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paylab

Additional operations for direct interchange in SmartSale-based integrated solutions

(Supplement to document "SmartSale-based cash-desk solution. Querying technology and rules, operation performance description")

Version 11.5.

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ООО "ЛАБОРАТОРИЯ ПЛАТЕЖНЫХ РЕШЕНИЙ"
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INTRODUCTION

This document describes only the interchange rules and message formats in direct interchange between cash-desk SW and UNIPOS Terminal SW with SmartSale feature set (independently of DUAL Connector library).

General technology and rules of querying, as well as description of performance of other operations are provided in the document: “SmartSale-based cash-desk solution. Querying technology and rules, operation performance description".

1. Description of asynchronous data link interchange rules

Notations used:

- ACK – 0x06 byte;
- NAK – 0x15 byte;
- EOT – 0x04 byte;
- Message – data packed in accordance with the protocol and transmitted over a communication link
- Timeout1 – time slot of 5 seconds
- Timeout2 – time slot of 45 seconds

In case of connection via asynchronous data links (for instance, via X25 or IP-networks), the following data interchange rules apply:

Once a connection with a terminal is established, the CR (cash register) sends a Message (authorization request) and waits on ACK confirmation during Timeout1. When NAK is received, the CR sends the Message again and waits on ACK confirmation during Timeout1. Upon expiry of Timeout1, or upon receipt of any symbol other than ACK (NAK), or a sequential receipt of three NAKs, CR sends EOT and drops connection.

Upon receipt of ACK, CR waits on the Message during Timeout2 (response to authorization request). If the Message is not received within Timeout2, CR sends EOT and drops connection. If the Message is received, but its signature (last two bytes of the message) is not correct, CR sends NAK and goes to the Message waiting mode during Timeout2. If the Message is received successfully, CR sends ACK.

CR analyzes response data. If response data contains "WAIT" command (see the Note), CR goes to the Message waiting mode during Timeout2. Otherwise, CR displays the data of response to the cashier.

Note:

- Timeout1, Timeout2 data can be on the CR side.
- “WAIT" command is useful for informing the CR that the operation is performed normally but time is required for operation completion (for instance, due to poor connection with the Bank processing center). The description of "WAIT" command is given in **para. 5.1**. herein.

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2. Description of message format

A message transmitted by the CCR may contain a header or no header. In most cases, the header is not required, however, if data must be transmitted as fixed length packets then the header must be used.

If a message contains no header then is consists of a message-beginning character (STX symbol), message length w/o service characters (LL LH), field sets and two check characters (CRC16L CRC16H). At that, the field sequence is immaterial.

The message length is limited to 65,535 bytes.

Message format:

<STX> <LL LH><N LL LH D> … <N LL LH D> <CRC16L CRC16H>, where

- <STX> - message-beginning character (0x02);
- <LL LH> – message length w/o service characters (2 bytes: LL – low-order byte, LH – high-order byte);
- <N LL LH D> – message field;

N – field number (one byte);

LL LH – field data length (2 bytes: LL – low-order byte, LH – high-order byte);

D – variable-length field data;

<CRC16L CRC16H> – check characters defined by the following polynominal: X^16 + X^15 + X^2 + 1 (2 bytes: CRC16L – low-order byte, CRC16H – high-order byte); the calculation involves all data starting from <STX>.

However, such message length is not acceptable for some cash-desk systems. Moreover, for the Result Reconciliation operation, the packet length can materially exceed the specified size due to the data for Reconciliation tape printing (Field 90). In this case, it is possible to transmit a message in 100 – 1024 byte long packs.

At that, the message contains a header and consists of the message-beginning character (SOH symbol), the length of current packet w/o service characters (the message may consist of several packets), the header, field set and two check characters (CRC16L CRC16H). The field sequence is immaterial.

Packet format:

<SOH> <LL LH><HEADER><N LL LH D> … <N LL LH D> <CRC16L CRC16H>, where

- <SOH> - header-beginning character (0x01);
- <LL LH> – packet length w/o service characters (2 bytes: LL – low-order byte, LH – high-order byte);
- <HEADER> - packet header (as described below);
- <N LL LH D> – packet field;

N – field number (one byte);

LL LH – field data length (2 bytes: LL – low-order byte, LH – high-order byte);

D – variable-length field data;

<CRC16L CRC16H> – check characters defined by the following polynominal: X^16 + X^15 + X^2 + 1 (2 bytes: CRC16L – low-order byte, CRC16H – high-order byte); the calculation involves all data starting from <SOH>.

The packet structure is as follows:

<LL LH><N LL LH D> … <N LL LH D>, where

<LL LH> – header length (total length of all header tags)

<N LL LH D> - header tag, where:

- N – header field number (one byte);
- LL LH – header field data length (2 bytes: LL – low-order byte, LH – high-order byte);
- D – variable-length header field data;

The current protocol version defines the following possible header field numbers:

- 1 - header version
- 2 - message packet number starting from 1. If a packet number = 0 then this is the last packet of the message

Sample header:

(08 00 01 01 00 31 02 01 00 30)

08 00 – header length

01 – field number (1 = header version)

01 00 – field 1 data length

31 – field contents (header version = 1)

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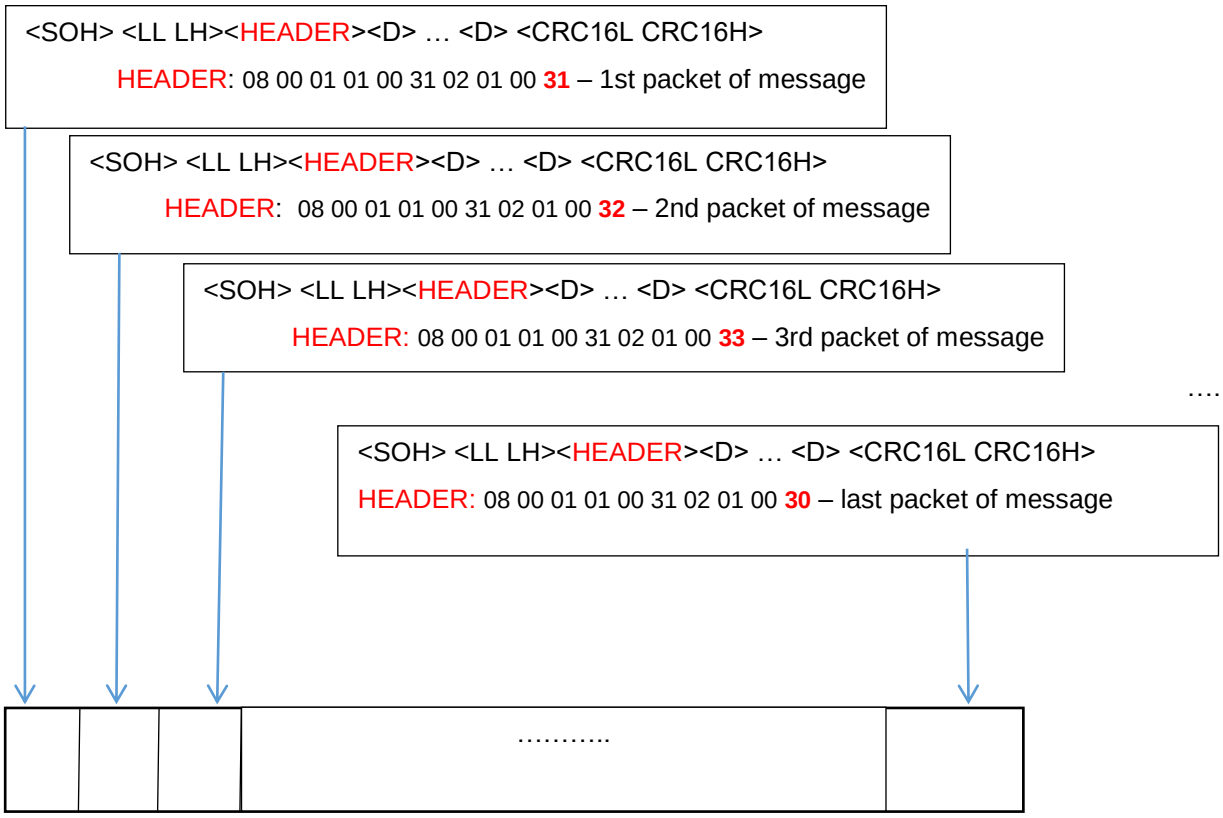
02 – field number (2 = message packet number)
01 00 – field 2 data length
30 – field contents (last packet of message)



SA message

When transmitting a message with headers (SOH) the total field data length is transmitted in the packet. If the field data exceed the size of one packet then the remaining data part will be transmitted in the next packet w/o specification of the field number. At that, the first packet, containing this field, will specify the size of entire transmitted field which would exceed the size of the packet itself.

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3. Sample packet for "Payment" operation

“02 3A 00 00 05 00 31 30 30 30 30 04 03 00 39 38 31 08 01 00 33 15 0E 00 32 30 31 34 30 35 31 34 31 38 30 36 31 30 19 01 00 31 1A 05 00 31 32 33 34 35 1B 08 00 73 6F 6D 65 64 65 76 31 CC 1E" with the following parameters:

Operation amount = 10000
Operation currency code = 981
Card feed method = 3
Original date and time = 20140514180610
Operation code = 1
Operation unique number = 12345
Peripheral device ID = somedev1

See Annex 1

4. Sample CRC calculation

```
WORD Crc16msb(BYTE *pBuf, long lSize)
{
	WORD s;
	for(s=0x0000 ; lSize>0 ; lSize--,pBuf++)
	{
		BYTE b = *pBuf;
		for(int j=0 ; j<8 ; j++)
		{
			int x16 = (((b&0x80)&&(s&0x8000))||((!(b&0x80))&&(!(s&0x8000)))) ? 0 : 1;
			int x15 = (((x16)&&(s&0x4000))||((!x16 )&&(!(s&0x4000)))) ? 0 : 1;
			int x2 = (((x16)&&(s&0x0002))||((!x16)&&(!(s&0x0002)))) ? 0 : 1;
			s = s << 1;
			b = b << 1;
			s |= (x16) ? 0x0001 : 0;
			s = ( x2 ) ? s | 0x0004 : s & 0xfffb;
			s = ( x15) ? s | 0x8000 : s & 0x7fff;
		}
	}
	s= int(s<<8) + int(s>>8);
	return s;
}
```

4.1. COM port parameters

COM port parameters -8n1 (bits - 8, parity - 0, number of stop bits - 1, flow control - hardware).
Speed is adjustable (from 300 to 115200).

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5. Description of operations. Field filling-in instructions.

5.1. “WAIT" operation. Wait message format

The wait message is sent if pin-pad (terminal) fails to generate a response to cash desk within 45 s (Timeout2). Upon receipt of the wait message, the cash desk shall maintain connection until the response or the next wait message is received.

Operation code 21 - "WAIT" operation			
Field	**Description**	**Type**	**Sending**
25	Operation code	n..2	M

Wait message format corresponds to the description in p. 2. At that, the field number <N> equals to 25 (number of "operation code" field), field data <D> consists of 2 bytes "32 31" (value of "wait" operation code recorded in ASCII as a hexadecimal code).

Wait message:

(02 05 00 19 02 00 32 31 A5 C2)

02 - <STX>

05 00 - message length (5 bytes) excluding <STX> , message length, CRC16

19 - field number (25 = Operation code)

02 00 - field length (2 bytes)

32 31 - field contents ("21" = "Wait")

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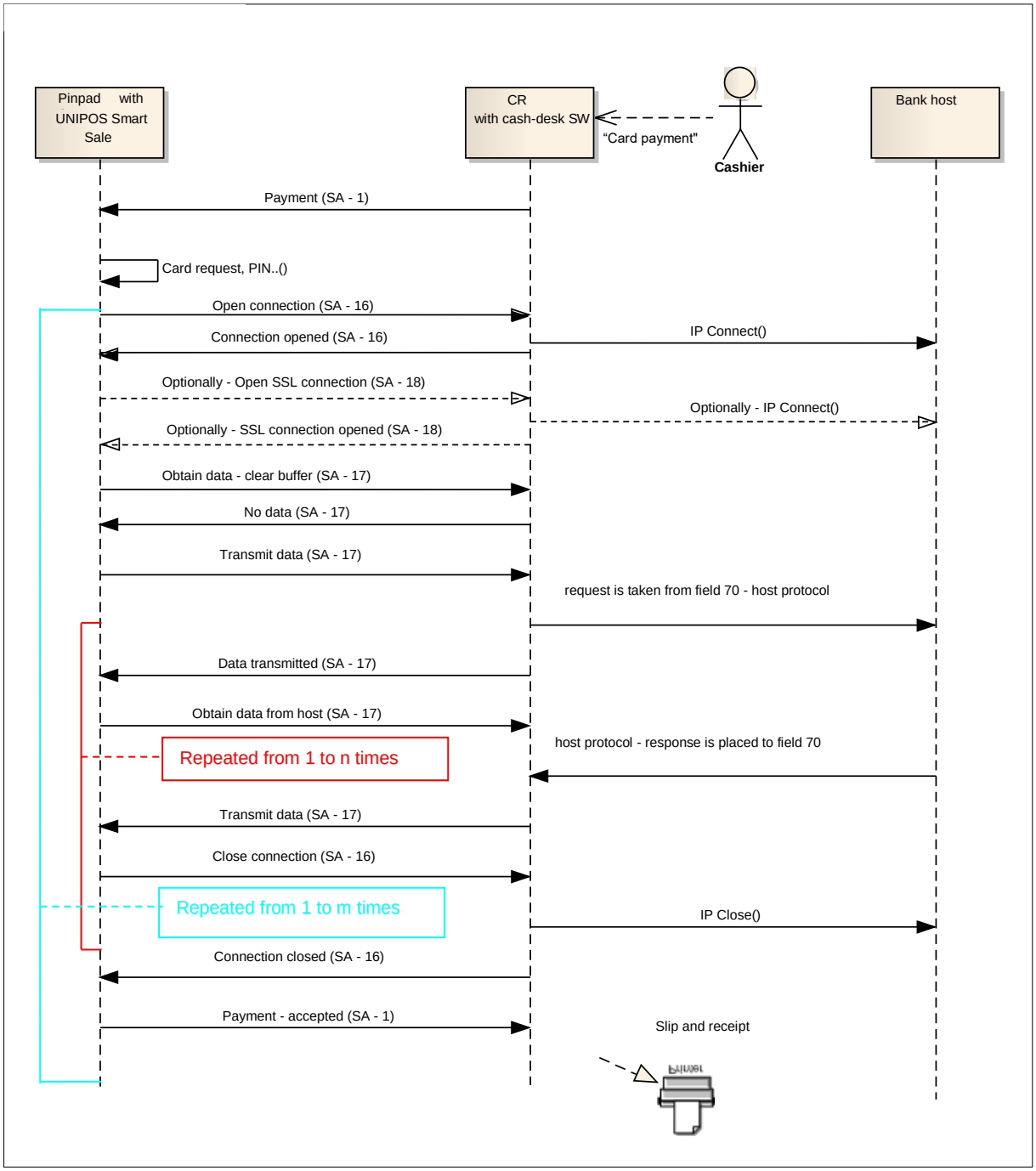
5.2. Additional operations in “pinpad–cash_desk–host" scheme

Operation running diagram in "pinpad–cash_desk–host" scheme



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User command 16 "Establish or drop server connection"

This operation is fulfilled when using "pinpad–cash_desk–host" scheme only.

The command is sent by pin-pad (terminal) to the CR (external system) for establishing or dropping connection with external authorization or control system.

Operation code 63 – Fulfillment of user command				
Field	**Description**	**Type**	**Request**	**Response**
25	Operation code	n..2	M	M
65	Command fulfillment mode 2. User command "16" ID – "Establish or drop host connection"	n..5	M	M
64	Command fulfillment mode ('0' – drop, '1' - establish)	n1	M	
67	Status (result) of command fulfillment ('0' – success, '1' or any other value - failure)	n..5		M
70	Sequence of characters (symbols) containing connection parameters linked with ';'	z…	M[1]	

[1] Field 70 shall be in ASCII format and filled in as follows:
<TCP/IP address>;<TCP/IP port>, for instance: 172.20.5.218;7777.

Note: When operating some types of host systems, upon data transmission, the connection is dropped by the host system independently, without a separate command from the external system (pinpad or CR).

User command 17 "Transmit data to external system from terminal and back"

This operation is fulfilled when using "pinpad–cash_desk–host" scheme only.

The command transmitted from pinpad (terminal) to the CR and back for transmission of a packet which must be transmitted to external system from terminal or from external system to terminal.

Operation code 63 – Fulfillment of user command				
Field	**Description**	**Type**	**Request**	**Response**
25	Operation code	n..2	M	M
64	Command fulfillment mode ('0' – from terminal to host, '1' - from host to terminal)	n1	M	
65	Command fulfillment mode 2. ID of user command "17" – "Transmit data"	n..5	M	M
67	Status (result) of command fulfillment ('0' – success, '1' or any other value - failure)	n..5		M
70	Series of characters (symbols) containing the authorization message according to the host protocol	z…	M[1]	

[1] Message in Field 70 may contain internal commands which do not require processing by cash-desk SW.

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Appendix 1

Description of the exchange during the operation “Payment”

Request for transaction Payment from cash register software	**Description (Parsing the message by field)**
02 30 00 00 03 00 31 30 30 04 03 00 36 34 33 15 0E 00 32 30 31 38 31 30 32 34 31 31 34 31 30 31 19 01 00 31 1A 01 00 31 1B 08 00 34 30 30 30 30 30 33 37 CC 35	[00] = '100' [04] = '643' [21] = '20181024114101' [25] = '1' [26] = '1' [27] = '40000037'
Response from pinpad	**Description**
06	Packet receipt acknowledgment symbol
Response from pinpad (WAIT message)	**Message parsing by field**
02 05 00 19 02 00 32 31 A5 C2	[25] = '21'
Response from cash register	**Description**
06	Packet receipt acknowledgment character
Response from terminal	**Description (Message Parsing by Fields)**
02 32 03 00 03 00 31 30 30 04 03 00 36 34 33 06 0E 00 32 30 31 38 31 30 32 34 31 35 35 30 34 30 0A 10 00 2A 2A 2A 2A 2A 2A 2A 2A 2A 2A 2A 2A 30 38 38 34 0B 04 00 32 35 31 30 0D 06 00 38 37 32 35 37 32 0E 0C 00 38 35 36 36 36 36 36 39 37 31 34 33 0F 02 00 30 30 13 08 00 CE C4 CE C1 D0 C5 CD CE 15 0E 00 32 30 31 38 31 30 32 34 31 35 35 30 34 30 17 01 00 31 19 01 00 31 1A 01 00 31 1B 08 00 34 30 30 30 30 30 33 37 1C 0A 00 31 31 31 31 31 31 31 31 31 31 27 01 00 31 5A 97 02 30 78 44 46 5E 5E 20 20 20 20 20 20 20 20 20 20 20 C4 C5 CC CE 20 D0 C5 C6 C8 CC 0A 0A 0D 0A 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 C0 F2 EE EB 0D 0A 20 20 20 20 20 20 CF D0 CE D6 C5 D1 D1 C8 CD C3 CE C2 DB C9 20 D6 C5 CD D2 D0 20 20 20 20 20 20 0D 0A 20 20 20 CC CE D1 CA C2 C0 20 D3 CB 2E CE CA D2 DF C1 D0 DC D1 CA C0 DF 20 C4 2E 37 32 20 20 20 0D 0A 20 20 20 20 20 20 20 20 20 20 D2 2E 20 37 32 31 2D 33 36 2D 32 31 20 20 20 20 20 20 20 20 20 20 0D 0A D7 C5 CA 20 CA CB C8 C5 CD D2 C0 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 30 30 30 31 0D 0A 20 20 20 20 20 20 20 20 20 CE CF CB C0 D2 C0 20 CF CE CA D3 CF CA C8 0D 0A 32 34 2E 31 30 2E 31 38 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 31 35 3A 35 30 3A 34 30 0D 0A D2 C5 D0 CC C8 CD C0 CB 3A 20 20 20 20 20 20 20 20 20 20 20 20 20 20 34 30 30 30 30 30 33 37 0D 0A CA C0 D0 D2 C0 20 20 20 20 20 20 20 20 20 20 20 20 20 20 56 49 53 41 20 43 6C 61 73 73 69 63 0D 0A 20 20 20 20 20 2A 2A 2A 2A 20 2A 2A 2A 2A 20 2A 2A 2A 2A 20 2A 2A 2A 2A 20 30 38 38 34 0D 0A D1 D0 CE CA 20 C4 C5 C9 D1 D2 C2 C8 DF 20 3A 20 20 20 20 20 20 20 20 20 20 20 20 32 35 2F 31 30 0D 0A D1 D3 CC CC C0 20 28 52 55 42 29 0D 0A 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20	[00] = '100' [04] = '643' [06] = '20181024155040' [10] = '************0884' [11] = '*** Данные: 4 байт ***' [13] = '872572' [14] = '856666697143' [15] = '00' [19] = 'ОДОБРЕНО' [21] = '20181024155040' [23] = '1' [25] = '1' [26] = '1' [27] = '40000037' [28] = '1111111111' [39] = '1' [90] = '0xDF^^ ДЕМО РЕЖИМ Атол ПРОЦЕССИНГОВЫЙ ЦЕНТР МОСКВА УЛ.ОКТЯБРЬСКАЯ Д.72 Т. 721-36-21 ЧЕК КЛИЕНТА 0001 ОПЛАТА ПОКУПКИ 24.10.18 15:50:40 ТЕРМИНАЛ: 40000037 КАРТА VISA Classic **** **** **** **** 0884 СРОК ДЕЙСТВИЯ : 25/10 СУММА (RUB) 1.00 ОДОБРЕНО КОД ОТВЕТА 00 КОД АВТОРИЗАЦИИ: 872572

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20 20 20 20 31 2E 30 30 0D 0A 20 20 20 20 20 20 20 20 20 20 20 20 CE C4 CE C1 D0 C5 CD CE 20 20 20 20 20 20 20 20 20 20 20 0D 0A CA CE C4 20 CE D2 C2 C5 D2 C0 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 30 30 0D 0A CA CE C4 20 C0 C2 D2 CE D0 C8 C7 C0 D6 C8 C8 3A 20 20 20 20 20 20 20 20 20 20 38 37 32 35 37 32 0D 0A B9 20 D1 D1 DB CB CA C8 3A 20 20 20 20 20 20 20 20 20 20 38 35 36 36 36 36 36 39 37 31 34 33 0D 0A 20 0D 0A 0D 0A 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 0D 0A 20 20 20 20 20 20 20 20 20 20 20 28 CA C0 D1 D1 C8 D0 29 0D 0A 0D 0A 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 3D 0D 0A 0D 0A 7E B4 B2	№ ССЫЛКИ: 856666697143 ------------------------------- (КАССИР) =================================
Response from the ECR	**Description**
06	Packet Receipt Acknowledgement Symbol
Response from the ECR	**Description**
04	Pinpad connection termination symbol

Legend:

- - Text highlighted in **red** indicates an indication of the beginning of the message
- - Text highlighted in **yellow** indicates the length of the message without service characters
- - Text highlighted in **green** indicates the field number
- - Text highlighted in **blue** indicates the length of the field data.
- - Text highlighted in **purple** indicates the field data.
- - Text highlighted in **brown**, service characters

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