

UPGdirect™

Transaction Format 2.1 Implementation Guide



Introduction

Universal Payment Gateway's UPGdirect is a real time card processing system that when used in simultaneous authorisation and settlement mode converts the traditional two stage authorisation and payment processes into one convenient 'transaction' process. Where merchants already have a settlement system, UPGDirect can be used for authorisation only transactions.

UPGdirect is designed for merchants running Electronic Point Of Sale (EPOS) or Electronic Funds Transfer (EFT) terminals, either with or without store controllers, merchants running call centres and Internet merchants.

UPGdirect is a Transmission Control Protocol/Internet Protocol (TCP/IP)-based system with communications access via: leased-line, point-to-point ADSL or secure Internet. Dial-up access - analogue Public Switched Telephone Network (PSTN) or Integrated Systems Digital Network (ISDN) - is available as a chargeable option.

For simultaneous authorisation and settlement, transaction messages can be sent in either UPG Format or APACS (Association for Payment Clearing Services) Standard 40 (now incorporated into APACS 70). For authorisation only, transaction message can be sent in either UPG Format, APACS Standard 30 (now incorporated into APACS 70), or ISO8583 format.

UPGdirect also includes support for Europay/MasterCard/Visa (EMV) Chip&PIN transactions.

For EPOS terminal manufacturers, using UPGdirect with UPG Format messaging makes the design and manufacture of machines much simpler. Terminals no longer have to concern themselves with...

- payment submission (APACS Standard 29/50)
- hot card files (mandatory zero floor limit for every card type)
- storage of card details (as encouraged by the card schemes)
- TPAD and X.25 (if using TCP/IP)

...or the purchase of special software to achieve the above.

This document is aimed at those who wish to write systems that communicate with UPGdirect using UPG Format.

If you wish to conduct EMV Chip&PIN transactions through UPG, you will also need your chosen EMV terminal's integration documentation. If, however, you are using the Microsoft Windows operating system for your in-store terminals and your chosen EMV terminal is manufactured by Dione, UPG can optionally supply you with a software object in the form of a dll or ocx to simplify integration.

If you wish to communicate with UPGdirect using APACS Standard 30 or 40 or ISO8586 you will need a copy of the APACS Standard 70 (previously known as Standard 30 or 40) or ISO8583 standard and to inform UPG that you intend to do so.

Functionality of EPOS Terminals

The functionality of an EPOS terminal or computer system acting as an EPOS terminal or a computer system representing a network of EPOS terminals is beyond the scope of this document. However the following should be noted:

- EPOS terminals should no longer accept settlement polling requests
- EPOS terminals should no longer store 'hot-card' files
- EPOS terminals should no longer store card details. The only exception being in circumstances in which the EPOS terminal fails to make contact with UPGdirect (see later note on this topic)
- Terminals no longer need to carry out card expiry or card pre-validity tests on non-EMV2000 Chip&PIN transactions. (If there is pressure to keep communications charges to an absolute minimum these checks may be carried out at terminal level. Card expiry and pre-valid checks will be carried out by UPGdirect regardless of whether or not the terminal has carried them out)

The whole transaction process is conducted using only two messages, the Transaction Request Message and the Transaction Response Message. One Transaction Response Message is returned to the terminal from UPGdirect for every one Transaction Request Message sent from the terminal to UPGdirect.

The following should also be noted:

Procedure for Submitting Transactions

Using a discreet IP socket for each transaction, connect to UPGdirect using your TCP/IP connection to UPG on port 1023, submit a Transaction Request Message and wait for the Transaction Response Message. Once the Transaction Response Message has been received – normally within 2 seconds – close the IP socket connection. Please note:

- In simultaneous authorisation and settlement mode (default) if a Transaction Response Message is returned as a valid authorisation from the merchant's acquiring bank, UPGdirect automatically presents the transaction for payment on behalf of the merchant.
- All card transactions should be sent to UPGdirect. Terminals normally no longer run floor limits and transactions should not normally be checked against hot-card files.
- It is advised, excepting communications failure, or when a floor limit other than zero is being used, that the terminal should not store card numbers, expiry dates and any other card information e.g. Card Verification Value (CV2).

Upon receipt of Transaction Response Messages, the terminal should always inform the operator of the outcome of the transaction by showing the contents of the `MESSAGE TEXT` field and the results of the Card Verification Value (CV2) and Address Verification System (AVS) checks, if used. In addition for:

- Transaction Successful / Authorised - terminals need do nothing more
- Card Referred - follow the Referred Transactions procedure below
- Card Declined - terminals need do nothing more
- Invalid Card Number - terminals should prompt for retry
- Card Expired - terminals need do nothing more
- Card Pre-valid - terminals need do nothing more

Note: Transaction Request Messages returned as Transaction Successful / Authorised are not a guarantee of payment. This is an important part of the agreement that a merchant will already have with their acquiring bank. This agreement is unchanged when using UPGdirect.

Procedure for Referred Transactions

If a Transaction Response Message is returned as a referral, UPGdirect will not present the transaction for payment. If an authorisation is subsequently granted for this transaction via a telephone authorisation to the merchant's acquiring bank, the transaction should be submitted in its entirety with the `MESSAGE TYPE` field of the Transaction Request Message set to the appropriate message type prefixed with `PAYMENT_ONLY_`, the authorisation number placed in the `AUTHORISATION CODE` field and if the transaction was chip&PIN, the acronym XR (eX-Referral) should be sent as part of the `<ICCO></ICCO>` tag pair sent in the `RESERVED` field. Ideally, the original transaction's Cross Reference number should be placed in the `CARD DETAILS` field rather than the track 2, EMV or keyed card data. This removes the need for the customer's card to be swiped twice or the need to store card details.

The merchant also has the option of using the Universal Payment Gateway Secure Merchant Extranet web site to facilitate the referral.

Note: For all Cardholder Not Present (CNP) transactions, it may be expedient for merchants to consider referred transactions as having been declined.

Procedure for Deferred Payment Transactions

Submit the Transaction Request Message, either sale or refund, as usual but with the DISPATCH field set to LATER the first sub-field (AUTHORISATION AMOUNT) of the AMOUNT field set to a nominal £1.01 (submitted in the currency's minor unit e.g. 101 for pounds Sterling) and the second sub-field (DISPATCH LATER AMOUNT) of the AMOUNT field set to the intended total amount for the transaction when finally settled

A successfully authorised transaction can generally be used as an indication that the card has not been registered as stolen and that the cardholder's credit limited has not been exceeded.

Note: An authorisation is only a 'snap shot' of a cardholder's position, it does not mean that funds will be available, particularly at a later date.

When the goods are ready for dispatch or in the case of a refund, the goods have been received, the transaction should be submitted once again in its entirety with the DISPATCH field set to NOW and the original transaction's Cross Reference should be placed in the CARD DETAILS field rather than the track 2, EMV or keyed card data. The AMOUNT field should be set to that of the DISPATCH LATER AMOUNT of the original transaction. Please note that for a limited proportion of transactions, it is possible to settle transactions where the final AMOUNT is something other than the original DISPATCH LATER AMOUNT.

The merchant also has the option of using the Universal Payment Gateway Secure Merchant Extranet web site to facilitate Deferred Payment Transactions.

Note: Transactions submitted with Cross Reference in lieu of card details are presented to the bank with an entry method of card keyed, this may have an adverse effect on your Merchant Service Charge (MSC).

Communications or Terminal Failure Procedure

In the rare event that a terminal is unable to communicate with UPGdirect or receives a UPG error that indicates a communications timeout, the terminal should completely disconnect and make two further attempts with at least a 5-second delay between attempts. If these attempts also fail, the terminal should use the secondary/back-up telephone number if supplied by UPG and if appropriate. If this does not work, the terminal should then store the transaction data. Authorisation for every transaction should normally be sought via telephone directly from the merchant's acquirer and stored together with the card and transaction details to be forwarded to UPG later.

On each subsequent transaction, the terminal should attempt to contact UPGdirect. When communications resume, each stored transaction(s) should be submitted with the MESSAGE TYPE field of the Transaction Request Message set to the appropriate message type prefixed with PAYMENT_ONLY_. In this instance, the authorisation code placed in the AUTHORISATION_CODE field is the result of having telephoned the acquirer's authorisation centre to obtain a voice authorisation.

If the terminal itself fails, the merchant should use their 'fall-back' procedure. This procedure is normally paper voucher with voice authorisation. If possible, the terminal should indicate the need to use a 'fall-back' procedure. Terminals should be designed to allow subsequent keying in of paper voucher transactions using a MESSAGE_TYPE of PAYMENT_ONLY_SALE_KEYED.

Note: Authorisations are not a guarantee of payment. This is an important part of the agreement that a merchant will already have with their acquiring bank. This agreement is unchanged when using UPGdirect.

Messaging Standards

Transaction messages may be sent to UPGdirect in one of two formats. Firstly, using UPG Format messages unique to the system and secondly, using native APACS Standard 30/40/70 format. APACS Standard 30/40/70 format provide only a subset of UPG Format functionality therefore integrators are encouraged to use UPG Format where possible.

UPG Format

The UPG Format offers more flexibility than APACS Standard 30 format. To illustrate, using the UPG Format, it is possible to:

- Include store, purchase and fuel card information together with the transaction data that in the traditional two stage system would have been forwarded to the card issuer via polling
- Send Line Item Detail
- Run a mail order pre-authorisation system. UPG Format supports enhancements to the 'pre-authorisation' system, used by some hotel and card rental merchants, allowing it to be conveniently used by all Cardholder Not Present merchants

The system has been designed to support multiple messaging standards. This document describes the UPG Format standard.

Native APACS Standard 30 Format

APACS 30/40/70 is the standard defined by the Association for Payment Clearing Services as a "Specification for a Credit Authorisation Terminal". UPGdirect is able to process transactions sent in the form of APACS Standard 30/40/70 format request messages.

If the system receives an acceptable APACS30/40/70 request message then, following authorisation, a response message will be returned to the merchant terminal in the form of an APACS Standard 30/40/70 response.

Description of the APACS Standard 30/40/70 specification for request and response messages is outside the scope of this document.

APACS can be contacted directly at the following address:

Association for Payment Clearing Services

Triton Court

Mercury House

14 Finsbury Square

LONDON EC2A 1LQ

www.apacs.org.uk

Telephone 0207 7116200

Please note that UPG generally only accepts APACS 30/40/70 Standard messages from large volume merchants as the approval processes is much more involved than that of UPG2.1 format messaging.

UPG Format Transaction Messages

The UPG Format Transaction Messages are simple text strings comprised of a number of fields and sub-fields, separated by ASCII control characters. The messages are prefixed and suffixed by two further ASCII control characters, Start Text [STX] and End Text [ETX], respectively. The ASCII control characters used are shown below.

ASCII control characters used in Transaction Request Messages

| Component | Separator | ASCII Character Code |
|-----------------------------|-----------------------|----------------------|
| Message | Start text [STX] | 2 |
| Message | End text [ETX] | 3 |
| Field | Field separator [FS] | 28 |
| Sub-field | Unit separator [US] | 31 |
| Reserved Sub-field | Group separator [GS] | 29 |
| EMV Authorisation Sub-field | Record separator [RS] | 30 |

Fields

The major components of the Transaction Message are divided into fields by Field Separator [FS] characters.

The final field separator must be appended to the message following the last field to be written and before the [ETX] field.

Optional fields may be left empty providing that all the preceding field separator characters are present.

For example, for a hypothetical message with four fields:

To specify information for all three fields:

```
[STX]FIELD 1[FS]FIELD 2[FS]FIELD 3[FS]FIELD 4[FS][ETX]
```

To specify information for Field 1 only:

```
[STX]FIELD 1[FS][FS][FS][FS][ETX]
```

To specify information for Field 3 only:

```
[STX][FS][FS]FIELD 3[FS][FS][ETX]
```

Sub-fields

Fields can be further divided into sub-fields separated by Unit Separator [US] characters.

Optional sub-fields can be left empty providing that all the preceding unit separator characters are not removed from the field. If no further optional sub-fields are to be provided, it is acceptable to jump to the next field separator character and continue from that point.

For example, for a hypothetical FIELD 2 with sub-fields:

To specify information for all sub fields:

...[FS]SUB-FIELD 1[US]SUB-FIELD 2[US]SUB-FIELD 3[FS]...

To specify information for sub-fields 1 and 3 only:

...[FS]SUB-FIELD 1[US][US]SUB-FIELD 3[FS]...

To specify information for sub-field 1 only:

...[FS]SUB-FIELD 1[FS]...

To specify information for sub-field 3 only:

...[FS][US][US]SUB-FIELD 3[FS]...

In certain circumstances, for example with the CARD DETAILS field of a Transaction Request Message for a keyed sale, the first sub-field needs to be prefixed with a Unit Separator [US] .

Key

| | Description |
|-------|---------------------------|
| [FS] | Field separator character |
| [US] | Unit separator character |
| [STX] | Start text character |
| [ETX] | End text character |

Transaction Request Message Structure (UPG 2.1)

Structure of a UPG Format Transaction Request Message

| No. | Size | Type | Req'd | Field Name and Contents |
|-----|--------|------|-------|---|
| 1 | 1 | A | M | START TEXT [STX] |
| 2 | V | A | M | SERVICE INDICATOR & VERSION |
| 3 | 1 | | M | FIELD SEPARATOR [FS] |
| 4 | 8 | A | O | TERMINAL IDENTIFIER |
| 5 | 1 | | M | FIELD SEPARATOR [FS] |
| 6 | max 15 | A | O | TRANSACTION IDENTIFIER |
| 7 | | | | FIELD SEPARATOR [FS] |
| 8 | 4 | A | M | TERMINAL TYPE |
| 9 | 1 | | M | FIELD SEPARATOR [FS] |
| 10 | V | A | M | MESSAGE TYPE |
| 11 | 1 | | M | FIELD SEPARATOR [FS] |
| 12 | V | N | M | UPG MERCHANT ID |
| 13 | 1 | | M | FIELD SEPARATOR [FS] |
| 14 | V | A | M | CARD DETAILS See "Card Details Field" section for field contents |
| 15 | 1 | | M | FIELD SEPARATOR [FS] |
| 16 | max 23 | N | M | AMOUNT |
| 17 | 1 | | M | FIELD SEPARATOR [FS] |
| 18 | max 11 | N | O | CASH BACK AMOUNT |
| 19 | 1 | | M | FIELD SEPARATOR [FS] |
| 20 | 3 | N | M | CURRENCY CODE |
| 21 | 1 | | M | FIELD SEPARATOR [FS] |
| 22 | 3 | N | M | COUNTRY CODE |
| 23 | 1 | | M | FIELD SEPARATOR [FS] |
| 24 | V | A | M | DISPATCH |
| 25 | 1 | | M | FIELD SEPARATOR [FS] |
| 26 | max 11 | A | O | AUTHORISATION CODE |
| 27 | 1 | | O | FIELD SEPARATOR [FS] |

| | | | | |
|----|---|---|---|---|
| 28 | V | A | O | CUSTOMER DETAILS |
| 29 | 1 | | O | FIELD SEPARATOR [FS] |
| 30 | V | N | O | CARD VERIFICATION VALUE / CODE |
| 31 | 1 | | O | FIELD SEPARATOR [FS] |
| 32 | V | A | O | DESCRIPTIVE DATA |
| 33 | 1 | | O | FIELD SEPARATOR [FS] |
| 34 | V | A | O | PURCHASE / STORE / FUEL CARD LINE ITEM DATA |
| 35 | 1 | | O | FIELD SEPARATOR [FS] |
| 36 | V | A | O | RESERVED |
| 37 | 1 | | O | FIELD SEPARATOR [FS] |
| 38 | V | A | O | TRANSACTION TIME & DATE |
| 39 | 1 | | O | FIELD SEPARATOR [FS] |
| 40 | 2 | N | O | EMV TERMINAL TYPE |
| 41 | 1 | | O | FIELD SEPARATOR [FS] |
| 42 | V | A | O | ICC TRANSACTION REQUEST DATA See "ICC Transaction Request Data Field" section for field contents |
| 43 | 1 | | O | FIELD SEPARATOR [FS] |
| 44 | 1 | | M | END TEXT [ETX] |

Key

| | Description |
|---|-------------------------|
| A | Alpha-numeric character |
| N | Numeric character |
| V | Variable length field |
| O | Optional field |
| M | Mandatory field |

Note regarding optional fields after Field 26: If data is to be provided for any of the optional fields after Field 26, then all previous optional field separator characters from Field 27 (inclusive) to the appropriate field must also be provided.

SERVICE INDICATOR & VERSION

Denotes the messaging standard to be used. Currently the first three characters contain the messaging standard service indicator and the last three characters contain the messaging standard version number. See example below.

Example SERVICE INDICATOR & VERSION field

| Service Indicator & Version |
|-----------------------------|
| UPG2.1 |

TERMINAL IDENTIFIER (TID)

Denotes the unique terminal identity number. Ideally, every EPOS terminal or application should be given a unique Terminal Identifier (TID).

Structure of TERMINAL IDENTIFIER field

| Digits | Description |
|--------|---|
| 1 to 4 | RID - Registered Identifier (Identifies the organisation) |
| 5 to 8 | UID - Unit Identifier (Identifies the terminal) |

TIDs are allocated in conjunction with Universal Payment Gateway and APACS.

TRANSACTION IDENTIFIER

ID created by the EPOS terminal or application to identify the transaction. If provided, it will be returned unaltered as part of the Transaction Response Message, for use in the reconciliation of Transaction Request and Transaction Response Messages.

TERMINAL TYPE

Four characters set according to terminal attributes. **Contact Universal Payment Gateway to establish the contents of this field.**

MESSAGE TYPE

Indicates the type of transaction being processed and can be one of the following:

Supported MESSAGE TYPE values

| Message Type | Description |
|------------------------|--|
| SALE_CHIP † | Sale transaction, card details read from ICC at point of sale |
| SALE_SWIPED † | Sale transaction, card details read from magnetic stripe at point of sale |
| SALE_KEYED † | Sale transaction, card details keyed at point of sale |
| SALE_CNP † | Sale transaction, cardholder not present (telephone, mail order, etc.) |
| SALE_CA † | Sale transaction with continuous authority * |
| SALE_CASHBACK_CHIP † | Sale transaction with cash back, card details read from ICC at point of sale |
| SALE_CASHBACK_SWIPED † | Sale transaction with cash back card details read from magnetic stripe at point of sale |
| SALE_CASHBACK_KEYED † | Sale transaction with cash back, card details keyed at point of sale |
| REFUND_CHIP † | Refund transactions, card details read from ICC at point of sale |
| REFUND_SWIPED † | Refund transactions, card details read from magnetic stripe at point of sale |
| REFUND_KEYED † | Refund transaction, card details keyed |
| REFUND_CNP † | Refund transaction, cardholder not present |
| ESALE_KEYED † | eCommerce sale transaction, card details keyed by merchant or cardholder |
| ESALE_CHIP † | eCommerce sale transaction, details read from ICC |
| ESALE_SWIPED † | eCommerce sale transaction, details read from magnetic stripe |
| EREFUND_KEYED † | eCommerce refund transaction, card details keyed by merchant or cardholder |
| EREFUND_CHIP † | eCommerce refund transactions, details read from ICC |
| EREFUND_SWIPED † | eCommerce refund transactions, details read from magnetic stripe |
| REVERSAL_CHIP | Cancellation of earlier EMV2000 Chip&PIN transaction |
| REVERSAL_SWIPED | Cancellation of earlier card swiped transaction |
| REVERSAL_KEYED | Cancellation of earlier card keyed transaction |
| CARD_QUERY_KEYED | Used in cardholder present environments prior to UPG2.1 sale, or refund messages in order to return card functionality to the terminal. Used mainly in |

| | |
|-------------------|--|
| | <p>card swiped sale transactions to determine if cash-back is allowed. Also used to signal if Line Item Detail (LID) is mandated for the given card.</p> <p>Card information is returned in the Reserved field of the UPG2.1 response.</p> |
| CARD_QUERY_SWIPED | <p>Used in cardholder present environments prior to UPG2.1 sale, or refund messages in order to return card functionality to the terminal. Used mainly in card keyed sale transactions to determine if cash-back is allowed. Also used to signal if Line Item Detail (LID) is mandated for the given card.</p> <p>Card information is returned in the Reserved field of the UPG2.1 response.</p> |
| PAYMENT_ONLY_ | <p>Prefix the Message Type for submission of a card transaction after (a) An EMV2000 Chip&PIN transaction that has been authorised off-line or (b) manual authorisation following a referral or (c) real time communication with UPGdirect has failed.</p> <p>Message Types that can optionally be prefixed for payment only are indicated below with *</p> |

* Sale transactions with continuous authority provide a mechanism for repeat charging of a pre-determined amount agreed by the cardholder. For example, continuous authority is often used for the billing of magazine subscriptions.

For other Message Types including custom messages, please contact UPG.

UPG MERCHANT ID

Issued by Universal Payment Gateway on a merchant-by-merchant basis and used to map the merchant number held at the acquiring bank with UPG account information.

New Merchant IDs can be created for each bank-issued merchant number that a merchant may possess. **Please inform the UPG Technical Team using the contact details at the end of this document to request the set-up of a new Merchant ID.**

CARD DETAILS

Contents vary based on the card details mode of entry. Additionally, the cross reference number may be sent if the transaction is being sent as a result of a previous referred or deferred payment transaction, removing the requirement for merchants to store card numbers, etc.

There are five modes of entry:

1. Magnetic stripe read - Track 2 data

2. Manually keyed data
3. ICC supplied equivalent Track 2 data
4. ICC supplied equivalent manually keyed data
5. Cross reference* of a previous transaction (certain transaction types only)

* *unique ID of a successfully processed transaction, returned as part of the UPG response message*

The mode of entry used for card details must be applicable for the message type. For example, a message type denoting a swiped transaction must provide card details in the form of a magnetic stripe read.

1. Magnetic stripe read – Track 2 data

CARD DETAILS field (magnetic stripe read Track 2 data) structure

| No. | Size | Type | Req'd | Field Name and Contents |
|-----|-----------|------|-------|--|
| 14 | max 40 | A/N | M | Unaltered contents of magnetic stripe track 2 (card parity bit discarded but must include checksum and sentinels) |

2. Manually keyed

CARD DETAILS field (manually keyed) structure

| No. | Size | Type | Req'd | Field Name and Contents |
|------|-----------|------|-------|--|
| 14.1 | 1 | | M | UNIT SEPARATOR [US] (to identify manual entry) |
| 14.2 | max 25 | N | M | CARD NUMBER |
| 14.3 | 1 | | M | UNIT SEPARATOR [US] |
| 14.4 | 4 | N | M | EXPIRY DATE sent as YYMM (entered as MM YY on terminal) |
| 14.5 | 1 | | O | UNIT SEPARATOR [US] |
| 14.6 | max 2 | N | O | ISSUE NUMBER |
| 14.7 | 1 | | O | UNIT SEPARATOR [US] |
| 14.8 | 4 | N | O | START DATE sent as YYMM (entered as MM YY on terminal) |

3. ICC supplied equivalent Track 2 data

CARD DETAILS field (ICC equivalent Track 2) structure

| No | Size | Type | Req'd | Field Name and Contents |
|------|-----------|------|-------|-------------------------------------|
| 14.1 | max 37 | A/N | M | ICC TRACK 2 DATA |
| 14.2 | 1 | | M | UNIT SEPARATOR [US] |
| 14.3 | max 2 | N | O | ICC APPLICATION PAN SEQUENCE NUMBER |

4. ICC supplied equivalent manually keyed

CARD DETAILS field (ICC equivalent manually keyed) structure

| No | Size | Type | Req'd | Field Name and Contents |
|------|-----------|------|-------|----------------------------------|
| 14.1 | max 19 | N | M | ICC CARD NUMBER |
| 14.2 | 1 | | M | UNIT SEPARATOR [US] |
| 14.3 | 4 | N | M | ICC EXPIRY DATE (format YYMM) |
| 14.4 | 1 | | O | UNIT SEPARATOR [US] |
| 14.5 | 2 | N | O | ICC SEQUENCE NUMBER |

5. Cross Reference (referred, deferred payment or rebilling transactions)

Allows a sale or refund for a previously referred transaction to be submitted for payment without the merchant needing to provide details about the card (card number, expiry date, etc.) apart from the cross reference of the original transaction. Similarly, allows a deferred payment or rebilling transaction to be re-authorised and, if successful, submitted for payment without the merchant needing to provide details about the card.

CARD DETAILS field (referred, deferred or rebilling transactions) structure

| No. | Size | Type | Req'd | Field Name and Contents |
|-----|------|------|-------|--|
| 14 | V | A | M | CROSS REFERENCE Value returned by earlier transaction |

Key

| | Description |
|----------|--|
| V | Variable length field or sub-field |
| max x | Variable length field or sub-field up to a maximum length of x |
| M | Mandatory field or sub-field |
| O | Optional field or sub-field |

AMOUNT

Contains a mandatory first sub-field, `AUTHORISATION AMOUNT` and a second sub-field, `DISPATCH LATER AMOUNT`, that is mandatory for any transaction in which the `DISPATCH` field is set to `LATER`.

`AUTHORISATION AMOUNT` contains the value of the transaction in minor currency units, i.e. in the form of the lowest denomination of the relevant currency. It should be set to a nominal amount e.g. 101 for deferred dispatch transactions

`DISPATCH LATER AMOUNT` contains the total value in a deferred dispatch transaction.

AMOUNT field structure

| No | Size | Type | Req'd | Field Name and Contents |
|------|-----------|------|-------|---|
| 16.1 | max 11 | N | M | AUTHORISATION AMOUNT |
| 16.2 | 1 | | O | UNIT SEPARATOR [US] |
| 16.3 | max 11 | N | O | DISPATCH LATER AMOUNT Mandatory for transactions in which DISPATCH = LATER |

Example AUTHORISATION AMOUNT values

| Currency Amount | Amount in minor currency units |
|-----------------|--------------------------------|
| £129.99 | 12999 |
| \$75.50 | 7550 |
| ¥2000 | 2000 |

CASHBACK AMOUNT

Contains the value of the cashback component of the transaction in minor currency units, i.e. in the form of the lowest denomination of the relevant currency.

Examples as per AMOUNT values above.

CURRENCY CODE

Indicates the currency of the transaction, **contact the Universal Payment Gateway Technical Team for further details.**

Example CURRENCY CODE values

| Currency Code | Description |
|---------------|-------------|
| 826 | GB Sterling |
| 840 | US Dollars |
| 978 | Euro |

COUNTRY CODE

Indicates the country of the EPOS terminal or application, **contact the Universal Payment Gateway Technical Team for further details.**

Example COUNTRY CODE values

| Country Code | Description |
|--------------|--------------------------|
| 826 | United Kingdom |
| 840 | United States of America |

DISPATCH

Indicates whether the transaction should be authorised and presented for payment (“settlement”) at the next batch-end or day-end, or simply authorised with a view to presenting for payment at a later date. Used to allow for a deferred-payment mechanism allowing merchants to:

1. In a sale environment, authorise a card for a nominal amount and, upon dispatch of the goods, charge the cardholder the full amount.
2. In a refund environment, authorise a card for a nominal amount and, upon return of the goods, refund the cardholder the full amount.

Note: According to card scheme rules, payment should not be taken from a card unless the goods will be dispatched within 24 hours.

With the DISPATCH field set to LATER, the customer’s card can be authorised but payment will not be taken. Payment can be requested at a later date by re-authorising the transaction with DISPATCH set to NOW.

Note: For all DISPATCH = LATER transactions, the DISPATCH LATER AMOUNT sub-field of the AMOUNT fields needs to be submitted. This allows the original transaction to be cleared from the UPG history data when a deferred transaction is dispatched for the full amount.

Supported DISPATCH values

| Dispatch Field | Description |
|----------------|---|
| NOW | Authorise immediately and present for payment at batch or day end |
| LATER | Authorise immediately but do not present for payment |

AUTHORISATION CODE

This field contains the authorisation code given via a telephone authorisation following a referral. The contents of this field are ignored if the MESSAGE TYPE field is **not** set to PAYMENT_ONLY.

CUSTOMER DETAILS

This field allows for the submission the cardholder's name, address, postcode, telephone number and email address as part of the transaction message. This information is used in the following:

- The Address Verification Services (AVS)
- Customer details for the UPGdirect extranet facility.

The AVS results are returned in conjunction with the CV2 check results in the `AVS/CV2 CHECK RESPONSE` field in the UPGdirect Transaction Response Message.

CUSTOMER DETAILS field

| No. | Size | Type | Req'd | Field Name and Contents |
|-------|------------|------|-------|-------------------------|
| 28.1 | 1 | | M* | UNIT SEPARATOR [US] |
| 28.2 | max 10 | A | M* | POSTCODE |
| 28.3 | 1 | | M* | UNIT SEPARATOR [US] |
| 28.4 | max 100 | A | M* | ADDRESS |
| 28.5 | 1 | | O | UNIT SEPARATOR [US] |
| 28.6 | max 50 | A | O | NAME |
| 28.7 | 1 | | O | UNIT SEPARATOR [US] |
| 28.8 | max 30 | N | O | TELEPHONE |
| 28.9 | 1 | | O | UNIT SEPARATOR [US] |
| 28.10 | max 50 | A | O | EMAIL ADDRESS |
| 28.11 | 1 | | O | UNIT SEPARATOR [US] |
| 28.12 | max 50 | N | O | RESERVED |

** note that certain CUSTOMER DETAILS fields are listed as mandatory – this is only applicable for AVS transactions*

Key

| | Description |
|-------|--|
| A | Alpha-numeric character |
| N | Numeric character |
| max x | Variable length field or sub-field up to a maximum length of x |
| O | Optional field |
| M | Mandatory field for AVS submission |

CARD VERIFICATION VALUE/CODE

This field allows for the submission the card verification value/code (CV2), as part of the transaction message. The CV2 is an additional 3 or 4 digit number that can usually be found on the signature strip on the back of a card.

If supplied, UPGdirect passes the CV2 value to the card issuer. In conjunction with the AVS check, the card issuer passes back a flag to UPGdirect which is subsequently decoded and passed back to the merchant as part of the Transaction Response Message, indicating whether or not the submitted CV2 matches that of the card issuer's records.

It is the responsibility of the EPOS system to display the result of the CV2 check and let the retailer decide what course of action to take if the match is negative. If the retailer does not wish to proceed with the transaction, it should be cancelled by re-submitting the Transaction Request Message with the MESSAGE TYPE field set to REVERSAL_x where x is the card entry method (eg. CHIP, KEYED, SWIPED).

Note: The CV2 must never be stored in any systems or printed on any receipts.

DESCRIPTIVE DATA

This field is currently unused by the UPGdirect system.

PURCHASE / STORE / FUEL CARD LINE ITEM DATA

The contents and format of this field are agreed jointly by the merchant and Universal Payment Gateway. Typically, information such as car registration, odometer reading, product purchased, number of litres purchased, price per litre, are passed in this field. The UPGdirect system passes all this information to the card issuer together with the financial data. Appendix 2 discusses the format of this field for American Express and Diner's Club International cards. **Please contact UPG for other supported formats.**

RESERVED

Amongst other uses, this field is used to signal to the UPG system transaction data that was not catered for in the original ICC TRANSACTION REQUEST DATA field. This data consisting of comma delimited, two-letter acronyms is contained within a single <ICCO></ICCO> tag pair.

If an ICC transaction needs to fallback to swipe, the acronym FB (Fall-Back) should be contained within the <ICCO></ICCO> tag pair.

If PIN entry is cancelled under the EMV PIN waiver, the acronym SV (Signed Voucher) should be contained within the <ICCO></ICCO> tag pair.

If the transaction was authorised off-line e.g. authorised by the chip and terminal combination rather than going on-line to the acquirer/issuer, the acronym FA (Off-line Authorised) should be contained within the <ICCO></ICCO> tag pair. Please note that all transactions submitted with the FA acronym, should also be labelled as PAYMENT_ONLY_.

If communications failure prevented the transaction from being authorised, the acronym CF (Communications Failure) should be contained within the <ICCO></ICCO> tag pair. Please note that all transactions submitted with the CF acronym, should also be labelled as PAYMENT_ONLY_.

If the transactions should be processed without UPG carrying out expiry date or LUHN checking, the acronym FN (Force on-line) should be contained within the <ICCO></ICCO> tag pair. Please note that this should only be used for certain card types as advised by your acquirer.

If the transaction was an authorisation following a referral, the acronym XR (eX-Referral) should be contained within the <ICCO></ICCO> tag pair. Please note that all transactions submitted with the XR acronym, should also be labelled as PAYMENT_ONLY_, and have the AUTHORISATION_CODE field populated with the authorisation code supplied by the issuer/acquirer.

For ecommerce transactions, if the transaction was passed for 3D Secure checking namely Verified by Visa, Mastercard SecureCode or JCB's JSecure, the Reserved field is utilised to transmit the additional fields relating to the outcome of the 3D Secure check. These fields, listed below, should be comma separated and contained within the <3DS></3DS> tag pair within the Reserved field.

<3DS></3DS> tag pair structure of RESERVED field for 3D Secure Transactions

| No | Size | Type | Req'd | Field Name and Contents |
|------|-----------|------|-------|---|
| | | | | OPENING TAG: <3DS> |
| 36.1 | 1 | A | M | ENROLLED [Y N U] |
| 36.2 | 1 | A | O | COMMA (ASCII character 44) |
| 36.3 | 1 | A | O | AUTHENTICATED [Y N A U] |
| 36.4 | 1 | A | | COMMA (ASCII character 44) |
| 36.5 | 2 | N | O | ECI returned by cardholder's issuer as part of 3D Secure check |
| 36.6 | 1 | A | O | COMMA (ASCII character 44) |
| 36.7 | 32 max | A | O | CAVV returned by cardholder's issuer as part of 3D Secure check |
| 36.8 | 1 | A | O | COMMA (ASCII character 44) |
| 36.9 | 20 | A | O | TRANSACTION ID unique ID supplied by merchant as part of 3D Secure check |
| | | | | CLOSING TAG: </3DS> |

Please refer to the UPG integration guide "3D Secure: The UPG Guide for 3D Secure Transaction Delivery" for further information on these fields and 3D Secure in general.

Example Reserved field containing 3D Secure data

```
<3DS>Y, Y, 05, AAABAnMVNHhgAAAAARU0AAAAAA=, 0000000000000000100</3DS>
```

TRANSACTION TIME & DATE

This field is only used for ICC (EMV) transactions where the card details etc. have been read from the card's integrated circuit card. The format is YYMMDDhhmm.

EMV TERMINAL TYPE

This field is only used for ICC (EMV) transactions where the card details etc have been read from the card's integrated circuit card. Defined in EMV. Please contact the Universal Payment Gateway Technical Team for further information.

ICC TRANSACTION REQUEST DATA

This field is only used for ICC (EMV) transaction where the card details etc have been read from the card's integrated circuit card. Defined in EMV and are as follows:

| No. | Size | Type | Req'd | Field Name and Contents |
|-------|-----------|------|-------|--|
| 42.1 | 16 | A | M | Application Cryptogram - Tag 9F26 |
| 42.2 | 4 | A | M | Application Interchange Profile (AIP) - Tag 82 |
| 42.3 | 4 | A | M | Application Transaction Counter (ATC) - Tag 9F36 |
| 42.4 | 8 | A | M | Unpredictable Number - Tag 9F37 |
| 42.5 | 10 | A | M | Terminal Verification Result (TVR) - Tag 95 |
| 42.6 | 2 | N | M | Cryptogram Transaction Type - Tag 9C |
| 42.7 | max 64 | A | M | Issuer Application Data (IAD) - Tag 9F10 |
| 42.8 | 1 | | M | UNIT SEPARATOR [US] |
| 42.9 | max 32 | A | M | Application Identifier (AID) - Tag 9F06 |
| 42.10 | 1 | | M | UNIT SEPARATOR [US] |
| 42.11 | 4 | A | M | Terminal Application Version Number - Tag 9F09 |
| 42.12 | 1 | | M | UNIT SEPARATOR [US] |
| 42.13 | 2 | A | M | Cryptogram Information Data - Tag 9F27 |
| 42.14 | 1 | | M | UNIT SEPARATOR [US] |
| 42.15 | 6 | A | M | CVM Results - Tag 9F34 |
| 42.16 | 1 | | M | RECORD SEPARATOR [RS] |
| 42.17 | 4 | A | M | Application Usage Control - Tag 9F07 |
| 42.18 | 4 | A | M | Application Version - Tag 9F08 |
| 42.19 | 4 | A | M | Transaction Status Information - Tag 9B |

| | | | | |
|-------|---|---|----|---|
| 42.20 | 2 | A | M | Terminal Type - Tag 9F35 |
| 42.21 | 6 | A | M | Terminal Capabilities - Tag 9F33 |
| 42.22 | 2 | A | M | POS Entry Mode - see following table |
| 42.23 | 1 | | C1 | RECORD SEPARATOR [RS] |
| 42.24 | 2 | N | C1 | Reason On-line Code - Vendor specific tag |

C1 Mandatory for transactions forced on line by the card acceptance device or chip. Not present for ICC transactions that are not forced on line by card acceptance device or chip.

Key

| Description | |
|-------------|----------------------------|
| [FS] | Field separator character |
| [US] | Unit separator character |
| [RS] | Record separator character |
| [STX] | Start text character |
| [ETX] | End text character |

POS Entry Mode

| Digit 1 (Card Transaction Information) |
|---|
| 0 = Not used |
| 1 = Swipe |
| 2 = Keyed |
| 3 = ICC |
| 4 = Recovered Data, Keyed - e.g. From merchant-stored card details on merchant-copy transaction receipt |
| 5 = Recovered Data, Electronic - e.g. UPG CrossReference used |
| 6 = Information Advice |
| 7 = Down-grade ICC transaction i.e. the card is only capable of returning track2 and no other EMV details |
| 8 = Swipe after ICC failure |
| 9 = Reserved |
| Digit 2 (Cardholder Verification) |
| 0 = Not used |
| 1 = Cardholder present, signature |
| 2 = Cardholder present, PIN |
| 3 = Cardholder present, alternative cardholder verification method i.e. passport |

| |
|---|
| 4 = Cardholder present, unattended payment terminal - no cardholder verification method |
| 5 = Cardholder present, unattended payment terminal, PIN |
| 6 = Cardholder present, unattended payment terminal, alternative cardholder verification method i.e. passport |
| 7 = Cardholder not present |
| 8 = No verification |
| 9 = Reserved |

Example Transaction Request Messages (UPG 2.1)

Examples of UPG Format Transaction Request Messages for sale and refund transactions for £12.99:

Example UPG 2.1 Transaction Request Message for a basic MasterCard swiped sale

UPG 2.1 Transaction Request Message

```
[STX]UPG2.1[FS]10024561[FS]TEST01[FS]2504[FS]SALE_SWIPED[FS]7650992[FS];5301250070000191=04061010912345678901?<[FS]1299[FS][FS]826[FS]826[FS]NOW[FS][ETX]
```

Example UPG 2.1 Transaction Request Message for a basic MasterCard keyed sale

UPG 2.1 Transaction Request Message

```
[STX]UPG2.1[FS]10024561[FS]TEST02[FS]2504[FS]SALE_KEYED[FS]7650992[FS][US]5301250070000191[US]0212[FS]1299[FS][FS]826[FS]826[FS]NOW[FS][ETX]
```

Example UPG 2.1 Transaction Request Message for a basic Maestro keyed sale

UPG 2.1 Transaction Request Message

```
[STX]UPG2.1[FS]10024561[FS]TEST03[FS]2504[FS]SALE_KEYED[FS]7650992[FS][US]633101999990016[US]0212[US]2[FS]1299[FS][FS]826[FS]826[FS]NOW[FS][ETX]
```

Example UPG 2.1 Request Message for a basic MasterCard keyed refund

UPG 2.1 Transaction Request Message

```
[STX]UPG2.1[FS]10024561[FS]TEST04[FS]2504[FS]REFUND_KEYED[FS]7650992[FS][US]5301250070000191[US]0212[FS]1299[FS][FS]826[FS]826[FS]NOW[FS][ETX]
```

Example UPG 2.1 Request Message for a basic MasterCard swiped sale with CV2/AVS and full customer detail submission

UPG 2.1 Transaction Request Message

```
[STX]UPG2.1[FS]10024561[FS]TEST01[FS]2504[FS]SALE_SWIPED[FS]7650992[FS];530125
0070000191=04061010912345678901?<[FS]1299[FS][FS]826[FS]826[FS]NOW[FS][FS][US]
HU12 7TG[US]7 MARLBOROUGH AVENUE, HULL, HUMBERSIDE[US]MR SIDNEY
PICKLES[US]01482 678534[US]sid.pickles@ic.ac.uk[FS]453[FS][ETX]
```

Example UPG 2.1 Request Message for a Maestro Chip&PIN sale

UPG 2.1 Transaction Request Message

```
[STX]UPG2.1[FS][FS]UPG_Test_2[FS]7006[FS]SALE_CHIP[FS]3400588[FS]5413330236098
728=0712201073630857[US]00[FS]2999[FS][FS]826[FS]826[FS]NOW[FS][FS][FS][FS][FS]
[FS][FS][FS][FS]9B56AAE25597F6D758000006626107AB000000800000010103A41800DAC0[
US]A0000000041010[US]0002[US]80[US]410302[RS]FF000002E80022E0B0E032[RS]09[FS][
ETX]
```

Transaction Response Message Structure (UPG 2.1)

Following the submission and receipt by UPGdirect of a valid UPG Format request message, the transaction is passed to the merchant's acquiring bank for authorisation. A successful authorisation from the bank results in the transaction being passed for payment at the next batch-end or day-end, as agreed with Universal Payment Gateway.

Successful or not, the result of the authorisation is passed back to the client terminal or application in the form of a UPG Response Message.

Structure of a UPG Format Transaction Response Message

| No | Size | Type | Req'd | Field Name and Contents |
|----|------------|------|-------|--|
| 1 | 1 | | M | START TEXT [STX] |
| 2 | V | A | M | SERVICE INDICATOR & VERSION Messaging standard service indicator and version number |
| 3 | 1 | | M | FIELD SEPARATOR [FS] |
| 4 | max 15 | A | O | TRANSACTION IDENTIFIER Returned unaltered from Transaction Request Message |
| 5 | 1 | | M | FIELD SEPARATOR [FS] |
| 6 | 2 | A | M | RESPONSE CODE Code indicating outcome of transaction |
| 7 | 1 | | M | FIELD SEPARATOR [FS] |
| 8 | V | A | M | MESSAGE TEXT Descriptive text about transaction outcome |
| 9 | 1 | | M | FIELD SEPARATOR [FS] |
| 10 | V | A | O | CROSS REFERENCE Uniquely identifies successful or referred transactions |
| 11 | 1 | | M | FIELD SEPARATOR [FS] |
| 12 | V | A | O | AVS / CV2 CHECK RESPONSE Outcome of Address Verification Services (AVS) and Card Verification Value (CV2) check |
| 13 | 1 | | M | FIELD SEPARATOR [FS] |
| 14 | max 16 | N | O | REFERRAL TELEPHONE NUMBER |
| 15 | 1 | | M | FIELD SEPARATOR [FS] |
| 16 | max 289 | A | O | ICC RESPONSE DATA See "ICC Transaction Response Data Field" section for field contents |
| 17 | 1 | | M | FIELD SEPARATOR [FS] |
| 18 | V | A | O | CARD TYPE |
| 19 | 1 | | M | FIELD SEPARATOR [FS] |
| 20 | V | A | O | RESERVED |
| 21 | 1 | | M | FIELD SEPARATOR [FS] |
| 22 | 1 | | M | END TEXT [ETX] |

Key

| | Description |
|-------|--|
| A | Alpha-numeric character |
| N | Numeric character |
| max x | Variable length field or sub-field up to a maximum length of x |
| O | Optional field |
| M | Mandatory field for AVS submission |

SERVICE INDICATOR & VERSION

Denotes the messaging standard being used, the first three characters contain the messaging standard service indicator and the last three characters contain the messaging standard version number. See example below.

Example SERVICE INDICATOR & VERSION field

| Service Indicator & Version |
|-----------------------------|
| UPG2.1 |

TRANSACTION IDENTIFIER

Optional ID created by the EPOS terminal or application to identify the transaction. If sent as part of the Transaction Request Message, it will be returned unaltered in the Transaction Response Message. Used for the reconciliation of request and response messages.

RESPONSE CODE

RESPONSE CODE values returned by UPGdirect

| Response Code | Description |
|---------------|-------------------------------------|
| 00 | Transaction successful / Authorised |
| 02 | Card referred |
| 03 | Retailer unknown |
| 04 | Keep card decline |
| 05 | Card declined |
| 11 | Invalid card details |
| 12 | Invalid request |
| 30 | Exception |

MESSAGE TEXT

Contains a message from the merchant's acquiring bank describing the outcome of the transaction. For successful transactions, this message will also contain the authorisation code, generated by either the cardholder's issuing bank or the merchant's acquiring bank. The exact wording of the response message can vary between different acquiring banks.

The payment terminal software should use the `RESPONSE CODE` field to determine the true outcome of the transaction, and display the `RESPONSE MESSAGE` field on the EPOS terminal or pass to the client application.

Example MESSAGE TYPE values

| Transaction Outcome | Message Text |
|------------------------|-----------------------------|
| Transaction successful | AUTH CODE:123456 |
| Card referred | REFERRAL B |
| Card declined | CARD DECLINED |
| Keep card decline | KEEP CRD DECLINE NOT AUTHED |
| Invalid card number | INVALID CARD NUMBER |
| Invalid request | INVALID MERCHANT ID |

CROSS REFERENCE

Cross References are unique reference numbers generated by UPGdirect to uniquely identify every successful or referred transaction passed through the system.

This allows transactions to be audited at every step of the authorisation and payment process and provides an efficient method for post-transaction information recall in the event of customer enquiry.

Cross references are generated for referred transactions to provide, if required, a mechanism for submission for payment following a successful referral call by the merchant to the acquiring bank.

Note: Cross References are not generated for any other unsuccessful transactions.

REFERRAL TELEPHONE NUMBER

Returned by some card issuers in the event of a referral being generated. This field is not always used, merchants should normally use the telephone number provided by their acquiring bank.

AVS / CV2 CHECK RESPONSE

Usually found on the signature stripe, three or four additional digits on cards are known as the Card Verification Value (CVV2) for Visa, and Card Verification Check (CVC2) for Europay / MasterCard, collectively termed the CV2.

The purpose of this optional check is to assist with the confirmation that the cardholder is actually in possession of the card and will be primarily used for Cardholder Not Present (CNP) transactions, such as telephone, mail order and Internet-based transactions.

Designed to provide additional protection for Cardholder Not Present (CNP) transactions, the optional Address Verification Service (AVS) Check is used to assist with confirming that any address given by the cardholder matches the recording address with the issuing bank.

The AVS comprises the numeric values from the cardholder's UK Post Code, in addition to any numeric values from the address.

If CV2 and AVS data is sent in the request message and the merchant is configured for this functionality, one of the following responses will be returned in the AVS / CV2 Check Response field:

AVS / CV2 Check Response Field messages

| AVS / CV2 Check Response | Description |
|-------------------------------|-------------------------------------|
| ALL MATCH | AVS and CV2 match |
| SECURITY CODE MATCH ONLY | CV2 match only |
| ADDRESS MATCH ONLY | AVS match only |
| NO DATA MATCHES | No matches for AVS and CV2 |
| DATA NOT CHECKED | Supplied data not checked |
| SECURITY CHECKS NOT SUPPORTED | Card scheme does not support checks |

This response field will be empty if no CV2 or AVS data was sent in the request message.

ICC RESPONSE DATA

Used only for Integrated Circuit Cards (ICC).

| No. | Size | Type | Req'd | Field Name and Contents |
|------|------------|------|-------|---------------------------------------|
| 16.1 | max 32 | A | M | Issuer Authentication Data - Tag 91 |
| 16.2 | 1 | | O | UNIT SEPARATOR [US] |
| 16.3 | Max 256 | A | O | Issuer Script Data – Tag 71 or Tag 72 |

CARD TYPE

A code denoting the type of card will be returned with the response message, providing that the transaction has successfully completed processing - for example, if the transaction was rejected due to an invalid card number, then no card type will be returned. Card Types and associated codes are shown below.

Card Types and associated Card Type Codes

| Card Type Code | Card Type |
|----------------|-------------------------------|
| VC | Visa Credit |
| VD | Visa Debit |
| MC | Mastercard |
| SW | Maestro |
| SO | Solo |
| EL | Electron |
| AM | American Express |
| DI | Diners Club |
| JC | JCB |
| MA | International Maestro |
| ST | Style |
| CF | Clydesdale Financial Services |
| OT | Other |

RESERVED

This field is used to carry the receipt information and the raw AVS/CV2 response data for sale and refund transactions. The delivery of receipt information must be enabled at UPG on a per-UPG merchant ID basis.

This field is also used to carry the card query data for CARD_QUERY messages.

Structure of the Reserved field

| No. | Size | Type | Field Name and Contents |
|------|------------|------|-------------------------|
| 20.1 | 1 | | GROUP SEPARATOR [GS] |
| 20.2 | Max 256 | A | Receipt Data |
| 20.3 | 1 | | GROUP SEPARATOR [GS] |
| 20.4 | 6 | N | Raw AVS/CV2 response |

Structure of the Receipt Information field

| No | Field Name and Contents | Req'd | Size | Type |
|----|---|-------|------------|------|
| 1 | BANK MERCHANT NUMBER | M | 15 max. | A |
| 2 | UNIT SEPARATOR [US] | M | 1 | |
| 3 | CARD TYPE – Full Name | M | 50 max. | A |
| 4 | UNIT SEPARATOR [US] | M | 1 | |
| 5 | MERCHANT NAME | M | 50 max. | A |
| 6 | UNIT SEPARATOR [US] | M | 1 | |
| 7 | MERCHANT LOCATION | M | 50 max. | A |
| 8 | UNIT SEPARATOR [US] | M | 1 | |
| 9 | DATE - "YYMMDD" | M | 6 | N |
| 10 | UNIT SEPARATOR [US] | M | 1 | |
| 11 | TIME – "HHMM" | M | 4 | N |
| 12 | UNIT SEPARATOR [US] | M | 1 | |
| 13 | TRANSACTION TYPE | M | 20 max. | A |
| 14 | UNIT SEPARATOR [US] | M | 1 | |
| 15 | CARD NUMBER – First 4 digits and last 4 digits with the remaining digits appearing as asterisks | M | 20 max. | N |
| 16 | UNIT SEPARATOR [US] | M | 1 | |
| 17 | START DATE – "YYMM" | O | 0 or 4 | N |
| 18 | UNIT SEPARATOR [US] | M | 1 | |
| 19 | EXPIRY DATE – "YYMM" | M | 4 | N |

| | | | | |
|----|--|---|---------|---|
| 20 | UNIT SEPARATOR [US] | M | 1 | |
| 21 | ISSUE NUMBER | O | 2 max. | N |
| 22 | UNIT SEPARATOR [US] | M | 1 | |
| 23 | CARD DETAILS ENTRY METHOD | M | 20 max. | A |
| 24 | UNIT SEPARATOR [US] | M | 1 | |
| 25 | TERMINAL IDENTIFIER | M | 8 | N |
| 26 | UNIT SEPARATOR [US] | M | 1 | |
| 27 | MESSAGE NUMBER | M | 4 | N |
| 28 | UNIT SEPARATOR [US] | M | 1 | |
| 29 | RESPONSE MESSAGE TEXT | M | 80 max. | A |
| 30 | UNIT SEPARATOR [US] | M | 1 | |
| 31 | TRANSACTION AMOUNT - minor currency units | M | 11 max. | N |
| 32 | UNIT SEPARATOR [US] | M | 1 | |
| 33 | CASH BACK AMOUNT - minor currency units (This field will be returned as empty unless a merchant is set up to process cash back and has passed a cash back amount to TransactDirect). | O | 11 max. | N |
| 34 | UNIT SEPARATOR [US] | M | 1 | |
| 35 | GRATUITY AMOUNT - minor currency units (This field will be returned as empty unless a merchant is set up to process gratuities and has passed a gratuity amount to TransactDirect). | O | 11 max. | N |
| 36 | GROUP SEPARATOR [GS] | M | 1 | |

M = Mandatory, O = Optional, A = Alpha-Numeric, N = Numeric

Structure of the Raw AVS/CV2 field

The AVS/CV2 Response Code is made up of six characters and is sent back in the raw form that is received by UPG from the acquiring bank.

| Position 1 Value | Position 1 Value Description |
|------------------|--------------------------------------|
| 0 | No additional information available. |
| 1 | CV2 not checked. |
| 2 | CV2 matched. |
| 4 | CV2 not matched. |
| 8 | Reserved |

| Position 2 Value | Position 2 Value Description |
|------------------|--------------------------------------|
| 0 | No additional information available. |
| 1 | Postcode not checked. |
| 2 | Postcode matched. |
| 4 | Postcode not matched. |
| 8 | Postcode partially matched. |

| Position 3 Value | Position 3 Value Description |
|------------------|--------------------------------------|
| 0 | No additional information available. |
| 1 | Address numeric not checked. |
| 2 | Address numeric matched. |
| 4 | Address numeric not matched. |
| 8 | Address numeric partially matched. |

| Position 4 Value | Position 4 Value Description |
|------------------|------------------------------------|
| 0 | Authorising entity not known |
| 1 | Authorising entity – merchant host |
| 2 | Authorising entity – acquirer host |
| 4 | Authorising entity – card scheme |
| 8 | Authorising entity – issuer |

| Position 5 Value | Position 5 Value Description |
|------------------|------------------------------|
| 0 | Reserved |
| 1 | Reserved |
| 2 | Reserved |
| 4 | Reserved |
| 8 | Reserved |

| Position 6 Value | Position 6 Value Description |
|------------------|------------------------------|
| 0 | Reserved |
| 1 | Reserved |
| 2 | Reserved |
| 4 | Reserved |
| 8 | Reserved |

Note:

- Values other than 0, 1, 2, 4 or 8 are not valid in character positions 1 to 4.
- A value of zero in any character position indicates that no additional information is available.

- *If the Authorising Entity is not known then character position 4 is set to zero and the authoriser is assumed to be the issuer.*

Structure of the Card Query Information field

| No | Field Name and Contents | Req'd | Size | Type |
|----|--|-------|---------|------|
| 1 | CARD TYPE | M | 2. | A |
| 2 | UNIT SEPARATOR [US] | M | 1 | |
| 3 | CARD ISSUER | M | 50 max. | A |
| 4 | UNIT SEPARATOR [US] | M | 1 | |
| 5 | PAN LENGTH | M | 2 | N |
| 6 | UNIT SEPARATOR [US] | M | 1 | |
| 7 | ISSUE NUMBER LENGTH | M | 1 | N |
| 8 | UNIT SEPARATOR [US] | M | 1 | |
| 9 | HANDLE START DATE | M | 3 max | A |
| 10 | UNIT SEPARATOR [US] | M | 1 | |
| 11 | CV2 LENGTH | M | 1 | N |
| 12 | UNIT SEPARATOR [US] | M | 1 | |
| 13 | FUNCTIONALITY - Any number of the following may be returned <CASHBACK> <AMEX_LID> <DINERS_LID> <ATM_ONLY> <SWIPED> <KEYED> <AVSCV2> <MULTI_CURRENCY> <CNP> <CA> <LUHN> <EMV> | M | 4 | N |
| 14 | UNIT SEPARATOR [US] | M | 1 | |

M = Mandatory, O = Optional, A = Alpha-Numeric, N = Numeric

Example Transaction Response Messages for Successful Transactions

Some examples of UPG Format Transaction Response Messages for successfully authorised transactions:

Sales and Refunds

Sale and refund Transaction Response Messages are sent as a result of a successful sale or refund authorisation, carried out upon receipt of a sale or refund request message.

Example response message for a basic sale transaction

```
Transaction Response Message
[STX]UPG2.1[FS]TEST01[FS]00[FS]AUTH CODE:309583[FS]001120165101309583658[FS][FS]
[FS][FS]VC[FS][RS][RS]220000[FS][ETX]
```

Example response message for a basic refund transaction

```
Transaction Response Message
[STX]UPG2.1[FS]TEST02[FS]00[FS]REFUND ACCEPTED[FS]00112016501765144334[FS][FS]
[FS][FS]VC[FS][RS][RS][FS][ETX]
```

Example response message for a sale transaction with CV2/AVS response

```
Transaction Response Message
[STX]UPG2.1[FS]TEST03[FS]00[FS]AUTH CODE:309583[FS]001120165101309583658[FS]SE
CURITY CODE MATCH ONLY[FS][FS][FS]VC[FS][RS][RS]210000[FS][ETX]
```

Example response message for a Chip&PIN sale transaction

```
Transaction Response Message
[STX]UPG2.1[FS]UPG TEST 2[FS]00[FS]AUTH CODE:253963[FS]050908120753253963518[F
S]DATA NOT CHECKED[FS][FS]11223344556677883531[US][FS]MC[FS][GS]6849870[US]MAS
TERCARD[US]UPG TAMWORTH[US]TAMWORTH[US]050908[US]1207[US]SALE[US]5413330089000
328[US][US]0712[US][US]CHIP[US]90004023[US]5174[US]AUTH CODE:253963[US]10192[U
S][US][GS][FS][ETX]
```

Reversals

A reversal response message is sent as a result of a successful reversal, carried out upon receipt of a reversal request message.

Response message for a successful reversal

```
Transaction Response Message
[STX]UPG2.1[FS]TEST04[FS]00[FS]ACCEPTED[FS]001120165118309583454[FS][FS][FS][F
S]VC[FS][FS][ETX]
```

Key

| | Description |
|-------|----------------------------|
| [FS] | Field separator character |
| [US] | Unit separator character |
| [RS] | Record separator character |
| [GS] | Group separator character |
| [STX] | Start text character |
| [ETX] | End text character |

Example Transaction Response Messages for Unsuccessful Transactions

Some examples of UPG Format Transaction Response Messages for transactions that have not successfully authorised:

Example response message for an unsuccessful basic sale transaction (card declined)

| Transaction Response Message |
|--|
| [STX]UPG2.1[FS]TEST01[FS]05[FS]CARD DECLINED[FS]001120165538582504361[FS][FS][FS][FS]VC[FS][FS][ETX] |

Example response message for an unsuccessful basic sale transaction (card referred)

| Transaction Response Message |
|---|
| [STX]UPG2.1[FS]TEST02[FS]02[FS]REFERRAL B[FS]001120165538582509969[FS][FS][FS][FS]VC[FS][FS][ETX] |

Example response message for an unsuccessful basic sale transaction (invalid card number)

| Transaction Response Message |
|---|
| [STX]UPG2.1[FS]TEST03[FS]11[FS]INVALID CARD NUMBER[FS][FS][FS][FS][FS][FS][FS][FS][ETX] |

Key

| | Description |
|-------|---------------------------|
| [FS] | Field separator character |
| [US] | Unit separator character |
| [STX] | Start text character |
| [ETX] | End text character |

IP Connectivity Testing

During testing, connectivity to the UPGdirect system can be tested by sending a PING message in place of a UPG Format Transaction Request Message. See example below.

Example PING request message

| Ping Request Message |
|----------------------|
| PING |

Following successful receipt of the ping message by the system, a response will be sent back through the socket connection.

The response is a further PING in reply to the original message.

Example PING response message

| Ping Response Message |
|-----------------------|
| PING |

Following transmission of the PING response, the server will close the socket connection.

Note: This facility is only available to IP-based connections and should not be used in a live environment.

Appendix 1: Common UPG Error Codes

This appendix describes some of the more frequently encountered UPG error codes. These codes are either 4 or 5 digits in length and can be divided into two types, general UPG errors and UPG request errors.

General UPG errors can be decoded by a simple lookup, the most common being shown in Table 1.

| UPG Error Code | Description |
|----------------|-----------------------------------|
| 1367 | CONNECTION TIMED OUT |
| 1368 | CONNECTION TIMED OUT |
| 1380 | MERCHANT IP ADDRESS NOT FOUND |
| 2056 | AUTHORISATION HOST NOT RESPONDING |
| 2057 | AUTHORISATION REJECTED BY HOST |
| 2137 | CARD PREVALID |
| 2138 | CARD PREVALID |

Table 1.

UPG Request errors are generated by a non-compliant UPG 2.1 Request message. They are decoded as follows:

The first digit is always a 4.

The second digit describes the problem as shown in Table 2.

| Digit 2 | Description |
|---------|-----------------|
| 0 | MISSING |
| 1 | EMPTY |
| 2 | TOO SHORT |
| 3 | TOO SMALL |
| 4 | TOO FEW FIELDS |
| 5 | TOO LARGE |
| 6 | TOO LONG |
| 7 | TOO MANY FIELDS |
| 8 | NOT INTEGER |
| 9 | NOT NUMERIC |

Table 2.

The 3rd, 4th and if present, 5th digits are decoded as shown in Table 3.

| Digits 3, 4 & 5 | Description |
|--------------------------------|---|
| 02 | TERMINAL IDENTIFIER |
| 03 | TRANSACTION IDENTIFIER |
| 04 | TERMINAL TYPE |
| 05 | MESSAGE TYPE |
| 07 | UPG MERCHANT ID |
| 08 | CARD DETAILS |
| 09 | AMOUNT |
| 10 | CASHBACK AMOUNT |
| 11 | CURRENCY CODE |
| 12 | COUNTRY CODE |
| 13 | DISPATCH |
| 14 | AUTHORISATION CODE |
| 15 | CUSTOMER DETAILS |
| 16 | CARD SECURITY CODE (CV2) |
| 17 | DESCRIPTIVE DATA |
| 18 | PURCHASE/STORE/FUEL CARD LINE ITEM DETAIL |
| 19 | RESERVED |
| 20 | TRANSACTION TIME & DATE |
| 21 | EMV TERMINAL TYPE |
| 22 | REASON ONLINE CODE |
| 23 | ICC TRANSACTION REQUEST DATA |
| 24 | CARD NUMBER |
| 25 | ISSUE NUMBER |
| 26 | EXPIRY MONTH |
| 27 | EXPIRY YEAR |
| 28 | START MONTH |
| 29 | START YEAR |
| 56 | CUSTOMER NAME |
| 57 | CUSTOMER ADDRESS |
| 58 | CUSTOMER POSTCODE |
| 59 | CUSTOMER TELEPHONE |
| 60 | CUSTOMER EMAIL |
| 71 | RESERVED |

Table 3

The following responses may also be received which fall outside of the above decoding table.

| UPG Error Code | Description |
|-----------------------|-----------------------|
| 4294 | START DATE TOO SHORT |
| 4295 | EXPIRY DATE TOO SHORT |
| 4694 | START DATE TOO LONG |
| 4695 | EXPIRY DATE TOO LONG |

Appendix 2: Guide to Processing American Express and Diners Club Card Transactions via UPG Direct

This appendix describes the procedure and requirements for passing Line Item Detail information to UPG Direct for American Express and Diners Club cards.

Before a merchant can begin to process American Express or Diners Club card transactions, they must have been issued with merchant number(s) from either American Express or Diners Club, and UPG have completed the necessary set-up procedures for these merchant numbers.

Implementation

For standard bank cards i.e. Visa Credit, MasterCard, Switch etc. the Purchase/Store/Fuel Card Line Item Detail field is optional and is used to send purchased product information in free-form text to UPG. For these card types used in cardholder not present environments UPG does nothing more than store this information together with the transaction's financial data for later reference by the merchant. For cardholder present environments this data is ignored by UPG.

For American Express and Diners Club cards, this field is mandatory and a specific format, explained herein, is used. The contents of the Purchase/Store/Fuel Card Line Item Detail field are scrutinised by the card issuer to ensure that the card-member's statement is detailed and meaningful enough to the card-member to meet American Express or Diners Club standards.

An American Express or Diners Club transaction may consist of between one and six items, with optional information to describe tax or discount changes that have been made to the total value. A transaction must contain the quantity, description and gross value of at least one item.

Purchase/Store/Fuel Card Line Item Detail Property Sub-Fields

| No. | Size | Type | Req'd | Field Name | Description |
|-----|-----------|------|-------|------------------------|---|
| 1 | max 3 | N | M | LID ITEM 1 QUANTITY | Quantity of item 1 |
| 2 | 1 | | M | [US] | UNIT SEPARATOR |
| 3 | max 15 | A | M | LID ITEM 1 DESCRIPTION | Description of item 1 |
| 4 | 1 | | M | [US] | UNIT SEPARATOR |
| 5 | max 10 | N | M | LID ITEM 1 GROSS VALUE | Gross value of item 1 in minor currency units |
| 6 | 1 | | O | [US] | UNIT SEPARATOR |
| 7 | max 3 | N | O | LID ITEM 2 QUANTITY | Quantity of item 2 |

| | | | | | |
|----|-----------|---|---|------------------------|--|
| 8 | 1 | | O | [US] | UNIT SEPARATOR |
| 9 | max 15 | A | O | LID ITEM 2 DESCRIPTION | Description of item 2 |
| 10 | 1 | | O | [US] | UNIT SEPARATOR |
| 11 | max 10 | N | O | LID ITEM 2 GROSS VALUE | Gross value of item 2 in minor currency units |
| 12 | 1 | | O | [US] | UNIT SEPARATOR |
| 13 | max 3 | N | O | LID ITEM 3 QUANTITY | Quantity of item 3 |
| 14 | 1 | | O | [US] | UNIT SEPARATOR |
| 15 | max 15 | A | O | LID ITEM 3 DESCRIPTION | Description of item 3 |
| 16 | 1 | | O | [US] | UNIT SEPARATOR |
| 17 | max 10 | N | O | LID ITEM 3 GROSS VALUE | Gross value of item 3 in minor currency units |
| 18 | 1 | | O | [US] | UNIT SEPARATOR |
| 19 | max 3 | N | O | LID ITEM 4 QUANTITY | Quantity of item 4 |
| 20 | 1 | | O | [US] | UNIT SEPARATOR |
| 21 | max 15 | A | O | LID ITEM 4 DESCRIPTION | Description of item 4 |
| 22 | 1 | | O | [US] | UNIT SEPARATOR |
| 23 | max 10 | N | O | LID ITEM 4 GROSS VALUE | Gross value of item 4 in minor currency units |
| 24 | 1 | | O | [US] | UNIT SEPARATOR |
| 25 | max 3 | N | O | LID ITEM 5 QUANTITY | Quantity of item 5 |
| 26 | 1 | | O | [US] | UNIT SEPARATOR |
| 27 | max 15 | A | O | LID ITEM 5 DESCRIPTION | Description of item 5 |
| 28 | 1 | | O | [US] | UNIT SEPARATOR |
| 29 | max 10 | N | O | LID ITEM 5 GROSS VALUE | Gross value of item 5 in minor currency units |
| 30 | 1 | | O | [US] | UNIT SEPARATOR |
| 31 | max 3 | N | O | LID ITEM 6 QUANTITY | Quantity of item 6 |
| 32 | 1 | | O | [US] | UNIT SEPARATOR |
| 33 | max 15 | A | O | LID ITEM 6 DESCRIPTION | Description of item 6 |
| 34 | 1 | | O | [US] | UNIT SEPARATOR |
| 35 | max 10 | N | O | LID ITEM 6 GROSS VALUE | Gross value of item 6 in minor currency units |

Key

| | Description |
|---|-------------------------|
| A | Alpha-numeric character |
| N | Numeric character |
| V | Variable length field |
| O | Optional field |
| M | Mandatory field |

Note:

- Every item must be presented with a quantity, a description and a gross value
- No more than six items should be presented
- A Unit Separator must NOT appear after the final LID Item Gross Value

Optional Tax / Discount Sub-Fields

In addition, the following optional fields may be appended to the end of the Purchase Data Fields (above) to provide details and explanation of either tax or discount changes to the total value. If used, either discount value or tax value may be present, but not both. The caption field must be provided if either the tax or discount value fields are used.

These fields appear on the American Express or Diners Club cardmember's statement, enabling the member to view net tax and discount on items bought.

Tax Changes to Total Value

| No. | Size | Type | Req'd | Field Name | Description |
|-----|-----------|------|-------|-------------|--|
| x | 1 | | M | [RS] | RECORD SEPARATOR |
| x+1 | max 20 | N | M | TAX CAPTION | Description and/or explanation of tax changes to total value |
| x+2 | 1 | | M | [US] | UNIT SEPARATOR |
| x+3 | 0 | A | M | RESERVED | Intentionally left blank |
| x+4 | 1 | | M | [US] | UNIT SEPARATOR |
| x+5 | max 9 | N | M | TAX AMOUNT | Tax changes to total value in minor currency units |

Key

| | Description |
|---|--|
| A | Alpha-numeric character |
| N | Numeric character |
| V | Variable length field |
| O | Optional field |
| M | Mandatory field if tax changes have been made to the total value |

Discount Changes to Total Value

| No. | Size | Type | Req'd | Field Name | Description |
|-----|-----------|------|-------|------------------|---|
| x | 1 | | M | [RS] | RECORD SEPARATOR |
| x+1 | max 20 | N | M | DISCOUNT CAPTION | Description and/or explanation of discount changes to total value |
| x+2 | 1 | | M | [US] | UNIT SEPARATOR |
| x+3 | max 9 | N | M | DISCOUNT AMOUNT | Discount changes to total value in minor currency units |
| x+4 | 1 | | O | [US] | UNIT SEPARATOR |
| x+5 | 0 | A | O | RESERVED | Intentionally left blank |

Key

| | Description |
|---|---|
| A | Alpha-numeric character |
| N | Numeric character |
| V | Variable length field |
| O | Optional field |
| M | Mandatory field if discount changes have been made to the total value |

Note:

- The Unit Separator is optional after DISCOUNT AMOUNT

Examples

A one-item transaction with no tax or discount changes

```
1[US]PENTIUM 4/2.1GHz[US]89900
```

A one-item transaction with tax changes

```
1[US]PENTIUM 4/2.1GHz[US]89900[RS]IMPORT TAX[US][US]23700
```

Note: The amount appearing in the Amount field will be 113600

A one-item transaction with discount changes

```
1[US]PENTIUM 4/2.1GHz[US]89900[RS]MEMBERS DISCOUNT[US]8990
```

Note: The amount appearing in the Amount field will be 80910

A two-item transaction with no tax or discount changes

```
1[US]PENTIUM 4/2.1GHz[US]89900[US]3[US]CPU FANS[US]1500
```

Note: The amount appearing in the Amount field will be 91400

Note: Each CPU fan costs 500

A two-item transaction with tax changes

```
1[US]PENTIUM 4/2.1GHz[US]89900[US]3[US]CPU FANS[US]1500[RS]HM C&E  
DUTY[US][US]23000
```

Note: The net amount appearing in the Amount field will be 114400 Note: Each CPU fan cost 500

Contact Details

Technical Enquiries

For all technical enquiries and client registration requests, please contact a member of the Universal Payment Gateway technical team on +44 (0) 1827 265 005 or by email to ecommerce@universalpaymentgateway.com

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