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**TITLE:** Elite I5100 Flex ECR Interface  
Technical Specification

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## ELITE I5100 FLEX / ECR INTERFACE

### TECHNICAL SPECIFICATION

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1	INTRODUCTION.....	5
1.1	Purpose.....	5
1.2	Scope.....	5
1.3	Glossary.....	5
2	REFERENCES.....	6
3	OVERVIEW OF FUNCTIONS.....	7
	HARDWARE OVERVIEW.....	8
4	FUNCTIONAL REQUIREMENTS.....	9
4.1	Assumptions.....	9
4.2	ECR Communication Parameters.....	9
4.3	Transaction Transfer Request.....	9
5	MESSAGE FLOWS.....	9
5.1	Message Flow for Transaction Transfer Request.....	10
5.2	Message Flow for Advice Transfer Request / Day End.....	11
6	MESSAGE STRUCTURES AND FIELD CONTENTS.....	12
6.1	Transaction Transfer Request.....	13
6.2	Transaction Transfer Response.....	14
6.3	Advice Transfer Request / Day End.....	15
6.4	Advice Transfer Response / Day End.....	16
6.5	Print Buffer (Receipt Data) command.....	17
6.6	Message Field Descriptions.....	17
6.6.1	Transactions/Messages Types.....	17
6.6.2	Currency Code.....	18
6.6.3	Cashier ID.....	19
6.6.4	Amount.....	19
6.6.5	Gratuity Amount.....	19
6.6.6	Response Code.....	19
6.6.7	Card Name.....	20
6.6.8	CRC.....	20
6.6.9	IDLE STATE ( Terminal Ready ).....	20

## 1 INTRODUCTION

Since its introduction, it has become apparent that a revised terminal to ECR link is required. This revised link is to provide additional features which allow the ECR to be notified of the completed transaction status.

### 1.1 Purpose

The purpose of this document is to describe in detail the Elite Flex ECR interfaces .

### 1.2 Scope

This document is intended to be read by

- i) LD Betalingssystemer Engineers implementing and maintaining the Elite I5100 Flex terminal ECR Interfaces.
- ii) ECR manufacturers wishing to integrate their ECR with the Elite I5100 Flex terminal (Payment Device ).

### 1.3 Glossary

<b>ECR</b>	Electronic Cash Register
<b>POS</b>	Is the <b>Elite I5100 Flex Terminal</b> which is a combined POS Terminal as it include a security PinPad, Display, Printer, Cardreaders and communication port. Takes care of receipt printing, Totals report and Merchant log and online communication with PBS Host.
<b>Merchant Application</b>	The Software application for the ECR. It performs all the functions such as amount, Currency, Transaction Type & Day End.
<b>PBS</b>	Pengeinstitutternes Betalingsservice. The Danish Banks which handling the majority of eletronic transactions in Denmark.
<b>PSAM</b>	Purchase Secure Application Module.

## 2 REFERENCES

- [1] Open Terminal Requirement Specification (OTRS)  
version 2.4, 2004-03-01  
published by:  
PBS A/S
- [2] EMV 4.1 Book 4 Cardholder, Attendant, and Acquirer Interface Requirements.

### 3 OVERVIEW OF FUNCTIONS

This document describes the payment interface (serial) used for communication between ECR and POS.

The protocol is described seen from the ECR/Merchant Application.

Payment is initiated by the Merchant Application/ECR by use of corresponding MESSAGE TYPE command. The currency, amount, Cashier ID, Transactions Type and Gratuity Amount (optionally) are transferred as part of the business call.

Following additional capabilities are supported:

#### **Gratuity:**

Existing POS terminals optionally support Gratuity function, based on so-called 'Preliminary Receipt' printing defined by PBS A/S. The preliminary receipt's printing is provided by the POS by means of corresponding Message Type command (0x34).

#### **Card Name and Receipt Data options:**

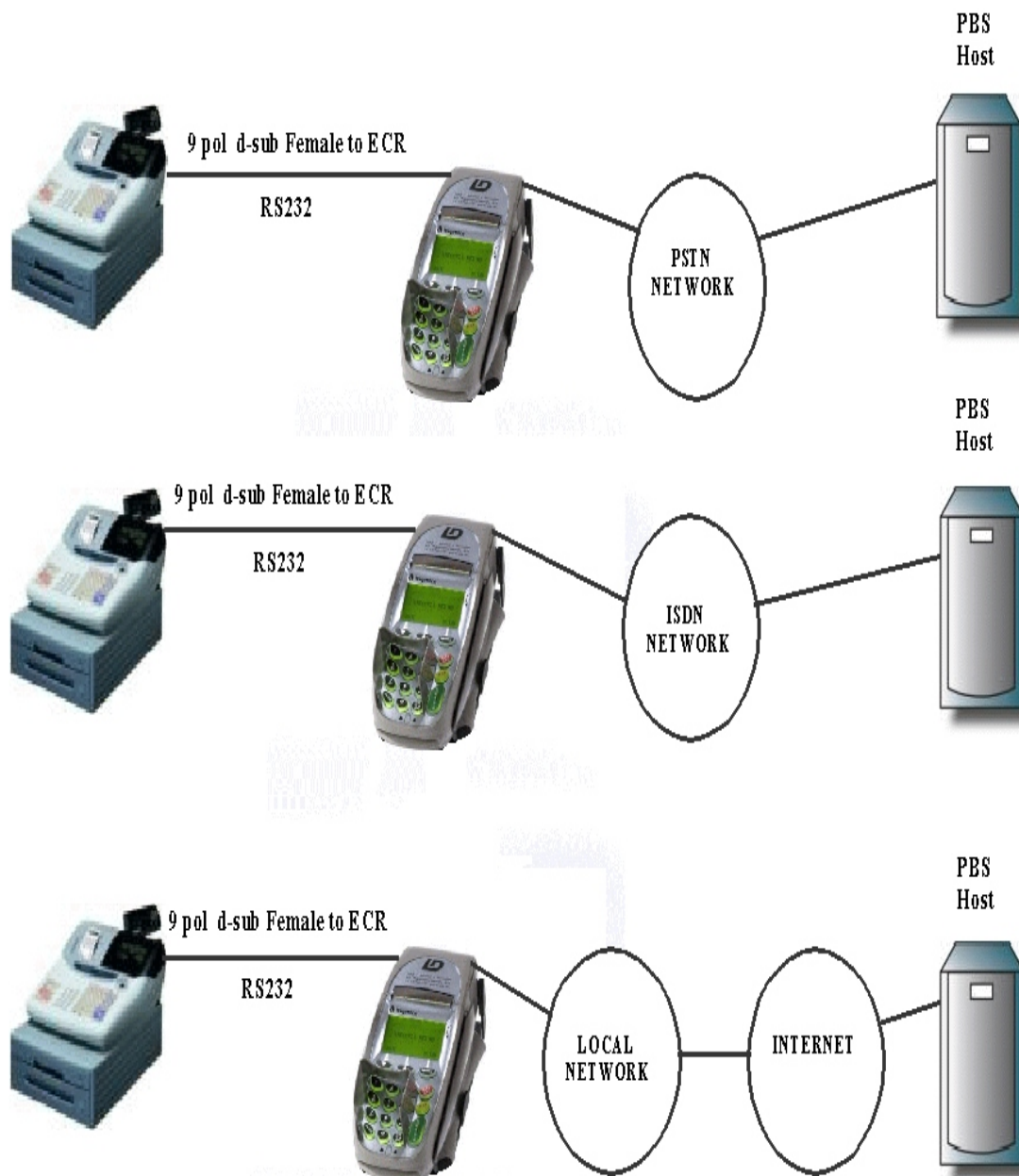
Existing POS terminals optionally support 2 additional capabilities:

- 1) Optional 'Card Name' field may be transmitted by the POS in Transaction Response message if corresponding option is active on the POS side.
- 2) ASCII formatted transaction's Receipt Data may be transmitted by the POS (by means of Print Buffer command) immediately after Transaction Response message has sent. It also requires that corresponding option must be active on the POS side.

N.B. In case when terminal has to print 2 receipts (e.g. in case of Signature based transactions), both receipts will be send to the ECR one by one, i.e. Print Buffer command will be transmitted to the ECR twice.

## HARDWARE OVERVIEW

POS and the ECR are communicate by using a RS232 serial cable which is connected between POS COM port and the COM/serial port on the ECR.



The diagrams shows that POS can be delivered with 3 different communications modules to make authorization up against PBS Host PSTN , ISDN , ETHERNET.

## 4 FUNCTIONAL REQUIREMENTS

This lists the functions which are required of the ECR / POS link.

### 4.1 Assumptions

- 1) All transactions must be initiated by ECR only.
- 2) The operator may need to use the terminals keyboard to make Advice Transfer ( Day end)

### 4.2 ECR Communication Parameters

POS and the ECR are communicate by using a RS232 serial cable which is connected between POS COM port and the COM/serial port on the ECR. Baud rates is 9600.

The character format is 8 bits, 1 start bit, 8 data bits, 1 stop bit and no parity.

COM 1 must be used on the POS Terminal to communicate with the ECR.

### 4.3 Transaction Transfer Request

It will be possible to transfer the Transaction Request from the ECR to the POS when the ECR Functionality is enabled on the POS/I5100, and the POS displaying following message:

“ TERMINAL ER KLAR “

## 5 MESSAGE FLOWS

This section shows the message flow between the POS and the ECR device.

The general name for the message from the ECR to the POS is “ Message X “.

The ECR must await the character ACK from the POS when the Message X has been send.

If the ECR does not receive the character within 500ms then it must resend the Message X, this will be repeated up to a maximum of three attempt.

There a two forms of Message X defined. These are:

- 1) Transaction Transfer Request.
- 2) Advice Transfer Request / Day End
- 3) Preliminary Receipt printing (optionally)

The general name given to a message from the POS/I5100 to the ECR is “ Message Y “.

The POS must await the characters ACK from the ECR when the Message Y has been send.

If the POS does not receive the character within 500ms then it must resend the Message Y, this will be repeated up to a maximum of three attempt.

Specific forms of Message Y

- 3) Transaction Transfer Response
- 4) Advice Transfer Response / Day End Status
- 5) Print Buffer/Receipt Data command (optionally)

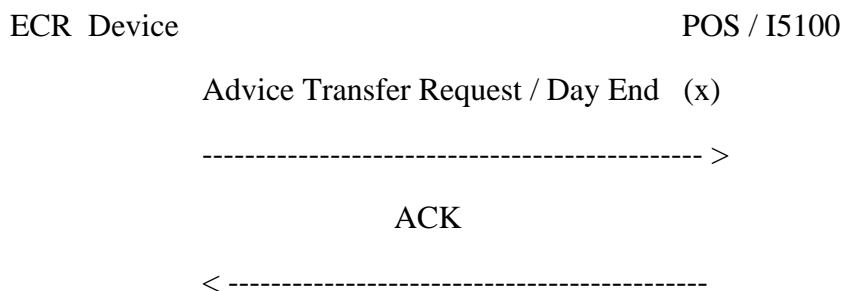


## 5.2 Message Flow for Advice Transfer Request / Day End.

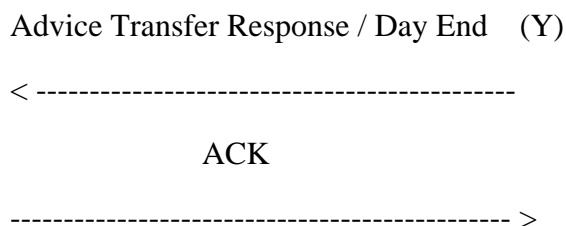
Advice Transfer Request / Day End will only be accepted by the POS when it is displaying following message

" TERMINAL ER KLAR "

Message flow if the Advice Transfer Request / Day End is correct.



Time-Delay, because the POS need to Dial up to PBS Host to send Advices.



## 6 MESSAGE STRUCTURES AND FIELD CONTENTS

This section describes the message structures and fields for each message types. The following abbreviations are used in the structure descriptions

A Alphanumeric – Characters.

N Numeric characters

CON Control Character used in protocol

FS Field Separator character. ( ASCII hex value 1C )

All messages shall be enclosed within the ASCII STX and ETX characters. Following the ETX there is a 2 bytes CRC

<STX> <MESSAGE DATA> <ETX>CRC

The receiver must check the incoming data for parity and the correct CRC.

CRC must include both STX and ETX.

## 6.1 Transaction Transfer Request

This message is used to transmit the Transaction Data from the ECR to the POS.

Field	Length(bytes)	Type	Value	Description
0	1	CON	0x02	STX
1	1	CON	FS	
2	1	AN	Purchase/Refund/Preliminary Receipt (0x31/0x32/0x34)	Transaction Type <b>Mandatory</b>
3	1	CON	FS	
4	1	CON	FS	
5	3	AN		Currency Code
6	1	CON	FS	
7	1	CON	FS	
8	2	AN		Cashier ID
9	1	CON	FS	
10	1	CON	FS	
11	3..8	AN		Amount <b>Mandatory</b>
12	1	CON	FS	
13 <sup>(*)</sup>	1	CON	FS	
14 <sup>(*)</sup>	3..8	AN		Gratuity Amount <b>Optional</b>
15 <sup>(*)</sup>	1	CON	FS	
16	1	CON	0x03	ETX
17	2	CRC		CRC

(\*) Fields 13,14,15 shall be present (and are mandatory) ONLY in case when Gratuity function is supported and Transaction Type is Sale (0x31).

Example of a message, where Transaction Type is Sale, Currency code is DKK, Cashier ID is not defined and the Amount is equal 12.50 DKK. Gratuities are not supported.

<STX>

<FS><0x31><FS><FS><0x32 0x30 0x38><FS><FS><0x30 0x30><FS><FS><0x31 0x32 0x35 0x30><FS>

<ETX>

CRC

## 6.2 Transaction Transfer Response.

This message is transmitted by the POS / I5100 to inform the ECR if the Transaction was accepted or rejected.

Field	Length(bytes)	Type	Value	Description
0	1	CON	0x02	STX
1	1	CON	FS	
2 <sup>(*)</sup>	16	A		Card Name <sup>(*)</sup>
3	1	CON	FS	
4	1	CON	FS	
5	1	AN		Response Code
6	1	CON	FS	
7	1	CON	0x03	ETX
8	2	CRC		CRC

<sup>(\*)</sup> – The Card Name field is an optional one. It shall be present only when corresponding option is active on the POS side, otherwise not. In case when the Card Name is not available (e.g. failed transaction), it will be fill up with spaces only.

A Response to an accepted Transaction when Card Name's sending is active:

<STX>

<FS>0x56 0x49 0x5A 0x41 0x20 0x20 0x20 0x20 0x20 0x20 0x20 0x20 0x20 0x20 0x20 0x20  
 <FS><FS>0x30<FS> (Here, Card Name is "VISA")

<ETX>

CRC

A Response to a Decline Transaction when Card Name's sending is inactive:

<STX>

<FS>0x31<FS>

<ETX>

CRC

### 6.3 Advice Transfer Request / Day End

The message is transmitted from the ECR to the POS / I5100 when the ECR requires the Day End totals.

Field	Length(bytes)	Type	Value	Description
0	1	CON	0x02	STX
1	1	CON	FS	
2	1	AN	0x39 (Day End)	Transaction Type
3	1	CON	FS	
4	1	CON	0x03	ETX
5	2	CRC		CRC

Example of Advice Transfer Request / Day End message.

<STX>

<FS><Transaction Type><FS>

<ETX>

CRC

## 6.4 Advice Transfer Response / Day End

This message is transmitted by the POS / I5100 to inform the ECR if the Advice Transfer was accepted or rejected.

Field	Length(bytes)	Type	Value	Description
0	1	CON	0x02	STX
1	1	CON	FS	
2	1	AN		Response Code
3	1	CON	FS	
4	1	CON	0x03	ETX
5	2	CRC		CRC

A Response to an accepted Transfer Day End message.

<STX>

<FS>0x30<FS>

<ETX>

CRC

A Response to a Decline Transfer Day End message.

<STX>

<FS>0x31<FS>

<ETX>

CRC

## 6.5 Print Buffer (Receipt Data) command

This (optional) command is transmitted by the POS to the ECR only if corresponding option is active on the POS side. The buffer contains ASCII formatted strings includes CR (0x0D) and LF (0x0A) characters. The buffer may be e.g. – save as a text file or send directly to a physical printer or just shown on the ECR display.

Field	Length(bytes)	Type	Value	Description
0	1	CON	0x02	STX
1	1	CON	FS	
2	1	AN	0x38	Print Buffer
3	1	CON	FS	
4	1	CON	FS	
5	Var.	ANC	Var.	ASCII Buffer
6	1	CON	FS	
7	1	CON	0x03	ETX
8	2	CRC		CRC

## 6.6 Message Field Descriptions

### 6.6.1 Transactions/Messages Types

This is a two digit number used to represent the type of transaction/action which is performed from the ECR, except the Print Buffer command which is sending from the POS.

It has the following values:

0x31 Sale \*

0x32 Refund

0x33 Copy of the last transaction

0x34 Preliminary Receipt Printing (if supported)

0x38 Print Buffer (Receipt Data) command (if supported)

0x39 Advice Transfer / Day End \*

**\* Please be aware that these 2 Transactions Type must only be use if the POS Terminal is an Unattended Terminal**

For the purpose of this specification, terminals are categorised by the following:

Environment: Attended or unattended

Table below defines the terms used to describe the Terminal types.

<b>TERMINAL</b>	<b>Definition</b>
<b>Attended</b>	An attendant ( an agent of the merchant or of the acquirer ) is present at the point of transaction and participates in the transaction by entering transaction-related data. The transaction occurs "face to face"
<b>Unattended</b>	The Cardholder conducts the transaction at the point of transaction without the participation of an attendant ( agent of the merchant or of the acquirer). The transaction does not occur "face to face".

### 6.6.2 Currency Code

The default currency code is set to "208" (0x32 0x30 0x38) DKK

If the field for currency code is empty the POS will default choose currency code "208" DKK.

The field is considered as an 'empty' one if it's filled by '0' (0x30).

Following currency code is supported by the POS:

"208" DKK **DEFAULT**

"752" SEK

"578" NOK

"826" GBP

"840" USD

"978" EUR

### 6.6.3 Cashier ID

The 'Cashier ID' field is an optional one and may be use in case if POS is operated by several persons. The field's value will be accepted by the POS if 2 following conditions are satisfied:

- a) POS itself is working in the 'Cashier ID' mode.
- b) The value sent by ECR match with Cashier ID Table in the POS, i.e. Cashier ID value exists in the Table.

The field is considered as an 'empty' one if it's filled by '0' (0x30), otherwise it must represent a Cashier ID as 2 ASCII digits in range '01' – '99'.

### 6.6.4 Amount

Amount value is represented in the minimal currency unit ( øre for DKK ) without a decimal point character. E.g. " 1.00" is expressed as 100.

0x39 0x33 0x35 0x00 ( Total Amount = 93.50 )

### 6.6.5 Gratuity Amount

Gratuity Amount value is represented in the minimal currency unit ( øre for DKK ) without a decimal point character. E.g. " 1.00" is expressed as 100.

N.B. Gratuity function is an optional one, thus this field has to present in the message ONLY when POS is setting up to support Gratuity. If there's no gratuity, belongs to current transaction, the field must be filled by ASCII zeroes (0x30).

### 6.6.6 Response Code

This field appears in Message Y only and is used to indicate the result of the request.

0x30 Accepted  
0x31 Declined  
0x32 Technical Failure  
0x33 Paper out\*

\* Important to note, that in case of 'Paper Out' response, it will overlap original response (e.g. 'Accepted' or 'Declined'). However, when the problem with paper is fixed, POS will re-send last response message and thus inform the ECR about last Transaction/Day End result.

### 6.6.7 Card Name

This field appears in Message Y only if corresponding option is active on the POS side.

The value is represented as 16 characters ASCII string right padding with spaces.

### 6.6.8 CRC

Cyclic redundancy check, CRC 16 forward ( Generator polynomial:  $x^{16}+x^{12}+x^5+1$  ), is calculated on fields of control.

Example of CRC calculation:

Test Message: "ABCDEF" 6 byte long.

CRC: 0x94 0x4D

### 6.6.9 IDLE STATE ( Terminal Ready )

This Request is issued by the ECR in order to check if the POS is in IDLE STATE.

This Request may be use by the ECR if the terminal is an Attended POS, but if the POS is an Unattended Terminal the ECR must use this request to check if the POS is in Idle State.

ENQ            0x05    1byte

The ENQ character is the Request to send to the POS to check if the POS is in Idle state.

If Terminal is in Idle state it will Response back with the character ACK

ACK            0x06    1byte

If no ACK is received from the POS the POS is not in Idle state.

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