**ECR-POS**

**INTERFACE**

**Ver. 1.5**

This document describes the communication protocol that any merchant willing to use POS (Point-Of-Sale) devices connected to their ECR (Electronic-Cash-Register) needs to implement either in the ECR application itself or in an interface layer between the ECR and the POS.

The POS device provides the merchant with swiped and chip card processing capabilities, and the direct connection between the ECR and the POS further improves reporting from the ECR, by sharing authorization information from the POS.

This way the ECR is always aware of any transaction regardless of payment method (i.e. cash vs card).

The ECR is physically connected to the POS which supports: magnetic stripe and smart card reader, along with direct communication with the financial processor.

This communication protocol manages all communication between the ECR and POS device.

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| --- | --- | --- |
|  | **Protocol**    **Message Format** |  |

**Message Format**

**<STX><Message><Len><ParamsList TLV><ETX><LRC>**

**<STX><Message><Status><Len><ParamsList TLV><ETX><LRC>**

**STX** = **0x02** [*Start of Text*]

**Message** = command or message type to be used

**Len** = Length

**ETX** = **0x03** [*End of Text*]

**LRC** = Character [*Longitudinal Redundancy Check*]

**Protocol**

The ECR will send an **<ENQ>0x05** [*Enquiry*] character to the POS and wait for an **<ACK>0x06** [*Acknowledge*] character from the POS in order to verify correct connection configuration.

Whenever data is transmitted the receiving end will respond:

**<ACK>0x06**[*Acknowledge*], if all transmitted data has been received and the **<LRC>**verification succeeds

**<NAK>0x15** [*Negative Acknowledge*], if all transmitted data has been received and the **<LRC>** verification fails

**<EOT>0x04** [*End of Transmission*], if three consecutive **<NAK>** have been sent, which terminates the session

Anytime the **<LRC>** verification fails, the receiving end will send a **<NAK>** to the sending peer, and discard the failed data; waiting for the re-transmission of the same data.

When data is expected in the receiving end, but does not arrive in a máximum waiting time interval, a [*Time Out*] presents, which forces the receiving end to send an **<EOT>** to terminate the session.

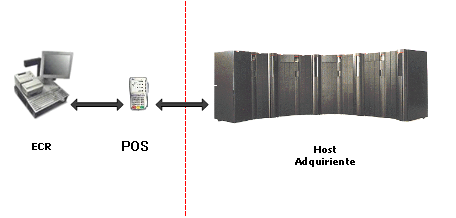
**Message Types**

***Message with Response:*** In these messages, the ECR requests an operation or POS information. The ECR expects a response message which indicates the result of the operation or the requested information.

|  |  |  |
| --- | --- | --- |
| **ECR** |  | **POS** |
| <STX>[Message][Len][ListParams TLV] <ETX> {LRC} | **→** |  |
|  | **←** | <ACK>if {LRC} ok;  <NAK> if{LRC} incorrect ;  <EOT> after three <NAK> |
|  | **←** | <STX>[Message][Status][Len][ListParams TLV]<ETX>{LRC} |

Along the complete transaction process, there are other entities involved besides the ECR and POS, which we will describe briefly so that we may present the complete conceptual framework.

Specific communication details between the Acquirer and Merchant are considered outside the scope of this protocol definition.



The POS is represented by a fully-fledged stand-alone payment terminal, connected to the ECR by means of a RS-232 serial or USB port.

We use the POS as a credit/debit card reader, which supports either chip or swiped entry mode, and also supports the complete authorization/settlement interface with the Acquirer.

The ECR manages all transaction flow, communicating with the POS when needed (i.e. card payment), and waiting for the POS authorization response.

The Acquirer Bank Processor is responsible for switching authorization requests to the corresponding Issuer Bank and sending the response back to the POS.

**Commands**

**C51 – Authorization/Settlement Request**

Request a financial/settlement operation to the POS, the ECR will wait for the response, with the operation approval/decline.

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Message Format

| **Element** | **Description** | **Format** | **Value** | **Example** |
| --- | --- | --- | --- | --- |
| **STX** | Control Character | H 1 | 02h Fixed | 02 |
| **Message Type** | Message identifier | AN 3 | **C51** Fixed | 43 35 31 (C51) |
| **Length** | Length of data | H 2 | Variable length | 004A Variable (74 Bytes) |
| **Parameters TLV** | | **Format TLV** | | |
| **C1** | Transaction Date | N 6 | 6 **BCD Digits YYMMDD**. Eg. 03 05 12 31 (31 DIC 10) | C1 03 10 12 31 |
| **C1** | Transaction Time | N 6 | 6 **BCD Digits HHMMSS**. Eg. 16 44 59  (16: 44: 59) | C1 03 16 44 59 |
| **C1** | Transaction Type | H 1 | 01 – Sale  02 – Void  03 – Refund  04 – Authorization  05 – Auth-Only/Pre-Auth  06 – Reversal  07 – Installment  08 – Tip Adjust  09 – Capture  10 – Detail Report  11 – Summary Report  12 – Server Report  13 – Settlement  14 – PreAuth (Gas)  15 – Completion (Gas)  16 – Top-Up Auth  17 – Sale Offline  18 – Key Exchange  19 – Form Feed  20 – Sync with ECR | C1 01 01 |
| **C1** | Voucher number | AN4 | Void operation, only applies to operations with reference to a previous transaction. (e.g. void 12345678), otherwise the value is 0 (i.e. c1 01 00). | C1 0412 34 56 78 |
| **C1** | Authorization Code | ANS 6 | ISO DE38  For offline sale use the auth code received by ECR.  Example  2CA025 | C1 06 32 43 41 30 32 35 |
| **C1** | Amount | H 4 | 8 **HEX digits**, “**Left-Padded**”with zeroes.  Eg. 000004D2  (12 dollars 34 cents ) | C1 04 00 00 04 D2 |
| **C1** | Cash Back | H 4 | 00 00 00 00 (Fixed) | C1 04 00 00 00 00 |
| **C1** | Tip Amount | H 4 | 00 00 00 00 (Fixed) | C1 04 00 00 00 00 |
| **C1** | Amount USD | H 4 | 8 **HEX digits**, “**Left-Padded**” with zeroes.  Eg. 000004D2  (12 dollars 34 cents ) | C1 04 00 00 04 D2 |
| **C1** | Cash Back USD | H 4 | 00 00 00 00 (Fixed) | C1 04 00 00 00 00 |
| **C1** | Tip Amount USD | H 4 | 00 00 00 00 (Fixed) | C1 04 00 00 00 00 |
| **C1** | Currency Index | H 1 | 01 – Local Currency  02 - Foreign Currency | C1 01 01 |
| **C1** | Merchant decision | H 1 | If Amount = 0 Merchant Decision = 01 (force online)  else  Merchant Decision = 00 (no decision) | C1 01 00 |
| **C1** | ECRID+ POS SN | AN 26 | ECR ID=0000000001(10)  POS SN = 0123456789 (10) | C1 2030 30 30 30 30 30 30 30 30 31 30 31 32 33 34 35 36 37 38 39 |
| **TOKEN E1** | EMV tags  (DE55 and ECR) | H 42 | Acquirer defined |  |
| **ETX** | Control Character | H F1 | 03h | 03 |
| **LRC** | Control Character | H F1 | - | - |

Note: A specific batch (host) is referenced by its currency code (each host is referenced by its currency code, using one host for local currency, and other host for foreign currency).

Example:

**<STX>C51[Len][ListParams TLV][E1]<ETX>{LRC}**

Protocol

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| --- | --- | --- |
| **PIN Pad** |  | **ECR** |
|  | **←** | <STX>C51[Len][ListParams TLV][E1]<ETX> {LRC} |
| <ACK>if{LRC} ok;  <NAK>if{LRC} incorrect ;  <EOT> after three <NAK> | **→** |  |

**C54 – Authorization/Settlement Response**

Response to a financial/settlement operation requested by the ECR to the POS.

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Message format

| **Element** | **Description** | **Format** | **Value** | **Example** |
| --- | --- | --- | --- | --- |
| **STX** | Control Character | H 1 | 02h Fixed | 02 |
| **Message Type** | Message Identifier | AN 3 | **C54** Fixed | 43 35 34 (C54) |
| **Status** | Operation Result | N 2 | Success (00)  Invalid C51 (02)  Timeout (06)  Cancel (08)  Removed Card(23)  Invalid Card (TBD) | 30 30 (Para 00) |
| **Length** | Length of the parameters | H V 2 | 2 **HEX digits**  Eje. 14 (20 Bytes) | 01 D5 (e.g. 469 Bytes) |
| **Parameters TLV** | | **Format TLV** | | |
| **C1** | Host Response | ANS 1 | 00 = Approved  01 = Declined  02 = No response from host  03 = Abort  99 = Sync Batch Not Empty.  98 = Sync ECR Serial Number Error.  97 = Sync POS Serial Number Error. | C1 01 00 |
| **C1** | Authorization Code | ANS 6 | ISO DE38  For offline saleuse the auth code received by phone.  Example  2CA025 | C1 06 32 43 41 30 32 35 |
| **C1** | Response code | ANS 2 | ISO DE39  00 = Approved  Other = No approved | C1 02 30 30 |
| **C1** | Transaction Date | N 6 | 6 **BCD digits YYMMDD**. Ej. 03 05 12 31 (31 DIC 10) | C1 03 10 12 31 |
| **C1** | Transaction Time | N 6 | 6 **BCD digits HHMMSS**. Ej. 16 44 59 (16: 44: 59) | C1 03 16 44 59 |
| **C1** | Card number (PAN) | N Var | BCD  Full PAN for Hotel POS/  Last 4 digits otherwise | C1 08 45 55 66 77 88 99 00 11  C1 02 00 11 |
| **C1** | Cardholder name | ANVar 2-26 | Variable data, the value is returned from chip, magnetic stripe.  If manual entry, the length of the tag is zero | C1 1A 42 41 4E 43 4D 45 52 20 46 49 43 54 49 43 49 4F 2F 4A 55 41 4E 41 20 20 20 20 |
| **C1** | Card Entry Mode | AN 3 | 01 – Manual  90 – Swiped  80 – Fallback  **05 – Chip** | C1 02 30 35 |
| **C1** | Voucher number | AN 4 | Sent to be use when referencing a transaction in the batch. | C1 04 12 34 56 78 |
| **C1** | Card Type | H 1 | 01 – Debit  02 – Credit | C1 01 02 |
| **C1** | Currency Code | H 2 | 0532 - ANG  0840 – USD | C1 02 05 32 |
| **C1** | Amount Authorized | H 4 | 8 **HEX digits**, “**Left-Padded**” with zeroes.  Eg. 000004D2 (12 dollars 34 cents ) | C1 04 00 00 04 D2 |
| **C1** | Software Version | 20 ANS | POS Application Version  Ej: VFV810v03\_0D | C1 56 46 56 38 31 30 76 30 33 5F 30 44 20 20 20 20 20 20 20 20 |
| **C1** | Serial Number | 20 ANS | POS Serial Number  Ej: 303050146 | C1 20 20 20 20 20 20 20 20 20 20 20 33 30 33 30 35 30 31 34 36 |
| **C1** | ECRID + POS SN | N 26 | ECR ID=0000000001  POS SN = 0123456789 | C1 0A 00 00 00 00 01 01 23 45 67 89 |
| **TOKEN E1** | EMV tags  (ISO DE55) | TLV | All EMV tags sent in ISO DE55  \*If not a chip card : E1 00 |  |
| **TOKEN E2** | EMV tags  (cert/diags) | TLV | All EMV tags needed for certification and diagnostics  \*If not a chip card : E2 00 |  |
| **ETX** | Control Character | H F1 | 03h | 03 |
| **LRC** | Control Character | H F1 | - | - |

**TOKEN E1**(Chip data calculated in the First GenAC)

Message Format

| **Tag** | **Description** | **Format** | | **Value** | **Example** |
| --- | --- | --- | --- | --- | --- |
| **5F2A** | Transaction Currency Code | N F 3  2 Bytes | Variable Data | | 5F 2A 02 04 84 |
| **82** | Application Interchange Profile | H F 2 | Variable Data | | 82 02 5C 00 |
| **9A** | Transaction Date | N F 6  3 Bytes | Variable Data | | 9A 03 11 02 28 |
| **4F** | Application Identifier (AID) | H V 5-16 | A0 00 00 00 03 10 10 | | 4F 07 A0 00 00 00 03 10 10 |
| **9F02** | Amount Authorized (Numeric) | N F 12  6 Bytes | Variable Data | | 9F 02 06 00 00 00 00 20 00 |
| **9F03** | Amount Other (Numeric) | N F 12  6 Bytes | Variable Data | | 9F 03 06 00 00 00 00 00 00 |
| **9F10** | Issuer Application Data | H V 32 | Variable Data | | 9F 10 07 06 01 0A 03 A0 20 00 |
| **9F12** | Application Preferred Name | AN V 1-16 | Variable Data | | 9F 12 00 |
| **9F1A** | Terminal Country Code | N F 3  2 Bytes | Variable Data | | 9F 1A 02 04 84 |
| **9F1E** | Interface Device (IFD) Serial Number | AN F 8 | Variable Data | | 9F 1E 08 30 34 38 36 35 37 39 32 |
| **9F21** | Transaction time | N F 3 | Variable Data (HHMMSS) | | 9F 21 13 12 21 |
| **50** | Application Label | AN V 1-16 | Para "VISACREDIT" | | 50 0A 56 49 53 41 43 52 45 44 49 54 |
| **9F33** | Terminal Capabilities | H F 3 | Variable Data | | 9F 33 03 E0 B0 C8 |
| **9F34** | Cardholder Verification Method (CVM) Results | H F 3 | Variable Data | | 9F 34 03 1E 03 00 |
| **9F36** | Application Transaction Counter | H F 2 | Variable Data | | 9F 36 02 01 AB |
| **9F37** | Unpredictable Number | H F 4 | Variable Data | | 9F 37 04 84 69 83 9E |
| **9F41** | Transaction Sequence Counter | N V 4-8  2-4 Bytes | Variable Data | | 9F 41 04 00 00 00 15 |
| **C2** | Signature Flag. | H F 1 | Variable Data | | C2 01 01 |
| **95** | Terminal Verification Results | H F 5 | Variable Data | | 95 05 00 00 00 08 00 |
| **9F27** | Cryptogram Information Data | H F 1 | Variable Data | | 9F 27 01 80 |
| **9F26** | Application Cryptogram |  | Variable Data | | 9F 26 08 D6 48 46 0C 85 28 29 37 |
| **9B** | Transaction Status Information | H F 2 | Variable Data | | 9B 02 E8 00 |
| **8A** | Authorization Response Code | AN 2 | Y1 (Aprobada EMV off line )  Z1 (Declinada EMV offline )  Y3 (Aprobada EMV off line por no poder ir en línea  Z3 (Declinada EMV offline por no poder ir en línea)) | | 8A 02 5A 31 (Z1) |

\* If not a chip card, token E1 = E1 00

**TOKEN E2** (Chip data calculated in the Second Gen AC)

Message Format

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tag** | **Description** | **Format** | | **Value** | **Example** |
| **8A** | Authorization Response Code | AN 2 | Y1 - Approved EMV off line  Z1- Decline EMV offline  Y3 - Approved EMV off line  Z3 - Decline EMV offline | | 8A 02 5A 31 (Z1) |
| **95** | Terminal Verification Result | H F 5 | Variable Data | | 95 05 00 00 00 08 00 |
| **9B** | Transaction Status Information | H F 2 | Variable Data | | 9B 02 E0 00 |
| **9F10** | Issuer Application Data | H V 32 | Variable Data | | 9F 10 07 06 01 0A 03 A0 20 00 |
| **9F26** | Application Cryptogram | H F 8 | Variable Data | | 9F 26 08 D6 48 46 0C 85 28 29 37 |
| **9F27** | Cryptogram Information Data | H F 1 |  | | 9F 27 01 80 |
| **9F36** | Application Transaction Counter | H F 2 | Variable Data | | 9F 36 02 01 AB |
| **9F37** | Unpredictable Number | H F 4 | Variable Data | | 9F 37 04 84 69 83 9E |

\* If not a chip card, token E2 = E2 00

Example:

**<STX>C54[Status][Len][ListParamsTLV] [E1] [E2]<ETX>{LRC}**

Protocol

|  |  |  |
| --- | --- | --- |
| **PIN Pad** |  | **ECR** |
|  | **←** | <STX>C54[Status][Len][ListParams TLV] [E1][ES]<ETX>{LRC} |
| <ACK> if{LRC} ok;  <NAK> if{LRC} incorrect ;  <EOT> after three<NAK> | **→** |  |