



POS SEMI- INTEGRATION GUIDE

ECR-POS INTEGRATION

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VERSION CONTROL

Version	Comment	Changed By	Date
1.0	Initial Version	N Mbatha	2025/03/10
1.1	Improvements to the device response to the client.	N Mbatha	2025/05/13
1.2	Improvements to the device response to the client	N Mbatha	2025/06/20
1.3	Added a wake call when a transaction is initiated.	N Mbatha	2025/07/11
1.4	Added QUERY_STATUS, CANCEL commands to the integrator. Added an optional TransactionID in the transaction body to reference transactions. Minimum SBG POS v0.0.8.4 required.	N Mbatha	2025/08/18
1.5	Added details around troubleshooting	N Mbatha	2025/12/23

INTRODUCTION

In today's rapidly changing payments landscape, merchants are seeking ways to better manage their businesses without having to worry about the administration of compliance and security. The semi-integration solution bridges the gap between a traditional full integration and standalone payment application processing, providing Point-of-Sale (POS) system developers with a lightweight specification integrate into the POS device.

This guide provides a simple way to directly integrate into the Standard Bank card machine without the need for a third-party payment processor. The machine is fully equipped with a fully PCI/DSS - Payment Card Industry (PCI)/ Data Security Standard (DSS), certified payment application that has the capability of independently switching a transaction from the client to the acquirer. This integration takes away the need to worry about compliance as the application is equipped with point-to-point encryption. The role of the External Cash Register (ECR) is reduced to connecting to the POS device and triggering a (payment) function.

INTEGRATION COMPONENTS

Integration Between Cash Register, PAX A920Pro and Standard Bank



The existing components include 1. the external cash register (ECR/Till), 2. the POS device, and 3. the Acquiring Bank

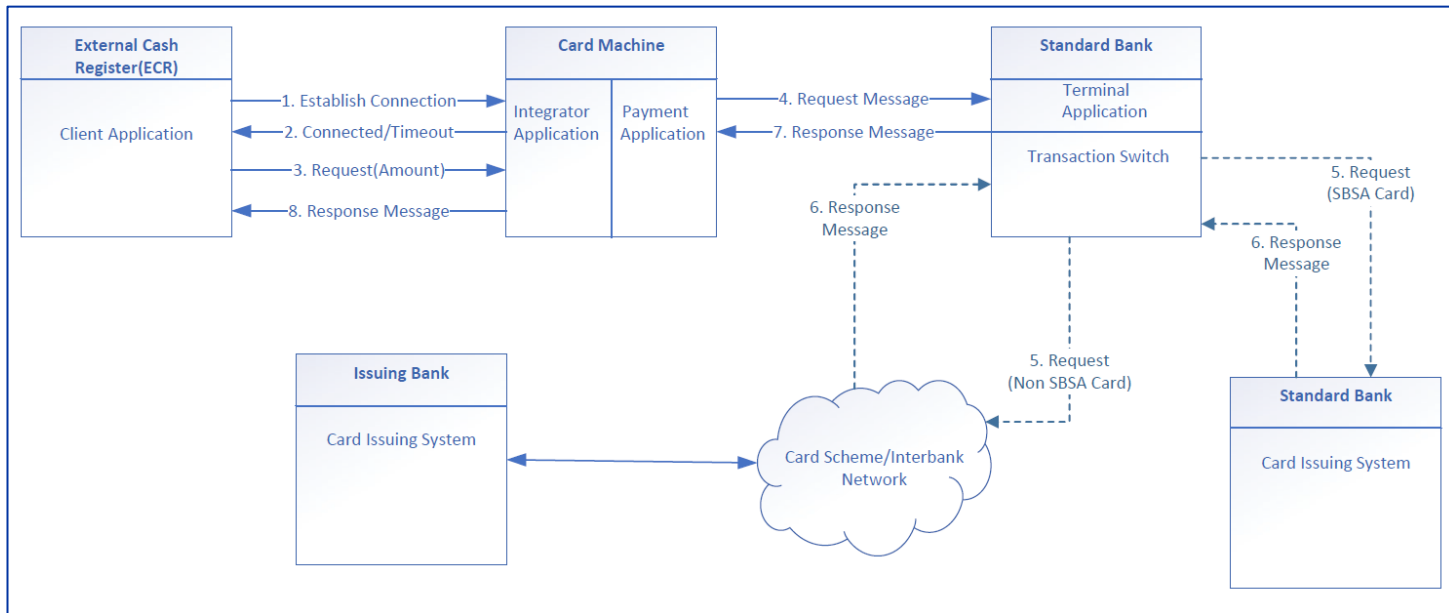


To achieve the seamless integration, SBG POS introduces a sub-component that enables the POS Device to establish a connection with the third-party POS application. This connection can be facilitated through TCP/IP communication.

The POS application sits on the ECR and the POS device through the POS listener listens for the incoming connections and receives and conveys the commands to the payment application, SBG POS.

SBG POS has a built-in secure communication (TLS) bridge to Standard Bank and handles the authentication leg with the bank. The response is then passed back through the listener to the ECR application.

TRANSACTION FLOW



1. Establish Connection – the client application establishes the connection to the card machine
2. Connected/Timeout – the card machine accepts the connection from the client
3. Request (Amount) – the financial request is sent to the card machine with the amount to be authorised
4. Request Message – the card machine constructs and sends the request message to the Standard Bank terminal application.
5.
 - a. Request Message (SBSA Card) – the transaction switch sends the request message to card issuing system for a Standard Bank issued card.
 - b. Request Message (Non SBSA Card) – the transaction switch sends the request message to the relevant card scheme or interbank network for any other bank issued card
6. Response message – the transaction switch receives the response from the issuing bank
7. Response Message – Standard Bank sends the response message to the card machine
8. Response Message – the card machine passes the response to the client application

DEVICE TYPES

There are different device types catering to different needs. The print device offers printing functionality, battery support and in most cases mobile sim support which are suitable for standalone operation. Both devices can be used in the integration setup. The distinguishing features are listed below:

	A920Pro	A35
		
Payment App	✓	✓
Rechargeable Battery	✓	✗
Receipt Printing	✓	✗
Barcode Scanner	✓	✗
WIFI	✓	✓
3G/4G Sim	✓	✗
Ethernet cable support	✗	✓

TCP/IP XML INTERFACE SPECIFICATION

The interface specification details out the method of communicating with the card machine. Subsequently, the request message format expected by the machine and the response message format returned to the ECR is detailed below.

1. Protocol Details:

Communication Protocol: TCP/IP

Port: 45001

Transport Layer: Persistent TCP Socket

2. General Communication Flow

Client connects to designated device IP and port 45001. Client sends XML request message. Server processes the request and responds with an XML response message.

Connection can remain open for further requests, or optionally close after each transaction (configurable). Because multiple messages can be sent over the stream, the request message should be enclosed with STX (start of text) and ETX (end of text) characters. See the example of ascii characters below:

```
// STX (Start of Text) character (ASCII 2)
char stx = (char) 0x02;

// ETX (End of Text) character (ASCII 3)
char etx = (char) 0x03;
```

3. Message Envelope Format

All messages (request & response) follow this structure:

```
<Message>
  <Header>
    <MessageType>...</MessageType>
  </Header>
  <Body>
    <!-- Message-specific content here -->
  </Body>
</Message>
```

Image example of message including STX and ETX characters:

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<Message>
  <Header>
    <MessageType>transaction</MessageType>
  </Header>
  <Body>
    <TransactionType>purchase</TransactionType>
    <TransactionAmount>1</TransactionAmount>
    <TransactionID>inv001</TransactionID>
  </Body>
</Message>
```

4. Functions

Function	Description	Data Elements
PURCHASE	Transaction to purchase goods and/or services	TransactionType: PURCHASE TransactionAmount e.g. 10.55 Optional: TransactionID
PURCHASE_WITH_CASH	Transaction to purchase goods and/or services and withdraw cash within the same transaction	TransactionType: PURCHASE_WITH_CASH TransactionAmount e.g. 10.55 CashAmount e.g. 100 Optional: TransactionID
CASH_WITHDRAWAL	Transaction to withdraw cash	TransactionType: CASH_WITHDRAWAL TransactionAmount e.g. 10 Optional: TransactionID
REFUND	Transaction to process funds into the cardholders account	TransactionType: REFUND TransactionAmount e.g. 10.55 Optional: TransactionID
QUERY_STATUS	Function to query the status of the transaction	TransactionType: QUERY_STATUS TransactionID
CANCEL	Used to abort the transaction before a card is presented.	TransactionType: CANCEL

PRINT_BATCH_REPORT	Function to return the list of transaction within a period.	TransactionType: PRINT_BATCH_REPORT DateFrom DateTo ReportType
SETTLEMENT	Function to initiate batch closure	TransactionType: SETTLEMENT

A. Transaction

MessageType: TRANSACTION

I) Financial Payment Types

Supported: PURCHASE, PURCHASE_WITH_CASH, CASH_WITHDRAWAL and REFUND

Purchase: initiates a sale of goods and services.

Purchase_with_cash: initiates a sale with a cash withdrawal.

Cash_withdrawal: initiates a pure cash withdrawal

REFUND: initiates a refund transaction.

Request Example:

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
```

```
<Message>
```

```
  <Header>
```

```
    <MessageType>TRANSACTION</MessageType>
```

```
  </Header>
```

```
  <Body>
```

```
    <TransactionType> PURCHASE_WITH_CASH </TransactionType>
```

```
    <TransactionAmount>10</TransactionAmount>
```

```
    <CashAmount>5</CashAmount>
```

```
    <TransactionID>TranID</TransactionID>
```

```
  </Body>
```

```
</Message>
```

Response Example:

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<Message>
```

```
  <Header>
```

```
    <CARD_DESCRIPTION/>
```

```
    <RESULT>APPROVED</RESULT>
```

```
    <MERCHANT_NO>3163318</MERCHANT_NO>
```

```
    <ENTRY_MODE>CONTACTLESS</ENTRY_MODE>
```

```
    <TRANSACTION_ID/>
```

```
    <BATCH_NO>2</BATCH_NO>
```

```
    <ISO_RESPONSE_CODE>00</ISO_RESPONSE_CODE>
```

```
    <SIGNATURE>false</SIGNATURE>
```

```
    <DISPLAY_TEXT>APPROVED</DISPLAY_TEXT>
```

```
    <AUTH_CODE>014900</AUTH_CODE>
```

```

<AUTH_MODE>HOST</AUTH_MODE>
<AC>B54A97A01DD59407</AC>
<AID>A0000000041010</AID>
<PAN>530351*****2964</PAN>
<RRN>PMDAwM002349</RRN>
<TSI>0000</TSI>
<TVR>0000008001</TVR>
<UTI>e23394ed-642b-4fd0-4d15-1967280d2ba8</UTI>
<DATE>250412</DATE>
<TIME>135839</TIME>
<TERMINAL_ID>1850496101</TERMINAL_ID>
<TERMINAL_NO>0000NX99</TERMINAL_NO>
<RESPONSE_CODE>000</RESPONSE_CODE>
<RECEIPT_NO>20</RECEIPT_NO>
<OTHER_AMOUNT>R0.00</OTHER_AMOUNT>
<RECEIPT/>
<AMOUNT>R0.10</AMOUNT>

```

</Header>

</Message>

II) Non-Financial Payment Types

Supported: PRINT_BATCH_REPORT, SETTLEMENT, QUERY_STATUS

Print_batch_report: requests a printout of the batch report by number or date.

Settlement: Used to upload and close the current batch of transactions for settlement.

Query_status: Used to query the transaction status by transaction id. The transaction being queried must have been accompanied by the transaction id.

Request Example:

PRINT_BATCH_REPORT by date

<Message>

<Header>

<MessageType>TRANSACTION</MessageType>

</Header>

<Body>

<TransactionType>PRINT_BATCH_REPORT</TransactionType>

<ReportType>DATE</ReportType>

<DateFrom>250710</DateFrom><DateTo>250712</DateTo>

</Body>

</Message>

PRINT_BATCH_REPORT by batch number

<Message>

<Header>

<MessageType>transaction</MessageType>

</Header>

```
<Body>

  <TransactionType>print_batch_report</TransactionType>

  <ReportType>NUMBER</ReportType>

  <BatchNumber>371</BatchNumber>

</Body>

</Message>
```

SETTLEMENT

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
```

```
<Message>

  <Header>

    <MessageType>TRANSACTION</MessageType>

  </Header>

  <Body>

    <TransactionType>SETTLEMENT</TransactionType>

  </Body>

</Message>
```

QUERY_STATUS

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
```

```
<Message>

  <Header><MessageType>TRANSACTION</MessageType></Header>

  <Body>

    <TransactionType>QUERY_STATUS</TransactionType>

    <TransactionID>INV0015</TransactionID>

  </Body>

</Message>
```

PRINT_BATCH_REPORT

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<Message>

  <Header>

    <RESULT>SUCCESS</RESULT>

    <MERCHANT_NO>2233447</MERCHANT_NO>

    <TRANSACTION_ID/>

    <BATCH_NO>33</BATCH_NO>

    <TERMINAL_NO>0000CAP2</TERMINAL_NO>

    <BATCH_REPORT_JSON>[B@9a6cc90</BATCH_REPORT_JSON>

    <DESCRIPTION/>

      <BATCH_REPORT>

        <line1>Batch Report (#33)</line1>

        <line2>Transactions: - 1</line2>

        <line3>Opened: - 2025/07/11 12:29:06</line3>

        <line4>Printed: - 2025/07/11 13:31:31</line4>

        <line5>Transaction Details</line5>
```

<line6>D:11/07/25 - T:13:11:20</line6>
<line7>A:453597 - N:24</line7>
<line8>M:Host:Fallback</line8>
<line9>UTI:e60f442e-5233-5375-e09d-02b5c231c269</line9>
<line10>P:54133300****29</line10>
<line11>Purchase - R10.00</line11>
<line12>Payment Type Summary</line12>
<line13>Mastercard/Visa</line13>
<line14>Purchases - R10.00</line14>
<line15>Cash - R0.00</line15>
<line16>(Refund) - (R0.00)</line16>
<line17>TOTAL - R10.00</line17>
<line18>TOTALS</line18>
<line19>Purchase - R10.00</line19>
<line20>Cash - R0.00</line20>
<line21>(Refund) - (R0.00)</line21>
<line22>TOTAL - R10.00</line22>

</BATCH_REPORT>

</Header>

</Message>

SETTLEMENT

<?xml version="1.0" encoding="UTF-8"?><Message>

<Header>

<RESULT>SUCCESS</RESULT>

<TRANSACTION_ID/>

<BATCH_NO>12</BATCH_NO>

<DISPLAY_TEXT>SETTLEMENT SUCCESSFUL</DISPLAY_TEXT>

<TERMINAL_ID>1853364204</TERMINAL_ID>

<BATCH_REPORT_JSON>[B@afe178b</BATCH_REPORT_JSON>

<DESCRIPTION/>

<BATCH_REPORT><line1>Test Integrator</line1>

<line2>MID:000000003404129</line2>

<line3>TID:0000NX77</line3>

<line4>S/N:1853364204</line4>

<line5>Batch Report (#12)</line5>

<line6>Transactions: - 2</line6>

<line7>Opened: - 2025/09/23 11:16:51</line7>

<line8>Printed: - 2025/09/23 11:21:27</line8>

<line9>Transaction Details</line9>

<line10>D:23/09/25 - T:11:16:51</line10>

<line11>A:736500 - N:2</line11>

ECR-POS Semi-Integration

```

<line12>M:Host:Tap</line12>
<line13>UTl:0e06c310-1bbf-8698-e3aa-3e04bc9e93c3</line13>
<line14>P:53035100*****64</line14>
<line15>Purchase - R1.00</line15>
<line16>D:23/09/25 - T:11:17:21</line16>
<line17>A:424300 - N:4</line17>
<line18>M:Host:Tap</line18>
<line19>UTl:a06f0e4f-93cd-57db-f952-827772ba51e1</line19>
<line20>P:53035100*****64</line20>
<line21>Refund - R1.00</line21>
<line22>Payment Type Summary</line22>
<line23>Mastercard/Visa</line23>
<line24>Purchases - R1.00</line24>
<line25>Cash - R0.00</line25>
<line26>(Refund) - (R1.00)</line26>
<line27>TOTAL - R0.00</line27>
<line28>TOTALS</line28>
<line29>Purchase - R1.00</line29>
<line30>Cash - R0.00</line30>
<line31>(Refund) - (R1.00)</line31>
<line32>TOTAL - R0.00</line32>
<line33>**BATCH CLOSED**</line33>
<line34>**SUCCESSFULLY**</line34>
</BATCH_REPORT>
</Header>
</Message>

```

MessageType: INSTRUCTION

Supported: CANCEL

Cancel: Used to abort a transaction sent to the device before a card is presented.

Request Example:

CANCEL

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<Message>
    <Header><MessageType>INSTRUCTION</MessageType></Header>
    <Body><Cancel>YES</Cancel></Body>
</Message>

```

5. Response Codes

00 – Success; <> 00 – Declined

6. Request Message Data Elements

Field	Description	Format
MessageType	A type of message describing a type of transaction	Text
TerminalId	An identifier used to identify a device used to process a transaction. This field is optional in the request message.	Four-digit alphanumeric characters preceded by 4 zeros e.g. 0000TID1
MerchantId	An identifier used to identify a merchant from which a transaction comes. This field is optional in the request message	Up to seven-digit numeric characters preceded by zeros to make it 15 characters e.g. 000000001234567
Timestamp	The time during which the transaction is sent from the device	Datetime
TransactionType	The transaction type as described in 4.1.	Text e.g. Purchase, Balance Enquiry, etc.
TransactionAmount	The amount to be authorised in the transaction	Numeric including 2 decimal values e.g. 10.12
CashAmount	The cash amount as applicable in the purchase with cash transactions.	Numeric e.g. 10
TransactionID	The unique transaction reference local to the device and client used to reference a transaction.	Alphanumeric value up to 30 characters e.g. INV000001

7. Response Message Data Elements

Field	Description
MessageType	A type of message describing a type of transaction being processed e.g. Purchase, Balance Enquiry, etc.
ResponseCode	A three-digit response code that indicates the result of the transaction
ResponseMessage	An identifier used to identify a merchant from which a transaction comes
ReceiptNumber	The time during which the transaction is sent to the device
MerchantNumber	A 7-digit merchant identification number assigned
TransactionID	A unique transaction identifier that is used to identify a transaction. This is useful in the QUERY_STATUS transaction type.
BatchNumber	The batch to which this transaction belongs
ISOResponseCode	A two-digit ISO response code that indicates the result of the transaction
SignatureRequired	Indicator of whether signature is required
DisplayText	The text corresponding to the response code. E.g. Approved/Declined.
RRN	Retrieval Reference number that is used to locate the message
Date	The date when the transaction was received by the bank.
Time	The time when the transaction was received by the bank.
TerminalId	The id assigned to the card machine used to identify the machine used to perform a transaction
MerchantName	The name of the merchant to which the card machine is assigned. Not populated.
OtherAmount	This amount is the withdrawal amount is when a purchase with cash transaction is requested.
Amount	Amount requested/approved in the transaction request message
TerminalNo	Serial number of the device
Longitude	Longitude coordinate of the machine location. Not populated.
Latitude	Latitude coordinate of the location of the machine. Not populated.
Model	Model of the machine. Not populated.
Version	Version of the payment software on the machine. Not populated.

8. Minimum Receipt Data Elements

Receipt data is essential for subsequent transaction referencing and can be useful to troubleshoot any arising issues. Some of the data elements are returned in the response message. The table below describes the minimum data elements that the receipt should contain for such a purpose.

Field	Description
Merchant Name	The name of this store
Transaction date and time	From Date and Time
Terminal Id	From TerminalId
Merchant Id	From MerchantId
Serial No	From TerminalNo
Transaction Type	From TransactionType
Card Type/ Obfuscated Pan	From CardType From Pan
Transaction Amount	From Amount, 0 is declined
Cash Amount	From OtherAmount, 0 if declined.
Transaction Result	From Result. E.g. Approved/Declined
Auth Mode	From AuthMode
Auth Code	AuthCode, returned if the transaction is approved
UTI	UTI
Entry Mode	From EntryMode
Response Code	From IsoResponseCode
AID/TVR/AC	For TAP and Insert transactions

9. TROUBLESHOOTING

- When sending a transaction and receiving no response within 30 seconds; Send a query status command using the transaction id as reference
- When sending a transaction and receiving an error response, send a cancel command to reset the application.

10. GLOSSARY

Term/Word	Description
ECR	External Cash Register – the hardware used to host/run the client application used to capture the items being purchased.
POS Device	Point Of Sale device refers to the card machine used to read a payment card to process a transaction.
PCI/DSS	A set of requirements developed by card associations to govern the safekeeping of account information.
Acquirer	An entity usually a bank, that processes a transaction on behalf of a merchant.