

# eDynamo

## **MPPG3 for Vantiv Express Integration and Operation User Manual**

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# MPPG3 for Vantiv Express - eDynamo

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**Table 0.1 - Revisions**

Rev Number	Date	Notes
10	July 25, 2018	Initial Release

**The purpose of this document:**

This guide describes EMV and magstripe operation mode.

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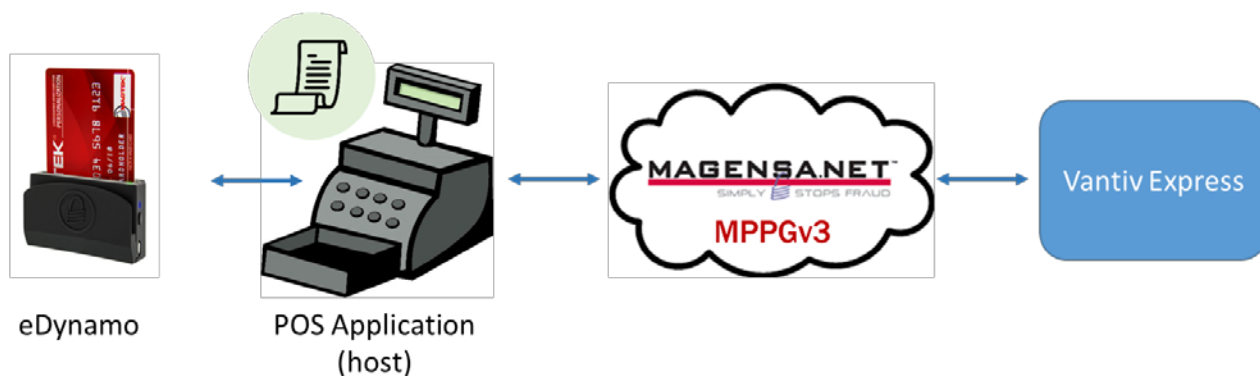
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# MPPG3 for Vantiv Express - eDynamo

## 1 Introduction

MPPGV3, a Magensa service, provides an interface to Vantiv through its Express platform for eDynamo EMV transactions in QwickDIP mode as well as magstripe transactions. The user of this guide is assumed to be a POS integrator, termed “user”. In order to use the interface, the user must have the following items:

1. An eDynamo (Part Number 21079802), configured as follows:
  - a. Configured as C2 - ONLINE ONLY WITH SDA, DDA, CDA DISABLED.
  - b. Injected with the MAGTEK DEFAULT EMV TEMPLATE tag load. This load contains support for the following card brand AIDs: Visa, MasterCard, American Express, and Discover. If you wish to support a different set of card brands, please contact your MagTek sales representative.
  - c. Injected with an encryption key supported by Magensa.
2. A merchant account with Vantiv Express. Please see your Vantiv agent for more details. When obtaining a merchant account, you first must indicate it is for Magensa, VAR – MAGENSA ELPS ID: 11417. Then provide the following:
  - a. Which card brands you wish to support (Visa, MasterCard, American Express, and Discover are standard). The card brands you support must match the brands in the eDynamo tag load.
3. Account credentials with Magensa for MPPGV3 in Pilot or Production mode. After obtaining your merchant account, you may request your credentials at [support@magensa.net](mailto:support@magensa.net) or contact your MagTek representative. A merchant account is not required to use Pilot mode.
4. A POS application that has the following functions:
  - a. Control of the eDynamo, via USB or BlueTooth, using byte-level commands, a MagTek SDK, or MagneFlex. In this role, the POS Application is the eDynamo’s “host”.
  - b. Posting to and reception from, via the Internet, Magensa’s MPPGV3 service.
  - c. Customer receipt generation, based on data returned by Magensa.



## 2 Operational Overview

The following operational regimes are described at a high-level to orient the user to payment transaction processing.

### 2.1 Card Reading

The eDynamo can read either a magstripe card, via a card swipe (**SWIPE**), or a “chip” card via card insert (**INSERT**) as follows:

- **SWIPE**: If the cardholder wishes to **SWIPE**, the host should first command the eDynamo to accept a **SWIPE** (see section 3.2). Then the host should prompt the cardholder to perform the **SWIPE**. Once the cardholder performs this action, the eDynamo will either return encrypted cardholder data to the host for processing to MPPGV3, or provide an error message if the **SWIPE** was unsuccessful. If unsuccessful, **SWIPE** may be repeated or the customer can be prompted for a different payment method.
- **INSERT**: If the cardholder wishes to **INSERT**, the host first commands the eDynamo to accept an **INSERT** (see section 3.1). Then the host should prompt the cardholder to perform the **INSERT**. After the card has been inserted, the eDynamo may communicate with the host to answer additional questions the chip may ask of the eDynamo. Once all questions have been answered, the eDynamo will return encrypted cardholder data to the host for processing to MPPGV3, or provide an error message if the **INSERT** was unsuccessful.
  - **FALLBACK**: If the **INSERT** was unsuccessful, it may be retried two (2) additional times. If this is unsuccessful, the cardholder can be prompted to **SWIPE** as above. This is termed **FALLBACK**. This functions identically to **SWIPE** above, however, the resulting data is processed to MPPGV3 slightly differently than a normal **SWIPE** as noted in following sections.

### 2.2 MPPGV3

Once the host has collected the data from the eDynamo, it must process the data to the MPPGV3 service at Magensa over the Internet. General information about this service can be obtained from magtek.com, including the API documentation. For the use of the eDynamo with Vantiv Express as described by the document, the following operations should be used:

1. **ProcessEMVSRED**: Use this method to process a transaction to Vantiv Express that originated with **INSERT**.
2. **ProcessCardSwipe**: Use this method to process a transaction to Vantiv Express that originated with **SWIPE** or **FALLBACK**.
3. **ProcessReferenceID**: Use this method to process VOID, REFUND or CAPTURE to Vantiv Express. This method requires no interaction with the eDynamo.

### 2.3 Receipt

Upon the completion of a transaction to MPPGV3, the user may be required to create a receipt for the cardholder, in either printed form or delivered electronically. MPPGV3 will return the data required to create the receipt.

## 3 Command of the eDynamo by the Host

Command of the eDynamo is accomplished using any of the following *access methods* over USB or Bluetooth: Directly by sending byte-level commands via a MagTek SDK available for a variety of operating systems, or via MagTek’s MagneFlex Prism suite. This guide will indicate the eDynamo commands and arguments for MagneFlex (version Blue, Navy, or Sky) as well as the byte-level commands for the MagTek SDK. These will be expressed in the document as [MagneFlex] *key:value* ([byte-level command] 0x00). Please see a MagTek representative for other options, and for the appropriate guides to eDynamo, eDynamo SDKs or MagneFlex.

### 3.1 EMV Transaction Initiation (INSERT)

To initiate an EMV transaction (**INSERT**) in MagneFlex, the *requestStartEMVTransaction* command is sent to the device with a set of arguments. For the SDKs, 0x300 is sent with arguments (offsets). Most arguments are fixed and should not be changed. After the command is received, the eDynamo may dialog with the cardholder to answer EMV-pertinent questions. If this occurs, have the cardholder answer these questions. Questions commonly include the preferred language of the cardholder as well as application selection. MagneFlex will display the questions in the browser interface to the user. To handle cardholder interactions via the SDK, please see the appropriate guides to the eDynamo and eDynamo SDKs.

- *timeLimit:3C* (offset 0: 0x3C) – This corresponds to a wait time of 60 seconds for the cardholder to interact with the eDynamo. Other values may be used, but are not recommended.
- *cardType:02* (offset 1: 0x02)
- *option:128* (offset 2: 0x80) – This forces the eDynamo into QwickDIP mode.
- *amount:9.99* (offsets 3..8: 0x000000003E7) – This is a fixed, plug amount, **NOT** the **SALE** amount. Do not change.
- *transactionType:00* (offset 9: 0x00)
- *qwickchipmode:true* – MagneFlex only
- *currencyCode:0840* (offset 16..17: 0x0840) – U.S. dollars.

#### 3.1.1 eDynamo Output for INSERT

Upon a successful interaction with the cardholder, the eDynamo will respond with a TLV-formatted data container, presented by MagneFlex as a string delineated at “arqcData=”, or as a byte stream by the SDKs. Further information about the TLV format may be found in the [TLV Parsing](#) section. The container will include, at a minimum, the following TLV tags (see the eDynamo’s Programmer’s Manual for further details):

- DFDF59 (Encrypted Data Primitive) – The encrypted cardholder data.
- DFDF56 (Key Serial Number) – The serial number of the key used to encrypt the data.
- DFDF58 (Number of Bytes of Padding) – The number of pad bytes used in the Encrypted Data Primitive.

### 3.2 Magnetic Stripe Transaction Initiation (SWIPE)

To initiate a magnetic stripe (**SWIPE**) transaction with MagneFlex, the *requestCardSwipe* command is sent to the device with a set of arguments. For the SDKs, please see the appropriate SDK documentation:

- *timeLimit:3C* – This corresponds to a wait time of 60 seconds for the cardholder to interact with the eDynamo. Other values may be used, but are not recommended.

#### 3.2.1 eDynamo Output for SWIPE

Upon a successful interaction with the cardholder, the eDynamo will respond with a TLV-formatted data container, presented by MagneFlex as a string delineated at “cardDataIn=”, or as a byte stream by the SDKs. Further information about the TLV format may be found in the [TLV Parsing](#) section. The container will include, at a minimum, the following TLV tags (see the eDynamo’s Programmer’s Manual for further details):

- DFDF39 (Encrypted Track 2) – The encrypted cardholder data.
- DFDF3C (Encrypted MagnePrint) – The encrypted MagnePrint data.
- DFDF43 (Magneprint Status Code) – The MagnePrint status.
- DFDF50 (Key Serial Number) – The serial number of the key used to encrypt the data. Note, this is NOT DFDF56 as is returned for **INSERT** above.

### 4 Processing Transaction Data to MPPGV3

#### 4.1 POS Transactions supported

- **SALE** – A request for funds from the cardholder’s account to satisfy a purchase. MPPGV3 will return data approving or declining the **SALE**.
- **AUTHORIZE** – A request that funds be held in a cardholder’s account in anticipation of the completion of a purchase at a later time. This transaction is often used in restaurant environments where a tip is collected after the presentation and processing of the card. MPPGV3 will return data approving or declining the **AUTHORIZE**.
- **CAPTURE** – A request that the funds held by **AUTHORIZE** be released to the merchant, along with additional funds in the case of restaurant tips. In that case, the **CAPTURE** amount is the total of the original **AUTHORIZE** amount plus the tip. The merchant must be set up at Vantiv Express as a restaurant to use **CAPTURE** in this way. Please see your Vantiv representative for further information and restrictions on the use of **CAPTURE** for tips. If the tip amount is known before the card is processed, then **SALE** may be used instead of the **AUTHORIZE/CAPTURE** pair. **CAPTURE** is processed using the **TransactionID** returned on the original **AUTHORIZE** transaction. No interaction with the eDynamo is required. MPPGV3 will return data approving or declining the **CAPTURE**.
- **VOID** – A request that a previously processed **SALE** or **AUTHORIZE** transaction be deleted by Vantiv Express. This transaction will only work the same day as the original transaction up to 8:00pm Eastern Time (This is the Vantiv settlement cutoff. See your Vantiv representative if you wish to change this time). This transaction is processed using the **TransactionID** returned on the original transaction. No interaction with the eDynamo is required. MPPGV3 will return data approving or declining the **VOID**.
- **REFUND** – A request that funds received by the merchant from a previously processed **SALE** transaction or **AUTHORIZE/CAPTURE** pair be deducted from the merchant and returned to the cardholder. This transaction is not available before 8:00pm Eastern Time. (This is the Vantiv settlement cutoff. See your Vantiv representative if you wish to change this time.) This transaction is processed using the **TransactionID** returned on the original **SALE** or **AUTHORIZE** transaction. The funds will be returned to the card account that was originally used. MPPGV3 does not support the return of funds to another card, nor can it process a **REFUND** using any other data than the **TransactionID**. No interaction with the eDynamo is required. MPPGV3 will return data approving or declining the **REFUND**.

#### 4.2 Using MPPGV3 Methods to Process a Transaction

To determine which MPPGV3 method to use, first determine the POS transaction desired. Then determine if card data is required from the eDynamo and collect that data. Then process the transaction using one of the following methods (only required or important fields are shown, see the MPPGV3 API documentation for further information):

##### 4.2.1 ProcessEMVSRED

This method is used when processing a **SALE** or **AUTHORIZE** transaction that originated with **INSERT**. The following data elements are used (\* denotes a required field):

### 4.2.1.1 Input

- **Amount\*** – The amount being requested, with decimal.
- **Username\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **Password\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **CustomerCode\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **CustomerTransactionID** – a user-defined number that will be echoed by Vantiv Express through the MPPGV3 response. Maximum length of 50.
- **EMVSREDDData\*** - TLV tag DFDF59 (Encrypted Data Primitive) returned by the eDynamo.
- **EncryptionType\*** - “80”
- **KSN\*** - TLV tag DFDF56 (Key Serial Number) returned by the eDynamo.
- **NumberofPaddedBytes\*** - TLV tag DFDF58 (Number of Bytes of Padding) returned by the eDynamo.
- **PaymentMode\*** – “EMV”.
- **ProcessorName\*** - “VantivExpress – Production” or “VantivExpress – Pilot”. The former is for production use. The latter may be used when testing on the MPPGV3 Pilot system. See the [Testing](#) section.
- **TransactionType\*** - “SALE” or “AUTHORIZE”.

### 4.2.1.2 Output

- **AuthCode** – If the transaction is approved by the card issuing institution, this numeric field is returned and is unique to this transaction.
- **AuthorizedAmount** – The amount of funds actually authorized by the card issuing institution. The amount *may be* less than that requested. If so, the merchant must ask the cardholder for the difference in funds via a different payment type (such as cash) or a different card. If the cardholder does not wish to provide the additional funds, the transaction may be deleted using **VOID**.
- **CustomerTransactionID** – Echoed from the input.
- **IsTransactionApproved** – A Boolean representing the approval status of the transaction.
- **MagTranID** – The unique ID assigned by Magensa to identify this interaction with MPPGV3.
- **TransactionID** – Provided by Vantiv Express to be used with **CAPTURE**, **VOID**, or **REFUND**.
- **TransactionMessage** – A message (String) from Vantiv Express concerning the status of this transaction.
- **TransactionStatus** – A numeric code from Vantiv Express concerning the status of this transaction. See the [Vantiv Express Response Codes](#) section.
- **EMVSREDDDataMasked** – a TLV-encoded container of EMV response data that is used to create a customer receipt. Further information about the TLV format may be found in the [TLV Parsing](#) section. Also see the [Receipt](#) section.
- **ProcessorResponse** – An XML-encoded response from Vantiv Express. Contains data required to create a customer receipt. See the [Receipt](#) section.



### 4.2.2 ProcessCardSwipe

- This method is to be used for **SWIPE** and **FALLBACK**. It may be used with either **SALE** or **AUTHORIZE**. The following data elements are used (\* denotes a required field):

#### 4.2.2.1 Input

- **Amount\*** – The amount being requested, including decimal.
- **Username\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **Password\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **CustomerCode\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **CustomerTransactionID** – a user-defined number that will be echoed by Vantiv Express through the MPPGV3 response. Maximum length of 50.
- **Track2\*** - TLV tag DFDF39 (Encrypted Track 2) returned by the eDynamo.
- **KSN\*** - TLV tag DFDF50 (Key Serial Number) returned by the eDynamo. (Not DFDF56, as in ProcessEMVSRED.)
- **MagnePrint\*** - TLV tag DFDF3C (Encrypted MagnePrint)
- **MagnePrintStatus\*** - TLV tag DFDF43 (Magneprint Status Code)
- **ProcessorName\*** - “VantivExpress – Production” or “VantivExpress – Pilot”. The former is for production use. The latter may be used when testing on the MPPGV3 Pilot system. See the [Testing](#) section.
- **TransactionType\*** - “SALE” or “AUTHORIZE”.
- **ZIP\*** - “12345”
- **CVV\*** - “123”
- **KeyValuePair\*** – In the **KeyValuePairOf** block in the **TransactionInputDetails** block, two key/value pairs must be added:
  - **Key\*** - “CreditOrDebit”; **Value\*** - “Credit”
  - **Key\*** - “CardInputCode”; **Value\*** - <If **SWIPE**, then “2”. If **FALLBACK**, then “9”>

#### 4.2.2.2 Output

- **AuthCode** – If the transaction is approved by the card issuing institution, this numeric field is returned and is unique to this transaction.
- **AuthorizedAmount** – The amount of funds actually authorized by the card issuing institution. The amount *may be* less than that requested. If so, the merchant must ask the cardholder for the difference in funds via a different payment type (such as cash) or a different card. If the cardholder does not wish to provide the additional funds, the transaction may be deleted using **VOID**.
- **CustomerTransactionID** – Echoed from the input.
- **IsTransactionApproved** – A boolean representing the approval status of the transaction.
- **MagTranID** – The unique ID assigned by Magensa to identify this interaction with MPPGV3.

- **TransactionID** – Provided by Vantiv Express to be used with **CAPTURE**, **VOID**, or **REFUND**.
- **TransactionMessage** – A message (String) from Vantiv Express concerning the status of this transaction.
- **TransactionStatus** – A numeric code from Vantiv Express concerning the status of this transaction. See the [Vantiv Express Response Codes](#) section.
- **ProcessorResponse** – An XML-encoded response from Vantiv Express. Contains data required to create a customer receipt. See the [Receipt](#) section.

### 4.2.3 ProcessReferenceID

This method is to be used with **CAPTURE**, **VOID**, or **REFUND**. This transaction requires the TransactionID from the original transaction. No interaction with the eDynamo is required to use this method.

#### 4.2.3.1 Input

- **Amount\*** – The amount being requested, including decimal.
- **Username\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **Password\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **CustomerCode\*** – Assigned to a specific merchant by Magensa in conjunction with that Merchant’s account at Vantiv Express.
- **CustomerTransactionID** – a user-defined number that will be echoed by Vantiv Express through the MPPGV3 response. Maximum length of 50.
- **ReferenceTransactionID\*** – The **TransactionID** returned from the original transaction.
- **ProcessorName\*** - “VantivExpress – Production” or “VantivExpress – Pilot”. The former is for production use. The latter may be used when testing on the MPPGV3 Pilot system. See the [Testing](#) section.
- **TransactionType\*** - “CAPTURE”, “VOID” or “REFUND”.

#### 4.2.3.2 Output

- **AuthorizedAmount** – The amount requested.
- **CustomerTransactionID** – Echoed from the input.
- **IsTransactionApproved** – A boolean representing the approval status of the transaction.
- **MagTranID** – The unique ID assigned by Magensa to identify this interaction with MPPGV3.
- **TransactionMessage** – A message (String) from Vantiv Express concerning the status of this transaction.
- **TransactionStatus** – A numeric code from Vantiv Express concerning the status of this transaction. See the [Vantiv Express Response Codes](#) section.

### 5 Receipts

Merchants are required to create receipts in compliance with EMV and card brand rules when a transaction is authorized (no receipt is required for **VOID** or if a transaction is declined). Data required to create receipts are provided as outputs of MPPGV3 methods ProcessEMVSRED and ProcessCardSwipe. TLV tag data can be found in the MPPGV3 field **EMVSREDDataMasked**. The following section provides receipt samples and rules that must be applied to this data to produce compliant receipts. Receipts must minimally contain these elements, though they may be formatted as desired and additional data may be added. Note that some elements are available only for an **INSERT** transaction. Prepended row numbers are for reference only.

#### SALE

```
1: Merchant Name
2: 123 Anywhere Street
3: Merchantville, CA, 12345
4: 123-456-7890

5: SALE

6: Term: 001
7: Ref Num: 1228171757
8: 12/29/17      2:14PM

9: Auth Code: 400101
10: AMEX
11: XXXXXXXXXXXXX1003
12: CHIP

13: AMOUNT: $39.50

14: X_____

15: AID: A000000025010801
16: AMERICAN EXPRESS
17: AMERICAN EXPRESS
18: TVR: 8040008000
19: TSI: 6800
```

- 1: The merchant's name
- 2-3: The merchant's address
- 4: The merchant's telephone number
- 5: SALE
- 6: The terminal ID, as provided by Vantiv and used when boarding this merchant on Magensa.
- 7: The MPPGV3 **CustomerTransactionID** generated by the merchant or the **TransactionID** returned by MPPGV3.
- 8: The local date and time of the transaction.

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- 9: The MPPGV3 **AuthCode**.
- 10: The brand of the card presented by the cardholder (**INSERT** only). This can be determined by analyzing TLV tag 9F06 and matching its contents using a regular expression as follows (for use with Java, other platforms may require minor modifications to syntax):
  - VISA: “^.\*((31010)|(32010)|(33010)).\*\$”
  - MASTERCARD: “^.\*((41010)|(43060)).\*\$”
  - DISCOVER: “^.\*1523010.\*\$”
  - AMEX: “^.\*2501.\*\$”
- 11: The masked card number. This can be found in the MPPGV3 **ProcessorResponse** field in XML node: <CardNumberMasked>
- 12: The card entry method. Use “MAGSTRIPE” for **SWIPE** and “CHIP” for **INSERT**.
- 13: The authorized amount from the MPPGV3 **AuthorizedAmount** field.
- 14: A signature line. (If the transaction is **INSERT**, a signature line is optional.)
- 15: The EMV Application Identifier (“AID”), found in TLV tag 9F06. (**INSERT** only)
- 16: The EMV Application Preferred Name, found in TLV tag 9F12. The tag contains the byte encoded application name, per ISO/IEC 8859-1 (ASCII equivalent). Decode for display on the receipt. If the tag does not exist, print nothing. (**INSERT** only)
- 17: The EMV Application Label, found in TLV tag 50. The tag contains the byte encoded application label, per ISO/IEC 8859-1 (ASCII equivalent). Decode for display on the receipt. If the tag does not exist, print nothing. (**INSERT** only)
- 18: TLV tag 95 (Terminal Verification Results or “TVR”). (**INSERT** only)
- 19: TLV tag 9B (Transaction Status Information or “TSI”). (**INSERT** only)

**AUTHORIZE** to process a restaurant tip

Same as **SALE**, with the addition of:

TIP: \_\_\_\_\_  
Total: \_\_\_\_\_

### **REFUND**

1: Merchant Name  
2: 123 Anywhere Street  
3: Merchantville, CA, 12345  
4: 123-456-7890

5: REFUND

6: Term: 001  
7: Ref Num: 1228171757  
8: 12/29/17 2:14PM

9: Auth Code: 400101

10: AMOUNT: \$39.50

- 1: The merchant's name
- 2-3: The merchant's address
- 4: The merchant's telephone number
- 5: REFUND
- 6: The terminal ID, as provided by Vantiv and used when boarding this merchant on Magensa.
- 7: The MPPGV3 **CustomerTransactionID** generated by the merchant or the **TransactionID** returned by MPPGV3.
- 8: The local date and time of the transaction.
- 9: The MPPGV3 **AuthCode**.
- 10: The amount refunded.

## 6 Technical Assistance

Technical assistance in using this guide or integrating to MPPGV3 may be requested via email at [support@magensa.net](mailto:support@magensa.net).

## 7 Testing

MPPGV3 has a **ProcessorName**, "VantivExpress – Pilot", that connects to the Vantiv Express test region. This will allow you to send transactions to the Vantiv Express authorization simulator and see test output. To use "VantivExpress – Pilot", you must first obtain EMV test cards and MPPGV3 test credentials from Magensa. Please see your Magensa sales representative for further information.

## 8 TLV Parsing

ProcessEMVSRED returns EMV data, in TLV (Tag-Length-Value) format, that is required to create receipts. The data is contained in **EMVSREDDataMasked**. TLV is a scheme to label data that includes its length. A TLV primitive is usually expressed as a sequence of bytes beginning with the label, followed by the length of the value (as one byte), followed by the value itself. For instance, EMV tag 95 might be "95050000008000". TLV has additional structures to embed groups of tags within larger container tags. TLV parsing routines are available on the Internet. MagTek can also provide source code for a JAVA TLV parsing class as a reference. Please contact [support@magensa.net](mailto:support@magensa.net) for details.

### 9 Vantiv Express Response Codes

#### Code Description

0 Approved / Success

5 Partial Approval

20 Decline

21 Expired card

22 Duplicate approved

23 Duplicate

24 Pick up card

25 Referral / Call Issuer

30 Balance Not Available

90 Not defined

101 Invalid data

102 Invalid account

103 Invalid request

104 Authorization failed

105 Not Allowed

120 Out of Balance

1001 Communication error

1002 Host error

1009 Error