ingenico
GROUP

EC CASH DIREKT

Ingenico Terminal

A32.de ECR Interface

Version 1.3.32

● SEAMLESS PAYMENT

ingenico
GROUP

Ingenico GmbH . Daniel-Goldbach-Str. 17-19 . 40880 Ratingen

(T) +49-2102-7701-0. (F) +49-2102-7701-495

info.de@ingenico.com . www.ingenico-gmbh.de

Change History

Version	Name	Date	Comments
1.0	M. Linke	2006-07-03	First released version
1.0.1	T. Kleibeler	2006-08-02	Clarification chapter 5.1
1.0.2	M. Linke	2006-09-18	Update chapters 5.4.1, 5.4.2 and 5.4.10
1.0.3	M. Linke	2006-09-20	Correction chapters 5.4.1 and 5.4.10 and update chapter 5.3
1.0.4	M. Linke	2007-01-05	Correction chapter 5.5.1, chapters 5.4.11, 5.4.12, 5.4.13 added
1.0.5	M. Linke	2007-03-30	Chapter 5.4.14 added and notice concerning the I5100/I3380 combination in chapter 5.3 added
1.0.6	A. Anschütz	2007-05-10	Chapter 5.5.1: BMP06 (TLV container) for EMV tags (Feature available as of release 4.0.X)
1.0.7	M. Linke	2007-05-25	Chapter 5.3: Notices concerning length byte removed and TLV-container notices changed. Chapter 5.4.2 + 5.4.4 : Bonus points support added. New chapter: 5.4.15 (account status query) Chapter 4: 5.5.1 expanded by TLV support (Feature available as of release 4.0.X)
1.0.8	M. Linke	2007-05-29	Chapter 5.4.4: Expansions of the TLV-container contents for "load bonus points " and "activate bonus

Version	Name	Date	Comments
			points". (Feature available as of release 4.0.X)
1.0.9	M. Linke	2007-09-12	Chapter 5.4.16 added, chapters 5.4.4 and 5.4.2 adjusted with respect to bonus points. This now corresponds to the planned PT protocol specification (version 12). (Available as of release 5.0.X)
1.2.0	M. Linke	2007-11-06	Chapter 5.4.2: Mail order support added (BMP 3A). New chapters 5.4.17 (pre-authorisation/reservation) and 5.4.18 (sum total booking) added. (Available as of release 5.0.X)
1.2.1	M. Linke	2008-01-22	Chapters 5.4.19 and 5.4.20 added
1.2.2	M. Linke	2008-09-25	Chapters 5.4.21, 5.4.22 and 5.4.23 added. Expansion chapter 5.4.2 for tip payment. Update chapter 5.4.17 and 5.4.18 .
1.2.3	T. Müller	2009-01-09	Chapter 5.5.4, end of receipt added. Chapters 5.4.1 and 5.4.2 extended for retail machine.
1.2.4	T. Müller	2009-01-20	Field 3C added for the transactions: authorisation, cancellation, refund.
1.2.5	M. Linke	2009-03-20	Chapter 5.5.10 "print text block" added, language selection for card holders added for all transaction types.
1.2.6	T. Müller	2009-05-06	Spelling errors corrected. The tag for trace number is 0B and not 03. Corrected for tip, reservation and sum

Version	Name	Date	Comments
			total booking.
1.2.7	T. Müller	2009-05-06	Conversion to new document template

Chapter "2nd Interface" now corresponds to the former chapter 5. |
| 1.2.8 | M.Linke | 2009-12-02 | Chapter 2.4.23 added.

Chapters 2.5.6 to 2.5.9 revised. |
| 1.2.9 | T. Müller | 2010-02-11 | Clarification in chapter 2.4.2 Payment type "safe payment"

Clarification automatic cancellation in case of communication errors with the ECR in chapter 2.4.2

Clarification of CardType in StatusInfo with CardIds larger than 255 in chapter 2.5.1

Clarification of the ConfigByte in case of a base terminal in chapter 2.4.1 |
| 1.2.10 | T. Müller | 2010-04-19 | New Tag 1F01 in chapter 2.4.8 "Repeat receipt".

Additional informations for "Print without master rights" in chapter 2.5.4 and 2.5.10.

New Tag 12 (line width) in chapter 2.4.1. |
| 1.2.11 | T. Müller | 2010-04-19 | Clarification for Timeout T3 and TCP-Protocol in chapter 2.2.2.

Reverted special handling of tip-transaction in chapter 2.4.2 |

Version	Name	Date	Comments
1.2.12	J. Rassbach	2010-04-26	Format changed
1.2.13	T. Müller	2010-08-17	Added more supported tag for command 06 24 (Book Total)
1.2.14	T. Müller	2010-09-30	Added Command 0F 13.\n\nClarification for config byte in case of vending machine
1.2.15	T. Müller	2010-11-18	Clarification for password in command 06 50
1.2.16	M. Linke	2011-03-15	Added Command Read File, extended chapter 2.4.14 (Account Balance Request) to deal with Geldkarte and other Prepayed Cards, Added chapter 2.4.26 – Delete File -,\n\nChanged reference for [ZVT1] to point to the new ZVT Spec- V. 13.02
1.2.17	A. Anschütz	2011-03-28	'Read File' (08 11): Restricted tags 1D, 1E and 1F 00
1.2.18	K. Janke	2011-03-29	Added Tag 0x41 requesting account balance for the German electronic purse card (Geldkarte). Extended chapter 2.4.14 (Account Balance Request)
1.2.19	T. Müller	2011-04-05	ServiceByte in command 06 20 (Reprint Ticket) is supported now.
1.2.20	T. Müller	2011-05-04	Carddata in command 060C are optional and not used.
1.2.21	K. Janke	2011-06-01	Added Card Terminal Application Programming Interface (CT-API). Added commands Card Terminal init, Card Terminal data and Card Terminal close

Version	Name	Date	Comments
1.3.0	K. Janke	2011-06-09	Added the ICC assignment table to Card Terminal Application Programming Interface (CT-API) chapter 2.4.27.1 General and change 2.4.27.5 Card Terminal Basic Command Set (CT-BCS).
1.3.1	T. Müller	2011-09-19	Clearyfication for Payment type. Removed optional carddata from TIP transaction.
1.3.2	K. Janke	2011-09-29	Added 2.4.27.6 IC Cards with Synchronous Transmission. Usage of Interindustry Commands (see part 7 [MKT 1.0]).
1.3.3	T. Müller	2012-01-05	Correct wrong error codes in Chapter 2.4.27.3
1.3.4	M. Djemal	2012-03-19	Support filed "3b" on refund command (06 31)
1.3.5	M. Djemal	2012-03-28	2.5.4 Print line (06 D1). Control text-formatting with field "attribute".
1.3.6	P. Pietraszkiewicz	2012-04-05	Added 2.5.4.28 Set Date And Time command
1.3.7	M.Linke	2012-06-15	Corrected chapter 2.4.27.6
1.3.8	A.Piatier	2014-03-06	Added 0F 19 and 0F 1A

Updated commands 04 0F and 06 70

Updated commands 06 D1 and 06 D3

Updated commands 06 00

Added commands 0F 20, 0F 21, 0F 22, 0F 23, 0F24 |

Version	Name	Date	Comments
			Added command 06 26
			Updated command 04 0F
			Added command 06 0A
1.3.9	H. Klein	2014-02-17	Added Mifare support to CT-API (see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**)
1.3.10	A.Piatier	2014-04-14	Correct wrong behaviour if 1F01 has a not supported value in chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**
1.3.11	A.Piatier	2014-10-02	Added tag EB in the command 06 E2 Added tag 8A and 41 in the command 06 01
1.3.12	A.Piatier	2014-10-08	Add deviation in the BMP 3A format
1.3.13	T.Herwig	2015-03-10	Added tag 8B in the command 06 01
1.3.14	A. Piatier	2015-06-12	Added Reset Terminal functionality
1.3.15	A. Piatier	2015-07-31	Make the tag 1F7F visible for customer too
1.3.16	A. Piatier	2015-10-07	Remove the deviation about BMP 3A since the ZVT specs have been updated.
1.3.17	A. Piatier	2015-12-04	Add details about return codes of CT_Close Add new supported commands : 08 20, 08 21, 08 22, 08 23 and 08 24
1.3.18	M. Schwartz A. Piatier	2016-02-04	Added iDRM signature capability SIG_A_IDRM (06 00) and Intermediate status: customer signature (04

Version	Name	Date	Comments
			FF)
			New behaviour of the completion into the command 06 01.
			Add the TLV-container into the completion message of the command 05 01
			Add the Software-Update command (08 10)
			Modification of commands 06 C0 and added 06 C5, 06 C6
			Add the command 06 1B
1.3.19	A. Piatier	2016-03-10	Move the signature from 04 FF to 04 0F
			Add a chapter "how to"
			Move the command 0F 21 into the ECR →Terminal chapter
1.3.20	A. Piatier	2016-03-15	New logo
1.3.21	A. Piatier	2016-03-30	New Template
1.3.22	A. Piatier	2016-04-08	Changes about the command 0F 27
			Remove the status info A6 from the command 04 FF
1.3.23	A.Piatier	2016-07-05	Add function 0F 22
1.3.24	A.Piatier	2016-07-25	Changes on the description of 19 <payment type> into 06 01
1.3.25	A.Piatier	2016-09-27	Added tag 3B in the list of supported tags in 06 24.

Version	Name	Date	Comments
1.3.26	A.Piatier	2016-10-24	Prepaid with ECRPOS BMP88 can be removed
1.3.27	A.Piatier	2017-01-19	Modification into Read Card (06 C0) Added command 04 0DAdded 2 lines into 06 E2
1.3.28	A.Piatier	2017-03-30	Details added on the error cases into 04 0D Changes on 06 E0 and 06 E1 Added Alipay
1.3.29	A.Piatier	2017-09-05	Update the answer from 04 0D to be compliant to [ZVT1]
1.3.30	A.Piatier	2018-03-14	Add a new command to set the terminal in sleep mode. Tag 30 in 06-TlvContainer from commands 06 01 and 06 31 is yet supported.
1.3.31	A.Piatier	2018-03-29	Renamed 0F 28 to 0F 30
1.3.32	A.Piatier	2018-06-15	Added abort when waiting for card

Content

● SEAMLESS PAYMENT

● SEAMLESS PAYMENT

1. Introduction

1.1. Overview

This document describes the interface between the Ingenico payment terminals (PT) and the external retailer units (ECRs).

All information contained is destined to customer.

2. Interface

2.1. General

The PT protocol is used between the ECR and the terminal. Its implementation largely corresponds to the PT Protocol Specification issued by the "Verband der Terminal Hersteller in Deutschland e.V." - [ZVT1]. Please refer to www.terminalhersteller.de.

Not all of the commands listed there are realised at present. The Ingenico implementation therefore corresponds to a subset of the commands listed in the PT Protocol Specification. In addition, there are slight restrictions and expansions concerning the Ingenico ECR interface.

All realised commands with properties that deviate from the standard are described in the following. This means that commands not listed here are also currently not supported.

2.2. Transport protocol

2.2.1. RS-232

The implementation corresponds to the PT Protocol Specification with a standard data transmission speed of **9600 Baud**.

The Baud rate can be set to max. 115.200 Baud via the device menu.

2.2.2. TCP/IP

Only the real APDUs (user data) are transferred. The data backup layer task is implemented by the TCP/IP protocol.

This means:

- No CRC
- No DLE/STX – DLE/ETX frames
- No ACK/NACK for incoming messages
- No "escape" from DLE codes contained in the message

In contradiction to "ECR-Interface Transport-Protocol and Application-Protocol" [ZVT1] the terminal will not close the socket itself in case of Time-out T3 expires.

2.3. Notices

- An evaluation of the password submitted with some commands is not performed at present.

- In case of serial ECR connection, printing via the terminal and intermediate status info messages are not supported with the terminal combination **i5100 / i3380** (pin pad).

- TLV-containers (bitmap 06) are used if this function was cleared by the ECR, meaning if the ECR sent a TLV-container during login or the triggering command, this is identified as a clearing command to send TLV-containers from the terminal. A logoff terminates the TLV clearing.

2.4. Commands: ECR ➔ Terminal

2.4.1. Registration (06 00)

The behaviour of this command differs depending on the application.

Variant -1:

Prior to a login command, no commands except for this one are allowed.

Variant -2:

The registration command is not required to perform other ECR commands.

In both cases:

The config byte is evaluated and leads to the corresponding action of the terminal excepted for the following cases:

- Bits 5 and 6 of the config byte are currently not evaluated.

Bit 2 or Bit 3: set only one of these is sufficient to disable all printing (payment and administration) on terminal printer

The check of the currency symbol corresponds to [ZVT1].

The field "03<Servicebyte>" is not evaluated at present.

Bitmap 06<TLV-container> activates the support for TLV containers.

Tag 06 D3 activates block printing on the terminal.

Tag 06 D1 activates line printing on the terminal.

The terminal will use 06D3 (blockprint) if both tags are present.

With Tag 12 the ECR can control the receipt line width for transaction receipts and most of the maintenance receipts.

If line width in Tag 12 is less than 24, the message from ECR will be re-jected with error 0xcc (printer nor ready).

Receipts from prepay transactions are not touched by this Tag because of different receipt construction method.

The optional Tag 12 in completion message is not supported.

No further values from the TLV-container are interpreted.

Vending machine:

If the terminal is configured for the operating mode "vending machine", the status byte is set accordingly in the closing message to the ECR (see [ZVT1]).

To not jeopardise the existing licenses for TA 7.0, the ConfigByte may be overridden with license-relevant values. This especially concerns printing via ECR.

Independent of the ConfigByte, the terminal always sets the bits 2,3,8 when registering!

Basic terminal:

To not jeopardise the existing licenses for TA 7.0, the ConfigByte may be overridden with license-relevant values. This especially concerns printing via ECR.

Independent of the ConfigByte, the terminal always sets the bits 2,3,8 when registering!

Signature capture:

The ECR indicates in tag 26 of the field "06<TLV-container>" if it supports signature capture and which signature capabilities are applicable.

Signature Capability Tags

Tag		Description	Supported
0F20	SIG_CMD_INTRX	In-transaction signature-capture. All transactions with CVM "signature" trigger automatically the signature capture handling.	Yes

0F21	SIG_CMD_OUTTRX	Out-of-transaction signature-capture command. This is a command triggered by ECR to capture signature independent of a terminal transaction.	Yes
0F22	SIG_A_COMPACT	Metro Signature Attribute: compact signature format. If set, the terminal sends the signature image blob in the "compact" format as described in Ingenico-Signature-For-Metro-Implementation-Guide_V0.8.pdf. If not set, the terminal would have to send the "full featured" which is not yet available. Therefore, the tag 0F22 is mandatory now for Metro.	Yes
0F24	SIG_A_TXDATA	Metro Signature Attribute: transactional data on image. If the tag is missing, there will be no transactional data printed on the signature image. As a side effect the image blob gets smaller.	Yes
0F27	SIG_A_IDRM	iDRM Signature Attribute: the signature is sent as jpg image in a dedicated 04 0F status message to the ECR.	Yes
0F28	SIG_A_IDRM2	iDRM Signature Attribute: the signature is sent as jpg image in a 04 0D input dialog directly after the customer confirmed the signature	
0F29	SIG_A_IDRM3	iDRM Signature Attribute: paper based transactions cause the terminal to send an Intermediate Status-Information (04FF) with a cashier notification.	

Turnover number (BMP88):

 The ECR indicates in tag 26 of the field "06<TLV-container>" that it doesn't expect the BMP88 in status info.

BMP88 Tags

Tag		Description	Supported
0FA0	ZVT_CMD_WO_BMP88	Remove the BMP88 of the status info (04 0F) command	Yes

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.2. Authorisation (06 01)

If optional track data or card numbers are transferred with this command, the terminal tries to use this to execute the transaction.

With a host response code of 55 (wrong PIN), the PIN is not entered again.

The following data fields are supported:

- 04 <amount>
- 49 <WKZ>
- 2D <track 1 data>
- 23 <track 2 data>
- 24 <track 3 data>
- 01 <timeout> is supported in each mode (not only the "vending machine" mode)
  - o Values between 5 and 255 seconds (if others, the timeout T3 as defined by profile will be used – default: 5 seconds)
- 19 <payment type> -   We do support following values:
  - o `0x00 -> ELV`
  - o `0x10 -> GK (same as 0x40)`
  - o `0x20 -> POZ`
  - o `0x30 -> Secure`
  - o `0x38 -> Secure TIP`
  - o `0x40 -> Limit (including GK)`

- o `0x48 -> Limit TIP`

  All other values will be declined.

- 0E <expiration date>

- 22 <card number>
  - o In case of Alipay, it contains an Alipay-token-ID (prefix N2 + Token-number N15-17 without Lühn key)

- 3A <CVV/CVC> - if this field is available, a **mail order transaction** is started.
  - o *Deviation for older releases (before 7.8.26): if less than 4 digits, the value should be left padded with 0 (right padded with F was not supported).*

- 3C <WW-data> if this field contains the value "TC:" or "TC=" at the beginning, this data is sent transparently to the host in the BMP60. This field is ignored with all other contents.

- 8A <card type>

- 8B <card name>

- 06 <TLV-container>
  tag 15: Via tag 15 in the TLV container, it is possible to select the **language for the card holder**.

  tag 30: card acceptance matching used to define black- and/or white-lists

  tag 41: used for CUP cards(0x6C) when 8A=0xFF

  tag 1F2D:
  - 0x00 read from magnetic stripe
  - 0x01 read from chipcard
  - 0x02 read from barcode / QR-Code
  - 0x03 read from chip NFC

Bonus points:

Collecting bonus points :   Subtag C1 in the bonus points container E1 contains the value '4D 45'

Redemption function: Subtag C1 in the bonus points container E1 contains the value '4D 53'

The subtag C2 <number of bonus points> in the bonus point container E1 is used if bonus points are to be used instead of the amount.

Vending machine:

If the terminal is configured for the "vending machine" mode, the data fields:

02 <max. status info>

can be sent.

For more information about vending machines, refer to [ZVT1].

The amount is a mandatory field for all transactions except for bonus transactions. With the latter, bonus points can be transferred instead of the amount in the tag C2<number of bonus points>.

All other data is ignored.

According to the configuration of the terminal, the completion message (06 0F) can be sent earlier to the ECR (before the printing of the receipts instead of after usually).

As for the remainder, the behaviour corresponds to the details in [ZVT1].

ATTENTION: An automatic cancellation of the transaction in the terminal in case of a communication problem (ECR does not respond, formally wrong or with an error response) only takes place with the status information message (04 0F).

2.4.3. Reversal (06 30)

If optional track data is transferred with this command, the terminal tries to use this to execute the transaction.

The following data fields are supported:

- 87 <receipt number>
- 04 <amount>
- 49 <WKZ>
- 2D <track 1 data>
- 23 <track 2 data>
- 24 <track 3 data>
- 0E <expiration date>
- 22 <card number>
    - In case of Alipay, it contains an Alipay-token-ID (prefix N2 + Token-number N15-17 without Lühn key)
- 3C <WW-data> if this field contains the value "TC:" or "TC=" at the beginning, this data is sent transparently to the host in the BMP60. This field is ignored with all other contents.

06 <TLV-container>

tag 15: Via tag 15 in the TLV container, it is possible to select the **language for the card holder**.   tag 1F2D:

- 0x00 read from magnetic stripe
- 0x01 read from chipcard
- 0x02 read from barcode / QR-Code
- 0x03 read from chip NFC

tag 1F0D: Alipay-Trade-ID (optional)

The receipt number serves to reference the original transaction.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.4. Refund (06 31)

If optional track data or card numbers are transferred with this command, the terminal tries to use this to execute the transaction.

The following data fields are supported:

- 04 <amount>
- 49 <WKZ>
- 2D <track 1 data>
- 23 <track 2 data>
- 24 <track 3 data>
- 0E <expiration date>
- 22 <card number>
    - In case of Alipay, it contains an Alipay-token-ID (prefix N2 + Token-number N15-17 without Lühn key)
- 3B <AID> - serves to transfer the approval number.
- 06 <TLV-container> -
- 3C <WW-data> if this field contains the value "TC:" or "TC=" at the beginning, this data is sent transparently to the host in the BMP60. This field is ignored with all other contents.
- 06 <TLV-container>
  tag 15: Via tag 15 in the TLV container, it is possible to select the **language for the card holder**.

  tag 30: card acceptance matching used to define black- and/or white-lists

  tag 1F2D:

    - 0x00 read from magnetic stripe
    - 0x01 read from chipcard
    - 0x02 read from barcode / QR-Code
    - 0x03 read from chip NFC

tag 1F0D: Alipay-Trade-ID

Bonus points:

Crediting bonus points: Subtag C1 in the bonus points container E1 contains the value ´4D 57´

Loading bonus points: Subtag C1 in the bonus points container E1 contains the value ´47 4C´

The subtag C2 <number of bonus points> in the bonus point container E1 is used if bonus points are to be used instead of the amount.

The amount is a mandatory field for all transactions except for bonus transactions. With the latter, bonus points can be transferred instead of the amount in the tag C2<number of bonus points>.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.5. End-of-day (06 50)

At present, <password> is not madatory and BMP06 (TLV-Container) is not supported.

The behaviour corresponds to the [ZVT1] specification.

2.4.6. Diagnosis (06 70)

The terminal is prompted to perform an extended diagnosis.

At present, the date is not transferred to the ECR.

The result code is always FF, a more precise definition is transmitted in the TLV-container.
The length depends on the number of data to be transmitted in the data block.
Data block always contains all data elements listed below. For the TLV-container
the following proprietary tags are defined:

Field	Tag	Value	Description
Result text	DF01	Up to 127 characters	

Ticket flag	DF02	00: No ticket print 01: Ticket print	This flag indicates if terminal should print a paper receipt.
Automatic Reversal Flag	DF03	00: No reversal 01: Reversal enable	This flag determines if the terminal is authorized to perform an auto cancellation.
Error code	DF04	00 – FF	

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.7. Initialisation (06 93)

If the terminal is not ready for operation, activation can be triggered with this command.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.8. Repeat receipt (06 20)

The receipt of the last positive payment is printed out again with this command.

Tag 1F01 is supported with following values:

02:     Reprint last merchant receipt (erroneous and successful transactions)

03:     Reprint last customer receipt (erroneous and successful transactions). Reprint of Prepay-PTOP customer receipt is not allowed. Terminal will reprint merchant receipt instead.

04:     Reprint of last End-of-day receipt incl. detailed transaction receipt (if available). Prepay End-of-day receipt is not reprinted.

If Tag 1F01 is not present the terminal will act like before and reprint the last successful merchant receipt.

If Tag 1F01 is present and contains a different (not supported) value, the terminal declines the command with an error code 849A.

Customer and merchant receipts are printed independent from EMV-configuration.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.9. Logoff (06 02)

The behaviour of this command differs depending on the application.

Variant -1:

The terminal is blocked after this command and only allows the execution of the command "Login". The config byte previously set by logging in is set back to the value 0x86.

Variant -2:

The config byte previously set by logging in is set back to the value 0x86.

In both cases:

This deactivates the release for bitmap 06<TLV-container>.

No values from the TLV-container are interpreted.

2.4.10. Display text (06 E0)

At most six text lines (F1, F2, F3, F4, F5, F6) with at most twenty characters each are supported. Font switching is not provided.

The following data fields are supported:

- F1 <text for line 1>
- F2 <text for line 2>
- F3 <text for line 3>
- F4 <text for line 4>
- F5 <text for line 5>
- F6 <text for line 6>
- F9 <number of beeps>
- F0 <display duration>

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.11. Display text with function-key input (06 E1)

At most six text lines (F1, F2, F3, F4, F5, F6) with at most twenty characters each are supported. Font switching is not provided.

The following data fields are supported:

- F1 <text for line 1>
- F2 <text for line 2>
- F3 <text for line 3>
- F4 <text for line 4>
- F5 <text for line 5>
- F6 <text for line 6>
- F9 <number of beeps>
- F0 <display duration>

All other data is ignored.

Response of the ECR:

ECR → PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	01	<key-code>

Only the following definition of the <key-code> is supported:

- OD Acceptance-Key <OK>
- 18 Correction-key <C>
- 1B Abort-key <STOP>
- 46 Function-key <F>
- 6C Timeout

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.12. Display text with numerical input (06 E2)

A text line (F1) with at most sixteen characters can be transferred for display. Font switching is not provided.

The following data fields are supported:

- F1 <text for line 1>
- F2 <text for line 2>
- F3 <text for line 3>
- E0 <min. length of input (must be <= max. length)>
- E9 <max. length of input (0..16)>
- F9 <number of beeps>
- F0 <display duration>
- EB<MAC>

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.13. Read card (06 C0)

Datenblock:

- <Time-out>
- 19<card-type>
- FC<Dialog-control>
- 06 <TLV-container>
    - 1F60 < Card technology allowed, bit field, 1 byte>

            xxxx xxx1 Magnetic stripe card

            xxxx xx1x Chip card

            xxxx x1xx Contactless card

        If it is absent, the "Magnetic stripe card" will be used.

        If the selected technology is not supported by the terminal, the command will be aborted by "84 83".

        If the Tag 1F60 = "00", the command will be rejected with "84 9A".

If the tags 19 and 1F60 are both present, the default "Magnetic stripe card" will be used.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.14. Close Card Session (06 C5)

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.15. Send APDUs (06 C6)

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.16. Prepaid top-up (06 09)

Only the <payment type> = 02, meaning cash payments, is accepted at present.

The following data fields are supported:

- <card type ID>
- <payment type>
- 04 <amount>
- 49 <WKZ> -- Attention = mandatory field!
- 3D <password> -- Attention = mandatory field, because only cash payment possible

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.17. Account balance request (06 03)

This command is used to retrieve the account balance for Sales Cards, Bonus Cards and Prepaid Payment Cards like the German Electronic Purse (Geldkarte) or the Prepaid Credit Cards.

If optional track data or card numbers are transferred within this command, the terminal tries to use these data to perform the transaction.

The following optional data fields are supported:

- 2D <track 1 data>
- 23 <track 2 data>
- 24 <track 3 data>
- 0E <expiration date>
- 22 <card number>
- 06 <TLV-container>

For <u>Bonus Cards</u> the TLV-container (BMP06) with the following content is mandatory:

<u>Requesting bonus points</u>: Subtag C1 in the bonus points container E1 contains the value '4D 55'

The subtag C2 <number of bonus points> in the bonus point container E1 is used if bonus points are to be used instead of the amount.

For Geldkarte (German electronic purse 'GEP') the TLV-container (BMP06) with the following content is mandatory:

Requesting account balance: The TLV container contains the TAG 0x41 (ZVT card –type-ID) with the card type ID for the Geldkarte (0x1E = 30d).

Example: Data object = 0x41011E

        Transport container = BMP06 + length + Data object = 0x060341011E

All other data are ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.18. Activate card (06 04)

If optional track data or card numbers are transferred with this command, the terminal tries to use this to execute the transaction.

The following data fields are supported:

- 2D <track 1 data>
- 23 <track 2 data>
- 24 <track 3 data>

- 0E <expiration date>
- 22 <card number>
- 06 <TLV-container>

At present, this command is only possible for bonus transactions.

The subtag C2 <number of bonus points> in the bonus point container E1 is used if bonus points are to be used instead of the amount.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.19. Pre-authorisation/reservation (06 22)

If optional track data or card numbers are transferred with this command, the terminal tries to use this to execute the transaction.

The following data fields are supported:

- 04 <amount>
- 49 <WKZ>
- 0B <trace number> - must be sent when **expanding a reservation**.
- 3B <AID> - must be sent when **expanding a reservation**.
- 06 <TLV-container>
  tag 15: Via tag 15 in the TLV container, it is possible to select the **language for the card holder**.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.20. Book total (06 24)

The following data fields are supported:

- 87 <receipt number>
- 04 <amount>
- 49 <WKZ>

- 2D <track 1 data>

- 23 <track 2 data>

- 24 <track 3 data>

- 0E <expiration date>

- 22 <card number>

- 0B <trace number> - is used to reference the original transaction.

- 3B <AID>

- 06 <TLV-container>
  tag 15: Via tag 15 in the TLV container, it is possible to select the **language for the card holder**.

The receipt number does not serve to reference the original transaction.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.21. E-purse Top-up (06 26)

This command is used to display amount to load in Prepaid Payment Cards like the German Electronic Purse (Geldkarte).

2.4.22. Cash report (0F 10)

With this command, the ECR triggers the PT to print a receipt about the card payment.

Attention: If the receipt is to be printed on the ECR, the ECR may only send this command to the PT if the printer on the ECR is ready for printing and has enough paper for the receipt.

ECR → PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	10	03	<password>

Data block:

<password> - presently not evaluated.

Response from PT:

PT → ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

After successful printout, the PT sends a **completion message** whereupon the ECR's "master rights" are restored:

PT → ECR

APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	0F	00	

Response of the ECR:

ECR → PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

In **case of an error**, the PT responds with **cancel**:

PT → ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	1E	01	<error code>

Response of the ECR:

ECR → PT

APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

2.4.23. System info receipt (0F 11)

With this command, the ECR triggers the PT to print a system information receipt (function number 522).

Attention: If the receipt is to be printed on the ECR, the ECR may only send this command to the PT if the printer on the ECR is ready for printing and has enough paper for the receipt.

ECR → PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	11	03	<password>

Data block:

<password> - presently not evaluated.

Response from PT:

PT → ECR			
APDU			
Control field		Length field	Data block

CCRC	APRC		
80	00	00	

After successful printout, the PT sends a **completion message** whereupon the ECR's "master rights" are restored:

PT → ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	0F	00	

Response of the ECR:

ECR → PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

In **case of an error**, the PT responds with **cancel**:

PT → ECR			
APDU			
Control field		Length field	Data block

CLASS	INSTR		
06	1E	01	<error code>

Response of the ECR:

ECR → PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

2.4.24. EMV receipt status (0F 12)

With this command, the ECR triggers the PT to print an EMV status receipt (function number 900).

Attention: If the receipt is to be printed on the ECR, the ECR may only send this command to the PT if the printer on the ECR is ready for printing and has enough paper for the receipt.

ECR → PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	12	03	<password>

Data block:

<password> - presently not evaluated.

Response from PT:

● SEAMLESS PAYMENT

PT → ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

After successful printout, the PT sends a **completion message** whereupon the ECR's "master rights" are restored:

PT → ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	0F	00	

Response of the ECR:

ECR → PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

In **case of an error**, the PT responds with **cancel**:

PT → ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	1E	01	<error code>

Response of the ECR:

ECR → PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

2.4.25. Telephone authorisation (06 21)

If optional track data or card numbers are transferred with this command, the terminal tries to use this to execute the transaction.

With a host response code of 55 (wrong PIN), the PIN is not entered again.

The following data fields are supported:

- 04 <amount>
- 49 <WKZ>
- 2D <track 1 data>
- 23 <track 2 data>
- 24 <track 3 data>
- 0E <expiration date>
- 22 <card number>

- 3B <AID> - serves to transfer the approval number.
- 06 <TLV-container>
  tag 15: Via tag 15 in the TLV-container, it is possible to select the **language for the card holder**.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.26. Tip (06 0C)

Initiates a tip transaction (tipped update).

The following data fields are supported:

- 04 <amount>
- 87<receipt number>
- 49<WKZ>
- 0B <trace number> - is used to reference the original transaction.
- 06<TLV-container>
  tag 15: Via tag 15 in the TLV-container, it is possible to select the **language for the card holder**.

The receipt number does not serve to reference the original transaction.

All other data is ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.27. Status enquiry (05 01)

It serves to enquire the current status of the terminal.

If the optional service byte is sent, the password must be sent as well.

In case of an available service byte, only bit 2 (send software version) and bit 3 (send TLV-container) are currently evaluated as described below:

Servicebyte	Description
xxxx xx1x	SW-Version must NOT be sent into the completion message
xxxx xx0x	SW-Version must be sent into the completion message, default if there is no service byte sent in the request
xxxx x1xx	TLV-Container must be sent into the completion message

xxxx x0xx	TLV-Container must NOT be sent into the completion message, default if there is no service byte sent in the request

The TLV-Container into the completion message (06 0F) contains the following data fields:

- 1 F44 <terminal ID> (optional)
- E4 (mandatory)
  - 1F 41 <Software version>
  - 1F 42 <Serial number>

Depending on the terminal configuration, this command also serves to trigger possible time-controlled events.

2.4.28. Software-Update (08 10)

The completion message is sent before that the update is performed.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.29. Read File (08 11)

This command is used to retrieve dedicated files from the Terminal.

In case of the German Electronic Purse (Geldkarte) the payment records are stored in a dedicated submissions file (Bezahldatei) which can only be retrieved if there has been a successful End Of Day request before.

The following data fields are supported:

- 06<TLV-container>
  Containing Tag 2D which includes the Tag 1D <file-ID>

Currently we support the following file-ID's inside Tag 1D:

- 0x10 = Geldkarte submissions file (Bezahldatei). Only one byte length is currently supported for tag 1D.

For the tags returned in the "Status Information" (04 0F) by the PT the following restrictions apply:

- Subtag 1E (start-position) and Subtag 1F 00 (total length of file): The length of this fields is always 4

All other data are ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.30. Delete File (08 12)

This command is used to delete dedicated files inside the Terminal.

In case of the German Electronic Purse (Geldkarte) the submissions file (Bezahldatei) has to be deleted before proceeding with new Geldkarte trans-actions. If this file is not deleted, still present in the Terminal, than there are no further Geldkarte transactions possible.

The following data fields are supported:

- 06<TLV-container>
  Containing Tags 1D <file-ID>

Currently we support the following file-ID's inside Tag 1D:

- 0x10 = Geldkarte submissions file (Bezahldatei)

All other data are ignored.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.4.31. Card Terminal Application Programming Interface (CT-API) commands

Application independent card terminal application programming interface for Integrated Circuit(s) Card (ICC) applications (see part 3 [MKT 1.0]).

2.4.31.1. General

For the realization of the CT-API interface we define the following constructed, primitive data objects and additional error messages. To avoid namespace clashes with [ZVT1] all primitive data objects are encapsulated in the con-structed tag "FF 10".

Primitive data objects:

Tag	Data-element
80	Destination address (dad type IU8), length = 1, binary
81	Source address (sad type IU8), length = 1, binary
82	ICC or PT command (command type IU8, byte array), length = var-iable

83	Response to the command (response type IU8, byte array), length = variable
84	The CT-API function return value (type IS8), length = 1, binary

Constructed data objects:

Tag	Data-element
FF 10	CT-API container, contains the transmitted CT-API function parameters; Length = variable. Supported tags: 80. 81, 82, 83, and 84.

To handle ZVT-command errors we define the following additional error-messages:

Error-ID (hexadecimal)	Error-ID (decimal)	Definition
83	131	wrong internal status (CT_data command was called without a previous successful CT_int command)
8A	138	wrong internal status (ZVT-command not allowed, a successful CT_init command was called before)

To handle contact less card interfaces we assign the Ingenico ICCs to the Integrated Circuit(s) Card (ICC) MKT specification [MKT 1.o] as described:

ICC assignment table:

MKT 1.o Integrated Circuit(s) Card (ICC)	Ingenico Integrated Circuit(s) Card (ICC)
ICC1 (IC card 1)	ICCSLOT CAM0
ICC2 (IC card 2)	ICCSLOT CAM1

ICC3 (IC card 3)	ICCSLOT CAM2
ICC4 (IC card 4)	ICCSLOT CAM3
ICC5 (IC card 5)	ICCSLOT SAM1
ICC6 (IC card 6)	ICCSLOT SAM2
ICC7 (IC card 7)	ICCSLOT SAM3
ICC8 (IC card 8)	ICCSLOT SAM4
ICC9 (IC card 9)	ICCSLOT CLESS1
ICC10 (IC card 10)	ICCSLOT CLESS2
ICC11 (IC card 11)	Not supported
…	Not supported
…	Not supported
ICC14 (IC card 14)	Not supported

2.4.31.2. Card Terminal init (CT_init) (0F 14)

This command is used to open and to initiate the CT-API communication to the PT (Payment Terminal) (see part 3 [MKT 1.0]).

The CT_init command must be called before CT-API communication (using of the CT_data command) begins with the PT and ICC (Integrated Circuit(s) Card). If the CT_init function was called successfully, the PT sends the ZVT-completion command to the ECR and then it is possible by the ECR to work with the CT_data command, otherwise the ECR gets an error message. After a successful CT_int call, all other ECR ZVT-commands with the exception of CT_data and CT_close will be disabled by the PT until the CT_close command will be sent.

CT_init command:

ECR -> PT

APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	14	00	

Answer from the PT, if no error occurs:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

If no error occurs the PT sends the Completion command.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	0F	00	

If an error occurs the PT sends the Abort command.

PT -> ECR			
APDU			
Control field		Length field	Data block

● SEAMLESS PAYMENT

CLASS	INSTR		
06	1E	08	06<TLV-Container>

Data block:

The field „06<TLV-Container>"includes the CT-API container FF10 with the CT-API tag 84. The length of the <TLV-Container> is 0x06.

Example CT-API return value (IS8) = -1:

Data object = 0x8401FF

Transport container = BMP06 + length + containerFF10 + length + Data object84 = 0x0606FF10038401FF

Remark: <CT-API return values> see MKT specification [MKT 1.o] part 3 chapter 4.4.

2.4.31.3. Card Terminal data (CT_data) (0F 15)

This command is used to transmit the needed parameter from the CT_data function (see Teil 3 [MKT 1.0]) to the PT.

The command is used to send ICC (Integrated Circuit(s) Card) and card terminal commands to the PT.

The command response to the calling ECR will be sent with ZVT-Completion (06 0F) command if no error occurs, if an error occurs the ZVT-Abort command will be sent.

The CT_data command is only allowed after a previous successful CT_init command call.

For example:

1. The ECR sends the CT_init command.
2. After a successful CT_init call the ECR sends a first CT_data command.
3. After a successful CT_data command answer the ECR sends another CT_data command.
4. …

5. …

6. The ECR sends a last CT_data command.

7. The ECR sends the CT_close command.

CT_data command:

ECR -> PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	15	XX	06<TLV-Container>

Data block:

The field „06<TLV-Container>"includes the CT-API container FF10 with the CT-API tags 80 and 82.

Answer from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

Answer from PT if the CT_data command was sent without a previous successful CT_init command:

PT -> ECR
APDU

Control field		Length field	Data block
CCRC	APRC		
84	83	00	

If no error occurs the PT sends the Completion command.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	0F	XX	06<TLV-Container>

Data block:

The field „06<TLV-Container>"includes the CT-API container FF10 with the CT-API tags 81 and 83.

If an error occurs the PT sends the Abort command.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	1E	08	06<TLV-Container>

Data block:

The field „06<TLV-Container>"includes the CT-API container FF10 with the CT-API tag 84. The length of the <TLV-Container> is 0x06.

Example CT-API return value (IS8) = -1:

Data object = 0x8401FF

Transport container = BMP06 + length + container FF10 + length + Data object84 = 0x0606FF10038401FF

Remark: <CT-API return values> see MKT specification [MKT 1.o] part 3 chapter 4.4.

Answer from PT, if the ECR sends a not allowed ZVT-command when a successful CT_init command was called before:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
84	8A	00	

2.4.31.4. Card Terminal close (CT_close) (0F 16)

This command is used to close the initiated CT_API communication to the PT (see Teil 3 [MKT 1.0]).

The CT_close command is analogue to the CT_init command. It ends the CT-API communication (using of the CT_data command) with the PT, which was assigned with CT_init command. The command must be sent by the ECR before the end of the programme (e.g. reading of KVK or EGK) to release possibly occupied resources and to enable the disabled ECR ZVT commands.

CT_close command:

ECR -> PT		
APDU		
Control field	Length field	Data block

CLASS	INSTR		
0F	16	00	

Answer from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

Answer from PT if the terminal is already in "usual ZVT mode":

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
84	83	00	

If no error occurs the PT sends the Completion command.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	0F	00	

If an error occurs the PT sends the Abort command.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	1E	08	06<TLV-Container>

Data block:

The field „06<TLV-Container>"includes the CT-API container FF10 with the CT-API tag 84. The length of the <TLV-Container> is 0x06.

Example CT-API return value (IS8) = -1:

Data object = 0x8401FF

Transport container = BMP06 + length + container FF10 + length + Data object84 = 0x0606FF10038401FF

Remark: <CT-API return values> see MKT specification [MKT 1.o] part 3 chapter 4.4.

2.4.31.5. Card Terminal Basic Command Set (CT-BCS)

Application independent card terminal basic command set (see part 4 [MKT 1.0]).

This part of this document describes the implemented general Card Terminal (CT) commands (see part 4 chapter 5 [MKT 1.0]), the card terminal commands for card terminals with special functional units (see part 4 chapter 6 [MKT 1.0]) and the B1 commands (see part 4 Annex C [MKT 1.0]) on the Telium and Unicapt32-based Ingenico payment terminals (PT).

a. General CT commands
   1. Reset CT:

Implemented as described in part 4 [MKT 1.0] with the following exceptions:

2. REQUEST ICC:

Implemented as described in part 4 [MKT 1.0] with the following exceptions:

Message to be displayed (Tag 50 in data field) are ignored.

3. GET STATUS: Not implemented yet.

4. EJECT ICC:

Implemented as described in part 4 [MKT 1.0] with the following exceptions:

Message to be displayed (Tag 50 in data field) are ignored.

b. CT Commands for CTs with Special Functional Units

1. INPUT: Not implemented yet.

2. OUTPUT: Not implemented yet.

3. PERFORM VERIFICATION: Not implemented yet.

4. MODIFY VERIFICATION DATA: Not implemented yet.

c. B1 commands

1. RESET: Not implemented yet.

2. DEACTIVATE ICC: Not implemented yet.

2.4.31.6. IC Cards with Synchronous Transmission

Usage of Interindustry Commands (see part 7 [MKT 1.0]).

This part of this document describes the use of ISO/IEC 7816-4 interindustry commands for IC cards with synchronous transmission and to specify how they are mapped onto chip specific actions. This is valid only for IC cards whose data sections are encoded according to [MKT 1.0], Part 5: ATR and data sections. It is a preprequisite for use of ISI/IEC 7816-4 interindustry commands at a Card Terminal Application Interface that the IC card has the structure of the ATR and the data section and that the CT is capable of mapping the related interindustry commands onto chip specificactions.

Implemented general interindustry commands for IC cards on the Telium and Unicapt32-based Ingenico payment terminals (PT).

a.) Interindustry Commands for Basic Functions:

1. Select FILE:

    Implemented as described in part 7 [MKT 1.0] with the following exceptions:

    Not supported is a multi-application memory card structure as described in part 5 [MKT 1.0]

2. Read Binary:

    Implemented as described in part 7 [MKT 1.0].

3. Update Binary:

    Implemented as described in part 7 [MKT 1.0].

b.) Interindustry Commands for Security Functions:

1. Verify:

    Implemented as described in part 7 [MKT 1.0].

2. Change Reference Data:

    Implemented as described in part 7 [MKT 1.0].

2.4.31.7. Mifare Cards

Mifare cards are only addressed as memory cards. The option to open some card types as ISO 14443-4 (EMV) card will not be implemented.

All cards that can be addressed via the Mifare card management commands from the SDK are supported.

The commands are transported inside the CT_Data command as payload in the TLV container.

The following functions from the Mifare card management command set, block and sector operations, will be available through the interface (see also inside the SDK documentation):

1. Authenticate card:

    This command detects the Mifare card (see also [OAI_Mifare]), activates it for usage and authenticates a part of the card for operations. Depending on the card type this is a specific sector or it is a Mifare Ultralight card.

● SEAMLESS PAYMENT

Input parameters:

Value	Size (B)	Description
KeyType	1	0x60 for TYPE_A or 0x61 for TYPE_B key
UncodedKey	6	The key to use
Sector	1	The sector to authenticate

Error codes returned in Tag 83:

Value	Description
MF_OK	The sector is authenticated
MF_AUTH_ERR	Authentication failed
MF_LOAD_KEY_ERR	Error during key loading
MF_NOT_MF1	The card is a MIFARE Ul-traLight
MF_KO	An error occurred

2. Read Block:

Reads page(s) from the Mifare card.

This command reads 4 Bytes from the specified sector/block or in case of a Mifare Ulralight card it reads 16 Bytes from the pages address specified in the input parameter 'Block'.

Input parameters:

Value	Size (B)	Description
DataType	1	VALUE or DATA
Sector	1	Sector number to read
Block	1	Block number to read

Error codes returned in Tag 83:

● SEAMLESS PAYMENT

Value	Description
MF_OK	The block is read
MF_TIME_OUT_ERR	Communication timeout
MF_RESPONSE_SIZE_ERR	Invalid response size
MF_AUTH_ERR	The block is not authenticated
MF_KO	An error occurred

Read data returned in Tag 83:

Value	Size (B)	Description
Buffer	16	Filled with 4 or 16 byte of data

3. Write Block:

Writes a page to the Mifare card.

This command writes into the specified sector/block or in case of a Mifare Ulralight card it writes into the page address specified in the input parameter 'Block'.

Input parameters:

Value	Size (B)	Description
DataType	1	VALUE or DATA
Sector	1	Sector number to read
Block	1	Block number to read
Buffer	16	Filled with 4 or 16 byte of data

Error codes returned in Tag83:

Value	Description
MF_OK	The block is read

MF_TIME_OUT_ERR	Communication timeout
MF_RESPONSE_SIZE_ERR	Invalid response size
MF_AUTH_ERR	The block is not authenticated
MF_KO	An error occurred

2.4.32. Set Date And Time in PT (06 91)

This command, as the name suggests, is used to change the current date and time of the terminal.

The behaviour corresponds to the one described in [ZVT1]. However the [ZVT1] describes only the good case. Potential parsing errors or problems during setting the date and time seem to be ignored. In addition it was requested that the support for this command is optional and depends on the zvt700 profile. For this reason, the following interpretation was assumed during implementation:

1) If *Options/enableSetDateAndTimeCmd* element of the zvt700 profile is set to TRUE and no errors during command processing occur, then the command behaves as described in the [ZVT1]. The PT sends regular response with APRC code set to 0x00, followed by the Completion message.

2) If *Options/enableSetDataAndTimeCmd* element of the zvt700 profile is set to FALSE then the PT sends a response in which it sets the APRC to 0x83 (function not possible). No Completion message will be sent.

3) Otherwise, if an error during command processing occurs (for example due to invalid value in the date-time spec part of the message) then the PT sends a response in which it sets the APRC to 0x9A (protocol error) and avoids sending the Completion message.

The *Options/enableSetDateAndTimeCmd* is set to FALSE in the standard profiles making this command **disabled by default**.

2.4.33. Display (0F 19)

With the command 0F 19 the ECR can display an image on the PT display. The boundary conditions:

1. The image must be encoded in one of the supported formats (PNG, JPEG, BMP, GIF).

2. The image should have a maximum dimension of 170 pixel (width) x 170 pixel (height)

3. The image size should be minimized

4. The image size should not exceed 24 KB of data

5. The PT does not guarantee that each of the supported image formats can render all types of images. The ECR should test a set of images of the desired image format. If the desired format causes display problems the ECR should convert the image to a different format

The ECR sends some item to display on the PT-display and returns immediately:

1. PT clears the display if the flag CLEAR_BEFORE is set in CFG_CLRSCR
2. PT displays the item
3. PT returns with <80 00> or another immediate response (see below Response format)

A completion message is not sent.

The item is displayed until:

- the duration CFG_TIMEOUT is expired
- or the ECR sends a command influencing the display (e.g. 06 01, 06 E0, 0F 19)
- or the PT is triggered automatically to perform an action influencing the display

After what, PT clears the display if the flag CLEAR_AFTER is set in CFG_CLRSCR

Request format:

ECR -> PT			
APDU			
Control field		**Length field**	**Data block**
CLASS	**INSTR**		
0F	19	xx	06<TLV-container>

Data-block:

- 06<TLV-container>

● SEAMLESS PAYMENT

- FFD803 <Configuration container>
  - DF10 (CFG_TIMEOUT)
  - FF10 <IMG container>
    - C0 (IMG_FORMAT)
    - DD (IMG_DATA)

Response format:

PT → ECR			
APDU			
Control Field		**Length**	**Data-block**
CCRC	**APRC**		
80	00	0	No error occurred
84	83	0	Function not possible (command not supported)
84	9A	0	Protocol Error (data format error)
84	A0	0	Data Error (ZVT-Bitmap not support)
84	C5	0	Image Format not supported
84	xx	n	The ECR should be prepared to treat unspecified error responses as an unknown error

2.4.34. Display and wait (0F 1A)

An ECR sends some item to the PT display and asks to get informed about specific events, like a non-numerical key press.

1. PT clears the display if the flag CLEAR_BEFORE is set in CFG_CLRSCR
2. PT displays the item
3. If an error occurred PT sends a fitting immediate response and stops the processing (there will be no Completion message in this case).
4. If no error occurred PT responds with <80 00> and continues to display the item and waits for the first of a given set of events (e.g. a timeout or key-press)

5. If the ECR requested Intermediate Status-Information during Registration the PT sends regularly the Intermediate Status 0x17 ("please wait…") to the ECR in order to re-start the time-outs.
6. When an event is occurred:
   a. PT sends a Completion message <06 0F> which contains the triggering event(s)
   b. The ECR's master rights are restored
   c. PT clears the display if the flag CLEAR_AFTER is set in CFG_CLRSCR

Request format:

ECR -> PT			
APDU			
Control field		**Length field**	**Data block**
CLASS	INSTR		
0F	1A	xx	06<TLV-container>

Data-block:

- 06<TLV-container>
  - FFD803 <Configuration container>
    - DF10 (CFG_TIMEOUT)
    - FF10 <IMG container>
      - C0 (IMG_FORMAT)
      - DD (IMG_DATA)

Response format:

Response is exactly the same than in Display commands (0F 19). See §**Fehler! Verweisquelle konnte nicht gefunden werden.**.

2.4.35. Abort (06 B0)

The ECR can terminate following this command prematurely with the command "Abort" (06 B0):

- Display (0F 19)

- Display and wait (0F 1A)
- Authorisation (06 00)
- Reversal (06 30)
- Refund (06 31)

2.4.36. Tax free (06 0A)

The behaviour corresponds to the [ZVT1] specification.

2.4.37. Reset Terminal (06 18)

The behaviour corresponds to the [ZVT1] specification.

2.4.38. Set/Reset Terminal-ID (06 1B)

In case of format error, the command will be rejected (84 9A).

The behaviour corresponds to the [ZVT1] specification.

2.4.39. Start OPT Action (08 20)

The behaviour corresponds to the [ZVT1] specification.

2.4.40. Set OPT Point-In-Time (08 21)

The behaviour corresponds to the [ZVT1] specification.

2.4.41. Start OPT Pre-Initialisation (08 22)

The behaviour corresponds to the [ZVT1] specification.

2.4.42. Output OPT-Data (08 23)

The behaviour corresponds to the [ZVT1] specification.

2.4.43. OPT Out-of-Order (08 24)

The behaviour corresponds to the [ZVT1] specification.

2.4.44. Out-Transaction Signature (0F 21)

With this command the ECR can start a signature capture on a payment terminal with a signature capture mechanism built-in. It is used to start an out-of-transaction signature capture.

ECR -> PT			
APDU			
Control field		**Length field**	**Data block**
CLASS	**INSTR**		
0F	21	xx	• 06<TLV-container> o FFD800<Ingenico TLV container>

The PT responds immediately with an ACK:

ECR -> PT			
APDU			
Control field		**Length**	**Data**
CCRC	**APRC**		
80	00	00	

2.4.45. Functioncode via ZVT700

With this command the cash register can call a A32 Functioncode.

Attention: If a function code needs password entry, the user has to enter the password.

ECR -> PT

APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	22	05	<password><functioncode>

Data block:

<password>

<functioncode> - 2byte BCD (zero padded)

Response from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

After a **successful action**, the PT sends a **completion message** whereupon the ECR´s "master rights" are restored:

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		

SEAMLESS PAYMENT

06	0F	00	

Response of the ECR:

ECR -> PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
08	00	0	

In case of an error, the PT responds with **cancel**:

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
06	1E	01	<error code>

Response of the ECR:

ECR -> PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
08	00	00	

2.4.46. Prepaid-Configuration (0F 26)

This command is used to receive information about possible activated prepaid products from the PT.

ECR -> PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	26	00	

Response from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

Response from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		

06	0F	xx	<crc>, <status>

Data block:

<crc>:

CRC-16 calculated over the whole prepaid productsCRC-16 is calculated of the product-container, like "123Vodafone101530" which is a CRC-16 of 0x761D

<status>:

A status indicating if prepaid-products are activated or not.

00 if no prepaid-products activated / known

01 if prepaid is activated

Example:

060F 03 761D 01 → CRC-16 for "123Vodafone101530" and activated prepaid.

2.4.47. Receive Prepaid products (0F 27)

ECR -> PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	27	00	

In case of a successful response

Response from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

Response from PT:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
06	0F	xx	<TLV-product-container>

Data block:

<products-container>:

The products container contains the list of prepaid products, prepaid-card-ID'
and value levels in format TLV, according to ZVT Specification.

Example:

Tag				Format	L	Description
06						<Container>
	FFD800		ING_CONTAINER			
		DF60	ItemID	2 byte binary	2	The ItemId, starting with 0x01

		DF61	CardId	2 byte binary	2	The prepaid-card-ID
		DF62	ProductName	LL VAR	*	The Product Name representing the ProductName to be displayed
		DF63	Values	LL VAR	*	The possible values, in format xxxyy (02000 = 20,00 € to be displayed)

Response from ECR:

PT -> ECR			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

In case of an error, the PT responds with **cancel**:

PT -> ECR		
APDU		
Control field	Length field	Data block

CLASS	INSTR		
06	1E	01	<error code>

Response of the ECR:

ECR -> PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80	00	00	

Following error codes should be used:

Intermediate status (hexadecimal)	Meaning
0x12	System error

2.4.48. Set sleep-mode (0F 30)

With this command the ECR can set an unattended terminal to the sleep mode to save energy.

ECR -> PT			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
0F	30	01	<type>

Data block:

<type>:

The type of the sleep mode is specified thanks to the following values:

Type (hexadecimal)	Meaning
0x00	Turn-Off
0x01	Deep sleep mode
0x02	Slight sleep mode

Response from PT:

PT -> ECR			
APDU			
Control field		**Length**	**Data**
CCRC	**APRC**		
80	00	00	No error
84	83	00	Function not possible (command not supported)
84	DC	00	Card inserted
84	XX	00	Other errors

*To Be Defined

2.5. Commands: Terminal ➜ ECR

2.5.1. Status information (04 0F)

Deviating from [ZVT1], the meaning of the field 8A <card type> may differ. Depending on the application settings, the content of this field corresponds to the [ZVT1] specification or the [POSEIDON 4.1] specification.

The following data fields are supported:

- 8A <application>
- 29 <terminal ID>
- 0D <transaction date>
- 0C <transaction time>
- 0B <trace number> - is used to reference the original transaction.
- 04 <amount>
- 49<WKZ>
- 22 <BLZ>
- 22 <account number>
- 0E <validity date>
- 17 <card sequence number >
- BA <PAN>
- 22 < card number>
- 2A <acceptor ID code>
- 3B <authorization ID>
- 3C <additional text>
- 27 <result code>
- 06<TLV-container>

For the TLV-container in BMP 06 ([ZVT1], chapter 7):

- merely the EMV tags in chapter 7.4.4 are implemented of those mentioned in chapter 7.4. Here tag 40 sent by the ECR is ignored and the tags 40-45 – if available - are always sent, tag 48 is never sent.
- Following tags are included (some of them are only useful for special configurations):
  - 2F
    - 1F7F <transaction>
    - 1F7C <time>
    - 1F7D <date>
    - 1F11 <online transaction>
    - 1F7E <AID parameter Lang>
    - 1F10
- In case of signature capture, tag FFD800 is present inside.

- DF48<SIGNATURE_RESULT>
- DF49<SIGNATURE_SIZE>
- DF4C<Customer Signature JPG>

Terminals with active iDRM functionality and active registration feature 0F27 (SIG_A_IDRM) send an additional status information message after the customer signature was captured. The 04 0F message includes into ZVT-Container 06 a container FFD800 with DF48 SIGNATURE_RESULT. If the signature capturing was successful the FFD800 container contains additionally DF4C (signature as JPG image plus some basic transactional data like date, time and amount) and the size of the image DF49.

Tag			For-mat	L	Description
06					<Container>
	FFD800	ING_CONTAINER			<Container>
		DF48	SIGNATURE-RESULT	(b 2)	2	The signature processing result can have these values: • 0x0000 PROCESSING_OK • 0x0001 CUSTO-MER_DECLINED • 0x0010 SIZE_EXCEEDED • 0x0050 INTERNAL_ERROR
		DF49	SIGNATU-RE_SIZE	(b 4)	4	The size of the signature JPG in bytes (hexadecimal value, e.g. 00 01 23 45 == 0x12345 Bytes). Field available only if SIGNATURE_RESULT == 0.
		DF4C	SIGNATU-RE_JPG	(b *)	*	Image of the customer signature plus basic transactional data (date, time, amount, …). Field available only if SIGNATURE_RESULT == 0.

- In case of availability of tax free transaction, the tag 1F13=05.

If the CardId to be sent is larger than 255, the value "FF" is set in field 8A and the tag "41" set in the TLV-container. If the ECR does not support any TLV-containers, field 8A receives the value "FF" and no TLV-container.

- 1F7F

The tag 1F 7F describes the transaction to the transaction. The following values are
defined as:

0x00000001 Authorization

0x00000002 Reversal

0x00000004 Credit

- 1F0D

The tag includes 1F0D, if present, the Alipay-Trade-ID.

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.5.2. Completion (06 0F)

The behaviour corresponds to the [ZVT1] specification.

2.5.3. Abort (06 1E)

The behaviour corresponds to the [ZVT1] specification.

2.5.4. Print line (06 D1)

At present, the supported attribute byte values are:

- 10: Double height
- 20: Double width
- 30: double width + double height
- 40:centred
- 50: centred + double height
- 60: centred + double width
- 70: centred + double width + double height
- 0F: justified right (but in this case, all others attributes are disable)
- FF: linefeed

To check the operational readiness of the ECR printer, the terminal may send a "print line" command with empty text. Meaning "06 D1 01 00".

After each receipt, the end of the receipt is signalled via the command "print line". The attribute with the value 0x81 is used for this purpose. The complete command is: "06 D1 01 81" without text information.

The terminal is capable to send print data without having master rights.

The behaviour corresponds to the [ZVT1] specification.

2.5.5. Intermediate status information (04 FF)

The following <intermediate status> values are currently used:

Intermediate status (hexa-decimal)	Meaning
0x01	Please observe display on the PIN pad
0x03	Transaction not possible
0x07	Card not admitted
0x08	Unknown card
0x09	Expired card
0x0A	Insert card
0x0B	Remove card
0x0C	Card not legible
0x0D	Transaction cancelled
0x0E	Processing transaction, please wait ...
0x10	Invalid card
0x12	System error
0x13	Payment not possible
0x15	Wrong PIN
0x17	Please wait ...
0x18	Wrong PIN entered too often
0x19	Wrong card data
0x1D	Authorisation not possible

0x43	Transaction not possible - please remove card
0x47	Card not admitted - please remove card
0x48	Unknown card - please remove card
0x49	Card expired - please remove card
0x4B	Please remove card
0x4C	Cannot read card - please remove card
0x4D	Transaction cancelled - please remove card
0x50	Invalid card - please remove card
0x52	System error - please remove card
0x53	Payment not possible - please remove card
0x55	Wrong PIN - please remove card
0x58	Wrong PIN entered too often - please remove card
0x59	Wrong card data - please remove card
0x5D	Authorisation not possible - please remove card
0xD2	Establishing remote data transfer connection
0xD3	Remote data transfer connection established
	The following <intermediate status> values are available in addition to [ZVT-1]:
0xA0	Payment processed
0xA1	Payment processed - please remove card
0xA2	Cancellation successful
0xA3	Cancellation processed - please remove card

0xA4	Cancellation not possible
0xA5	Cancellation not possible - please remove card

Inasmuch as cleared by the ECR, TLV-containers are sent along if needed. Tag 24 is used here with subtags 07 to transfer the corresponding texts for the retailer display to the ECR. If this is the case, the ECR should display these text lines and not use the <intermediate status> value to control this display.

The following data fields are supported:

- <intermediate-status>
- <timeout>
- 06 <TLV-container>
  - 24

As for the remainder, the behaviour corresponds to the details in [ZVT1].

2.5.6. Establishing a remote data transfer connection (06 D8)

If the terminal is configured for communication via the ECR, remote data transfer connections can also be established if the terminal dies not have master rights. This may happen e.g. if the host requests diagnoses or similar via response code. These are performed by the terminal after the completion of a transaction.

Otherwise the behaviour corresponds to the [ZVT1] specification.

2.5.7. Closing a remote data transfer connection (06 DB)

See chapter 2.5.6.

Otherwise the behaviour corresponds to the [ZVT1] specification.

2.5.8. Sending data via a remote data transfer connection (06 D9)

See chapter 2.5.6.

Otherwise the behaviour corresponds to the [ZVT1] specification.

2.5.9. Receiving data via a remote data transfer connection (06 DA)

See chapter 2.5.6.

Otherwise the behaviour corresponds to the [ZVT1] specification.

2.5.10. Print text block (06 D3)

A complete receipt can be transferred to the ECR with this command. Retailer and customer receipts are marked with corresponding tags in the TLV-container.

Whether block printing via the terminal is used or printing takes place line by line on the ECR is controlled via the corresponding configuration of the terminal software.

The terminal is capable to send print data without having master rights.

Possible tags in 06 <TLV-container>:

- Tag 25:
    - In E3:
        - Tag 1F2E (Barcode type):
            - 0x07: Code128
            - 0x08: EAN 128
        - Tag 1F2F (Product code):
            - If Barcode type = 0x07 or 0x08, Product code, "Code 128 Value", variable length.
            - else Product code, BCD, variable length. If length of product code is odd, it is padded with one nibble 0xf.
- Tag 09
- Tag 07

The same attributes as 06 D1 are supported with same restrictions.

The behaviour corresponds to the [ZVT1] specification.

2.5.11. Input-Request (04 0D)

For our use, the input request cannot be used as defined into the [ZVT1] specification. Additional fields are required either to allow to the ECR to check and confirm a signature captured and displayed it on the terminal or to get an input into a range from the ECR.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		
04	0D	xx	06 <Tlv-container>

Possible tags in 06 <TLV-container>:

- Tag 32 <Input-container>
    - o Tag 24 (display-texts)
    - o Tag 1F38 (input mode)

        Supported values: 0 (string), 1 (number)
    - o Tag 1F39 (timeout)
    - o Tag E0 (minimum size, not sent in case of signature conf.)
    - o Tag E9 (maximum size, not sent in case of signature conf.)
- Tag FFD800 <Ingenico-container> (only required for signature conf.)
    - o DF48 (signature result)
    - o DF49 (signature size)
    - o DF4C (signature JPG, at the most 50 kB of data)

Response by confirmation of the ECR:

ECR -> PT			
APDU			
Control field		Length field	Data block
CCRC	APRC		
80 or 84	00	xx	06 <Tlv-container>

Possible tags in Data block:

- 06 <Tlv-container>:
  - o Tag 32 <Input-container>
    - ▪ Tag 1F3A (Input result)

Data block example in case of signature confirmation:

060632041F3A01xx (where xx can be '5', 'y' or 'Y')

In case of rejection, the ECR responds with:

PT -> ECR			
APDU			
Control field		Length field	Data block
CRCC	APRC		
84	00	xx	06 <Tlv-container>

Possible tags in Data block:

- 06 <Tlv-container>
  - o Tag 32 <Input-container>
    - ▪ Tag 1F3A (Input result)

Data bloc example in case of signature confirmation:

060632041F3A01xx (where xx can be '0', 'n' or 'N')

In case of timeout/no input, the ECR responds with:

PT -> ECR
APDU

Control field		Length field	Data block
CRCC	APRC		
84	00	02	06023200

In case of erroneous answer according to the expected input, this command will be repeated up to two times.

By signature confirmation, it might occur if the tag 1F3A is present but contains: no character, or more than one character or a character not mentioned in case confirmation or rejection.

In other cases, it might occur if the input result is out of the range E0-E9 (min and max) by example or if a string is given instead of a number (input mode).

2.5.12. In-Transaction Signature (0F 20)

If a transaction ends with the cardholder verification method "signature" and ECR and PT

Both support the tag 0F 20, the terminal initiates the signature capture.

PT -> ECR			
APDU			
Control field		Length field	Data block
CLASS	INSTR		

0F	20	xx	• 06<TLV-container>
			    ○ DF01<Signature Blob>
			    ○ FFD800<Ingenico TLV container>

In both cases, the ECR responds with one of these following values:

- Signature accepted:

ECR -> PT

APDU		
Control field	Length	Data
CCRC APRC		
80 00	00	

- Signature authentication failed:

ECR -> PT		
APDU		
Control field	Length	Data
CCRC APRC		
84 6F	00	

- Signature not authenticated, but signature capture retry allowed:

ECR -> PT		
APDU		
Control field	Length	Data
CCRC APRC		
84 7A	00	

3. How to

3.1. Signature displaying

The ECR has the possibility to receive the signature captured by the terminal to display it in case of a validation from the cashier is required (as performed today with the paper-based transactions).

In order to process signature confirmation you need 3 steps:

- Step1: register

  The ECR sends a registration command containing the tag 0F27 (for more details, please see the chapter 2.4.1 **Registration (06 00)**).

- Step2: evaluate

  The ECR receives the image of the signature into a status information request inside the 06<TLV-container> and answers with 84 9C during the displaying of the signature in front of the cashier (for more details, please see the chapter 2.5.1 **Status information (04 0F)** and the document **[ZVT1]**).

- Step 3 confirm:

  The terminal asks each 2s the confirmation of the cardholder's authentication to the ECR thanks to the command 04 0F up to get a completion or an abort (for more details, please see the document **[ZVT1]**).

To note that the timeout and the maximum number about the sending of commands 04 0F are configurable into the authorization request respectively with the BMP01 <timeout> and BMP02 <max. status-info> (for more details, please see the chapter 2.4.2 **Authorisation (06 01)**).

Important: in case of rejection by the cashier, an automatic reversal will be performed.

4. Bibliography

Reference	Document title, version number, date, etc.
[A32 ECR]	THIS document
[ZVT1]	Verband der Terminal Hersteller in Deutschland e.V.; ECR interface ZVT protocol; commands, bitmaps, error codes; 30.04.2014; version 13.06 and Verband der Terminal Hersteller in Deutschland e.V.; ECR interface ZVT protocol; transport protocol, application protocol; 16.04.2008; version 03 Please refer to www.terminalhersteller.de.
[POSEIDON 4.1]	Atos Origin "Function description for payment terminal POSEIDON", version 4.1
[MKT 1.0]	Multifunktionale Kartenterminals MKT-Version 1.0 see: http://www.teletrust.de
[OAI_Mifare]	OAI Erweiterung Mifare

EC CASH DIREKT

● SEAMLESS PAYMENT