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Translated by: www.ChineseStandard.net
Wayne Zheng et al.

Email: Sales@ChineseStandard.net

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JR

FINANCE INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

JR/T 0001-2009

Replacing JR/T 0001-2001

Specification on point of sale (POS) terminal for bank card

银行卡销售点(POS)终端规范

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Foreword

This Standard replaces JR/T 0001-2001 Specification of Point of Sale (POS) Terminal with Magnetic Stripe Card in Bank.

This Standard, in comparison with JR/T 0001 -2001, has the major changes as follows:

- The title of the standard is revised from Specification of Point of Sale (POS) Terminal with Magnetic Stripe Card in Bank to Specification on Point of Sal (POS) Terminal for Bank Card;
- Contents of IC card are added in respect of terminal display, information transmission from terminal to backstage, and voucher printing, etc. And the contents of judging bank card medium are added in the transaction process;
- Improve safety requirements of POS terminal. Add descriptions of MAC encryption algorithm and length requirements for keys based on various banks' experiences;
- Unify transaction processing and transaction interface elements;
- Unify transaction response codes and text messages of screen prompts for cashier;
- Unify voucher elements and give transaction voucher sample;
- Add descriptions of balance check, offline transaction and additional pre-authorized transaction. However, it is an optional transaction for accepting institution.

In this Standard, Annex A, Annex B and Annex C are informative Annexes.

This Standard was proposed by the People's Bank of China.

This Standard shall be centralized by the National Financial Standardization Technical Committee.

Drafting organizations of this Standard: Technology Department of People's Bank of China, and China Financial Computerization Corporation.

Participating drafting organizations of this Standard: Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, China Merchants Bank, China UnionPay Co., Ltd., and Bank Card Test Center, and Zhongchao Credit Card Industry Development Co., Ltd.

The main drafters of this Standard: Jiang Yunbing, Du Ning, Li Shuguang, Zhang Yan, Liu Qibin, Liu Zhiyu, Ma Xiaoqiong, Liu Yun, Zhao Zhilan, Jin Rusen, Pu Humin, Liao Zhijiang, Tang Shuming, He Zhijian, Zeng Zheng, Yuan Guoneng, Qian Fei, Ji Xidong, Huang Faguo, Shao Kuoyi, Liu Zhigang, Zhang Yongfeng, Liu Erjun, and Gao Yun.

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JR/T 0001-2009

Specification on point of sale (POS) terminal for bank card

1 Scope

This Standard specifies the requirements for hardware, software and safety, application functions, transaction interface, transaction processing process, message format and voucher elements of POS terminal of specially engaged merchant's bank magnetic strip card. It does not specify the provisions of bank magnetic strip card and IC card transaction host.

The Standards is applicable to POS terminal equipment accepting various kinds of bank card within the territory of the People's Republic of China.

2 Normative references

The articles contained in the following documents have become part of this Standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

- GB 2312 Code of Chinese graphic character set for information interchange; Primary set
- GB 4943 Safety of information technology equipment (GB 4943-2001, eqv IEC 60950:1999)
- GB 9254 Information technology equipment Radio disturbance characteristics Limits and methods of measurement (GB 9254-1998, CISPR 22: 1997, IDT)
- GB 13000.1 Information technology-Universal multiple- Octet coded character set(UCS)- Part 1: Architecture and basic multilingual plane (GB 13000.1-1993, ISO/IEC 10646.1-1993, IDT)
- GB/T 14916 Identification cards Physical characteristics (GB/T 14916-2006, ISO/IEC 7810:2003, IDT)
- GB/T 15120 (All parts) Identification cards-Recording technique (GB/T 15120 (All parts)-1994, ISO 7811: 1985, IDT)
- GB/T 15694.1 Identification cards Identification of issuers Part 1: Numbering system (GB/T 15694.1-1995, idt ISO/IEC 7812-1:1993)
- GB/T 17552 Identification cards--Financial transaction cards
- GB/T 17618 Information technology equipment--Immunity characteristics--Limits

and methods of measurement (GB/T 17618-1998, idt CISPR 24:1997)

GB 18030 Information technology -- Chinese coded character set

GB/T 19584 Specification on magnetic stripe data content and application for bank card

GB/T 21078.1 Banking - Personal Identification Number management and security - Part 1: Basic principles and requirements for online PIN handling in ATM and POS systems (GB/T 21078.1-2007, ISO 9564-1:2002, MOD)

JR/T 0008 Bank identification number and card number for bank card

JR/T 0025 (All parts) China financial integrated circuit card specifications

ISO 9564-3 Banking - Personal Identification Number (PIN) management and security - Part 1: Basic principles and requirements for online PIN handling in ATM and POS systems

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1

Bank card

The payment tools issued by financing institutions such as commercial banks, etc. to the society, with whole or part functions of consumer credit, transfer and settlement of accounts as well as cash deposit and withdrawal, etc.

3.2

Magnetic stripe card

Magnetic recording medium card has three magnetic-tracks to record magnetically encoded information.

Notes: Physical features shall conform to GB/T 14916 standard. Records of magnetic strip shall conform to standards including GB/T 15120, GB/T 15694.1, GB/T 17552 and GB/T 19584.

3.3

Integrated circuit(s) card (ICC)

Cards with one or more integrated circuit(s) installed inside, used for executing the functions of processing and storage.

3.4

Point of sale terminal (POS terminal)

Any magnetic strip card, as long as it conforms to the standards of GB/T 14916, GB/T 15120, GB/T 15694-1 and GB/T 17552, shall be able to be read. The card swiping direction might be single or bi-directional. Speed of card swiping is between 10cm/s to 100cm/s. And the service life of magnetic strip reader shall be up to more than 400,000 times.

Card number reading of magnetic strip card shall give priority to reading data of the second magnetic track. And if it is unavailable, read from the third.

Under the condition that magnetic strip reader reads the card with wrong magnetic information, it shall prompts "swipe the card again or press cancel-key to quit".

4.5 IC-card reader

ICC reader is used for accepting ICC insertion by user and proceeding transmission and communication of command data with ICC. Its modules include mechanical part, electric part and logical protocol, etc. See JR/T 0025.3.

There shall be a distinct sign indicating how to insert ICC, near the slot of ICC reader of POS terminal. If the terminal can lock cards, then it shall ensure that the card can be released under the condition of power-down, equipment exception or transaction cancelation.

4.6 Storage capacity of transaction

It is required that under the premise of ensuring completing the function of transaction, the memory space is capable of storing more than 300 transactions within a single batch.

4.7 Communication port

Communication port shall support all or some types of communication modes below:

- Serial communication;
- MODEM communication;
- Infrared Communication;
- Wireless communication;
- Ethernet communication;
- Password keyboard communication;
- Others.

4.8 Printer

The printer can choose dot matrix impact printer or thermal paper recording printer. The displayable characters or Chinese characters of printing shall at least conform to the requirements of GB 2312. However, considering the requirements of extensive

Sign-out includes 2 types: POS sign-out and operator sign-out:

- POS sign-out: POS exits from normal working condition;
- Operator sign-out: The operator ends the operation for POS.

7.1.3.3 Setup reversal mark

This sign indicates whether the POS needs to proceed automatic reversal, prior to online transaction. POS shall firstly set the reversal sign prior to financial request transactions. And if the transaction succeeds, POS shall remove the sign. If the transaction fails due to causes as failing to receive response from the host, the POS shall keep the sign, so as to proceed automatic reversal prior to the next transaction.

7.1.3.4 POS terminal state management

POS terminal states can be divided into three categories: normal transaction, sign-out completion, and locked.

7.1.3.5 Clock control

The clock data of POS shall be based on the data returned from POS center. And it is synchronized with POS center.

7.1.3.6 Print functions

7.1.3.6.1 Reprint

Voucher reprinting is used for voucher supplementary under the condition that the voucher has failed to be printed out due to printer failures or other causes in successful transaction. The reprinted voucher shall be marked with reprinting-logo in remark column. Reprint function only applies to the transaction before settlement.

7.1.3.6.2 Print transaction record

The transaction records stored in POS terminal shall be printed in the time sequence of transactions, so as for check and statistics.

7.1.3.6.3 Print the total transactions

The printing of total amount and total stoke count of current batch shall be divided into 2 parts - total debit and total credit.

7.1.3.7 Transaction inquiry

7.1.3.7.1 Query transaction record

Started with the latest transaction of POS, check the transaction particulars of current batch transaction by transaction. Only unsettled transactions can be queried.

Offline settlement transaction is firstly generated under offline state. And the previously generated offline settlement shall be notified to POS center when POS terminal is online.

7.2.1.2.2 Settlement adjustment (only for the wild card, optional)

Settlement adjustment transaction is to adjust the amount of current offline transactions, or add tips to the current consumption transactions.

7.2.2 ICC transaction function

For ICC transaction functions, refer to JR/T 0025.

8 POS terminal transaction interface³

8.1 Main interface of function selection

The operator may press corresponding digit key from the main interface of function selection to select transaction or enter into sub-interface. The appropriate functions shall include "consumption, consumption cancellation, sales return, pre-authorization, offline transaction, printing, management, and others".

8.2 Pre-authorization transaction sub-interface

The operator can press the corresponding number key to select transaction, and press the Cancel-key to return back to the main interface of function selection. The appropriate sub-functions include "pre-authorization, additional pre-authorization, pre-authorization completion, pre-authorization cancellation, and pre-authorization completion cancellation".

8.3 Offline transaction sub-interface

The operator can press the corresponding number key to select transaction, and press the Cancel-key to return back to the main interface of function selection. Sub-functions shall include "off-line settlement, and settlement adjustments".

8.4 Print Interface

The operator may press corresponding digit key to select functions, and press cancel-key to return to the main interface of function selection. The appropriate sub-functions include "reprint the last transaction, reprint any transaction, print transaction particulars, and print transaction summary".

8.5 Management function sub-interface

³ This Standard has defined the elements of transaction interface of selectable transaction functions of POS terminal. Specific appearance of the functions shall be determined by acquirer.

password".

If the current transaction requires password input and POS terminal has obtained the transaction amount, then the terminal and password keyboard shall display the amount.

If the operator or card holder has objections against the amount, the transaction can be terminated via pressing cancel-key on POS or on password keyboard.

8.27 Cardholder verification certificate interface

In transactions based on JR/T 0025 debit/credit ICC, ICC may require the operator to verify the certificate of card holder. The POS terminal shall display transaction type and remind the operator of "please verify the certificate type and certificate number of the card holder. Press confirm-key if verification is pass, otherwise press the Cancel-key".

8.28 Dial-up communications prompt interface

When the terminal contacts with POS center via dial mode, if successful, it shall successively display that "dialing, press cancel-key to quit". "Connected...processing...please wait", "connected...processing...sending data" and "connected...processing...receiving data".

If the connection fails, the cause shall be prompted. If the telephone wire is not connected, "communication fails, please connect telephone wire" shall be displayed. If the extension phone connected with POS is used, it shall show "Phone is busy". If it is still busy after dialing existing telephone number in POS, "telephone is busy, press confirm-key to try again or press cancel-key to quit", etc. shall be displayed.

8.29 Not support transaction temporarily prompt interface

If the operator selects the transaction which the terminal does not support temporarily, the terminal shall display "not support the transaction temporarily".

8.30 Original transaction does not exist prompt interface

For transactions of consumption cancellation, pre-authorization completion cancellation, settlement adjustment, if POS terminal fails to find transaction record in consistent with the voucher number which the operator has entered, the terminal shall display transaction type and prompt the operator of "original transaction does not exist".

8.31 Original transaction information prompt interface

For transactions of consumption cancellation, pre-authorization completion cancellation, settlement adjustment, if POS terminal finds the transaction record in consistent with the voucher number which the operator has entered, the terminal shall display transaction type. And after verifying, the operator presses confirm-key to continue transaction or press cancel-key to terminate transaction.

8.38 Batch uploading prompt interface

For uploading of unbalances accounts, the terminal shall display "unbalanced accounts", prompt uploading progress, and display "please wait".

8.39 Prompt interface of printing clearing total list

When printing settlement information, the terminal shall display "Batch settlement in progress, please wait".

8.40 Choose whether to print details interface

When printing billing information, the terminal shall show "Print details or not".

8.41 Amount confirmation interface

For transactions of pre-authorization completion and sales return, after the cashier inputs transaction amount, the terminal shall display the transaction type and transaction amount and prompt the cashier to confirm whether the amount is correct. After verification, press confirm-key, otherwise press the cancel-key.

8.42 Card number verification interface

For transactions of operator's card swiping, the terminal shall display card number after card swiping and prompt the operator to verify the card number. The operator can press confirm-key to continue the transaction, or press cancel-key to return to the main interface of function selection. If there is no other operation, the interface shall automatically return to the main interface of function selection in 30 seconds.

Figure 17 ICC pre-authorization transaction processing flow based on JR/T 0025 Debit/Credit Standards

- 9.3.3.8 Pre-authorization completion
- 9.3.3.8.1 Request mode
- 9.3.3.8.1.1 Magnetic strip pre-authorization completion transaction processing flow

See Figure 18 for transacted completion of pre-authorization of magnetic strip card in the request mode.

11 POS terminal voucher elements

11.1 General descriptions

The voucher is divided into two printing modes - dot matrix impact type or thermal paper recording type.

The transaction certificate is generally divided into merchant identification column, transaction element column, remarks and signature column of card holder. Each section of POS terminal's transaction voucher shall be separated clearly. The contents relevant to card holder shall be expressed in eye-catching. The methods of front size, adjacency control, aligning cross and retraction shall be used for thermo-sensitive paper recording printing (especially in both Chinese and English) to ensure the readability of transaction information. On the condition of traceability of transaction, the private information such as card number of card holder shall be shielded.

In the instructions of elements of various vouchers, for voucher of dot-matrix impact printer, the characters in "Chinese title" and "English title" columns are pre-printed on the voucher. For voucher by thermo-sensitive paper recording printer, the "Chinese title" and "English title" shall be printed. Characters in "contents" column shall be printed by POS. And "requirements" and "instructions" are the instructions and explanations to the characters in the said column printed by POS.

Annex C gives examples on transaction vouchers printed by dot-matrix impact printer and thermo-sensitive paper recording printer.

11.2 Transaction voucher elements⁵

11.2.1 Merchant ID column

1) Merchant name:

Chinese title: Merchant name

English title: MERCHANT NAME

Content: Name of the merchant of POS

Requirements: Mandatory

Descriptions: For printing the English or bilingual (English and Chinese) title of

merchant, the maximum characters are 40

2) Merchant No.

_

⁵ The voucher shall include the following elements. It may also contain other relevant information. The specific options can be determined by various issuers.

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Chinese title Transaction type

English title: TRANS TYPE

Content: Chinese or Chinese/English name of transaction type

Requirements: Mandatory

Descriptions: Consumption, consumption cancellation, sales return,

pre-authorization and pre-authorization completion, etc.

4) Expiration date of Card

Chinese title: Expiration date

English Title: EXP DATE

Content: Validity period of card

Requirements: Required (credit card)

Descriptions: Format is "MM/YY"

5) Transaction batch number

Chinese title Batch No.

English title: BATCH NO.

Content: Current transaction batch number of POS

Requirements: Optional

Descriptions: 6 figures

6) Transaction voucher number

Chinese title: Voucher No.

English title: VOUCHER NO.

Content: POS serial number

Requirements: Mandatory

Descriptions: 6 figures

7) Transaction date and time

Chinese title: Date/ Time

English title: DATE/TIME

Content: Transaction date and time in the POS center response message

Requirements: Mandatory

Descriptions: YYYY/MM/DD hh:mm:ss

8) Authorization No.

- (4) Transaction certificate (TC): The information shall be printed in the reference column for approved ICC transactions.
- (5) Apply label or preferred name: For JR/T 0025 transaction, for the application title selected by the terminal, if the terminals supports the language of the preferred title, then it shall print the preferred title, otherwise, print the application tag

Descriptions:

- (1) Original transaction voucher number: "Original voucher number/VOUCHER:" + original transaction voucher (6 digits)
- (2) Authorization code: "Authorization number/AUTH N0:"+authorization number (figures or letters)
- (3) Reprinted logo: "Reprinted voucher/DUPLICATED"
- (4) Transaction certificate (TC)"Transaction certificate/TC:" + TC value
 In case of several combinations above, it shall print in multi-line.

11.2.4 Signature column for cardholder

Chinese title: Cardholder signature

English title: CARDHOLDER SIGNATURE

Content: Leave sufficient white space in this column for cardholder signature.

Descriptions: The following instructions shall be generally shown in appropriate

locations of the cardholder signature column.

"I acknowledge satisfactory receipt of relative goods/services"

11.3 Total settlement voucher elements

1) Settlement report

Chinese title: Settlement report

English name: SETTLEMENT REPORT

Content: Summarize total amount, total number and transaction type of the

transaction.

Requirements: Mandatory

Descriptions: Omitted

2) Merchant name

Chinese title: Merchant name:

English name: MERCHANT NAME

Content: Name of the merchant of POS

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Requirements: Optional Descriptions: 6 figures

8) Settlement date and time

Chinese title: Date /Time English title: Date/Time

Content: Transaction date and time in the settlement transaction POS center

response message

Requirements: Mandatory

Descriptions: YYYY/MM/DD hh:mm:ss

9) Sum total

Chinese title: Sum total

English title: SUM TOTAL

Content: The POS of merchant includes the total transactions and amount of

transaction of consumption, sales return, pre-authorization completion; the transactions of pre-authorization, cancellation and cancelled are not accounted into the total transactions and total

amount.

Requirements: Mandatory

Descriptions: The transaction total is printed in three columns as per transaction

type, total transactions and total amount, and the total transactions is integer justified right-hand, total amount is corrected to Fen, and

aligned as per its decimal point.

11.4 Settlement detail voucher elements

1) Settlement list title

Content: Settlement details list/SETTLEMENT LIST

Requirements: Optional

Descriptions: Settlement is not usually printed.

2) **Details of Transaction**

Chinese title: Details of Transaction

English Title: TRANS LIST

Content: In the detailed list of all financial transactions of the current batch,

pre-authorization transaction, transaction cancellation and cancelled

transactions are not listed.

Requirements: Mandatory

Annex A

(Informative)

MAC algorithm

POS terminal adopts ECB encryption method. It is summarized as follows:

- a) The MAC element block (MAB) is constituted from MTI to field 63, from the message to be sent to POS center.
- b) For MAB, proceed XOR operation for every 8 character (regardless of the character format in the information). If the last string is not enough for 8 characters, append with "0X00".

Examples:

MAB = MI M2 M3 M4

In which:

M1=MS11 MS12 MS13 MS14 MS15 MS16 MS17 MS18

M2=MS21 MS22 MS23 MS24 MS25 MS26 MS27 MS28

M3=MS31 MS32 MS33 MS34 MS35 MS36 MS37 MS38

M4=MS41 MS42 MS43 MS44 MS45 MS46 MS47 MS48

XOR operations shall be carried out according to the following rules:

MS11 MS12 MS13 MS 14 MS15 MS16

XOR) MS21 MS22 MS23 MS24 MS25 MS26

TEMP BLOCK1 = TM11 TM12 TM13 TM14 TM15 TM16 TM17 TM18

Then, carry out the next operations:

TM11 TM12 TM13 TM14 TM15 TM16 TM17 TM18

XOR) MS31 MS32 MS33 MS34 MS35 MS36 MS3T MS38

TEMP BLOCK2=TM21 TM22 TM23 TM24 TM25 TM26 TM27 TM28

Then, carry out the next operations:

TM21 TM22 TM23 TM24 TM25 TM26 TM27 TM28

XOR) MS41 MS42 MS43 MS44 MS45 MS46 MS47 MS48

RESULT BLOCK = TM31 TM32 TM33 TM34 TM35 TM36 TM37 TM38

c) Transfer the final 8 characters (RESULT BLOCK) after XOR operation into 16 HEXDECIMAL:

RESULT BLOCK = TM31 TM32 TM33 TM34 TM35 TM36 TM37 TM38

=TM311 TM312 TM321 TM322 TM331 TM332 TM341 TM342

=TM351 TM352 TM361 TM362 TM371 TM372 TM381 TM382

d) Take the front 8 bytes and encrypt with MAK:

ENC BLOCK1 = eMAK (TM311 TM312 TM321 TM322 TM331 TM332 TM341 TM342)

=EN11 EN12 EN13 EN14 EN15 EN16 EN17 EN18

e) Carry out XOR operations between encrypted results and the rear 8 bytes:

EN11 EN12 EN13 EN14 EN15 EN16 EN17 EN18

XOR) TM351 TM352 TM361 TM362 TM371 TM372 TM381 TM382

TEMP BLOCK=TE11 TE12 TE13 TE14 TE15 TE16 TE17 TE18

f) Use the XOR results TEMP BLOCK carries out single time long key algorithm operation once again.

ENC BLOCK2 = eMAK (TE11 TE12 TE13 TE14 TE15 TE16 TE17 TE18)

=EN21 EN22 EN23 EN24 EN25 EN26 EN27 EN28

g) Transfer the results of operation (ENC BLOCK2) into 16 HEXDECIMAL:

ENC BLOCK2 = EN21 EN22 EN23 EN24 EN25 EN26 EN27 EN28

=EM211 EM212 EM221 EM222 EM231 EM232 EM241 EM242

=EM251 EM252 EM261 EM262 EM271 EM272 EM281 EM282

Examples:

ENC RESULT= %H84, %H56, %HB1, %HCD, %H5A, %H3F, %H84, %H84

C.2 Thermal paper recording print transaction voucher sample

MERCHANT NAME:			
Renmin Mall			
MERCHANT NO.:B00201208002011			
TERMINAL NO.: 20663201			
ACQUIRER: 00090001			
CARD NO.: 6227 89** ****7890			
CARD SN: 001			
EXP DATE: 08/12			
DATE/TIME: 2000/05/20 19:20:18			
BATCH NO.: 000122			
VOUCHER NO.: 100523			
AUTH.NO.: 884328			
REFER NO.: 004532641123			
TRANS TYPE: Consumption/SALE			
AMOUNT: RMB 1,234.56			
REFERENCE:			
CARDHOLLDER SIGNATURE			
I ACKNOWLEDGE SATISFACTORY RECEIPT OF RELATIVE GOODS/SERVICES			

Figure C.2 Thermal paper recording print transaction voucher sample

E	END

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