses relating to the direct expenses required to correct and investigate fraudulent claims, as well as the erosion of consumer confidence in the payment system.

Card issuers expect that their customers' PINs will be protected throughout the interchange process. Acquirers depend on consumer confidence to facilitate the desired transaction volume. To ensure the value of interchange network branded services, this chapter outlines the minimum acceptable standards for securing PINs and encryption keys.

The successful management of payment system risks depends on the cooperation of all participants. There *must* be reasonable assurance that cardholders' PINs will not be compromised when used in the following devices belonging to other institutions or controlled by other networks and service providers:

- Automated teller machines (ATMs).
- Cash dispensers used at the point of sale (POS).

ANSI and ISO Standards

The ANSI and ISO standards referenced throughout this manual are:

- *Data Encryption Algorithm* ANSI X3.92-1981.
- *Personal Identification Number (PIN) Management and Security* ANSI X9.8-1982.
- *Personal Identification Number Management and Security* ISO 9564: 1991.
- *Modes of Data Encryption Algorithm Operation* ANSI X3.106-1983.

- *Financial Institution Key Management (Wholesale)* ANSI X9.17-1985.
- *Financial Institution Retail Message Authentication* ANSI X9.19-1986.
- *Financial Services Retail Key Management* ANSI X9.24-1992.

Security Responsibilities

Members are responsible for ensuring that they are in compliance with the requirements in *Consolidated PIN Security Standards Requirements*. It is their responsibility to make sure that their agents, card acceptors, vendors, and sponsored institutions also are in compliance.

Card Issuer Requirements

Each card issuer is responsible for ensuring the security and confidentiality of a PIN during generation, issuance, storage, and verification. The card issuer must be capable of performing PIN verification or having it performed through an agent.

Card issuers are responsible for advising cardholders not to disclose their PINs.

Acquirer Requirements

Each acquirer accepting PINs *must* be capable of accepting and translating encrypted PINs for interchange according to the requirements in this chapter. In addition, the acquirer *must* be able to perform key management as described.

Card Acceptor Requirements

Card acceptors *must* be capable of accepting and securely encrypting PINs of 4–6 digits in length according to the requirements in this document. While not required, card acceptors are encouraged to support encrypting of PINs up to 12 digits in length.

Only the cardholder can enter the PIN. All other information relating to the transaction can be entered by either the cardholder or card acceptor. Card acceptors *must never* request cardholders to disclose their PINs.

PIN Management

To ensure the highest level of PIN security, controls *must* exist to minimize the risk of PIN compromise during entry, transmission, storage, and processing.

PIN Entry Requirements

All cardholder-entered PINs *must* be:

- Reversibly encrypted using the Data Encryption Standard (DES) algorithm either:
  - Within a Tamper-Resistant Security Module (TRSM) as specified in the "Tamper-Resistant Security Module" section of this chapter.
  - Within a minimum-acceptable PIN entry device, as specified in the "Tamper-Resistant Security Module" section.
- Encrypted and translated within a TRSM. TRSMs include PIN pads and hardware security modules.

Data Encryption Standard

Data Encryption Standard (DES) is a standard encryption technique used to protect critical information by enciphering data based on a 64-bit input key. The DES algorithm is described in ANSI X3.92-1981, *"Data Encryption Algorithm."*

Members can choose to use either single-length DES or double-length DES (Triple DES) keys. Issuers and acquirers that choose to submit double-length DES keys must contact their Visa representatives.

Tamper-Resistant Security Module

Tamper-Resistant Security Modules (TRSMs) *must* be certified consistent with the guidelines in ISO 9564-1: 1991 (E) Section 6.3.1, "Physically Secure Device." A TRSM *must* have a negligible probability of being successfully penetrated to disclose all or part of any cryptographic key or PIN. A PIN entry device that complies with this definition can use Fixed Key or "Master Key/ Session Key" key management techniques. It can also use a unique key per transaction technique, as specified in Section 4.0 of ANSI X9.24-1992, *Financial Services Retail Key Management.*

A TRSM *must* only be placed in service if there are assurances that the equipment has not been subject to unauthorized modifications or tampering. Once TRSMs are placed in service, at a minimum, the following procedures and controls *must* exist to detect or prevent unauthorized modification or tampering:

- The TRSM *must* be capable of detecting any fraudulent access or modification meant to disclose any cleartext PIN or key.
- If a TRSM can translate a PIN from one PIN block format to another, or if the TRSM verifies PINs, controls *must* be in place to prevent or detect repeated, unauthorized calls that could result in determining PINs.

- Controls *must* be in place to ensure that equipment is not reinstalled when a suspicious alteration of a key in a TRSM is detected until it has been inspected and a reasonable degree of assurance has been reached that the equipment has not been subject to unauthorized physical or functional modification.

Minimum-Acceptable PIN Entry Device

A minimum-acceptable PIN entry device *must* conform to the following specifications:

- The PIN *must* be encrypted using the DES algorithm within the device.
- The device *must* not permit disclosure of any PIN if penetration is successful, even with the knowledge of additional relevant data that is or has been accessible external to the device (for example, encrypted PINs as previously transmitted from the device). There *must* be no feasible way to determine the key used by the device to encrypt any PIN, given a knowledge of all data currently stored within the device, as well as all data that had been transmitted to and from the device.
- The unauthorized determination of the secret data (PINs and keys) stored within the PIN entry device, or the placing of a "tap" within the device to record secret data, *must* result in physical damage to the device to the extent that the damage has a high probability of detection should the device be placed back in service. Furthermore, determining the data stored within the device *must* require specialized equipment and skills that are not generally available.
- A PIN entry device *must* use a unique key-per-transaction technique, as specified in Section 4.0 of ANSI X9.24-1992, *Financial Services Retail Key Management*.
- The data stored within a PIN entry device *must* not be able to be transferred into another such device.
- A minimum acceptable PIN entry device *must* only be placed in service if there is an assurance that the equipment has not been subject to unauthorized modifications or tampering.

PIN Transmission Requirements

For secure transmission of the PIN from the acquirer to the card issuer, the encrypted PIN block format described in this section *must* be used.

Encrypted PIN Block Format

PIN encryption in interchange between the point of PIN entry (ANSI PIN Block Format) and the point of PIN verification *must* be reversible so that the cleartext PIN block is recoverable at the point of verification.

The cleartext PIN block and the primary account number (PAN) must be exclusive-ORed (a mathematical operation, symbolized as XORed) together to form the standard ANSI PIN Block. This format is the PIN block format specified in ANSI Standard X9.8-1982, *Personal Identification Number (PIN) Management and Security* or ISO 9564-1:1991 (E), *Personal Identification Number Management and Security*.

PIN block format 1 (ANSI format 0) is required, except for members that use Triple DES keys. For these members, Visa recommends ISO PIN block format 3 where the keys are not changed.

The PIN block format specifies the number, position, and function of bits within a 64-bit block used as input to the DES algorithm operating in Electronic Code Book (ECB) mode (such as 64 bits in, 64 bits out). The 64-bit output of the DES algorithm is transmitted (or stored in the case of file protection) in its entirety.

Security may be enhanced if a double-length (112 bits plus parity) key is used for PIN encryption. The only acceptable method and sequence for double-length encryption is as follows.

Encrypting With the Double-Length Key

1. Encrypt the PIN block with the left half of the double-length key.
2. Decrypt this result with the right half of the double-length key.
3. Encrypt this result using the left half of the double-length key.

Encrypted PIN Block Rejection Criteria

Any Interchange Network Center having access to the cleartext PIN block *must* reject the encrypted PIN block if, during decryption, reformatting, re-encryption, or PIN verification, any of the following conditions are found:

- The Control field is not 0000 (binary).
- The PIN Length field value is less than 4 or greater than 12.
- A PIN digit has a value greater than 9.

When any of these conditions is met, a rejection *must* be transmitted to the sending node.

PIN Storage Requirements

PIN storage procedures *must* comply with Section 3.3 of ANSI Standard X9.8-1982, *Personal Identification Number (PIN) Management and Security* or ISO 9564-1:1991 (E), *Personal Identification Number Management and Security*. It is recommended that PINs not be stored. When necessary, they *must* be re-encrypted under a unique PIN encryption key not used for any

other purpose. Access to stored, encrypted PINs *must* be strictly controlled. This control includes restricting both physical and logical access to the media used to store the encrypted PINs.

PIN Verification Requirements

The card issuer is responsible for verifying the cardholder's PIN. The issuer or its agent can perform this function on either a permanent or stand-in arrangement. Each card issuer *must* use its own unique keys for stand-in verification. These keys are to be maintained using the same principles for safekeeping as for all other encryption keys used to provide PIN security.

PIN Verification Keys *must* be uniquely created and *must* not be related to any other encryption key except by chance. Compromise of a PIN Verification Key could result in the disclosure of all cardholder PINs using that particular key. Such a compromise would require reissuing of all cards with PINs derived from the compromised key.

PIN Verification Service (PVS)

PVS is an SMS service that provides verification of personal identification numbers (PINs) used for ATM transactions.

PINs are required for all cardholder-initiated ATM transactions. Card issuers are responsible for verifying their cardholders' PINs.

At the issuer's option, SMS can verify PINs on behalf of the issuer, at all times or only when the issuer is unavailable. When SMS verifies PINs, it intercepts all requests, verifies the PINs, and passes the requests to the issuers or the SMS stand-in processor (STIP), as appropriate, for processing.

Issuers can use either of the following options for encrypting PINs:

- The encrypted PIN for a given card can be encoded on that card's magnetic stripe.
- The encrypted PIN for each account can be stored in Visa's database.

In either case, the issuer's PIN Verification Key (the key used to derive the PINs) must be sent to Visa. This is done by encrypting the PIN Verification Key using the Zone Control Master Key (ZCMK) that is established between Visa and the issuer as described in "Key Management and Security" later in this chapter.

Visa currently offers these methods for calculating the encrypted PIN:

- Visa PIN Verification Value (PVV)
- IBM PIN Offset
- Atalla Technovations Encryption systems

For more information, refer to:

- "PIN Check" in Chapter 6, Stand-In and Card Verification Value Processing
- The *Card Technology Standards Manual* for information on computing and placement of the PVV.
- The *IBM 3624 Computer Transaction Facility Programmer's Reference and Component Descriptions* manual for information about the IBM PIN Offset method. Contact IBM for a copy of this manual.

Key Management and Security

To ensure the highest level of key security, controls *must* exist to minimize the risk of keys being compromised during creation, transmission, loading, administration, and destruction. This section outlines the minimum acceptable standards for providing adequate key security.

Key Creation Requirements

Keys must be created using a random or pseudo-random process as described in ANSI X9.17-1985, *Financial Institution Key Management (Wholesale)*. Keys must be generated such that it is not feasible to determine that certain keys are more probable than other keys from the set of all possible keys by using statistical randomness.

Where two organizations share a key to encrypt PINs communicated between them, that key *must* be unique to those two organizations and *must* not be given to any other organization. This technique of using unique keys for communication between organizations is referred to as *zone encryption* and is described in the "Zone Encryption" section of this chapter. Inter- and intra-zone encryption is required.

Zone Encryption

VisaNet uses the *zone encryption* scheme to ensure PIN secrecy as requests pass from acquirers to VisaNet and to issuers.

PIN processing in a DES-based zone encryption scheme is characterized by two zones: an acquirer zone and an issuer zone. SMS is a participant in each of these zones and functions as a cryptographic intermediary.

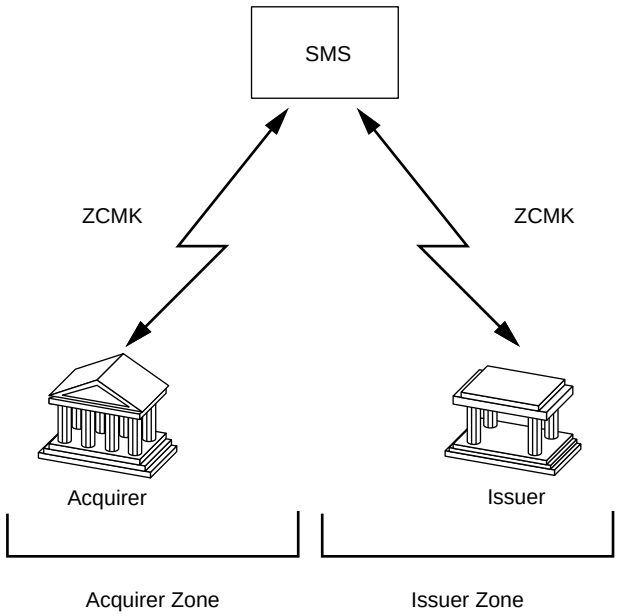
A zone begins at a TRSM device that encrypts the PIN and ends when the encrypted PIN is decrypted at a TRSM using the same cryptographic key that originally encrypted the PIN. The security of zone encryption, and the ability to change keys used within a zone without affecting other zones, is dependent upon using a unique Zone Control Master Key (ZCMK) for each zone.

The ZCMKs are used to encrypt Working Keys. All PIN Encryption Keys

conveyed between the two organizations *must* be encrypted under these ZCMKs.

Figure 7–1 illustrates an example of zone encryption.

Figure 7–1: Zone Encryption



The acquirer's security zone begins at the point of PIN entry and encryption and ends at the next point of PIN decryption. The issuer's security zone begins at the point of PIN encryption where the Issuer's Working Key (IWK) is first used and ends at the issuer's processor. Issuers are strongly encouraged to process PINs within the confines of a hardware security module. There may be several intermediate security zones between these two points where PIN translations are performed in Physically Secure Devices (PSDs). At no time in the zone encryption process are PINs to be translated in software.

PINs must be encrypted from point of entry to the acquirer. Keys reserved for local use, however, can be used to encrypt PINs in on-us and interchange transactions from point of entry to the acquirer. Before sending the transaction to SMS, the acquirer center must encrypt the PIN using an Acquirer Working Key (AWK).

When SMS receives a transaction, SMS determines where the PIN is to be verified and whether the request is destined for the issuer or a stand-in processor for authorization. If the request is destined for the issuer's center, SMS acts as an intermediary by performing PIN translation. Before the PIN is sent to the issuer's center, SMS must encrypt the PIN using the applicable IWK.

The AWK *must* only be known by the acquirer and SMS. The IWK *must* only be known by the issuer and SMS.

Key Uniqueness

Encryption keys *must* only be used for the purpose they were intended; for example, Key Encryption Keys (KEKs) are not to be used as Working Keys. This precaution is necessary to limit the magnitude of exposure should any key or keys be compromised. Using keys only as they were intended to be used also significantly strengthens the security of the underlying system. Keys should never be shared or substituted in a processor's production and test systems.

Any key used to encrypt a PIN in a minimum acceptable PIN entry device *must* be known only in that device and in security modules at the minimum number of facilities consistent with effective system operations.

Weak Keys

Weak keys *must* not be purposely generated. Weak keys are defined as those keys that create the same results during both encryption and decryption.

Key Component Generation

When the physical key components are generated, there *must* be at least two components, each having 16 characters in length. The encryption key is then created by a process of XORing the separate 16-character components together to create a unique encryption key. The XORing process is to be managed inside a TRSM.

Two or more components *must* still be created for devices requiring manual entry of a single encryption key. The components are parts of the single key (for example, left eight digits and right eight digits).

Transmission Requirements

Because the DES is a symmetrical encryption algorithm, keys *must* be shared between communication nodes. Encryption keys can be initialized between nodes by forwarding the hard copy key components to the opposite node using different communication mediums, for example:

- Regular mail and overnight mail services.
- A cryptogram of the encryption key.
- A cryptographic entry pad under a key shared between the two nodes.

An encryption key, typically a KEK, *must* be transferred by physically forwarding the separate hard copy components of the key using different communication channels or transmitting them in ciphertext form.

Dynamic exchange of the ciphertext form of Working Keys used for PIN encryption reduces the risk associated with manually maintaining Working Keys at many different locations. The Working Keys *must* be changed at random to reduce the window of exposure associated with compromising the keys.

Dynamic Key Exchange Service

Visa offers a Dynamic Key Exchange Service. The Dynamic Key Exchange Service offers members the following two alternatives for key conveyance using 0800 and 0810 network management messages:

- The member sends an administrative request to SMS at random intervals for a new acquirer or a new issuer working key. Upon receipt of the request, SMS generates the appropriate working key and sends it online to the member.
- The member designates SMS to:
  - Generate automatically new acquirer or new issuer working keys at a set time during the day.
  - Send new keys before sending an authorization request to the issuer.

To ensure that the participant and SMS are using the same keys, the participant must acknowledge successful receipt of a new key.

For details about this service, refer to the "Dynamic Key Exchange" section in Chapter 4, Message Types and Flows.

Hard Copy Form

Hard copy key parts are the separate parts of a cleartext key that have been created for transport to another endpoint in a symmetrical cryptographic system. Typically, hard copy key parts exist for KEKs, that is, keys used to encrypt Working Keys for transport across some communication channel. Until such keys can be protected by encryption or by inclusion in a PSD, the separate parts *must* be managed under the strict principles of dual control and split knowledge.

Dual control means that each hard copy key part *must* be controlled by the single individual designated as the key custodian for the specific key part. *Split knowledge* means that separate individuals can have custodial control of key components, but each component must not convey knowledge of the resulting cryptographic key.

Ciphertext Form

Once the initial keys have been established, encryption keys can be transmitted in ciphertext form or within a PSD.

Key Loading Requirements

The DES algorithm is reversible. The cryptographic keys must be shared between endpoints to decrypt the encrypted PINs and perform PIN translation. Because the same encryption key exists in two different locations and the security of the cryptographic process depends on the secrecy of the encryption key, the loading of the keys into TRSMs and into the host processing system *must* be managed using highly controlled and secure procedures.

When encryption keys are established, a key has to be communicated from the point of origin to the next logical node on the communication link. This communication is accomplished through the transfer of hard copy key components. Until the key components have been cryptographically secured, they *must* be maintained using the principles of dual control and split knowledge.

Host Key Loading Practices

The following practices apply to host key loading.

- The host processing environment controls the Master File Key, KEKs, and Working Keys. All keys managed at the processing level *must* be stored encrypted under the host Master File Key or maintained in the hardware security module.
- When loading the Master File Key and any KEK from the individual key components, centers *must* use dual control and split knowledge. Procedures *must* be established that prohibit any one individual from having access to all components of a single encryption key. Individuals entrusted with a key component *must* ensure that no person (not similarly entrusted with that component) can observe or otherwise ascertain the component before, during, and after key loading.
- Any EPROMS and EEPROMS used to load encryption keys *must* be maintained using the same controls used to maintain the security of the hard copy key parts.
- Any hardware used in the key loading function *must* be controlled and maintained in a secure environment. Use of the equipment should be monitored and a log of all key loading activities maintained for audit purposes. All cable attachments *must* be examined before each application to ensure that there has been no tampering.
- Working Keys are typically created by the hardware security module. Working Keys *must* never exist outside a TRSM or a hardware security module in any form other than a cryptogram.

- All high-level key loading procedures *must* be created to be consistent with the key loading requirements of the hardware processing software and the unique security features of the hardware security module used for hardware security.

Key Loading at the PIN Entry Device

The following practices apply to key loading at the PIN entry device.

- Encryption keys are loaded either as two or more components or injected directly into the TRSM using a secure transfer device. When keys are loaded manually, the principles of dual control and split knowledge *must* govern the process. Procedures *must* be established that prohibit any one individual from having access to all components of a single encryption key. Individuals entrusted with a key component *must* ensure that no person (not similarly entrusted with that component) can observe or otherwise ascertain the component before, during, and after key loading.
- When keys are loaded to a PIN pad by using a secure transfer device, controls must be established that prohibit unauthorized use or substitution of equipment. The key *must* be erased from the transfer device after transfer to a terminal or PIN entry device. The key transfer device *must* be loaded under dual control to prevent unauthorized modification or tampering.
- Many vendors provide software applications for loading encryption keys into PIN entry devices. This software usually runs on a personal computer and, in all situations, the key that is injected into the PIN entry device is resident in the random access memory of the microprocessor. The personal computer is not a PSD. In all situations, this process *must* be managed so that the key loading function is consistent with the standards identified in *Consolidated PIN Security Standards Requirements* and that the intended security of the keys to be injected is maintained to ensure that the keys are not compromised.
- Any hardware used in the key loading function *must* be controlled and maintained in a secure environment. Use of the equipment should be monitored and a log of all key loading activities maintained for audit purposes. All cable attachments *must* be examined before each application to ensure that there has been no tampering with the equipment.

Key Storage and Distribution

The following practices apply to key storage and distribution.

- Cleartext keys, that is, keys that are either not encrypted or not maintained under the principles of dual control and split knowledge, *must* exist only inside a device that is physically secure.

- Cryptographic keys *must* be hierarchically stored if they are stored in their ciphertext form or communicated to a device to facilitate an electronic key change function. A hierarchy of encryption keys includes Master File Keys, KEKs, and Working Keys.
- The sharing of keys within a network works well when the network is small, but becomes increasingly cumbersome in large systems. Regardless of the situation, when keys are shared between and within encryption zones, procedures *must* exist that ensure the security of the key components during the distribution process. For example, dual control and split knowledge must be used, assuring that no single person has full knowledge of the encryption keys.

  When encryption keys are established, a key has to be communicated from the point of origin to the next logical node on the communication link by transfering hard copy key components. Until the key components have been cryptographically secured, they *must* be maintained following key administration requirements.

Key Administration Requirements

Key administration practices require protecting the key or keys from disclosure, substitution, or both. Procedures to restrict the use of encryption keys and methods to limit the effects of key compromise also are important. Key administration also must provide for key replacement and destruction standards.

Protection Against Key Disclosure

Any cryptographic key *must* exist only:

- In an encrypted form.
- In a TRSM or a minimum acceptable PIN entry device.
- In at least two components, in which every bit of the key depends, independently, on every other bit of the key. (That is, the key is formed by XORing the two components together.)

  Each key component *must* be in the physical possession of only one person or group of persons considered trustworthy. The person or group of persons *must* be instructed to keep secret the component entrusted to them.

  If the component is not in human-readable form (for example, in a PROM module), it *must* be in the physical possession of only one person or group of persons and for the minimum practical time.

If the component is in human-readable form (for example, printed, as within a secure mailer), it *must* be known to only one person (or alternate) and only for the duration of time required for this person to enter the key component into a TRSM or a minimum acceptable PIN entry device.

A single component *must* never be in the physical possession of a person or group of persons when any one such person is or ever has been similarly entrusted with any other component of this key.

Protection Against Key Substitution

The unauthorized substitution of one stored key for another, whether encrypted or unencrypted, *must* be prevented. This precaution reduces the risk of unauthorized persons substituting keys known only to them.

When it is not feasible to physically or cryptographically prevent the substitution of one encrypted stored key for another, it *must* not be possible for an adversary to ascertain cleartext and corresponding ciphertext encrypted under the ZCMK. In addition, such substitution can be cryptographically prevented by encrypting the stored key as a function of the users' identities (for example, XORing the users' identities with the ZCMK before encrypting the stored key). Also, if the compromise of any key is known or suspected, both the keys in question and their KEK *must* be changed.

Restrictions on Use of PIN Protection Keys

A key used to encrypt a PIN or protect the PIN Encryption Key *must* never be used for any other cryptographic purpose. Variants of the same key, however, can be used for different purposes.

Limiting the Effects of Key Compromise

The following requirements are necessary to prevent the compromise of the key or keys in one cryptographic device from compromising the encryption keys in any other cryptographic device:

- Any ZCMK and PIN Encryption Key used to encrypt the transaction PIN in other than a PIN entry device *must* be known only at two locations: where the key or PIN is encrypted and where it is decrypted.
- Any key used to encrypt a PIN in a minimum acceptable PIN entry device *must* be known only in that device and in security modules at the minimum number of facilities consistent with effective system operations.
- No cryptographic key *must*, except by chance, be equal to any other cryptographic key. Knowledge of one cryptographic key *must* provide no information about any other cryptographic key, except in the case of a variant of a key, the irreversible transformation of a key, or keys encrypted under a key.

- The irreversible transformation of a key *must* be used only at the same level in a key hierarchy as the original key or the level immediately below that of the original key.
- The variant of a key *must* be used only in those devices that possess or possessed the original key.

Key Replacement

A cryptographic key *must* be replaced with a new key whenever the compromise of the original key is known or suspected. The replacement key *must* not be a variant of the original key, nor an irreversible transformation of the original key. In addition, all keys encrypted under or derived using that key must be replaced with new keys within the minimum feasible time.

A cryptographic key *must* be replaced with a new key before it is feasible to determine the key through exhaustive attempts.

Key Destruction

Keys that are no longer used or that have been replaced by a new key *must* be destroyed. This precaution is necessary because any information that was encrypted under the old key can be decrypted and the contents revealed.

All keys *must* be securely destroyed as follows:

- If the key is maintained on paper, the key is to be destroyed by burning or shredding.
- If the key is stored on an EEPROM, the key should be overwritten with binary zeros a minimum of three times. If the key is stored on an EPROM or PROM, the chip should be smashed into many small pieces and scattered.

In all cases, keys *must* be destroyed by another individual other than the key custodian. An affidavit must be signed by all parties observing this destruction process. This affidavit is kept indefinitely with the key log.

Procedure Documentation

To ensure a high level of security and integrity, documented procedures and controls *must* exist for managing PINs, keys, and security systems. This section lists the minimum acceptable standards for providing adequate controls and documentation requirements.

PIN Management and Security Procedures

All procedures related to PIN entry, transmission, storage, and verification *must* outline the controls for preventing or detecting the compromise of PINs.

PIN Entry

PINs that are not encrypted *must* be within a TRSM or within a minimum acceptable PIN entry device. Procedures for certifying TRSMs and minimum acceptable PIN entry devices *must* be documented.

Procedures *must* be documented and used to detect the tampering with or loss, theft, substitution, or unauthorized modification of PIN-processing equipment.

If a TRSM can translate a PIN from one PIN block format to another, or if the TRSM verifies PINs, then procedures and controls *must* be documented and in place to prevent or detect repeated, unauthorized calls resulting in the exhaustive determination of PINs.

The procedures to follow when the suspicious alteration of a key in a TRSM is detected must be documented. This precaution ensures that new keys are not installed in the equipment until it has been inspected and a reasonable degree of assurance has been reached that the equipment has not been subject to unauthorized physical or functional modification.

PIN Transmission

The PIN block formats used *must* be documented. If double-length keys are used for PIN encryption, procedures detailing the method and sequence for encrypting with the double-length key also *must* be documented.

Criteria for rejecting the encrypted PIN block *must* be documented. This procedure should include when rejection would occur (for example, decryption, reformatting, re-encryption) and what condition would cause the rejection (for example, the Control field is not binary 0000).

Additionally, procedures for changing the security system software used for PIN transmission and translation *must* be documented.

PIN Storage

SingleConnect members *must* document procedures for transactions that are stored or stored and forwarded. These procedures should include the conditions of storage and the method used to protect the PIN.

PIN Verification

The methods used for PIN verification must be documented.

Key Management and Security Procedures

All procedures related to key creation, transmission, loading, and administration *must* use access logs and be carried out in a physically secure environment. Access to TRSMs *must* be controlled and logged.

Key Creation

Procedures for creating keys *must* be documented. This process includes documenting zone definition, the key hierarchy used, and how key uniqueness is ensured. A process for requesting the generation of ZCMKs and Working Keys and the physical security during the creation of the key components *must* be documented. Additionally, procedures used for changing the security system software used for key creation *must* be documented.

Key Transmission

Procedures for transferring separate hard copy components of a key or transmitting the ciphertext form of a key *must* be documented. Application of the principles of dual control and split knowledge should be documented, including the process of identifying and selecting employees to be entrusted with key custodial responsibilities.

Key Loading

Procedures for loading separate hard copy components of a key *must* be documented and followed. The physical security measures used when loading keys into TRSMs or minimum acceptable PIN entry devices, and the application of the principles of dual control and split knowledge during the loading of the key components or during the injecting into PIN entry devices, *must* be documented.

Key Administration

Procedures describing how keys are protected from disclosure and key substitution *must* be documented. If Dynamic Working Key Exchange or key variants are used, when and how they are used *must* be documented.

Procedures for detecting key compromise and the process for replacing a compromised key with a new key *must* be documented.

Procedures for destroying keys that are no longer used or that have been replaced by new keys *must* be documented. Documentation should include the method of destruction and confirmation of destruction.

Self-Audit Procedures

Participants in the electronic interchange system must comply with the standards presented in the *Consolidated PIN Security Standards Requirements*. To measure compliance, each participant in the transaction processing chain who manages cardholder PINs and encryption keys *must* complete the Consolidated PIN Security Standards Self-Audit, in *Consolidated PIN Security Standards Requirements*.

Proprietary and processor members are responsible for verifying that their member group, as a whole, is in full compliance. It is the responsibility of the designated auditing staff of each member group to explore the possible security implications of each unique implementation.

Security Self-Audit

The Consolidated PIN Security Standards Self-Audit and compliance statement (found in *Consolidated PIN Security Standards Requirements*) *must* be completed and returned 45 days before the advent of card activation, card processing, or both. Completion of the full self-audit and compliance statement is required every third year thereafter.

Any time a participant makes substantive security changes, revalidation is required. A new security self-audit *must* be completed within 45 days of such changes.

Annual Certification

In the years that the self-audit is not performed, the participant *must* complete and return an annual certification form (found in *Consolidated PIN Security Standards Requirements*). The certification verifies that there have not been substantive changes to the participants' last security self-audit.

The annual certification statement is required at the end of the quarter for the month that the full security self-audit was completed. For example, if the participant completes the self-audit in February, the annual certification would be required by March 31 of the next year, and thereafter.

Audit Exception Form

For every answer that is not "yes," an audit exception form *must* be completed. The audit exception form identifies why the participant is not in compliance and what actions are being taken to bring the participant into compliance. A blank form is in *Consolidated PIN Security Standards Requirements.*

When compliance is not possible, the interchange network contacts the member to review and resolve any exceptions.

Auditor Verification

The Consolidated PIN Security Standards Self-Audit is to be completed and certified by an internal or independent auditor. The auditor *must* have sufficient skill and experience to determine compliance.

Field Review

The interchange network, at its discretion, can perform an on-site inspection to verify the participant's compliance to the security self-audit. All auditor work papers from the self-audit can be requested and should be kept for a minimum of three years. A complete audit form is in *Consolidated PIN Security Standards Requirements.*

Routing 8

Routing refers to decisions made when sending transactions from the acquirer to SMS and from SMS to the issuer.

This chapter includes a description of:

- How SMS determines transaction routing from one member to another.
- The routing services available for both acquirers and issuers.

Transaction Routing

To route transactions, SMS maintains information on Network IDs, card types, account ranges, and processors. For example, SMS usually routes cardholder transaction requests based on the account number in the message.

Table 8–1 lists each SingleConnect ATM transaction and on what field the routing decision is based.

Table 8–1: Transaction Routing (1 of 2)

Transaction	Message Type	Routing Decision Based on...
Cash Disbursement	0200	The account number contained in Field 2—Primary Account Number.
Reversal	0420	
Adjustment, Representment	0220	

Table 8–1: Transaction Routing (2 of 2)

Transaction	Message Type	Routing Decision Based on...
Chargeback, Chargeback Reversal Issuer-initiated Fee Collection/Funds Disbursement (except Plus)	0422	The acquirer ID contained in Field 32—Acquiring Institution Identification Code.
Acquirer-initiated Fee Collection/Funds Disbursement (except Plus)	0220	The issuer ID contained in Field 100—Receiving Institution Identification Code or in Field 2—Primary Account Number. (Field 100 takes priority over field 2 if both fields are provided.)
Text Messages	0600	The member identified in Field 100—Receiving Institution Identification Code.
CRIS Alerts (except Plus)	0620	The issuer identified in Field 100—Receiving Institution Identification Code.
Fraud Notifications	9620	The issuer identified in Field 100—Receiving Institution Identification Code.

Routing Options, Tables, and Services

Routing options are determined by issuers and acquirers. This section discusses the relationship between ATM processing and the following items:

- Routing tables
- Priority Routing Service
- Alternate Routing Service
- Split Routing Service

Routing Options

This subsection identifies the routing options that apply to the SingleConnect ATM Service. Issuer and acquirer applicability are also specified.

The routing services that Visa provides are optional, except for the routing tables. Visa and Plus acquirers are required to use the Visa and Plus or the Combined Visa/Plus routing tables. Arrangements for receiving the tables can be made through an acquirer's Visa representative.

The routing tables and the Priority Routing Service are for acquirers; the Split Routing Service is for issuers. Both acquirers and issuers can use alternate routing. ATM Routing Service options described in this chapter are listed in Table 8–2.

Table 8–2: ATM Routing Table and Service Options

Routing Tables and Services	Acquirer	Issuer
Routing Tables	Required	
Priority Routing	Optional	
Alternate Routing	Optional	Optional
Split Routing		Optional

ATM Routing Tables

Any one of the following tables (also referred to as BIN tables or account range tables) can be used for ATM routing:

- Visa Routing Table
- Plus BIN Table
- Combined Visa/Plus Routing Table

The Visa, Plus, and Combined Visa/Plus routing tables are batch data files that list all ATM card prefixes, prefix lengths, and account number lengths. The tables help Visa and Plus acquirers determine which account ranges belong to ATM issuers and help them make authorization routing decisions.

Acquirers use routing tables to determine which transactions should be sent to VisaNet for processing. Entries in the Visa, Plus, and Combined Visa/Plus routing tables consist of whatever number of digits are required to identify a card range or card portfolio.

EXAMPLE

A routing table entry may be simply a BIN (for example, 412345) or a longer number for a Plus proprietary card program (for example, 504667214). Entries can be up to 12 digits. The Visa, Plus, and Combined Visa/Plus routing tables each include the Issuer Institution Country Code.

VisaNet delivers the tables as follows:

- Visa Routing Table: weekly on Tuesday
- Plus BIN Table: weekly on Thursday
- Combined Visa/Plus Routing Table: weekly on Friday

Acquirers using the routing tables must install them as follows:

- Visa Routing Table: within six business days of receipt from VisaNet
- Plus BIN Table: within three business days of receipt from VisaNet
- Combined Visa/Plus Routing Table: within three business days of receipt from VisaNet

Each transmission is a full file replacement. The acquirer must modify the BIN table between regularly scheduled updates if VisaNet identifies needed changes.

Acquirers receive the Visa, Plus, and Combined Visa/Plus routing tables in TC 33 records through a BASE II VAP or through the Direct Access Service (DAS), as described in Chapter 10, Member-to-Visa Connection Options.

Refer to the Files appendix of the *V.I.P. System SingleConnect SMS ATM Technical Specifications* for more information about routing table files.

Routing Services

This section discusses each of the routing services.

Priority Routing

Acquirers that process two or more card products on SMS can use the Priority Routing Service. The service allows SMS to determine which network and card program rules to apply to message routing decisions for ATM cash disbursements, cash disbursement adjustments, reversals, balance inquiry requests, and account transfers.

Acquirers can invoke Priority Routing by placing 0000 in Subfield 63.1—Network ID. Upon receipt of the request, SMS compares the networks of the acquirer and the issuer, identifies a common network, and routes the message accordingly. If SMS detects more than one common network, it selects the network preferred by the acquirer (a value stored by SMS).

SMS assigns the appropriate network ID and then forwards the request to the issuer with only those fields that pertain to the network's programming rules.

SMS includes the assigned network ID in the response to the acquirer.

NOTE: *If an acquirer wants a transaction to be processed for a particular network, the acquirer should use the appropriate network ID; for example, Network ID 0002=Visa, 0004=Plus.*

Alternate Routing

To determine routing, SMS maintains information on network IDs, account ranges, processing centers, acquirer and issuer stations, and user preferences. Both acquirers and issuers can designate an alternate endpoint to originate and receive exception transactions and other back office transactions.

The alternate endpoint can be located at the participant's site or another site, and use either the Visa BackOffice Adjustment System (BOAS) or an equivalent back office system. For information about BOAS, see the list of BOAS documents in the About This Manual chapter.

Transactions eligible for Alternate Routing Service include:

- Back office adjustments.
- Chargebacks.
- Chargeback reversals.
- Representments.

- Fee-related transactions (Visa only).
- Administrative free text messages.
- Fraud notification messages.
- Updates to the Exception File, PIN Verification File, or both.

Only issuers or their designates can update the Exception and PIN Verification files.

For exception transactions, fee-related transactions, and administrative messages, different endpoints can be specified for ATM and POS transactions. An alternate endpoint can be used for ATM transactions only, for POS transactions only, or both.

If two alternate endpoints are specified, one is used for ATM transactions and the other is used for POS transactions.

Alternately routed transactions can be settled at an alternate settlement entity. An alternate settlement entity can only be specified for alternately routed transactions.

Split Routing

The Split Routing Service allows issuers to separate types of transactions and to route these transactions to two or more issuer processing centers. SMS split routing decisions are based on the customer account number in field 2.

The service offers three routing options: Account Type, ATM/POS, and PIN/No-PIN .

ATM Account-Type Split Routing—Issuers can specify that SMS route ATM transactions based on the account the cardholder selects when using a multipurpose card at an ATM. Issuers can specify up to three endpoints: one for deposit accounts (checking or savings), one for credit accounts, and one for nonspecified accounts.

This type of transaction routing helps issuers of multipurpose cards that process credit and deposit accounts in different systems or at different sites.

EXAMPLE

If the cardholder selects the From Checking Account option when performing an ATM cash disbursement, SMS can route the transaction to the issuer-specified site that processes checking accounts, rather than the site that processes credit accounts. Reversals and adjustments are routed in the same manner.

IMPORTANT

Issuers must specify which of the three endpoints is to receive transactions for which no account was specified at the ATM. The same endpoint must be designated in BASE II to avoid duplicate posting of cardholder transactions.

ATM/POS Split Routing—Issuers may use separate processing centers for ATM and POS transactions.

ATM/POS split routing is available to all issuers that process Visa (Network ID 0002) and Plus (Network ID 0004) transactions. It is not valid for Interlink (Network ID 0003) transactions.

PIN/No-PIN Split Routing—Issuers can designate one processor to receive all PIN-based transactions (ATM and some POS), and another processor to receive transactions not requiring a PIN (POS only).

Settlement and Reconciliation 9

The SingleConnect settlement and reconciliation process for ATM is described in the following sections:

- Settlement Overview
- VisaNet Settlement Service (VSS)

Settlement Overview

The settlement process consists of various tasks that are performed so that funds can be transferred. Settlement tasks are performed during and after transaction processing (clearing), the process that delivers transaction data to participants.

The settlement process includes the following tasks performed by VisaNet:

- Accumulating transaction counts and amounts during transaction processing
- Calculating a net amount for the settlement day after transaction processing
- Reporting the net amount to a funds-transfer agent that manages the actual debit or credit to participants' settlement accounts

When transactions are processed through SMS, they are delivered for account posting in real time through the use of 02*xx* and 04*xx* messages. Thus, settlement refers to accumulating these transaction counts and amounts and then determining the net amount to be transferred to and from the participant's settlement account.

Transactions Qualifying For Settlement

All SingleConnect financial transactions are settled by VisaNet. A transaction qualifies for settlement if it meets the following criteria:

- The account number must be within account ranges belonging to a SingleConnect issuer set up for SMS participation
- The transaction must be one of the following types of financial transactions:
  - Cash disbursements
  - Reversals
  - Chargebacks
  - Representments
  - Adjustments

Values of the following transactions are not included in settlement totals; however, processing charges apply and are billed at month end.

- Balance inquiries
- Account transfers
- Declined financial transactions

Settlement Day

Settlement accumulation and reporting are done daily; however, funds transfer occurs only on banking days. Thus, the term *settlement day* refers to a 24-hour period during which transactions are accumulated. At the end of a settlement day, accumulators are cleared, the system settlement date is advanced, and reports are prepared.

The Gross Interchange Value (GIV) is reflected on daily reports. Each banking day, the net settlement amount for the settlement day is wire-transferred to or from the participant's settlement account. For non-U.S. dollar settlement, the wire transfer occurs two business days after the processing date.

NOTE: *If a member processes BASE II as well as SMS messages, SMS and BASE II settlement can be combined in one wire transfer. To exercise this option, contact your Visa representative.*

Accumulation and Reconciliation

As transactions occur, SMS logs them and accumulates counts and gross amounts of those qualifying for settlement. At the end of the settlement day (EOD), accumulated totals are placed in 0520 reconciliation advices.

The advices contain the number and value of transactions accumulated since the beginning of the settlement day.

End-of-day (EOD) 0520 reconciliation advices are optionally delivered automatically when participants sign on to recovery status. For details see the "Network Management Transactions" section of Chapter 4, Message Types and Flows.

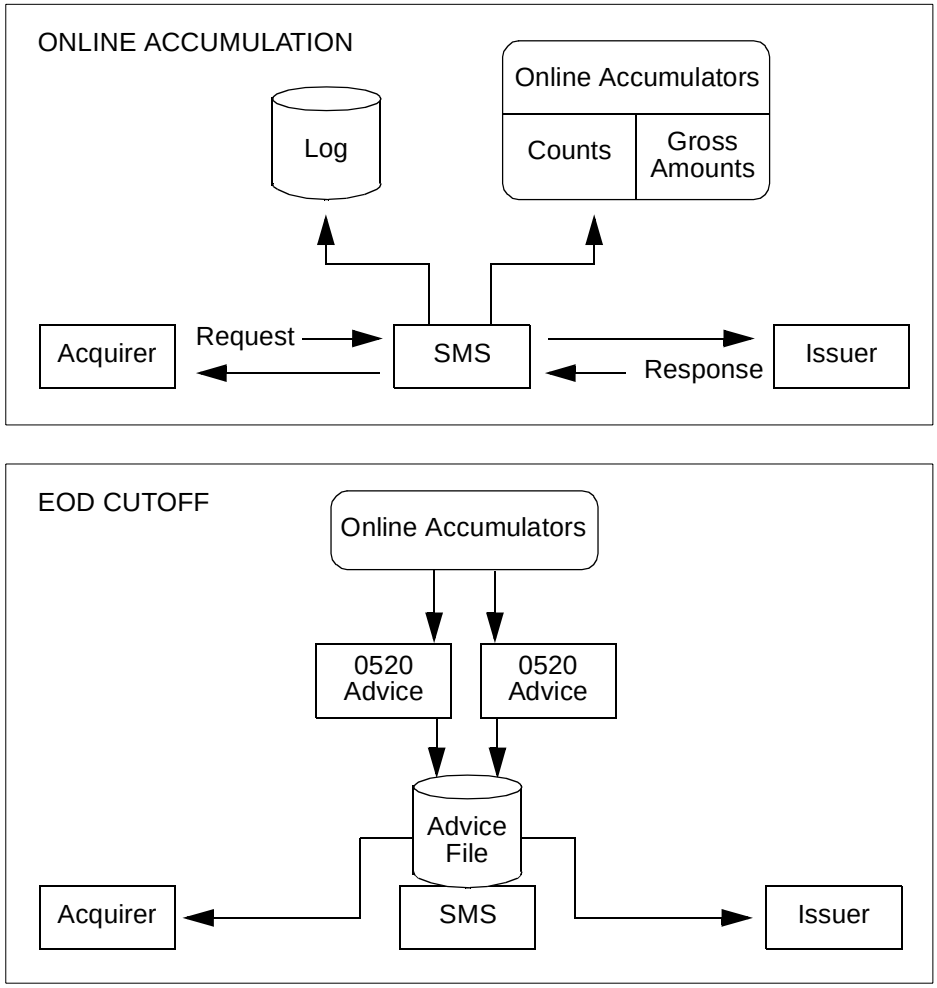
In addition, members can request 0500 reconciliation advices that contain the cumulative settlement totals for the day, from start of processing to the time of the request for the advice.

To exercise these options, contact your Visa representative.

After advices are recovered, they can be used to cross-check acquirer center and issuer totals with those accumulated by SMS.

Figure 9–1 outlines the accumulation and advice generation processes.

Figure 9–1: Overview of Online Process



Offline Processing

At the end of the settlement day, an SMS offline process uses the logged data to total the transactions processed.

The result of this process is a net settlement value for each settlement endpoint and the production of daily settlement reports.

Transactions for each settlement day are accumulated throughout the monthly cycle. Pertinent information is held to produce month-end bills for processing charges. All chargebacks, representments, and adjustments processed during the cycle are held and used to produce monthly exception transaction compliance reports.

VisaNet Settlement Service

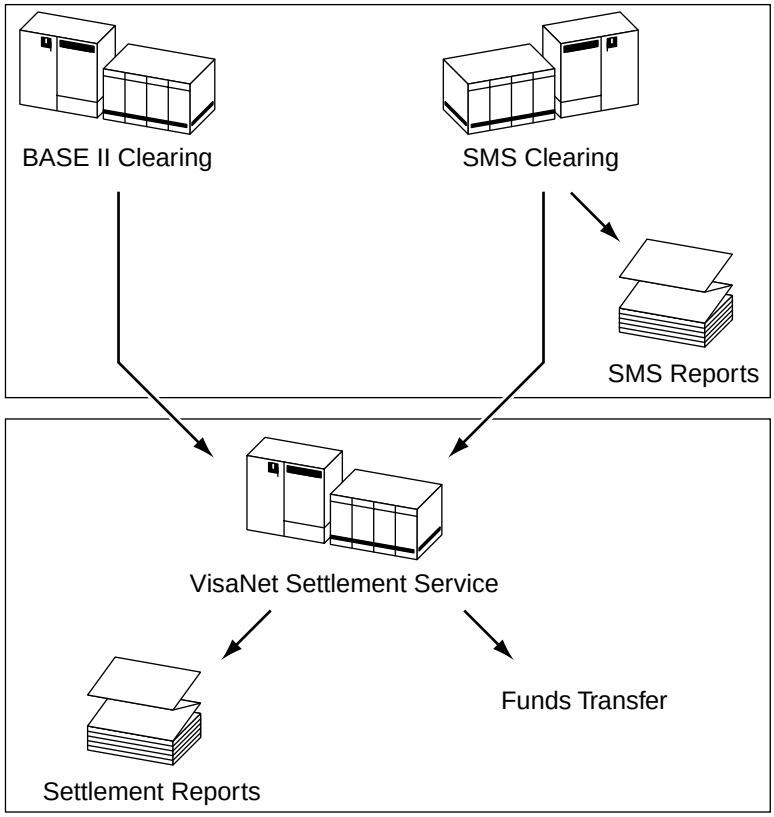
SingleConnect members settle through the VisaNet Settlement Service (VSS). Visa processes interchange transactions for SMS and BASE II through separate systems. Both SMS and BASE II perform their own clearing functions. VSS performs the settlement functions for SMS and BASE II in one centralized service that ensures consistency in settlement and reporting.

Clearing and settlement are defined as follows:

- Clearing is the process of collecting an individual transaction from one member or processor and delivering it to another.
- Settlement is the process of calculating and determining the net financial position of each member for all transactions that are cleared.

The VSS clearing and settlement process is shown in Figure 9–2.

Figure 9–2: VisaNet Settlement Service (VSS) Process



VSS provides members with the following features:

- Flexibility in establishing settlement relationships
- Standardized report layouts in print-ready and machine-readable formats
- Several report delivery options
- Member-defined funds transfer points
- Choice of settlement options for alternately-routed transactions

The following sections describe these features along with key elements of the settlement and reconciliation process in the VSS environment.

Settlement Services

Within VSS, Visa offers two settlement services:

- International Settlement Service
- National Net Settlement Service

The International Settlement Service is used to settle all international transactions and domestic transactions for members that do not participate in a National Net Settlement Service.

The National Net Settlement Service allows members within a country to settle qualifying domestic transactions through a central settlement agent bank. Qualifying transactions are those for which the merchant, acquirer, and issuer are in the same country, and the transaction currency is the local currency for that country.

Settlement Relationships

VSS provides flexibility when defining settlement relationships.

Members can define up to eight levels of settlement relationships in a hierarchy of settlement reporting entities (SREs).

The different levels allow members to build and maintain the most appropriate settlement relationships for their business needs. For example, the settlement relationship levels can be used to reflect the products in a member's organization. With this flexibility, members can easily and efficiently manage settlement functions.

Settlement Schedule

The cutoff time for SingleConnect ATM transactions processed by VisaNet is shown in Table 9–1 in Greenwich mean time (GMT). The GMT cutoff time changes by one hour when times change because of daylight savings.

IMPORTANT

Visa is enhancing the Single Message System (SMS) and BASE II to more closely synchronize processing between the systems. These enhancements will:

- *Enable BASE II to clear transactions seven days per week, instead of the current six.*
- *Synchronize the settlement cutoffs for SMS and BASE II, resulting in a standard cutoff time of:*
  - 10 GMT from first Sunday in April to last Sunday in October.
  - 11 GMT from last Sunday in October to first Sunday in April.

14 July 2001 is the planned installation date for these enhancements, which will be mandatory for all SMS and BASE II members.

Table 9–1: Settlement Cutoff Timing—ATM Transactions

GMT Dates	GMT
First Sunday in April to last Sunday in October	0500
Last Sunday in October to first Sunday in April	0600

Other key times in the daily settlement process are shown in Table 9–2.

Table 9–2: Daily Settlement Process

Event	GMT	
	Apr – Oct	Oct – Apr
Settlement report processing and report delivery begins	1000	1100
Delivery of SMS reports and raw data to VisaNet endpoints completed	1500	1600
Reporting of net settlement positions to the National Settlement Banks for domestic transactions	1500	1600
Delivery of funds transfer positions to the Visa Settlement Bank completed	1630	1730

The relative timing of these events is summarized in Table 9–3.

Table 9–3: Timing of Settlement Process (GMT)

	For work of						
	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
SMS detail reports and raw data delivered seven days a week	Tue	Wed	Thu	Fri	Sat	Sun	Mon
VSS summary reports prepared and delivered seven days a week	Tue	Wed	Thu	Fri	Sat	Sun	Mon
Funds transfers for US$ settlement	Tue	Wed	Thu	Fri	Mon	Mon	Mon
Funds transfers for non-US$ settlement	Thu	Fri	Mon	Tue	Wed	Wed	Wed

Alternately Routed Transactions

Members can use an alternate processor, such as the BackOffice Adjustment System (BOAS), to collect and deliver exception transactions and other back office transactions. For SingleConnect members, this option is called alternate routing.

Members can specify whether to settle these transactions with their normally routed transactions or separately.

Funds Transfer

This section describes:

- SMS messages containing settlement-totals data.
- The movement of actual funds.

SMS 0620 Funds Transfer Messages

After the completion of settlement, SMS uses 0620 advices to send the day's final funds transfer totals (but not the funds themselves) to issuers and acquirers. For more information about these advices, see "Funds Transfer Message" in Chapter 4.

Movement of Funds

The final step in the settlement process is the actual funds transfer, during which funds are collected from settlement entities with a net debit position and paid to settlement entities with a net credit position.

Funds transfer refers to the movement of funds between the member's settlement bank and Visa's settlement bank for the purpose of settlement. Funds transfers are a net of the member's credits and debits.

Funds can be settled in U.S. dollars (USD) or non-USD currency with a member-selected settlement bank.

Each funds transfer is associated with only one settlement account, although several funds transfers can be associated with the same account.

Funds Transfer Point

The funds transfer point can be defined at any level in the settlement structure. This flexibility allows members using third-party processors to be responsible for their own funds transfers.

VSS Reports

VSS offers control over settlement reporting and the ability to send reports to multiple locations.

Layouts and Formats

VSS reports provide a common layout for BASE II and SMS members. This common layout allows all members to streamline their internal procedures. It eliminates the need to cross-train personnel on different back office reconciliation layouts for SMS and BASE II settlement reports.

All VSS reports are available in both print-ready and machine-readable formats. Receiving reports in machine-readable formats allows members and processors to:

- Provide automated interfaces to internal systems.
- Automate their reconciliation process.

To reflect the business needs of members, VSS reports use common, business-oriented terminology, which makes them easy to read and reconcile.

Delivery

Members can have their reports sent to multiple locations of their choice, including locations other than their processing centers. Interchange routing does not determine the routing of settlement information.

Reconciliation

SingleConnect members and processors must be able to reconcile their internal totals to those provided by VisaNet. VSS is designed to help members meet each of the following reconciliation requirements:

- Match counts and amounts of financial transactions cleared by VisaNet
- Match counts of nonfinancial transactions cleared by VisaNet
- Match counts and amounts of transactions sent to or received from VisaNet for settlement with members' and processors' settlement totals
- Find specific fields on the VisaNet Settlement Service (VSS) reports that are needed for reconciliation

Key elements of the reconciliation process include:

- Processors and VSS settlement hierarchies.
- Reports and files.
- SMS reconciliation messages.

These elements are described in the following sections.

Processors and VSS Settlement Hierarchies

Effective reconciliation procedures are based on the relationships between processors and VSS settlement hierarchies. Possible relationships include:

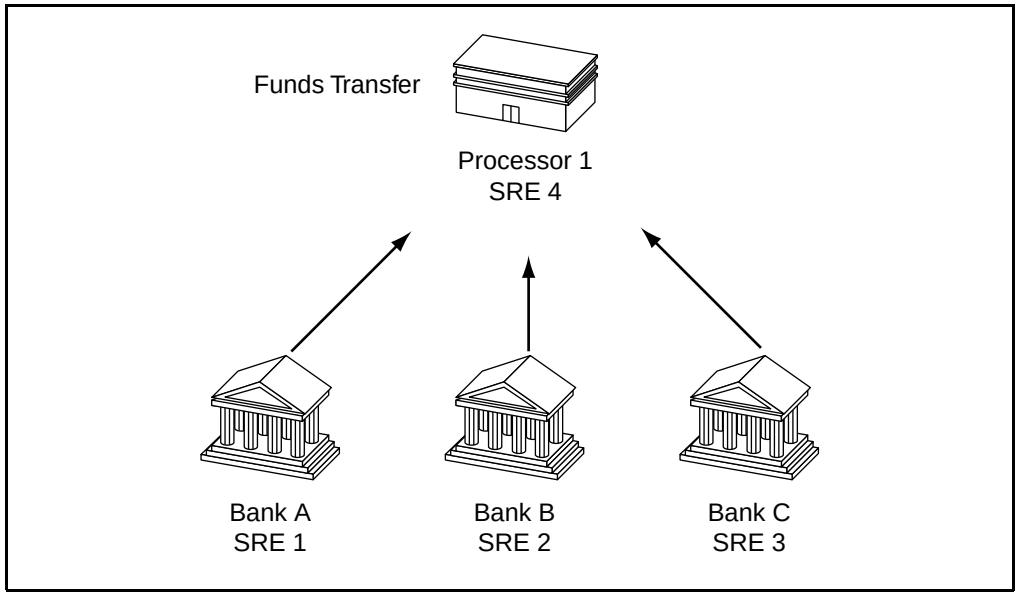
- Processor performs funds transfer for all members.
- Processor performs funds transfer for some members and not others.
- Processor supports National Net Settlement Service transactions.

Such hierarchies are reflected in the reports and files used in the reconciliation process.

Figure 9–3 contains an example of a settlement hierarchy, where a processor performs funds transfer for all its members. In this case, Processor 1 (SRE 4) represents:

- The funds transfer totals for Banks A, B, and C.
- The total work performed by the processor.

Figure 9–3: Settlement Hierarchy Example—Processor Performing Funds Transfer for All Members



Reports and Files

SingleConnect members and processors can reconcile their daily activity using the following reports and files:

- VSS reconciliation reports—VSS reconciliation reports provide totals for all transactions sent to or received from VisaNet, including nonfinancial transactions.
- VSS settlement reports—VSS settlement reports provide interchange, reimbursement fee, and charge totals settled by VSS.
- SMS transaction detail reports—Optional SMS transaction detail reports provide an audit trail of all SMS transactions in the day's settlement total. The reports can be used to research differences, if any, between totals reported by VisaNet on the VSS reports and those reported by the member's or processor's system.
- Raw data files—Raw data files can be used, in conjunction with VSS machine-readable reports, to automate the reconciliation process.

  As an optional service, Visa provides raw data files that contain detailed information about the settlement day's transactions for a given participant. Raw data is available to all SingleConnect issuers and acquirers. Users of this service can use the data to create customized reports and to reconcile data reported by their own systems.

  Raw data is distinguished from report data in that it is suited for automated processing. The raw data records are produced from the same sources as SMS reports.

SMS Reconciliation Messages

In addition to using the reports mentioned in the previous subsection, SingleConnect members can optionally reconcile their online activity by using SMS reconciliation (0500 and 0520) messages that contain the current or previous day's gross interchange totals (that is, the financial position exclusive of fees and charges) accumulated online. Each message contains the counts and amounts accumulated by VisaNet for approved, settled transactions.

Online totals are accumulated at the processor level. The processor's totals include the totals of each affiliate. These messages can be used by a processor to balance its online totals to the totals accumulated by VisaNet.

An 0520 message is generated for each settlement currency. Totals are accumulated separately for International Settlement Service and National Net Settlement Service transactions. A processor whose International Settlement Service and National Net Settlement Service transactions are in the same settlement currency has the option of getting reconciliation messages that include a combined total.

For More Information

For detailed information about the VSS topics discussed in this section, please refer to the *VisaNet Settlement Service (VSS) User's Guide.*

NOTE: *Raw data record layouts are available in both the* VisaNet Settlement Service (VSS) User's Guide *and the* V.I.P. System SingleConnect Service SMS ATM Technical Specifications.

Member-to-Visa Connection Options 10

This chapter covers connection options of acquirers of Visa and Plus transactions and issuers of proprietary cards with Plus marks that choose to receive all Plus transactions in single-message format.

A Visa member can be connected to VisaNet's Single Message System (SMS) only, to the BASE I and BASE II dual-message systems only, or to all three, depending on the requirements of the product mix offered by the member. SMS supports all products in full financial mode. The BASE I and BASE II dual-message systems support all products except Interlink.

All new Visa/Plus acquirer endpoints must process all ATM transactions in full financial mode through VisaNet's SMS.

Visa Access Point Options

A member connects to VisaNet through a VisaNet Access Point (VAP), which is a Visa-owned, PC-based system located in the member's processing center. A VAP can connect the member to the BASE I and BASE II dual-message systems, SMS, or all three.

VAPs can support both online interchange and batch processing. Members can transfer report and data files using a VAP's BASE II or Direct Access Service (DAS) application. The VAP must be running VAP Software Release 10.23 or higher. The VAP Release 10.23 documentation is for PS/2 architecture. The VAP Release 11 documentation is for PCI and ISA architecture.

Online interchange is always processed by the V.I.P. component of the VAP, which handles BASE I and SMS online traffic. The V.I.P. component can reside on the same VAP as the BASE II or DAS components, or on a separate VAP. The following descriptions assume the V.I.P. component is on the same VAP as the BASE II or DAS components.

VAP Files

VisaNet delivers report and data files to the VAP with the files' records inside "envelopes" called Transaction Code (TC) records. TC record formats are described in the files chapter of the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications.*

If the member is not ready to receive files at its host as soon as the VAP receives them from VisaNet, the VAP stores the files for later delivery to the member.

VAP File Types

SingleConnect members can receive all data and report records at the VAP in a single, undifferentiated file (File Type UNDIF). Alternatively, the Customized Delivery feature allows members to request individual files for some types of data and reports. Routing table files are not available through Customized Delivery and are delivered as shown in Table 10–1.

Table 10–1: VAP File Types

File Name and Description	File Type (VAP Pullkey)	TC Records Used For Data Records or Printlines
Undifferentiated • Visa & Plus routing tables • Combined Visa/Plus Routing Table • All data and report records not selected for Customized Delivery	UNDIF	Routing Table: TC 33 TC type shown below for distinct data and report types
Raw Data Machine-readable raw data for reconciliation	DBRAW	TC 33
SMS Reports	DBRPT	TC 45
VSS Reports—Machine Readable	SETLM	TC 46
VSS Reports—Print-Ready	SETLP	TC 47
VSS Reports—Both Machine-Readable & Print-Ready	SETLR	TC 46 TC 47

File Transfer Connectivity Between VAP and Host

Members can choose from among the following connectivity options to transfer files between their VAP and host:

- TCP/IP FTP file delivery over Token Ring or Ethernet

  Visa provides the member with procedures for TCP/IP FTP delivery. No additional design is required for receipt of a file on the host.

- Visa File Transfer Program (VFTP)

  Visa provides this program to members running MVS on IBM or IBM compatible hosts. Members choosing to transfer files using VFTP may select one of the following protocol connectivity options:

  – SNA LU0 using Token Ring

  – SNA LU0 Synchronous Data Link Control (SDLC)

  – 2780 Point-to-Point protocol on Binary Synchronous Communications (BSC)

  – 3270 BSC Multipoint

  – Coax

- Member-designed file transfer

  Upon request, Visa provides specifications for member use in developing a VAP-to-host file transfer application.

- Tape or Diskette

  The BASE II and DAS File Processors on the VAP enable delivery of files to tape or diskette. Various labeling options are available for tape transfer.

- Remote Job Entry (RJE)

  Visa supports the 2780/3780 point-to-point protocol on a Binary Sychronous Communication (BSC) for RJE file transfer. This connectivity option is available only to members using the DAS file delivery service.

For more information on options for transferring report and data files from the VAP to a member's host, see the *VisaNet Access Point Interface Specifications: BASE II & Other File Processing*.

Member Host Processing of Files Received from VAP

Members may want to write software programs to print or manipulate data transferred into their hosts.

VAP with V.I.P. and BASE II Components

A VAP configured for V.I.P. and BASE II supports online and batch processing for all Visa products. This VAP allows members to:

- Send and receive online authorizations and full financial transactions through the V.I.P. component.
- Send and receive clearing and exception transactions for products, BINs, or card ranges not converted to SMS processing through the BASE II component.
- Receive end-of-day reports and files from SMS and the BASE II Clearing and Settlement System through the BASE II component

The BASE II component sends files to, and receives files from, a Visa-supplied Edit Package. The Edit Package resides in the member's host. It is designed to:

- Ensure the integrity of the batch clearing and exception transactions that the member sends to the BASE II System.
- Perform final processing of transactions that BASE II sends to the member, including the transactions (TC records) that make up end-of-day reports and files.

For more information on the functions of the Edit Package, see the *BASE II Clearing & Settlement System Edit Package Operations Guide* or the *BASE II PC Edit Package User's Guide*.

VAP With V.I.P. and DAS Components

A VAP configured for V.I.P. and DAS can be used by SingleConnect members. This VAP configuration allows members to:

- Send and receive online authorizations and full financial transactions through the V.I.P. component.
- Receive end-of-day report and data files from SMS and the BASE II Clearing and Settlement System through the DAS component.
- Receive deferred clearing draft transactions through bulk retrieval. For more information on receiving deferred clearing advices in bulk files, see the DCAF section in Chapter 1, Service Overview.

DAS handles report files differently from data files. DAS strips all data files of hash bytes but not header and trailer records. At the member's option, DAS delivers the DS Reports file (DBRPT) as 133-byte printlines or as data records with embedded printlines. The member always receives the International and National Net Settlement Report file (SETLR) as 133-byte printlines. This report file does not have header and trailer records.

For more information on DAS, see the *V.I.P. SingleConnect Service File Delivery: Direct Access Service (DAS) Technical Specification* or contact your Visa representative.

VAP Options for Existing VisaNet Endpoints

A member already connected to VisaNet using a VAP with the V.I.P. and BASE II components for Visa POS, Visa Electron, or Interlink processing may also want to use the same VAP for ATM processing.

Alternatively, the member can use a separate VAP with V.I.P. and DAS for SingleConnect ATM transaction processing. This is typically done when the member has a separate system for deposit accounts, and plans to deliver ATM transactions to that system, or if the member wants to separate ATM SingleConnect acquiring from its existing Visa point-of-sale (POS) acquiring structure.

New ATM-Only Endpoints

A member that plans to acquire Visa and Plus ATM transactions, or issue proprietary Plus ATM cards, can choose either the BASE II or DAS component to connect to VisaNet for file delivery. Typically, DAS is selected based on its simpler operating requirements (the Edit Package is not necessary), especially if the member's future plans are to support all other Visa products in a single-message environment.

Functions to be Supported

There are three basic functions that V.I.P. SingleConnect Service participants must support:

- Online transaction processing
- Settlement and reconciliation
- Exception handling

Each of these functions is discussed in the following sections.

Online Transaction Processing

This section identifies the message format and delivery requirements for online transaction processing.

Online Message Format

All message types, both financial and nonfinancial, are supported by the V.I.P. message format. The V.I.P. format is required for online financial processing.

The BASE I message format supports nonfinancial message types only. This format is used by many issuers for their current VisaNet interfaces.

A member can choose to continue to use the BASE I format for existing Visa products and add the V.I.P. format for online financial processing. In this case, two separate ports are required on the VAP, one for each message format.

Instead of supporting two formats, all processing can be performed through a single V.I.P. interface on the VAP. In this case, BASE I transactions must be converted from the BASE I format to the V.I.P. format.

Online Transaction Delivery

Real-time messages (in both V.I.P. and BASE I formats) are always delivered through the V.I.P. System component of the member's VAP. The V.I.P. System component can be either on the same VAP as the BASE II or DAS components, or on a separate VAP.

Settlement and Reconciliation Report Delivery Options

At end of day, members' VAPs receive settlement and reconciliation reports from VisaNet.

A member may want to receive online transaction reports, raw data, or both through its BASE II interface, along with any other batch data being delivered from the BASE II System for other Visa products supported by the member. A Visa-supplied Edit Package is used to extract and print the reports. The BASE II reports use a different port than that used for online transaction delivery.

Members connected exclusively to SMS can receive their reports and raw data through DAS, without using a Visa Edit Package in their host systems. Batch report and file delivery is always performed on a separate port than that used for online transaction processing.

Exception Handling

A member must decide how to set up its exception handling interface. Exception handling is a process in which staff members:

- Accumulate exceptions during the day.
- Conduct inquiries.
- Follow up on correspondence.
- Submit adjustment transactions to the interchange system.

Members typically establish a workstation platform for this purpose. The workstation can be a stand-alone system, connected to the member's host, or both.

Once a member is ready to transmit the accumulated exception items, the exception handling system is connected to SMS. This connection is often through a dial-up line, and transactions are transmitted conversationally.

BackOffice Adjustment System (BOAS)

Members that do not already have an exception handling system for ATM transactions can choose to use Visa's stand-alone BackOffice Adjustment System (BOAS) connected to SMS through the VAP.

NOTE: *BOAS is available at the region's discretion.*

For a member that uses BOAS, the origination and receipt of all ATM exception items are handled on a platform separate from the member's host system.

BOAS is available from Visa as stand-alone software that runs on the member's IBM or IBM-compatible personal computer.

Because the BOAS software is offered by and maintained by Visa, and is available for immediate shipment to a member, BOAS often saves the time and expense involved in building and maintaining an automated exception system.

BOAS communicates with VisaNet through a dedicated port on the member's VAP. To send or receive exception transactions, the member must be signed on to VisaNet.

Acquirers can initiate the following transactions from a BOAS terminal:

- Adjustments (back office)
- Representments
- Fee collections and funds disbursements (Visa only)
- Free text messages

Acquirers can receive the following transactions at a BOAS terminal:

- Chargebacks
- Chargeback reversals
- Fee collections and funds disbursements (Visa issuer-generated)
- Free text messages (issuer-generated)

Issuers can initiate the following transactions from a BOAS terminal:

- Chargebacks
- Chargeback reversals
- Fee collections and funds disbursements (Visa only)

- File maintenance
- Free text messages

Issuers can receive the following transactions at a BOAS terminal:

- Adjustments (back office)
- Representments
- Fee collections and funds disbursements (Visa acquirer-generated)
- Free text messages (acquirer-generated)

For more information on BOAS, see the list of BOAS documents in the "For More Information" section of the About This Manual chapter in this manual.

Considerations for Dual-Message Acquirers 11

Dual-message acquirers of Visa or Plus ATM transactions receive Tier II rates when they comply with Tier II business requirements and either:

- Enhance their dual-message system with dual-message CPS/ATM features
- Use the Single Message System (SMS) to process ATM transactions in full financial mode

For more information on the dual-message CPS/ATM service, or on the tiered interchange option, please refer to the *VISA/Plus International ATM Member Guide.*

CPS/ATM Versus V.I.P. SingleConnect Service

Dual-message acquirers need to make a decision regarding which option to implement for their ATM transaction processing. Which option is best for each acquirer depends on many factors that are specific to the acquirer's own operating environment.

For example, if the acquirer's ATM network operates in single-message mode, that infrastructure can serve as the base to participate in V.I.P SingleConnect ATM Service. On the other hand, if the acquirer's ATM system operates in dual-message mode, then upgrading it to dual-message CPS/ATM may provide an adequate enhancement path.

The acquirer's future product expansion plans can also influence the ATM processing decision. For example, a member that is both an acquirer and an issuer may plan to add the Interlink and Plus marks to its own proprietary

ATM card. Because Interlink operates only in a single-message mode, this member may choose to connect to SMS for its Interlink processing as well as for its ATM traffic, which uses the same card.

The decision can be made based upon monetary savings. The projected three-year benefits in back office and operations savings, as shown in the following hypothetical example, may result in the acquirer deciding to upgrade to single-message processing rather than enhance its dual-message system with dual-message CPS/ATM.

In Table 11–1, the Tier II differential of US$0.75 is applied to 50,000 international transactions per year, to produce incentive fees of US$112,500 over a three-year period. The cost to upgrade the system is subtracted from the revenue generated by the incentive fees. Savings in operations and back office costs are calculated over the same three-year period.

Table 11–1: Example of Savings Comparison

Items	Dual-Message CPS/ATM	Single-Message
Total incentive fees x 3 years	US$112,500	US$112,500
Cost to upgrade	(100,000)	(140,000)
Back office savings/yr. x 3 years (reduced exceptions)	75,000	150,000
Operations savings/yr. x 3 years (settlement)	0	75,000
Three-year benefit projection	US$87,500	US$197,500

The benefits of enhancing the existing system with dual-message CPS/ATM features or converting to single-message processing vary by acquirer. Either option decreases back office work because fewer chargebacks and inquiries can be expected when the integrity of online and batch transactions is improved.

The single-message option provides the following added ongoing benefits:

- A better cash flow: the acquirer may be reimbursed faster than if the acquirer sends the clearing and settlement message in a separate later step

- Fewer operational steps: no separate settlement programs need to be coordinated and executed
- A single point for reconciliation and research: an online transaction log contains all clearing data

Dual-Message CPS/ATM Versus V.I.P. SingleConnect Service

The following chart contains points that acquirers should consider when evaluating the changes necessary to upgrade to dual-message CPS/ATM or to V.I.P. SingleConnect Service, and when calculating the costs associated with these changes. Each item is explained in more detail in the descriptions following the chart. The assumption made in the chart is that the acquirer currently supports Visa and Plus ATM transactions in a dual-message environment and is connected to the VisaNet BASE I Authorization System and the BASE II Clearing and Settlement System.

Points for consideration are presented in three categories:

- Online Transaction Processing (Table 11–2)
- Clearing and Settlement (Table 11–3)
- Exception Handling (Table 11–4)

Table 11–2: Online Transaction Processing (1 of 2)

Item	Dual-Message	Dual-Message CPS/ATM	SingleConnect Service
Message Types	01xx • authorizations • confirmations • balance inquiries 04xx • reversals 06xx • free text	Same as dual	02xx • originals • adjustments • balance inquiries 04xx • reversals 06xx • free text
Message Format	BASE I or V.I.P.	Same as dual	V.I.P.
Network ID	Not used	Same as dual	Network 2=VISA Network 4=Plus

Table 11–2: Online Transaction Processing (2 of 2)

Item	Dual-Message	Dual-Message CPS/ATM	SingleConnect Service
Reversals	Required	Same as dual	Required
Partial Dispense D detected by ATM	Confirmation message 0102	Same as dual	Online adjustment 0220
CPS Transaction Identifier	Not applicable	Required	Required for new participants
CPS Authorization Characteristics Indicator	Not applicable	Required	Required for new participants
CPS Validation Code	Not applicable	Required	Not applicable

Table 11–3: Clearing and Settlement

Item	Dual-Message	Dual-Message CPS/ATM	Single-Message
Clearing and Settlement Step	Submits batch of clearing records to BASE II within 4 days	Submits batch of clearing records to BASE II within 3 days	Automatic clearing as part of authorization
Reconciliation	Host draft capture system to VSS reports	Same as dual	Optional raw data file
Reports	Received through the BASE II Visa Access Point (VAP)	Same as dual	Received through BASE II VAP or Direct Access Service (DAS)

Table 11–4: Exception Handling

Item	Dual-Message	Dual-Message CPS/ATM	Single-Message
Chargebacks	Through BASE II or the BackOffice Adjustment System (BOAS)	Same as dual	Online 0422 or BOAS
Representments	Through BASE II or BOAS	Same as dual	Online 0220 or BOAS
Adjustments	Through BASE II or BOAS	Same as dual	Online 0220 or BOAS

Online Transaction Processing Differences

Message Types

- Dual-message mode:

  The online transactions supported are authorizations, confirmations (online adjustments), balance inquiries, and reversals. The same set is supported with dual-message CPS/ATM. These transactions are submitted to the BASE I System and have no financial impact. Financial transactions are cleared and settled in batch mode in a subsequent step using a file created by the acquirer one to four days after the authorization transaction took place. Exception transactions are also handled in batch mode.

- Single-message mode:

  All ATM transactions are handled online, including exception transactions. All transactions except balance inquiries have financial impact and are cleared and settled as part of the authorization request. There is no subsequent batch step to clear and settle the transaction.

Message Format

- Dual-message mode:

  Either the BASE I or V.I.P. format is supported. The same applies to dual-message CPS/ATM.

- Single-message mode:

  Only the V.I.P. format is supported.

Network ID

- Dual-message mode:

  The concept of network is not used. The same applies to dual-message CPS/ATM.

- Single-message mode:

  A network indicator (ID) is used to denote the ATM or POS network with which the card is affiliated. For example, Plus transactions are processed as Network ID 0004, Interlink transactions as Network ID 0003, and VISA transactions as Network ID 0002. Co-branded cards (for example, a VISA card with a Plus mark on it) can be processed as either Network ID 0002 or Network ID 0004 at the option of the acquirer or VisaNet. Different networks can have different rules, fees, and data requirements.

Reversals

- Dual-message mode:

  A reversal is required if the cardholder cancels the authorization transaction at any point before it is completed, or if the acquirer's system detects a malfunction that prevents the cardholder from receiving the requested withdrawal amount. Because there is no financial impact, some acquirers do not send reversals and simply do not include the transaction in the subsequent clearing and settlement step. Although this has the desired effect from the acquirer's perspective, it creates a burden for issuers because it could affect the cardholder's available funds if the issuer places a hold on funds based on an authorization that never clears.

- Dual-message CPS/ATM:

  Reversals are required as above, and the certification scripts include reversal conditions.

- Single-message mode:

  All online transactions have financial impact. Therefore, the acquirer *must* create a reversal for the circumstances described above to avoid subsequent chargebacks. Certification scripts include reversal conditions.

Partial Dispense

- Dual-message mode:

  A confirmation transaction (0102) is needed if the ATM detects a failure to dispense funds that causes less funds to be dispensed than were authorized. The subsequent batch clearing and settlement record reflects the lesser amount dispensed. The same applies to dual-message CPS/ATM.

- Single-message mode:

  There is no confirmation transaction. When the ATM detects a misdispense, the acquirer submits an adjustment (0220) transaction backing out the amount not dispensed. This transaction is done immediately after the misdispense, without any other intervening transactions occurring at the ATM.

CPS Transaction Identifier

The Transaction Identifier is a unique number assigned by VisaNet to all ATM transactions.

- Dual-message mode:

  Without dual-message CPS/ATM, the Transaction ID is not available.

- Dual-message CPS/ATM:

  The Transaction ID is returned to the acquirer in every approved transaction response if the acquirer is certified to receive it.

- Single-message mode:

  The Transaction ID is returned to the acquirer in every approved transaction response if the acquirer is certified to receive it.

CPS Authorization Characteristics Indicator

- Dual-message mode:

  The Authorization Characteristics Indicator (ACI) field is not used.

- Dual-message CPS/ATM:

  The acquirer uses the ACI to request Tier II fees.

- Single-message mode:

  The acquirer provides the ACI to maintain consistency across VisaNet-provided services.

CPS Validation Code

- Dual-message mode:

  The Validation Code is not used.

- Dual-message CPS/ATM:

  A Validation Code is returned by VisaNet to the acquirer in every approved transaction response. The Validation Code is a value calculated from key fields in the authorization transaction. The acquirer places the same key fields and the Validation Code in the clearing message for verification by VisaNet.

- Single-message mode:

  The Validation Code is not necessary, because there is no subsequent clearing message.

Clearing and Settlement Differences

Clearing and Settlement Step

- Dual-message mode:

  The acquirer submits an authorization request (0100) when the transaction is performed. Up to four days later, the acquirer submits a clearing and settlement batch record (TC 07).

- Dual-message CPS/ATM:

  The acquirer performs the same functions as in dual-message mode, but the clearing cycle is shortened to a maximum of three days. The Validation Code and the Transaction Identifier received from VisaNet in the authorization response must be included in the TC 07 along with other key fields, such as the account number and transaction amount fields, that were present in the authorization. VisaNet uses the Validation Code to determine that the key authorization fields are unaltered in the clearing message.

- Single-message mode:

  The acquirer does not go through a separate batch step to clear and settle its ATM transactions. The 0200 original transaction is a financial transaction which contains sufficient information to clear and settle, and to allow the issuer to post to the cardholder's account.

Reconciliation

- Dual-message mode and dual-message CPS/ATM:

The acquirer needs to reconcile its host draft capture system to the BASE II Edit Package reports and to the BASE II settlement reports.

- Single-message mode:

  VisaNet produces detail reports of all transactions processed by VisaNet as well as settlement summary reports. This data is also provided as a raw data file, which some members use to reconcile their transaction logs to the activity reported by VisaNet. The issuer and acquirer may choose to write software to automate the identification of discrepancies between VisaNet's raw data file and the members' logs.

Reports

- Dual-message mode and dual-message CPS/ATM:

  All member reports are produced by BASE II and delivered through the BASE II VAP at the member's site for printing by the Edit Package. These are summary settlement reports.

- Single-message mode:

  Detail reports, summary reports, and files are transmitted to either a BASE II VAP or a VAP with the Direct Access Service (DAS) features at the member site. The member has several options to receive and process the reports and files. These options are set up in the VAP at installation time and can be subsequently modified as needed.

Exception Handling Differences

Chargebacks

- Dual-message mode and dual-message CPS/ATM:

  The acquirer receives chargebacks as TC 17 batch records. In dual-message CPS/ATM, the chargeback may include the Transaction Identifier of the original TC 07 record.

- Single-message mode:

  The acquirer receives chargebacks online as ISO 0422 transactions or through BOAS. The chargeback may include the Transaction Identifier of the original transaction.

Representments

- Dual-message mode and dual-message CPS/ATM:

  The acquirer submits representments as TC 27 batch records. In dual-message CPS/ATM, the representment must include the Transaction Identifier if it was received in the chargeback.

- Single-message mode:

  The acquirer submits representments online as ISO 0220 transactions or through BOAS. The acquirer must include the Transaction Identifier in the representment if it was included in the chargeback.

Back Office Adjustments

- Dual-message mode and dual-message CPS/ATM:

  Discrepancies found when balancing the ATM are submitted as batch credit or debit transactions. In dual-message CPS/ATM, these adjustments should include the Transaction Identifier of the original transaction.

- Single-message mode:

  Adjustments are submitted online as 0220 advices.

Regardless of the processing method, BOAS can be used for back office adjustments.

Recommendation

Visa recommends that the acquirer perform a cost-to-benefit analysis of the following two options:

- Enhance existing system with dual-message CPS/ATM
- Upgrade system to single-message

Points in the chart above could serve as a guideline for the analysis, which should also factor in existing system and future product direction.

Once the analysis is complete, the acquirer is better prepared to choose the best option for its environment.

ATM Processing Integration A

SMS participants that want to format and process *all* ATM transactions without distinguishing between Visa ATM and Plus ATM transactions can do so by using one or both of the following options:

- ATM Transaction Standardization
- Field 63.5 Option.

ATM Transaction Standardization

Members that use the ATM Transaction Standardization option *do not* need to:

- Send or receive Plus contact information in field 44.

  Field usage must conform to the Visa SMS usage defined in the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications*. Acquirers and issuers that want to receive Plus contact information in field 44 should not use the ATM Transaction Standardization option.

- Receive the state code in positions 1–2 of field 59 when the country code in the transaction is not for the U.S. or Canada.

  For members that use the ATM Transaction Standardization option, SMS does not forward field 59 unless the country code is US or CA. The state or province code is required in field 59 if the country code is US (United States) or CA (Canada).

  On Plus transactions (Network ID = 0004), SMS forwards 00 in field 59 to issuers when the country code is not US or CA. Issuers that want to receive 00 in field 59 should not use the ATM Transaction Standardization option.

- Send or receive Plus message reason codes in field 63.3.

Acquirers and issuers that want to convert to a single set of message reason codes for all ATM transactions processed by VisaNet may do so by selecting the ATM transaction standardization option. Members that choose this option must use Visa message reason codes for both Visa and Plus transactions. For details, see the *V.I.P. System SingleConnect Service SMS ATM Technical Specifications.*

Acquirers and issuers that want to use both Plus and Visa message reason codes in field 63.3 should not select the ATM Transaction Standardization option.

Field 63.5 Option

Members that use the field 63.5 option do not need to send or receive Field 63.5—Plus Proprietary Member Center (PMC) ID—in ATM transactions. If desired, field 63.5 may still be sent. It appears in reports and raw data, even for members who choose this option.

Comparison of ATM Processing Options

Members that do not choose either option may continue to send and receive Plus data as they currently do. Table A–1 provides a field-by-field comparison of the available options.

Table A–1: ATM Processing Options (1 of 2)

Option	Field Number, Name	No Change		Options Chosen	
		Acquirer	Issuer	Acquirer	Issuer
ATM Transaction Standardization	**Field 44** Plus Contact	Must send and receive both Plus and Visa usages of field 44	Must send and receive both Plus and Visa usages of field 44	Will receive only Visa usage of field 44	Will receive only Visa usage of field 44
	Field 59 State/ Province Code	Must send and receive if country code is US or CA	Always receive field even if transaction is not for US or CA	No change	Will no longer receive 00 in field 59 for non-U.S., non-Canada

Table A–1: ATM Processing Options (2 of 2)

Option	Field Number, Name	No Change		Options Chosen	
		Acquirer	Issuer	Acquirer	Issuer
	Field 63.3 Message Reason Code	Must send and receive both Plus and Visa reason codes	Must send and receive both Plus and Visa reason codes	Will send and receive only Visa reason codes for both Visa and Plus transactions	Will send and receive only Visa Reason codes for both Visa and Plus transactions
Field 63.5 Option	**Field 63.5** Plus PMC ID	Must send or receive field 63.5	Must receive or send field 63.5	Will not send or receive field 63.5	Will not send or receive field 63.5

Member Impacts

ATM acquirers and issuers that use one or both of these options no longer need to:

- Send or receive field 44 (Plus usage) and field 63.5.
- Use Plus message reason codes in field 63.3.

In addition, issuers do not need to receive field 59 (for non-US or non-CA).

Acquirers and issuers that choose to continue sending or receiving these fields or using Plus reason codes may do so. There are no changes to reports and raw data, even for members who choose one or both of these options.

Member testing is required for these changes.

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