Payment Express SCR200 Serial Communications

SCR Serial Message Specification 1.6.60 / v1.3.4.x Firmware

paymentexpress®

Document Revision Information

Version	Date	Revision Information
1.0	18/08/2011	Initial Version
1.1	30/08/2011	Formatting revisions, some clarifications
1.2	1/09/2011	Added missing functions, and added more detail on all operations
1.3	2/09/2011	Change VA to busy. Recommendations on EMV and CPT status messages were ultimately removed to keep the protocol simple
1.3.1	7/09/2011	Updated with customer feedback
1.3.2	8/09/2011	Added Transaction State diagram to appendices
1.4.0	8/09/2011	Added sections to cope with electronic purses where the card must be re-inserted on a VOID
1.4.1	16/09/2011	A minor update to the logic around initialisation
1.5.0	10/11/2011	Add stored value functions. Update to note that handling data messages is always required by POS. Updates to AUTH and TXEN behaviour
1.5.1	18/11/2011	Update to display messages
1.5.2	22/11/2011	Add card insert and card removal
1.5.3	7/12/2011	Update display message size to standard 2 x 16 character display
1.5.4	25/01/2012	Extend the tokens which can be set on an authorisation
1.5.5	2/02/2012	Simplify AUTH and add additional information to GET1 command
1.5.6	9/02/2012	Update some fields and remove prototype functions
1.5.7	16/02/2012	Update GETR to allow longer receipts. Modify Auth to allow a return code indicating a bad card read.
1.5.8	24/02/2012	Update specification to show tx timeouts in initial version of TXEN “toggling” implementation
1.5.9	2/03/2012	Add guidance on buffering for integration with embedded devices
1.5.10	8/03/2012	Add new code for TXEN not enabled on commands that require a channel
1.6.0	16/3/2012	Add next generation protocol features
1.6.1	3/04/2012	Add PxScrController Section
1.6.2	5/04/2012	Changes in response to comments
1.6.4	30/4/2012	Update several functions to include optional transaction ref
1.6.5	5/03/2012	Update to include system prompt IDs and update functions using Snapper stored value cards. Allow the balance to be retrieved in some cases
1.6.6	8/05/2012	Update POST specification for SCR200 messages
1.6.8	16/08/2012	Add details and refinement around Stored Value card interactions
1.6.9	10/09/2012	Update SVE error code
1.6.10	13/09/2012	Update SVR description to correctly describe retry behaviour
1.6.11	09/10/2012	Remove extraneous snapper error codes
1.6.12	31/10/2012	Add multi-merchant slot information
1.6.13	02/11/2012	Remove TxnRef for multiple Auth / Complete (Slots are used instead)
1.6.14	12/11/2012	Add STS for upgrade pending, add upgrade now command
1.6.15	19/11/2012	Add diagnostic commands
1.6.16	19/11/2012	Add purchase operation
1.6.17	22/11/2012	Add backlight (LUM) operation
1.6.18	05/12/2012	Add merchant reference to GET1 response for power loss recovery
1.6.19	18/02/2013	Fix error in AUTH which incorrectly described the default for Auth Slot.
1.6.20	28/02/2013	Refined slot ID (still one error). Updated the ENTD command
1.6.21	22/03/2013	Add card token method for entry / exit
1.6.22	10/04/2013	Add DpsTxnRef to refund
1.6.23	05/06/2013	Added card read command (mainly for non-PCI card reads)
1.6.24	07/06/2013	Add corrected information for PCI requirements. Correct err~vg response
1.6.25	12/06/2013	Add current matching General Release firmware version to document
1.6.26	03/07/2013	Described WI result code, updated TX message info. Updated CDTK, CDTKU.
1.6.27	03/07/2013	Reserved sequence numbers 900000 to 999999 for Payment Express usage. Removed CDTKU
1.6.28	08/08/2013	Updated ITR command to include multiple reports required for testing/diagnostics
1.6.29	03/10/2013	Updated entry/exit commands for CDTK followed by AUTH/PUR, also advice on dealing with error recos
1.6.30	04/10/2013	Added CardSuffix and CardId to CDTK response
1.6.31	04/10/2013	Extended secure mag stripe caching across CDRD/CTDK/PUR/AUTH sequences
1.6.32	04/10/2013	Added CINFO command

1.6.33	10/01/2014	Clarified some explanations for 1.2.8.12
1.6.34	4/02/2014	Updated CDRD command, which now returns 76 if a PCI card is presented, in addition to masking the track2 data (which it already did). Removed references to retrieving TLV data from the card which had not been implemented.
1.6.35	10/02/2014	Added OemData field to transaction commands, and the OEMD command to retrieve OemData updated by the servers.
1.6.36	04/03/2014	Added OemDataFormat fields
1.6.37	10/03/2014	Updated transaction state table to include purchase and refund transaction states
1.6.38	25/03/2014	Added VF example reco to SVE documentation
1.6.39	2/04/2014	Note that ScrData can be empty
1.6.40	15/04/2014	Add CFG~LOGON command
1.6.41	13/05/2014	Reviewed for 1.3.0.6 release
1.6.42	20/06/2014	Added the CashOut field to the PUR transaction, and Surcharge Amount
1.6.43	18/07/2014	Added signature receipt support and the SIG command, also more GET1 fields for PxPP emulation
1.6.44	28/08/2014	Added receipt option to retrieve a Logon receipt
1.6.45	29/08/2014	Added UID to CDRD response
1.6.46	1/10/2014	Removed V7 reco from example responses which SCR does not produce. Typically VG or VK instead
1.6.47	7/1/2015	Added TxnResultDisplaySec to SETD and ResultPromptIDDisplayed to the response messages of AUTH, PUR, REF. Removed TXN~SIG, the SCR just indicates if a transaction needs a signed receipt, and it is the POS's responsibility to VOID the transaction if the signature is not accepted.
1.6.48	09/01/2015	Changes to target multiple firmware revisions, i.e. 1.3.3.X and 1.3.0.8A.
1.6.49	30/1/2015	SignatureRequired is also signalled on GET1. TxnRef is expanded to 40 characters, and the allowed characters expanded also.
1.6.50	23/2/2015	SIG command simplified. Switched to 'Payment Express' rather than DPS.
1.6.51	27/2/2015	TxnRef returned from GET1. DISP can now specify the message should be displayed only on the SKP or only on the POS, or on both.
1.6.52	27/2/2015	TXN~PUR updated for cash out, the Amount field includes the cash out amount.
1.6.53	3/3/2015	Removed CDRD's reply field that contained cardholder name. Returning that value is not best PCI practice.
1.6.54	16/3/2015	Updated SETD TxnResultDisplaySec field so that the POS can specify an 'idle' message to display after transaction results are automatically displayed. Also added Width field to GETR reply.
1.6.55	19/3/2015	Updated REF command with RefundToken, and added REFT command
1.6.56	23/3/2015	Added IssuerName and PrivateCardData return fields from CDRD
1.6.57	23/4/2015	Added AlternateInitialPromptId to CDRD and CDTK
1.6.58	04/5/2015	Added AmountRequested to Auth response, ResultPromptId to REFT, upated VY description, LineSeparator to DGN~ITR message
1.6.59	06/5/2015	Updated CDTK description to clarify key rolling periods.
1.6.60	21/6/2015	Added MerchantId and TerminalIT to GSX and GET1 messages

Related Documents

Version	Document Title	Link/Location

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Contents

1 INTRODUCTION

The primary purpose of this document is to describe serial communications between the Payment Express devices and a customer's POS (Point Of Sale) hardware and software. This is to allow Payment Express customers to integrate the Payment Express hardware into their systems.

It also provides the PCI Payment Application Data Security Standard (PCI PA-DSS) implementation guide. These are the measures that you need to take if you want your integration to be PCI PA-DSS compliant. Currently this is entirely handled by the secure firmware and Payment Express host intrastructure (refer to section 13).

Please note that this document is reviewed annually, and before new releases to ensure that functional changes and security issues (if they exist) are documented. This document is also updated (and sent to all registered integrators) in the event of a change to PCI PA-DSS requirements.

This version of the manual applies to the SCR firmware version which is specified on the title page.

1.1 WHAT IS THE SCR200?

The SCR200 provides standards compliant hardware and software for performing "card present" transactions. It supports Magnetic Stripe, ICC (chip card), and Contactless (NFC) payment types. Contactless transactions require a BRF to be attached. It may optionally and transparently support PIN entry and communications with appropriate attached hardware (e.g. the Payment Express SKP200 Keypad and Display)

Figure 1: The Payment Express SCR200 (demounted)

The SCR200 is an EMV compliant transaction acceptance device. The SCR200 is complies with all relevant card industry security standards (14.2).

Integrators using the SCR200 must provide support for data communications to Payment Express.

1.1.1 Base Hardware Overview

The SCR200 hardware provides:

- Secure MCU
- Hardware accelerated encryption (Triple DES, RSA and AES) and a CRC engine
- Tamper grid and removal switch monitor
- Combined magnetic stripe card and ICC card reader interface
- 2 SAM interfaces

- 3 RJ-45 RS-232 serial ports

1.1.2 Physical Link Interface

Connection with the customer equipment is via a RJ45 connector numbered “1” and more fully described in 14.8.

The two remaining physical interfaces allow connection to a keypad (SKP200 on port “2”) and to the contactless receiver (port “3”).

1.2 PAYMENT EXPRESS HARDWARE DESCRIBED BY THIS DOCUMENT

Payment Express provides a number of hardware variants. These are composed of the following basic components

- SCR200 card reader (base unit)
- Numeric keypad
- Cancel button
- Contactless card reader (NFC)
- Communications unit: GPRS internet communications
- LCD display:

NB: The SKP200 includes numeric keypad, LCD display, Cancel button and optionally a contactless receiver

At the time of writing these are represented in the following products:

Product	Description	SCR200	Numeric Keypad	Cancel	C/less	Comms	LCD
SCR200	Card reader only	Yes	No	No	No	No	No
SCR200-SS	Card reader only – this is a different physical casing for a shorter cavity	Yes	No	No	No	No	No
SCR200-VM	Basic vending solution	Yes	No	Yes	No	No	No
SCR200-VM-L	Basic vending solution	Yes	No	Yes	No	No	Yes
SCR200-VM-L-C	Vending solution (contactless)	Yes	No	Yes	Yes	No	Yes
SCR200-VM-L-C-X	Vending Machine with communications (contactless communications)	Yes	No	Yes	Yes	Yes	Yes
SCR200-K-L	Basic unattended EFTPOS solution	Yes	Yes	Yes	No	No	Yes
SCR200-K-L-C	Unattended EFTPOS solution (contactless)	Yes	Yes	Yes	Yes	No	Yes
SCR200-K-L-C-X	Unattended EFTPOS solution (contactless, communications)	Yes	Yes	Yes	Yes	Yes	Yes

Additionally the external contactless card reader (the “BRF”) is available to allow contactless card reading with the base SCR200 package.

1.2.1 Numeric Keypad

This is required for account selection and PIN entry functions. This particularly applies to EFTPOS transactions.

1.2.2 Standards Compliance

Details of compliance with EMC standards are detailed in Appendix 14.1. Payment Card Industry Compliance is detailed in 14.2

1.3 THE PA-DSS IMPLEMENTATION GUIDE

Section 13 describes how to setup an SRC200 with optional attached hardware in such a way that sensitive data such as cardholder data is protected.

1.3.1 Payment Application Data Security Standard (PA-DSS)

https://www.pcisecuritystandards.org/security_standards/documents.php?association=PA-DSS

The PA-DSS is a security standard developed by the PCI Security Standards Council to help software vendors develop secure applications that protects sensitive information such as cardholder data and pin data.

1.3.2 Payment Card Industry Data Security Standard (PCI-DSS)

The PCI-DSS is a set of requirements designed to protect cardholder data. The requirements are a minimum set of policies, procedures, network architecture

1.3.3 Relationship between PCI-DSS and PA-DSS

The requirements for PA-DSS are derived from the PCI-DSS requirements. The use of a PA-DSS compliant application by itself does not make an entity PCI-DSS compliant, since that application must be implemented into a PCI-DSS compliant environment and according to the PA-DSS Implementation Guide.

Secure payment applications, when implemented in a PCI-DSS compliant environment, will minimize the potential for security breaches leading to compromising card-holder data.

Please note that Payment Express provide both this API which is PCI-PA-DSS compliant, and PCI DSS certified infrastructure for handling card holder information.

1.4 TERMS AND ABBREVIATIONS

Throughout the following document the term “POS” will be used to signify the integrator’s Point of Sale software. The term “SCR” is used to refer to the SCR200 (either the base unit – or extended Payment Express hardware). “Host” refers to the Payment Express server responsible for processing e-commerce transactions.

Other terms are below:

Term	Explanation
PIN	Personal Identification Number. In the context of card transactions this is typically a secret four digit value, entered to approve a transaction
PCI	Payment Card Industry Standards Security Council (established 2006). Set data security standards for hardware and software in the payments industry
PTS	PIN Transaction Security. As set of standards applied to a security standards applying to secure devices such as the SCR200
PCI DSS	The PCI Data Security Standard: a specification describing how card holder data can be secured end to end throughout all payment related systems
PCI PA-DSS	The PCI Payment Application Data Security Standard
SCR	Secure Card Reader. The Payment Express SCR200 PTS device in this document
POS	Point of Sale. Used in this document to mean the integrators Point of Sale Software
CRC	Cyclic Redundancy Check
Host	The Payment Express Host. Provides e-commerce services on the internet
NFC	Near Field Communication (used in the context of contactless cards)

1.5 SUPPORTED VERSIONS

The document targets the follow firmware versions, Payment Express SCR 1.3.4.X

2 NETWORK LAYOUT AND PROTOCOL

There are several options now available for integration with the SCR200.

2.1 STANDARD POS INTEGRATION

The following diagram shows a typical POS integration (Figure 2):

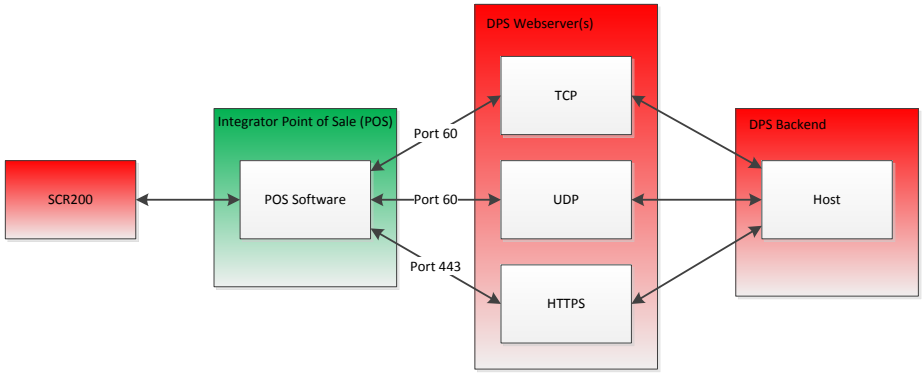


Figure 2: Typical POS integration

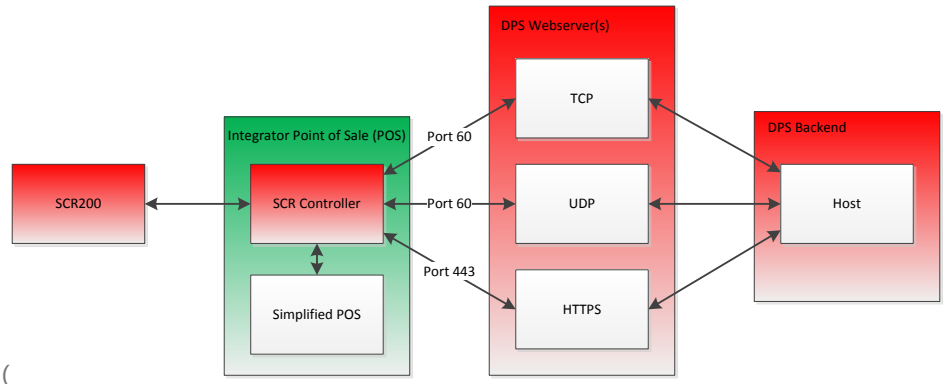
In this scenario the POS must perform three sets of functions:

- SCR200 initialisation
- Forwarding encrypted network traffic to and from the Payment Express Host
- Controlling the SCR200 for transactions

Payment Express components are shown in red. Integrator components in green.

2.2 SIMPLIFIED POS INTEGRATION WITH SCR200 CONTROLLER

This scenario applies to systems which have a Microsoft Windows or Linux operating system that can run the



PxScrController software (

Figure 3):

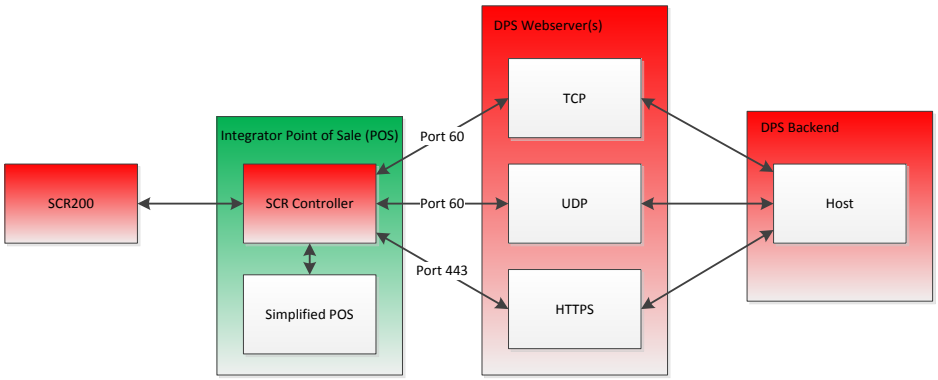


Figure 3: Integrations using the PxScrController software

In this scenario the PxScrController takes care of:

- SCR200 initialisation
- Forwarding encrypted network traffic to and from the Payment Express Host

Payment Express components are shown in red. Integrator components in green.

The POS must only control the SCR200 financial operations. “CFG” and “MSG” message types do not need to be coded for (see following sections)

If you wish to use the simplified POS integration please enquire with your developer program contact at Payment Express.

3 MESSAGE PROTOCOL

3.1 OVERVIEW

3.1.1 Using the PxScrController

The SCR Controller service is available for linux and windows platforms. This service takes over a number of aspects of the required communications with the SCR200. In particular it removes the need of the POS to perform maintenance of the serial and host connections, and transmission of encrypted messages between the SCR200 and the host.

Payment Express hardware may also handle the requirement to communicate with the Payment Express host (by providing a communications channel to the host).

3.1.2 Optional Protocol Elements

Payment Express Hardware optionally includes modules for displaying data to an end user, and for communicating with Payment Express servers. These hardware elements are not always integrated, and which capabilities are present will affect which parts of the serial protocol need to be used.

Basic functionality:

- The integrator uses the SCR200 to process card present transactions

If the integrator is not integrating with a product containing a Payment Express communication component, or using the PxScrController service:

- The integrator must provide a data channel between the SCR200 and Payment Express systems on the internet (Payment Express cryptography ensures that the vendor cannot ever view secured transaction information).

If the integrator is connecting to Payment Express hardware with an LCD:

- The integrator uses the SCR200 to communicate messages and images to the end user of the POS

The integrator may optionally communicate directly with Payment Express online services. The SCR200 may be used to facilitate interactions to Payment Express servers, by providing encryption services and message tokens.

3.1.3 All Functions

The SCR200 serial protocol supports the following broad types of functionality:

- Transaction processing for “card present” transactions.
- Displaying POS application specific images and messages on display hardware connected to the SCR200
- Status queries: Is the SCR200 ready to use?
- Configuration: Setting the protocol version, putting the device into sleep mode
- Message processing: Enabling and disabling protocol features, communicating data between the SCR200 and Payment Express internet servers
- Authentication functions: Functions to facilitate communications between the POS and Payment Express internet services.
- Level 1 functions: Low level card functions, allows restricted information about a card (insertion, removal and some reading of card information).

All communications are paired, there is a response for each request, although (in some cases) new requests may be issued before a response is received (e.g. a status request).

3.2 MESSAGE FORMAT

NOTE: CRCs are not currently implemented at this time. The following CRC information is forward looking.

Every message originating from the POS or originating from the SCR contains at least two parameters indicating the object (or category) of the message and the action requested, followed by a message specific list of additional message specific parameters and finally followed by a CRC value if CRC is enabled for the SCR.

Messages can contain only ASCII characters from decimal 32 (ASCII space) to decimal 126 (ASCII '~' character) with the tilde ('~') character being used as a separator between parameters. The ASCII CR (decimal 13) is always present to terminate a message. Maximum message length (total number of characters including the CR terminator is 512).

The format of a message sent to the SCR from the POS is (with CRC), note the use of upper case object and action:

OBJECT~ACTION~action parameter 1~action parameter 2~crc[CR]

Without CRC:

OBJECT~ACTION~action parameter 1~action parameter 2~[CR]

The format of a message from the SCR to the POS is (with CRC), note the use of lower case object and action:

object~action~action parameter 1~action parameter 2~crc[CR]

Without CRC:

object~action parameter 1~action parameter 2~[CR]

CRCs are expressed in decimal (not hex). The SCR will use the first message it receives from the POS after power on to determine if CRCs should be set on subsequent messages.

Messages originating from the SCR will have the object and action parameters represented in lower case.

3.3 BACKWARDS AND FORWARDS COMPATIBILITY

Except in extraordinary circumstances the SCR200 will maintain backwards compatibility. It does this by treating missing trailing parameters as null. This specification will where possible also obey this stricture: Future versions will add parameters in addition to existing ones (i.e. trailing parameters)

POS implementations are required to be forwards compatible. This means messages from the SCR with additional fields unknown to the POS must be ignored.

3.4 SERIAL CONNECTION PARAMETERS

The communications protocol is RS232 level at 115200 baud, 8 bit, no parity and no flow control.

3.5 MESSAGE OBJECTS AND ACTIONS

Each object represents a functional capability and defines certain actions that are permitted. Request messages sent from the POS to the SCR have the object and action in uppercase, and response messages from the SCR have the object and action in lowercase.

Object	Description	Actions	Action Descriptions
CFG	Set Configuration	SETD	Set POS Device ID and minimum protocol version supported by POS.
		LUM	Set system levels for diplay and pin pad illumination
		SHUT	Shutdown / Sleep Mode
		FINS	Install new firmware if there is an image to install
TXN	Transaction Processing	AUTH	Authorise
		COMP	Complete approved authorisation
		PUR	Purchase
		VOID	Cancel Transaction
		REF	Refund
		SVP	Stored Value Purchase
		SVR	Stored Value Refund
		SVE	Stored Value Error Recovery
		GET1	Get Transaction Information
		GETR	Get Transaction Receipt Suitable for Printing
STS	Query Status	GS1	Get Online and Availability status and current time.
		GSX	Get Extended Status
		BTN	Button Pressed

		LOG	Retrieve a Log Event
DSP	Display (Only allowed for SCR200 Devices with optional LCD display)	DISP BMPS PDSP	Display Text Bitmap Show (Reserved – Not yet in production) Display (on POS hardware) request from SCR (non PIN)
DGN	Diagnostic	MSR ICC NFC PP DSP	Magnetic Stripe Read ICC Card Read Near Field Card (Contactless) Read Pin Pad Display
PED	PIN Entry Device	GETI	Get Input from PIN Pad
MSG	Messaging (Not required where Payment Express communication hardware is used)	TXEN tx RX	Enable or Disable Transmit from SCR. Transmit Message from SCR to POS Transmit message from Host to SCR
L1	Level 1 ICC and magnetic stripe access	CDI CDO CDTK CDRD	Card inserted Card removed Card token (for entry / exit) Card read (low level data only for non-PCI cards)
err	Indicates an error condition	VG	The message was badly formed and the Object or Action could not be identified

In the following section the arguments for each type of message are defined. Fields that must be set verbatim are shown in **bold** (i.e. the Object and Action). Many of the messages require the same formatting and have the same format limitations. These are cross referenced to the appendices where exact formatting information may be found.

A carriage return at the end of each command is implicit in the example communications provided.

3.6 SCR200 ERROR RESPONSES

After sending a request to the SCR, it will reply with a response message. The 4th field is always a two character code indicating success (with reco 00) or a failure reason. In the case of an error response, the remainder of the reply fields may not be present, depending on how much of the requested processing was performed. Additionally expected fields might not be present in the case where the SCR firmware is upgraded to a version that supplies an additional response field, but due to some incompatibility the firmware later has to be rolled back. For those reasons it is best to ignore any additional unexpected fields from the SCR, and to allow for missing fields at the end of a response message.

3.7 SERIAL STARTUP AND BADLY FORMED MESSAGES

If the SCR200 cannot read the object or action parts of a message it will respond with the error message. Consider the following malformed message and its response:

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
err~VG~41414141414141414141~~
```

This means: The object could not be identified in the last message. The hex encoded characters which could not be decoded (up to the first 10 characters) for the object and action. In this case no ~ separator was detected, so the second response argument is blank. This display allow for the debugging of non-visible ASCII characters sent to the terminal

This error can occur at start-up due to noise on the serial line, or garbage in one of the serial buffers. It can also occur if additional characters are added to the command stream after the terminating <CR> (0xD) character. Consider the following three cases:

1. Garbage on the serial line at start-up (garbage at start)

```
POS: adsfk;lj1234MSG~TXEN~1234~1~
SCR: err~VG~616473666B3B6C6B3132~5458454E~
```

2. Message sent before SCR200 has started (initial characters missed)

```
POS: EN~1234~1
SCR: err~VG~454E~31323334~
```

The start-up time is one second.

3. Additional character after <CR> (‘\r’ = 0xD hex) – in this case a line feed character <LF> (‘\n’ = 0xA hex)

```
POS: MSG~TXEN~1234~1~<CR><LF>
SCR: msg~txen~1234~0~<CR>
POS: CFG~SETD~123~Device1234~USD~0005~ABCCORP_PARKING_001
SCR  err~VG~0A434647~53455444~
```

The SCR sees: “<LF> CFG” as the object – which cannot be parsed.

Please note that due to windows use of “\r\n” (0xD 0xA) as a line ending combination this is a common error when integrating with the SCR200.

Note that overall only 1000 characters will ever be processed. The message parsing is protected against buffer overflow attacks.

3.8 SCR200 TRANSACTION HISTORY

There are a number of actions which allow the POS to “recall” information from the SCR200 about a previous transaction. It is important to note that **the SCR200 stores only the last transaction (per slot)** for the current version of this specification. Attempting to access prior transactions will result in the return code “VF”, i.e. Transaction Reference Not Found (this includes GET1 and GETR actions)

Note (as advised above) this will make receipt information unavailable. The recommended logic for an integrator is to ensure that each AUTH is either COMP(leted) or VOID(ed) before another AUTH is attempted. This will ensure that receipt and last transaction information is available as expected.

The exception to this rule is if a merchant is registered for “multi-merchant” use of the SCR200 at the Payment Express host. In this case a number of slots will be configured. Only the last transaction will be remembered per slot.

3.9 DETECTING A LOSS OF SERIAL CONNECTION

It is possible that the serial connection between the POS and the SCR may be lost. A “hello” message that can be sent at any time to check the link and device status is the STS GS1 query.

If GS1 does not respond there is a problem with the serial connection, or the device is restarting (takes about 5 seconds) after a firmware update.

Note that on recovery of a serial connection a MSG + TXEN to enable online communications and a CFG + SETD may be required.

Note also that the serial port will become non-responsive when a firmware upgrade is in progress.

3.10 COMMUNICATIONS WITH PAYMENT EXPRESS

Communications to Payment Express servers are required for transaction processing and configuration download. In many instances an integrator will provide the communications channel to Payment Express. If you are providing a communications channel to Payment Express please refer to part 9 (Messaging).

3.11 BUFFER SIZES

In order to communicate with the POS an integrator must provide buffer space. The POS must be able to buffer messages from the SCR. By default these messages are 512 bytes long for communications efficiency.

If the POS also provides the communications channel to the Payment Express Host, then it must also provide a buffer for the Host to write to. By default this is also 512 bytes.

These buffer sizes may be individually reduced to 256 as a specific integration request, where 512 byte buffers cannot be supported due to hardware limitations. Payment Express will provide information on this feature on request.

The size of buffers on the SCR200 is only limited by the definition of this specification, i.e. the maximum allowed message size of 1000 bytes.

3.12 OFFLINE MODE

Offline mode has been implemented (as of firmware revision 1.271). Limitations on offline transactions are set on a per merchant basis is agreement between the merchant and the acquirer.

4 POS CONFIGURATION

4.1 CONFIGURATION OVERVIEW

The SCR requires the POS to advise the POS specific device Id and the minimum revision of this protocol that the POS can support. This communication must occur before transaction processing can be undertaken (after power on).

The SCR can also be switched into a low power mode, provided that an operation is not in progress.

4.2 SETD

The SETD action sets the POS DeviceID to the SCR and specifies the minimum protocol version that the POS can support and also the currency that the POS expects to transact in. This command will return immediately showing the either success, a mismatch or a "configuration update needed" message ("VL"). This third possibility means that configuration needs to be downloaded from Payment Express.

NB: If the POS is supplying the communications channel between the SCR and Payment Express Host, and **VL is returned by SETD**:

a) The POS must open a communications channel to Payment Express
b) The POS must notify the SCR with a MSG +TXEN message that communications can occur

It is recommended that MSG + TXEN be sent first as a matter of course.

After configuration has been downloaded from Payment Express then SETD may work without requiring a communications channel. Devices are required to communicate with Payment Express at least every 24 hours.

The SCR can be polled by the POS with a STS + GS1 request to retrieve the SCR Status. Alternatively repeat SETD commands can be attempted while "VL" is returned.

SETD must return "00" before financial transactions can begin. If a subsequent SETD is attempted and fails, transactions will not be possible until SETD succeeds again. Even after SETD succeeds, it is possible that a configuration change can be downloaded from the host in the background, and if that configuration is not compatible with the active SETD parameters then the GS1 Status will return to 1, and another successful SETD will be needed before transactions can succeed.

4.2.1 SETD Request message

<table>
<tr><th>#</th><th>Field</th><th>Value</th></tr>
<tr><td>1</td><td>Object</td><td>CFG</td></tr>
<tr><td>2</td><td>Action</td><td>SETD</td></tr>
<tr><td>3</td><td>CmdSeq</td><td>Command sequence number for pairing requests and responses (format in 14.6)</td></tr>
<tr><td>4</td><td>DeviceId</td><td>POS Device ID (format in 14.6)</td></tr>
<tr><td>5</td><td>CurrencyCode</td><td>Currency Code that this POS is configured to use. This must match the SCR configured currency code or an error is returned (currency codes are specified in 14.3)</td></tr>
<tr><td>6</td><td>ProtocolVersionPOS</td><td>Protocol Version. Minimum version that the POS can support. Current version is 0007 (format in 14.6).</td></tr>
<tr><td>7</td><td>VendorId</td><td>This is a string assigned by Payment Express for a particular integration. The field is 32 characters alphanumeric and may additionally include '-' and '_' (e.g. ABCCORP_PARKING_001)</td></tr>
<tr><td>8</td><td>Event Mask</td><td>The event mask sets the events that will be sent from the SCR200 to the POS. The mask is supplied in hex digits.
<table>
<tr><th>Bit</th><th>Meaning</th></tr>
<tr><td>0</td><td>Card insertion / removal events</td></tr>
<tr><td>1</td><td>Display message events</td></tr>
</table>
</td></tr>
</table>

		The default value is 0. A null or empty entry will return the actual mask in the response message. All bits on = 3 (not '11') (NB: In backward compatibility mode – versions less than 0007- the mask is 3) Note that transmit events cannot be blocked. These messages are not received in SCR200 hardware where a data channel is provided.
9	EnableOffline	0 = Disabled, 1 = Enable. This will only allow offline mode to be activated if it is also enabled in the Payment Express host. The default value is disabled. Please note that this is making provision for future functionality, offline transactions are not currently available.
10	SignatureSupported	For an Attended POS which can validate signature receipts, this flag must be set to 1. For Unattended, set this to 0 or leave blank. Supported 1.3.3.X or higher.
11	TxnResultDisplaySec	This field supports automatic display of transaction result messages on the SKP and/or POS. Leave this field blank for backward compatible functionality, in which the POS always has to set a prompt to show the transaction result, and then another prompt for an 'idle' message after a delay. There are 3 parts to this field, comma separated. - Number of seconds to display error messages - Number of seconds to display success messages - A prompt ID to display after the success or error message. Setting either of the first two to be 0 results in the default behaviour for that case, no prompts are set, and the POS is responsible for those. The POS may prefer that for faster operation. Some transaction result codes (eg VF) will not result in a message being displayed because the error is more of a system issue, and the transaction did not start. The POS is responsible for setting prompts in these cases. The POS can be sure a prompt was displayed if this field is set and the transaction result returned a promptID. Eg. 5,0,101 Error messages will be displayed for 5 seconds, followed by prompt 101. A success message will not be displayed (could be so that the POS can continue sooner, it will send an appropriate DISP message to display to the user itself). Supported 1.3.3.X or higher.

4.2.2 SETD Response Message

#	Field	Value
1	Object	**cfg**
2	Action	**setd**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). "00" will be returned for compatible versions, and a matching currency selection.
5	ProtocolVersionSCR	Protocol Version 0000-9999 – version of protocol implemented by SCR (format in 14.6).
6	VendorId	This is a string assigned by Payment Express for a particular integration. The field is 32 characters alphanumeric and may additionally include '-' and '_' (e.g. ABCCORP_PARKING_001)
7	Event Mask	The event mask sets the events that will be sent from the SCR200 to the POS. The mask is supplied in hex digits.
8	OfflineEnabled	0 = Disabled, 1 = Enabled. Offline transactions also have to be enabled in the downloaded configuration from the Host in order to turn this on

4.2.3 Possible Return Codes

ReCo	Meaning
00	Approved

V0	Protocol Version Mismatch
V1	Currency Mismatch
VL	Configuration update needed (communications with Payment Express host required)
WI	DeviceId does not match the required DeviceIdPrefix configured at the host
VK	Invalid message. One or more fields are malformed or too long

4.2.4 Example Communications

A successful initialisation

```
POS  CFG~SETD~123~Device1234~USD~0005~ABCCORP_PARKING_001~
SCR  cfg~setd~123~00~0006~ ABCCORP_PARKING_001~
```

A failed initialisation (bad protocol version)

```
POS  CFG~SETD~123~Device1234~USD~0005~ABCCORP_PARKING_001~
SCR  cfg~setd~123~V0~0010~
```

A currency mismatch

```
POS  CFG~SETD~123~Device1234~USD~0005~ABCCORP_PARKING_001~
SCR  cfg~setd~123~V1~0006~
```

Communications required

```
POS  CFG~SETD~123~Device1234~USD~0006~ABCCORP_PARKING_001~
SCR  cfg~setd~123~VL~0006~

POS  CFG~SETD~123~Device1234~USD~0006~ABCCORP_PARKING_001~
SCR  cfg~setd~123~VL~0006~

POS  CFG~SETD~123~Device1234~USD~0006~ABCCORP_PARKING_001~
SCR  cfg~setd~123~00~0006~
```

4.3 SHUT

The shutdown command is intended to put the SCR200 into a low power mode. This is not fully implemented yet, and is subject to review.

4.3.1 SHUT Request message

<table>
<tr><th>#</th><th>Field</th><th>Value</th></tr>
<tr><td>1</td><td>Object</td><td>CFG</td></tr>
<tr><td>2</td><td>Action</td><td>SHUT</td></tr>
<tr><td>3</td><td>CmdSeq</td><td>Command sequence number for pairing requests and responses (format in 14.6)</td></tr>
<tr><td>4</td><td>PowerLevel</td><td>The SCR takes longer to wake up from a lower power state. Actual power usage varies by hardware revision and firmware version. Default is 0 if not supplied.
<table>
<tr><th>Value</th><th>Meaning</th></tr>
<tr><td>0</td><td>Low power, but no significant delay on wakeup. The SCR will wake up and respond when the next serial command is sent, or an event such as card insertion occurs. Any messages scheduled to be sent to the host, such as the periodic logon, will be sent as usual.</td></tr>
<tr><td>1</td><td>Very low power. The SCR may take up to 1500ms to wake up. Card insertion will wake it up, which will be signalled by a CDI</td></tr>
</table>
</td></tr>
</table>

		message. It can also be woken up by a transition on the CTS pin of Port 1. The SCR will send a single carriage return when it has woken up and is ready to process messages again. Additionally it can be sent a single carriage return (the null message), and it will reply with a single carriage return if it has woken up. Messages scheduled to be sent to the host will not be sent while in very low power mode. The SCR should be woken periodically to be given a chance to send logon messages and check for config updates. Once it is woken up, SETD should be used to also wake up attached devices such as an SKP or BRF, which are also put into a low power state with powerlevel 1.

4.3.2 SHUT Response Message

#	Field	Value
1	Object	**cfg**
2	Action	**shut**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

4.3.3 Possible Return Codes

Shutdown is guaranteed to work if the serial link is functioning

ReCo	Meaning
00	Approved

4.3.4 Example Communications

Successful shutdown

```
POS  CFG~SHUT~123~
SCR  cfg~shut~123~00~
```

4.4 LUM

Configure the illumination of the pin pad or display if connected. Note: That for a regular display the illumination settings are passed with the display message, this setting affects system prompts.

4.4.1 LUM Request message

#	Field	Value
1	Object	**CFG**
2	Action	**LUM**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	DisplayLight	0-100. This indicates the strength of the backlight on the display. “0” indicates that the backlight is off. (This is a future looking statement in this revision the backlight is on or off)
5	KeyLight	0-100. This indicates the strength of the backlight on the display. “0” indicates that the backlight is off. (This is a future looking statement in this revision the backlight is on or off)

4.4.2 LUM Response Message

#	Field	Value
1	Object	**cfg**
2	Action	**lum**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). Always “00” since we cannot detect if an external display is connected

4.4.3 Possible Return Codes

Shutdown is guaranteed to work if the serial link is functioning

ReCo	Meaning
00	Approved

4.5 FINS

Upgrade the firmware if there is an image present to install. The serial command returns immediately. The upgrade itself will occur within 120 seconds. The POS can confirm that the upgrade has completed by using the STS + GS1 serial command. This will no longer indicate that a firmware upgrade is pending once the firmware update has completed.

NOTE: If the POS does not upgrade the firmware once the firmware indication flag is set the firmware will be automatically updates by the SCR200. Firmware must be updated in a timely fashion. At this time “a timely fashion” means within five minutes – future revisions will add a time stamp to indicate when the firmware must be installed

NOTE: There may be a period of 60 seconds where there will be no response to the STS + GS1 serial command during the upgrade.

4.5.1 FINS Request message

#	Field	Value
1	Object	**CFG**
2	Action	**FINS**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

4.5.2 FINS Response Message

#	Field	Value
1	Object	**cfg**
2	Action	**fins**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

4.5.3 Possible Return Codes

Shutdown is guaranteed to work if the serial link is functioning

ReCo	Meaning
00	Approved – Firmware installation complete
76	Declined – No firmware image to install

4.6 LOGON

This command sends a logon message to the host and waits for the reply. Under normal circumstances the SCR will send logon messages to the host on the required schedule anyway, but this function is provided to support manual logon attempts. It may also be used to confirm the host connection is working.

While the logon is in progress the pinpad screen will be updated to say 'Processing', and once it completes the result may be displayed on screen according to the flags in SETD. Also any idle screen specified in SETD will be applied after that.

4.6.1 LOGON Request message

#	Field	Value
1	Object	**CFG**
2	Action	**LOGON**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

4.6.2 LOGON Response Message

#	Field	Value
1	Object	**cfg**
2	Action	**logon**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

4.6.3 Possible Return Codes

ReCo	Meaning
00	Approved – Successful reponse received from the host
76	Declined – Failed response received from the host
VZ	Cannot execute command – TXEN is not enabled
U9	Timeout (No Response from Host)
WU	Logon attempt is too frequent

TRANSACTION PROCESSING

4.7 TRANSACTION PROCESSING OVERVIEW

When performing a card present transaction the POS requests an authorisation using the “Auth” message and provides an amount to be authorized. A successful outcome (ReCo = 00) indicates successful authorisation and the POS can then proceed to vend the goods or service for which payment is required (for example a ticket or a vending purchase).

If the vend is successful the POS must then promptly confirm vend completion to the SCR by means of a “Comp” message. The “Comp” message will result in irrevocable transfer of the amount requested in the “Comp” message. The amount completed may be the same or less than the amount originally authorized. It may not be more than the authorized amount. In this way, it is possible to vend product or services for which the final amount is not known at the vend start.

An example where this may be the case is vending of fuel. If the vend is unsuccessful or if for any other reason the POS needs to cancel the payment, then the POS should send a Void message instead of a Complete. Upon receipt of a Void, the SCR will cancel any outstanding authorisation. A Void may be sent before a response for an Auth has been received.

If a customer attempts a second Auth without completing or voiding the first one**, the first transaction will NOT be automatically be voided**.

Alternatively a transaction can be processed using a single “Purchase” command. This is equivalent to an Auth and Complete. A Void message can also be sent after a purchase command.

The SCR200 remembers one outstanding transaction locally (the last one per slot) for the purpose of POS driven VOID and COMP commands. If a second AUTH (or PUR) is attempted it will be allowed, but the first Auth (or Purchase) will be “forgotten” by the device (remaining in force online).

COMP and VOID commands always act on the most recent Auth.

4.8 TXN OBJECT ACTIONS

The TXN (Transaction) Object is used by the POS to access all transaction (payment) functions, whether initiating, completing or cancelling a payment, or enquiring about previous transaction outcome or attributes. The following section details each Action that may be applied to the TXN object, including input and output parameters. For the format of parameters, sent to the SCR or received from the SCR, please refer to Appendix 14.6 Parameters.

Sample Message sent to SCR

```
TXN~AUTH~1234567890123456~100~MERCHANT REFERENCE 12345678~~~[CR]
```

Authorisation requested for amount of 1.00, using Txnref “1234567890123456”, providing the optional Merchant Reference of “MERCHANT REFERENCE 12345678”.

4.9 REVERSALS FOR STORED VALUE SYSTEMS

For certain payment systems, for example electronic purse systems, a “SVR” must interact with the payment card again in order to effect the reversal of funds.

This is because the balance is maintained on the card itself. In this case, the void will require the card to be represented. If the POS is responsible for managing display, the POS will receive a message or messages from the SCR to request the cardholder re-present the card. The void will then receive a response as for a non-purse system. (NB: A response will not be received until the card is represented – or a timeout occurs)

Host communications may be required for voids with these payment systems.

4.10 AUTOMATIC VOIDS

There are two scenarios where the SCR200 will automatically VOID a transaction on the Payment Express Host.

1) A cancel button (STS + BTN) message is sent to the SCR during an AUTH (before a response has been returned). In this case the AUTH will return the "VW" code. NB: If a "00" return code is received the POS must VOID or COMP the transaction.
2) The communications channel was enabled, but the message could not be transmitted. The AUTH will return a "U9".

The automated void condition can be detected using a STS + GS1 message. If the transaction state is 3 (Reversal in progress) then the VOID is still pending. This will change to 0 (Idle / Ready) when the VOID is complete.

Note that further AUTHs may be processed while an automatic void is in progress

4.11 MULTI-MERCHANT FACILITY

Payment Express makes provision in the API for sharing a single payment terminal for sharing. The two typical cases for this usage are where several merchants share premises (e.g. a doctor's surgery), with a single payment terminal. Or where there are multiple automatic dispenser's but only a single payment terminal (e.g. fuel pumps).

This facility is not automatically configured, it is set by arrangement with Payment Express. If a multi-merchant facility is configured then providing a blank or zero slot on an AUTH or an SVP will result in an error (WA).

4.12 TRANSACTION PROCESSING EXAMPLE LOGS

The following logs illustrate actual interactions between a POS and SCR. Messages generated by the POS (sent to SCR) are preceded by a "POS" legend (which does not form part of the actual interaction). Messages generated by the SCR are preceded by a "SCR" legend.

4.12.1 Successful Online Vend Example (AUTH then COMP)

Power On – Issue Set DeviceId Command (this need only be done once at SCR power on). Messages containing "…." Indicate some of the data has been deleted for reasons of printing space.

```
POS  CFG~SETD~123~Device1234~USD~0100~ABCCORP_PARKING_001~
SCR  cfg~setd~123~00~0100~
```

One time device Setup complete, now perform Authorization for US$10.00

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~~~
SCR  dsp~pdsp~1~TAP OR~INSERT CARD~
SCR  DSP~PDSP~1~00~
SCR  dsp~pdsp~2~PROCESSING~~
SCR  DSP~PDSP~2~00~
SCR  msg~tx~3~D74A652E67……..A146AE604~
POS  MSG~TX~3~00~
POS  MSG~RX~4~C0C17BF8CD507…... AD05AA4E3DDEBE8155C0FE
SCR  msg~rx~4~00
SCR  dsp~pdsp~5~REMOVE CARD~~
SCR  DSP~PDSP~5~00~
SCR  txn~auth~1~00~1000~0000000f0000008c~
```

POS is able to successfully vend the product.
Once vended, POS now completes the transaction to confirm settlement of the amount authorised.

```
POS  TXN~COMP~1~1000~~
SCR  txn~comp~1~00~00~
```

4.12.2 Unsuccessful Vend Example (AUTH then VOID)

```
POS  TXN~AUTH~1~1000~ Merchant Reference 87654321~~~
SCR  dsp~pdsp~2~TAP OR~INSERT CARD~
SCR  DSP~PDSP~2~00~
SCR  dsp~pdsp~3~PROCESSING~~
SCR  DSP~PDSP~3~00~
```

```
SCR  msg~tx~4~D74A652E67850….146AE604~
POS  MSG~TX~4~00~
POS  MSG~RX~5C0C17BF8C….DEBE8155C0FE
SCR msg~rx~5~00
SCR  dsp~pdsp~6~REMOVE CARD~~
 SCR  DSP~PDSP~6~00~
SCR  txn~auth~1~00~1000~0000000f0000008c~
```

Auth has been approved, but POS cannot vend product. Authorisation is cancelled and settlement will not occur.

```
POS  TXN~VOID~1~~
SCR  txn~void~1~00~00~
```

4.12.3 Successful Stored Value Vend Example

Auth fails – this is a stored value card.

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~~
SCR  txn~auth~VM~0~
```

Stored value purchase

```
POS  TXN~SVP~2~1000~ Merchant Reference 87654321~~~
SCR  dsp~pdsp~3~TAP CARD~
SCR  DSP~PDSP~3~00~
SCR  dsp~pdsp~4~PROCESSING~~
SCR  DSP~PDSP~4~00~
SCR  msg~tx~5~D74A652E67850….146AE604~
POS  MSG~TX~5~00~
POS  MSG~RX~6~C0C17BF8C….DEBE8155C0FE
SCR msg~rx~6~00
SCR  dsp~pdsp~7~REMOVE CARD~~
SCR  DSP~PDSP~7~00~
SCR  txn~svp~2~00~
```

Goods could not be delivered – refund card

```
POS  TXN~SVR~8~1000~ Merchant Reference 87654321~~~
SCR  dsp~pdsp~9~TAP CARD~FOR REFUND~
SCR  DSP~PDSP~9~00~
SCR  dsp~pdsp~10~PROCESSING~~
SCR  DSP~PDSP~10~00~
SCR  msg~tx~11~D74A652E67850….146AE604~
POS  MSG~TX~11~00~
POS  MSG~RX~12~C0C17BF8C….DEBE8155C0FE
SCR msg~rx~12~00
SCR  dsp~pdsp~13~REFUND COMPLETE~REMOVE CARD~
SCR  DSP~PDSP~13~00~
SCR  txn~svr~8~00~
```

4.13 AUTH

The AUTH action requests the authorisation (or pre approval) of a specified value by the SCR.

An AUTH will fail with a specific error code if a stored value card is presented. It will also fail on a bad card read which may be caused if an EMV or contactless card is prematurely removed.

If the POS vendor is not integrating to a product with a Payment Express communications module, then the POS should expect to receive tx messages which will need to be transmitted (unless there is a network failure), before the auth response will be received.

The AUTH command will update the pinpad or other display as required to prompt the customer to insert, swipe, or present their card, enter their pin, and so on. If any other timeout based display message is in effect, the timeout is cancelled. Once the AUTH completes, the last message it left on the screen is the new idle message. The POS must request a new display message to inform the customer of the success or failure of the transaction, or prompt to proceed to the next step.

4.13.1 AUTH Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**AUTH**
3	TxnRef	Transaction reference (format in 14.6).
4	Amount	Amount to be authorised (format in 14.6)
5	MerchantReference	Optional reference for the transaction (format in 14.6)
6	BillingId	Optional billing ID provided by the merchant. This can be used by a merchant to associate a charge with a previously approved transaction (up to 32 characters – printable ASCII on the range 0x20 to 0x7d hex). The BillingId is a 32 character field that contains a reference that is unique to the merchant's customer that will be associated with the credit card information stored securely at Payment Express. This is provided with the initial transaction. For subsequent charges to the card (Rebill Phase), the merchant does not need to supply the card number or expiry date, only the BillingId originally associated during the Setup Phase
7	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.
8	OneSwipeFlag	0 or 1, default 0. This flag is to allow CDRD, CDTK, and AUTH/PUR to be performed with just one card swipe even when the card is mag stripe. Set it to 1 if the prior operation was CDTK or CDRD and you want to use that card's data for the transaction. If it was a mag stripe card then instead of needing a second card swipe, the securely cached card data from the prior operation will be used. The swipe must have been very recent. For contact EMV the card will still be present and will be re-read. For contactless cards, the card should still be in the contactless radio field and it will be read again, or an error will be returned.
9	OemDataFormat	Indicates the format of the data in the OemData field. Leave blank for free form text. Payment Express will provide a format string if upstream services might process this data.
10	OemData	This is a free text field to allow associating additional data with a transaction. Format in 14.6. The data may be manipulated by upstream services, and altered data is available via the TXN~OEMD command after the auth completes. Once another transaction is started on the same slot, the TXN~OEMD cannot retrieve data for this transaction. The field can be left blank if it is not being used.

4.13.2 AUTH Response Message

#	Field	Value
1	Object	**txn**
2	Action	**auth**
3	TxnRef	Transaction reference (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	Amount	Actual Amount Authorized (format in 14.6). This amount can be less than the requested amount, even though the AUTH is successful, if the cardholder account balance is insufficient. Any surcharge applied is also included in this amount and so it can also be larger than the requested amount. Also returns the balance of a stored value card if one is presented (VM return code), or the balance of the account if declined due to insufficient funds.
6	DpsTxnRef	Payment Express Transaction reference. This refers this is a guaranteed unique reference containing 16 hexadecimal characters (0-9 or a-f). A DpsTxnRef is not returned for offline approved transactions. In this case the DpsTxnRef will be blank.

		Contactless transactions can be offline.
7	SurchargeAmount	This field contains the surcharge amount if the transaction is successful, otherwise it will be 0. The value in this field is included in the Amount field.
8	ResultPromptID	This field indicates the prompt ID to indicate to the user the result of their transaction. If SETD is configured to display these then the message has aleady been displayed for the set amount of time. If not, the POS can issue a DISP message in order to display the result for an appropriate period. This field may also be empty if the transaction could not begin (eg return code VL, VZ), so the POS must be ready to use DISP to send a generic failure message in those cases. Supported 1.3.3.X or higher.
9	SignatureRequired	For unattended solutions this will always be 0. For Attended solutions, this can be 0 or 1. If it is 1, the POS must print a receipt signature and have the cardholder's signature validated by the POS operator. If the signature is not acceptable, the POS must send a TXN~SIG to the SCR to cancel the transaction. Supported 1.3.3.X or higher.
10	GratuityAmount	This field contains the amount of gratuity included in the authorized amount. Supported 1.3.3.X or higer
11	AmountRequested	Amount Originally requested by Auth Requestor. (format in 14.6)

4.13.3 Possible Return Codes

ReCo	Meaning
00	Approved (A signed receipt may be required, see response field 9)
76	Declined
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
V8	Maximum authorisation amount exceeded
VB	Card swipe timeout (the cardholder did not insert or remove their card within the timeout period)
VE	Not initialized (CFG+SETD is not done)
VJ	More than max outstanding voids / completions
VL	Configuration update needed (communications with Payment Express host required)
VM	Stored Value Card Presented
VW	Authorisation cancelled
VZ	Cannot execute command – TXEN is not enabled
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
U9	Timeout (No Response from Host)
VK	Invalid message. One or more fields are malformed or too long

4.13.4 No Response to an AUTH

In the event of data not being received in response to an AUTH request, the following strategy should be employed:

- Send a STS GS1 and wait for a response, thereby confirming the serial connection is good. If this fails then then technical support is required to restore the serial link
- If the STS GS1 succeeds the POS should send TXN GET1 to retrieve the result of the last transaction.

In general it is undesirable to send multiple AUTH messages for the same transaction as this will lock funds in the card-holders account (but will not settle without a COMP). How long it takes for an AUTH to timeout depends on the financial institution. One week is a typical timeframe.

4.13.5 Example Communications

Note: The following example does not show the data messages sent to and from the Payment Express host for simplicity. These will occur between the AUTH request and response if the Payment Express hardware does not include a Payment Express communications module.

Successful auth:

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~0100~~~~
SCR  txn~auth~1~00~1000~0000000f0000008c~
```

Failed Auth:

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~0100~~~~
SCR  txn~auth~1~76~1000~0000000f0000008c~
```

Failed Auth:

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~0100~~~~
SCR  txn~auth~1~VB~1000~~
```

Second Auth before a response:

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~0100~~~
POS  TXN~AUTH~2~1000~Merchant Reference 87654321~0100~~~
SCR  txn~auth~2~VA~1000~~
```

4.14 COMP

The COMP action requests the completion (finalisation and settlement) of the most recently approved authorisation, unless an explicit transaction reference is provided (final field). NOTE: A COMP must be sent after an AUTH if you wish for a financial transaction to settle. Otherwise an AUTH will timeout after 1 week.

4.14.1 COMP Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**COMP**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	Amount	Amount to be settled. If the amount is not supplied, the transaction is completed for the amount originally authorized. If an amount is supplied it must be the same or less than the amount originally authorised (format in 14.6). Any surcharge amount applied in the Auth should not be included here, but will be automatically applied.
5	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.
6	OemDataFormat	Indicates the format of the data in the OemData field. Leave blank for free form text. Payment Express will provide a format string if upstream services might process this data.
7	OemData	This is a free text field to allow associating additional data with a transaction. Format in 14.6. The data may be manipulated by upstream services, and altered data is available via the TXN~OEMD command after the comp has been uploaded to the host, which will usually occur a few seconds after the comp response. However if there are communications issues then it may not be uploaded until those are resolved. If any other transaction occurs on the same slot then the OemData will not be retrievable for this transaction. The field can be left blank if it is not being used.

4.14.2 COMP Response Message

#	Field	Value
1	Object	**txn**
2	Action	**comp**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	TxnRef	The TxnRef of the completed transaction

4.14.3 Possible return codes

ReCo	Meaning
00	Approved
V3	Completion amount exceed authorised amount
VK	Invalid message. One or more fields are malformed or too long
VF	Transaction Reference Not Found
VZ	Cannot execute command – TXEN is not enabled
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured

4.14.4 Example Communications

Note: The following example assumes that a Payment Express communications channel is being used (i.e. the POS does not process tx messages).

Successful completion

```
POS  TXN~COMP~1~1000~~
SCR  txn~comp~1~00~1234~
```

Bad transaction reference. The SCR passes the COMP through to Payment Express servers, but notes that it has not seen the completion before. This covers the case where an SCR is replaced.

```
POS  TXN~COMP~1~1000~~
SCR  txn~comp~1~VF~~
```

Complete a failed authorisation. The SCR returns success, but notes that the transaction was not authorised, there will be no settlement of funds.

```
POS  TXN~COMP~1~1000~~
SCR  txn~comp~1~76~1234~
```

Amount exceeds authorised amount:

```
POS  TXN~COMP~1~9900~~
SCR  txn~comp~1~V3~~
```

The POS need the COMP to match a previous AUTH (not the most recent). Note this is not typical usage, in general (where there is only one outstanding AUTH), field 5 should be empty.

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~~~
SCR  txn~auth~1~00~1000~0000000f0000008c~
```

```
POS  TXN~AUTH~2~1000~Merchant Reference 87654322~~~
SCR  txn~auth~2~00~90~0000000f0000008c~
POS  TXN~COMP~3~1000~1~
SCR  txn~comp~3~00~1~
```

4.15 PUR

The PUR action requests a purchase of a specified value by the SCR. This is equivalent to a AUTH and COMP combined into a single request.

An PUR will fail with a specific error code if a stored value card is presented. It will also fail on a bad card read which may be caused if an EMV or contactless card is prematurely removed.

If the POS vendor is not integrating to a product with a Payment Express communications module, then the POS should expect to receive tx messages which will need to be transmitted (unless there is a network failure), before the PUR response will be received.

The PUR command will update the pinpad or other display as required to prompt the customer to insert, swipe, or present their card, enter their pin, and so on. If any other timeout based display message is in effect, the timeout is cancelled. Once the PUR completes, the last message it left on the screen remains there. The POS must request a new display message to inform the customer of the success or failure of the transaction, or prompt to proceed to the next step.

Purchase, Purchase with Cash Out, and Cash Out transactions are all supported by the SCR but must also be supported by the Acquirer. The Amount field and CashAmount fields should be set appropriately to select one of those. Purchase with Cash Out and Cash Out transactions can only be done online, and will fail with code WF if the SCR is offline.

4.15.1 PUR Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**PUR**
3	TxnRef	Transaction reference (format in 14.6).
4	Amount	Value of the purchase (format in 14.6). For a Purchase with Cash Out transaction, this value includes both the purchase value and the cash out amount. For a Cash Out transaction this field should be set to the cash out amount.
5	MerchantReference	Optional reference for the transaction (format in 14.6)
6	BillingId	Optional billing ID provided by the merchant. This can be used by a merchant to associate a charge with a previously approved transaction (up to 32 characters – printable ASCII on the range 0x20 to 0x7d hex). The BillingId is a 32 character field that contains a reference that is unique to the merchant's customer that will be associated with the credit card information stored securely at Payment Express. This is provided with the initial transaction. For subsequent charges to the card (Rebill Phase), the merchant does not need to supply the card number or expiry date, only the BillingId originally associated during the Setup Phase
7	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.
8	OneSwipeFlag	0 or 1, default 0. This flag is to allow CDRD, CDTK, and AUTH/PUR to be performed with just one card swipe even when the card is mag stripe. Set it to 1 if the prior operation was CDTK or CDRD and you want to use that card's data for the transaction. If it was a mag stripe card then instead of needing a second card swipe, the securely cached card data from the prior operation will be used. The swipe must have been very recent. For contact EMV the card will still be present and will be re-read. For contactless cards, the card should still be in the contactless radio field and it will be read again, or an error will be returned.
9	OemDataFormat	Indicates the format of the data in the OemData field. Leave blank for free form text. Payment Express will provide a format string if upstream services might process this data.
10	OemData	This is a free text field to allow associating additional data with a transaction. Format in

		14.6. The data may be manipulated by upstream services, and altered data is available via the TXN~OEMD command after the PUR completes. Once another transaction is started on the same slot, the TXN~OEMD cannot retrieve data for this transaction. The field can be left blank if it is not being used.
11	CashOutAmount	This field should be left blank or 0 for a Purchase transaction that does not involve cash out. For a Cash Out or Purchase with Cash Out transaction, set this field to the value of the cash part of the transaction. This field must be left blank for unattended projects. Cash out transactions may not be supported depending on the Acquirer used.

4.15.2 PUR Response Message

#	Field	Value
1	Object	**txn**
2	Action	**pur**
3	TxnRef	Transaction reference (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	Amount	Total purchase amount (format in 14.6). This includes any surcharge, cash out or gratuity amount, as well as the originally requested amount, and is the total charged to the cardholder. Also returns the balance of a stored value card if one is presented (VM return code).
6	DpsTxnRef	Payment Express Transaction reference. This refers this is a guaranteed unique reference containing 16 hexadecimal characters (0-9 or a-f). A DpsTxnRef is not returned for offline approved transactions. In this case the DpsTxnRef will be blank. Contactless transactions can be offline.
7	SurchargeAmount	This field contains the surcharge amount if the transaction is successful, otherwise it will be 0. The value in this field is included in the Amount field.
8	CashOutAmount	This field contains the cash out amount if the transaction is successful, otherwise it will be 0. The value in this field is included in the Amount field. Older firmware will not return this field, in which case the Cash Out part of the transaction has not occurred.
9	ResultPromptID	This field indicates the prompt ID to indicate to the user the result of their transaction. If SETD is configured to display these then the message has aleady been displayed for the set amount of time. If not, the POS can issue a DISP message in order to display the result for an appropriate period. This field may also be empty if the transaction could not begin (eg return code VL, VZ), so the POS must be ready to use DISP to send a generic failure message in those cases. Supported 1.3.3.X or higher.
10	SignatureRequired	For unattended solutions this will always be 0. For Attended solutions, this can be 0 or 1. If it is 1, the POS must print a receipt signature and have the cardholder's signature validated by the POS operator. If the signature is not acceptable, the POS must send a TXN~SIG to the SCR to cancel the transaction. Supported 1.3.3.X or higher.
11	GratuityAmount	This field contains the amount of gratuity included in the authorized amount. Supported 1.3.3.X or higer

4.15.3 Possible Return Codes

ReCo	Meaning
00	Approved (A signed receipt may be required, see response field 10)
76	Declined
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
V8	Maximum authorisation amount exceeded
VB	Card swipe timeout (the cardholder did not insert or remove their card within the timeout period)
VE	Not initialized (CFG+SETD is not done)

VJ	More than max outstanding voids / completions
VL	Configuration update needed (communications with Payment Express host required)
VM	Stored Value Card Presented
VW	Authorisation cancelled
VZ	Cannot execute command – TXEN is not enabled
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
WF	Not allowed in offline mode, or one or more of the offline limits would be exceeded.
U9	Timeout (No Response from Host)
VK	Invalid message. One or more fields are malformed or too long

4.15.4 Example Communications

A simple successful purchase, no signature required

```
POS  TXN~PUR~1~1000~MR~BI~~~7~~~
SCR  txn~pur~1~00~1000~1234567890~0~0~~0~
```

Purchase with signature required, signature accepted

```
POS  TXN~PUR~1~1000~MR~BI~~~7~~~
SCR  txn~pur~1~00~1000~1234567890~0~0~~1~
POS  TXN~GETR~2~1~20~7~
SCR  SCR  txn~getr~2~00~Card          ……....2228Amount   NZD          1.25 PUR   204
```

Purchase with signature required, signature rejected

```
POS  TXN~PUR~1~1000~MR~BI~~~7~~~
SCR  txn~pur~1~00~1000~1234567890~0~0~~1~
POS  TXN~GETR~2~1~20~7~
SCR  SCR  txn~getr~2~00~Card          ……....2228Amount   NZD          1.25 PUR   204
POS  TXN~VOID~3~~
```

4.16 VOID

The VOID action requests the cancellation (de-allocate funds and prevent settlement) of a previously approved authorisation (AUTH) or purchase (PUR).

4.16.1 VOID Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**VOID**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.16.2 VOID Response Message

#	Field	Value
1	Object	**txn**

2	Action	**void**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	TxnRef	TxnRef of cancelled transaction.

4.16.3 Possible Return Codes

ReCo	Meaning
00	Approved
VF	Transaction Reference Not Found
VZ	Cannot execute command – TXEN is not enabled
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
WO	Transaction cannot be voided. Eg refunds cannot be voided.
VK	Invalid message. One or more fields are malformed or too long

4.16.4 Example Communications

Note: The following example assumes that a Payment Express communications channel is being used (i.e. the POS does not process tx messages.

Successful void

```
POS  TXN~VOID~1~
SCR  txn~void~1~00~
```

Bad transaction reference. The SCR passes the VOID through to Payment Express servers, but notes that it has not seen the completion before. This covers the case where an SCR is replaced.

```
POS  TXN~VOID~1~1000~
SCR  txn~void~1~VF~
```

Void a failed authorisation. The SCR returns success, but notes that the transaction was not authorised, there will be no settlement of funds.

```
POS  TXN~VOID~1~1000~~
SCR  txn~void~1~76~~
```

The POS need the VOID to match a previous AUTH (not the most recent). Note this is not typical usage, in general (where there is only one outstanding AUTH), field 4 should be empty.

```
POS  TXN~AUTH~1~1000~Merchant Reference 87654321~~~
SCR  txn~auth~1~00~1000~0000000f0000008c~
POS  TXN~AUTH~2~1000~Merchant Reference 87654322~~~
SCR  txn~auth~2~00~90~0000000f0000008c~
POS  TXN~VOID~3~1~
SCR  txn~void~3~00~1~
```

4.17 REF

The REF action requests a refund of a specified value by the SCR. This is equivalent to a purchase where the source and destination accounts are reversed (i.e. the merchant is paying the card holder), and so refund functionality is protected from potential misuse.

Refund must be enabled in the SCR's configuration by DPS, and it can only be performed in online mode (ie, the SCR has been informed that host comms are available with MSG~TXEN 1). Refund does not work with stored value cards.

This command takes over the pinpad screen immediately (cancelling any existing prompt, with or without a timeout) and controls the screen (prompting for card insert/present, PIN entry, etc) until the transaction ends. When SCR replies with the transaction result, the POS must take over the display messages again. See the SETD command for prompt options.

Refunds cannot be voided.

There are two ways to do a refund on the SCR, one is by specifying the DpsTxnRef of the original transaction to refund. That value can be seen on the receipt from the original purchase, or can be looked up online. The amount refunded cannot be larger than the original amount. The other way does not match an existing transaction, and so it requires authorisation in the form of a Refund Token from a manager, which can be obtained online or via the REFT command.

4.17.1 REF Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**REF**
3	TxnRef	Transaction reference (format in 14.6).
4	Amount	Amount to be refunded (format in 14.6)
5	MerchantReference	Optional reference for the transaction (format in 14.6)
6	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.
7	DpsTxnRef	The DpsTxnRef will have been printed in the receipt data for the customer if the transaction was online, or if the transaction was offline (and has been uploaded), the DPS txnref can be retrieved from Payment Express. This is a guaranteed unique reference containing 16 hexadecimal characters (0-9 or a-f). Use this field to specify the original transaction that is being refunded, or leave it empty if supplying the RefundToken field.
8	OemDataFormat	Indicates the format of the data in the OemData field. Leave blank for free form text. Payment Express will provide a format string if upstream services might process this data.
9	OemData	This is a free text field to allow associating additional data with a transaction. Format in 14.6. The data may be manipulated by upstream services, and altered data is available via the TXN~OEMD command after the REF completes. Once another transaction is started on the same slot, the TXN~OEMD cannot retrieve data for this transaction. The field can be left blank if it is not being used.
10	RefundToken	Usually 6 digits. Fill in this field when the amount refunded is not being matched to an existing transaction. The value must be obtained by a shop manager online, or by using the REFT command.

4.17.2 REF Response Message

#	Field	Value
1	Object	**txn**
2	Action	**ref**
3	TxnRef	Transaction reference (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	Amount	Actual Amount Refunded (format in 14.6).
6	DpsTxnRef	Payment Express Transaction reference (for the refund transaction not the original AUTH or PUR). This refers this is a guaranteed unique reference containing 16 hexadecimal characters (0-9 or a-f). A DpsTxnRef is not returned for offline approved

		transactions. In this case the DpsTxnRef will be blank.
7	ResultPromptID	This field indicates the prompt ID to indicate to the user the result of their transaction. If SETD is configured to display these then the message has aleady been displayed for the set amount of time. If not, the POS can issue a DISP message in order to display the result for an appropriate period. This field may also be empty if the transaction could not begin (eg return code VL, VZ), so the POS must be ready to use DISP to send a generic failure message in those cases. Supported 1.3.3.X or higher.
8	SignatureRequired	For unattended solutions this will always be 0. For Attended solutions, this can be 0 or 1. If it is 1, the POS must print a receipt signature and have the cardholder's signature validated by the POS operator. If the signature is not acceptable, the POS must send a TXN~SIG to the SCR to cancel the transaction. Supported 1.3.3.X or higher.

4.17.3 Possible Return Codes

ReCo	Meaning
00	Approved (A signed receipt may be required, see response field 9)
76	Declined
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
V8	Maximum authorisation amount exceeded
VB	Card swipe timeout (the cardholder did not insert or remove their card within the timeout period)
VE	Not initialized (CFG+SETD is not done)
VJ	More than max outstanding voids / completions
VL	Configuration update needed (communications with Payment Express host required)
VM	Stored Value Card Presented
VW	Authorisation cancelled
VZ	Cannot execute command – TXEN is not enabled
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
U9	Timeout (No Response from Host)
VK	Invalid message. One or more fields are malformed or too long

4.18 REFT

The REFT action requests a Refund Token to enable a refund that is not matched against a prior transaction. This same token can be requested online instead of using the SCR, however in many circumstances the SCR will be more convenient. The token can only be used for one refund, and only for a short period after receiving it. If the REFT command is successful the shop manager or other authorised person will receive a text message on their mobile phone with the Refund Token which can then be used in the REF command.

4.18.1 REFT Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**REFT**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	EmployeeID	Numeric identifier for Shop Manager or other authorised employee. Not more than 16 digits, usually just four.
5	EmployeePIN	Refund PIN known only to this employee. Numeric only. Not more than 16 digits, usually just four.

4.18.2 REFT Response Message

#	Field	Value
1	Object	**txn**
2	Action	**reft**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	ResultPromptID	This field indicates the prompt ID to indicate to the user the result of their transaction. If SETD is configured to display these then the message has aleady been displayed for the set amount of time. If not, the POS can issue a DISP message in order to display the result for an appropriate period. This field may also be empty if the command could not begin (eg return code VL, VZ), so the POS must be ready to use DISP to send a generic failure message in those cases. Supported 1.3.3.X or higher.

4.18.3 Possible Return Codes

ReCo	Meaning
00	Approved (Shop manager will receive a text message on their phone with the Refund Token)
76	Declined
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
VE	Not initialized (CFG+SETD is not done)
VL	Configuration update needed (communications with Payment Express host required)
VZ	TXEN is not enabled
U9	Timeout (No Response from Host)
VK	Invalid message. One or more fields are malformed or too long

4.19 SVP

The Stored Value Purchase command is used in systems that support store value cards (i.e. credit is stored on the card – not in a central server). NB: Depending on the card type communications are needed to Payment Express servers – requiring communications to be enabled (MSG + TXEN) before further transactions can be processed.

Note: If communications to the card are lost and the final state of the card cannot be determined a “W5” error code will be returned. The POS must ensure that the card-holder is prompted to re-present their card – and that an SVE command is issued to the SCR200.

Note: In the current general release only Snapper cards are supported via SVP.

SVP will update the prompt on the pinpad or other screen as required during the transaction, similar to AUTH.

4.19.1 Power Failure

If there is a power failure during an SVP command it is possible (but unlikely) that a partial transaction may have been executed (i.e. value may have been deducted from the card – but no ticket delivered, and no reconciliation record written to Snapper). If power is then restored, then the next SVP will return a “W7” error.

To clear this error a SVE must be attempted. Once an SVE has been attempted, even if this fails with an error code, then further SVP commands will succeed and over-write the previous transaction. This allows the POS to recover due to a power failure without loss to a customer. It also allows for the case where the original card holder is no longer present, but further Snapper transactions need to be carried out.

4.19.2 SVP Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**SVP**
3	TxnRef	Transaction reference (format in 14.6).
4	Amount	Amount to be authorised (format in 14.6).
5	MerchantReference	Optional reference for the transaction (format in 14.6)
6	BillingId	Optional billing ID provided by the merchant. This can be used by a merchant to associate a charge with a previously approved transaction (up to 32 characters – alphanumeric). May be null
7	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.19.3 SVP Response Message

#	Field	Value
1	Object	**txn**
2	Action	**svp**
3	TxnRef	Transaction reference (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	AmountDeducted	Amount authorised (format in 14.6)
6	Balance	Balance on the stored value card (format in 14.6)

4.19.4 Possible Return Codes

ReCo	Meaning
00	Approved
76	Declined
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
V8	Maximum authorisation amount exceeded
VA	Busy (The SCR200 is already processing)
VB	Card swipe timeout (the cardholder did not present their card within the timeout period)
VE	Not initialized (CFG+SETD is not done)
VJ	More than max outstanding voids / completions outstanding (8 outstanding transactions not settled with Payment Express internet servers)
VK	Invalid message (fields are malformed)
VL	Configuration update needed (communications with Payment Express host required)
VN	Non-Stored Value Card Presented
VW	Transaction cancelled
VZ	Cannot execute command – TXEN is not enabled
W1	Feature is disabled. This message is received when you attempt an operation which has not been enabled at Payment Express for this device
W5	Stored Value Card state is unknown. The card needs to be represented to confirm the correct card state (with an SVE command).
W6	Stored Value Transaction could not be settled – POS should reverse the transaction with an SVR
W7	A previous stored value transaction failed due to power failure
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured

U9	Timeout
VK	Invalid message. One or more fields are malformed or too long

4.19.5 Example Communications

Successful SVP:

```
POS  TXN~SVP~1~1000~Merchant Reference 87654321~0100~~~
SCR  txn~svp~1~00~1000~999~
```

Failed SVP:

```
POS  TXN~SVP~1~1000~Merchant Reference 87654321~0100~~~
SCR  txn~svp~1~76~~999~
```

4.20 SVR

The stored value reversal is needed where a stored value purchase has been executed – but for some reason the requested product cannot be delivered. In this case we need to return the deducted value to the card-holders card.

Note: If communications to the card are lost and the final state of the card cannot be determined a “W5” error code will be returned. The POS must ensure that the card-holder is prompted to represent their card – and repeat the SVR command.

SVR will update the prompt on the pinpad or other screen as required during the transaction, similar to AUTH.

4.20.1 SVR Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**SVR**
3	TxnRef	Transaction reference (format in 14.6).
4	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.20.2 SVR Response Message

#	Field	Value
1	Object	**txn**
2	Action	**svr**
3	TxnRef	Transaction reference (format in 14.6).
4	ReCo	Response Code (reference 14.7.1)
5	Balance	Balance on the stored value card (format in 14.6)

4.20.3 Possible Return Codes

ReCo	Meaning
00	Approved
VA	Busy
VF	Transaction Reference Not Found
VL	Configuration update needed (communications with Payment Express host required)

VN	Non-Stored Value Card Presented
VW	Transaction cancelled
VZ	Cannot execute command – TXEN is not enabled
W1	Feature is disabled. This message is received when you attempt an operation which has not been enabled at Payment Express for this device
W5	Communications failure – retry SVR
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
U9	Timeout
VK	Invalid message. One or more fields are malformed or too long

4.20.4 Example Communications

Successful void

```
POS  TXN~SVR~1~
SCR  txn~svr~1~00~999~
```

Bad transaction reference. The SCR passes the VOID through to Payment Express servers, but notes that it has not seen the completion before. This covers the case where an SCR is replaced.

```
POS  TXN~SVR~2~1000~
SCR  txn~svr~2~VF~~
```

4.21 SVE

When processing a stored value purchase it is possible that communications may be lost to the card. If this is the case – and the card the card may be left in a state where the SCR200 does not know what the state of the card is – in particular the value on the card.

Similarly the unit may suffer a power failure at a point where the stored value on the card is not known – preventing proper reconciliation of the transaction.

In these cases the POS issues an SVE command to the SCR200 and will ask the user to re-present their card.

After a maximum number of failed presentations the POS may elect to direct the card-holder to contact the card issuer for trouble-shooting.

SVE will update the prompt on the pinpad or other screen as required during the transaction, similar to AUTH.

4.21.1 SVE Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**SVE**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.21.2 SVE Response Message

#	Field	Value
1	Object	**txn**
2	Action	**sve**

3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	AmountDeducted	Amount authorised (format in 14.6)
6	Balance	Balance on the stored value card (format in 14.6)

4.21.3 Possible Return Codes

ReCo	Meaning
00	Approved
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
VA	Busy (The SCR200 is already processing)
VB	Card swipe timeout (the cardholder did not present their card within the timeout period)
VE	Not initialized (CFG+SETD is not done)
VF	Could not find a suitable transaction in a state that would require SVE.
VJ	More than max outstanding voids / completions outstanding (8 outstanding transactions not settled with Payment Express internet servers)
VL	Configuration update needed (communications with Payment Express host required)
VN	Non-Stored Value Card Presented
VW	Transaction cancelled
VZ	Cannot execute command – TXEN is not enabled
W1	Feature is disabled. This message is received when you attempt an operation which has not been enabled at Payment Express for this device
W5	Stored Value Card state is unknown. The card needs to be represented to confirm the correct card state (with an SVE command).
W6	Stored Value Transaction could not be settled – POS should reverse the transaction with an SVR
W8	Wrong card presented (during an SVE or in relation to the card used in a prior CDRD/CDTK)
W9	No error to recover from (during an SVE). This means that no value was deducted from the card
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
U9	Timeout
VK	Invalid message. One or more fields are malformed or too long

4.21.4 Example Communications

4.22 GET1

The GET1 action requests the additional information about the last transaction processed by the SCR.

4.22.1 GET1 Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**GET1**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.22.2 GET1 Response Message

#	Field	Value
1	Object	**Txn**
2	Action	**get1**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	CardSuffix	Card Suffix 4 digit card suffix suitable for storing by POS application.
6	Card ID	CardID Refer Appendix 14.4 for a list of card types. Note the card ID is a string e.g. VISA, MASTERCARD. Not a numeric value
7	AmountRequested	Amount Originally requested by Auth Requestor (format in 14.6)
8	AmountAuthorized	Amount actually authorized by SCR. For certain configurations the authorised amount may be lower than the requested amount (format in 14.6). If the transaction has completed, then this field contains the completed amount, which may also be less than the amount authorised.
9	TxnState	Transaction State. Refer to 14.7.5 for a list of possible states and meanings.
10	CardNumber2	CardNumber2 is a token generated by Payment Express and associated with card details supplied. It is 16 numeric characters and conforms to a Luhn “mod 10” algorithm. This makes it ideal for storage within the database in place of a card number where the value is validated against checks which might normally be made against credit card numbers. A CardNumber2 value is always unique for a given card number. Should a card number be presented for tokenization multiple times the same CardNumber2 value will be returned Maximum length = 16 characters
11	DpsBillingId	This is a billing ID provided by Payment Express. It can be used for repeat billing in the BillingId Field to associate a charge with a previously approved transaction Maximum length = 16 characters
12	Stan	Index number for message that was sent to the acquirer
13	SettlementDate	The date that this transaction will be settled (actual fund transferred) (YYYYMMDD)
14	AuthCode	Authorisation code (6 character)
15	CardHolderName	The name of the card holder. NOTE: The provision of this data is subject to regional privacy laws and regulations. A merchant must request that Payment Express enable this field. Otherwise the field will be empty. Maximum length = 26 characters
16	DpsTxnRef	Repeat the DpsTxnRef here in case the response message is lost (as per 4.13.4) Also if the transaction was approved offline (Note that contactless EMV transactions can be approved offline when under the floor limit, even if offline is not enabled), then once the transaction is delivered to the host the DpsTxnRef will be available here, provided another transction has not yet been started.
17	TxnReCo	Response code for the transaction matching the transaction reference requested (empty in the case of failure modes).
18	Merchant Reference	The merchant reference submitted with the original transaction. This can be used by the POS to recover in the case of power failure
19	TxnType	Indicates the transaction type, eg AUTH, PUR, REF, COMP.
20	TxnTime	Time of the transaction, converted to the local time zone configured in SCR. Time format is described in 14.6
21	MaskedPAN	Contains the card number, with most of the digits replaced by *
22	CardExpiry	Card expiry date. This may be masked depending on PCI requirements
23	AmountSurcharge	This field is reserved, but not yet implemented. The amount added as a surcharge for this transaction. This amount is in addition to the amount requested via PUR or similar. This value is included in the Amount field, eg in the case of purchase for $10 and with a configured surcharge of $1, the GET1 AmountRequested would be $10, AmountAuthorised would be $11, and AmountSurcharge would be $1.
24	AmountCashOut	This field is reserved, but not yet implemented. The approved CashOut amount for this transaction. If the transaction did not include cash out, or was not successful, this will be 0. This value is included in the Amount field, eg in the case of PUR for $10 with cash out of $5, the GET1 AmountRequested would be $10, AmountAuthorised would be $15, and AmountCashOut would be $5.

25	SignatureState	0 – indicates no signature was required for this transaction 1 – indicates that a signature is required for this transaction and has not been confirmed by TXN~SIG yet 2 – indicates that signature was required and TXN~SIG was used to update the transaction. The reco 00 or Z9 indicate whether the signature was accepted.
26	TxnRef	The TxnRef string provided by the POS when creating the transaction
27	MerchantId	This is the MerchantId that was used for the transaction (see GSX command), or empty if the transaction failed before an acquirer was selected
28	TerminalId	This is the TerminalId that was used for the transaction (see GSX command) , or empty if the transaction failed before an acquirer was selected

4.22.3 Possible Return Codes

ReCo	Meaning
00	Approved
VF	Transaction Reference Not Found
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
VK	Invalid message. One or more fields are malformed or too long

4.22.4 Example Communications

Success:

```
POS  TXN~GET1~1~
SCR  txn~get1~1~00~0010~2~1000~1000~0~1234567890~1234ABCD~102~20120303~12ACDE~
```

Bad transaction reference :

```
POS  TXN~GET1~1~
SCR  txn~auth~1~VF~~~~~~~~~~
```

4.23 SIG

When receipt signatures are supported, a transaction may signal that it requires a receipt. The flag is the SignatureRequired field returned by an AUTH, PUR, or REF. If that flag is set then the POS must use GETR to print a receipt with a space for a signature, and have an operator validate the customer's signature. If the signature is not accepted, the POS must send a SIG message to indicate that the transaction is not accepted, and the SCR will cancel the transaction, updating its reco to Z9 and SignatureState to 2. SIG should be sent also when the signature is acceptable, and the SignatureState will be set to 2, with reco left as 00. Having the SignatureState kept up to date may be useful to the POS to keep track of whether the signature has been checked yet or not. SIG should be sent within two minutes of the SCR reply indicating a signature is required.

4.23.1 SIG Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**SIG**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	Signature Result	00 if the signature is accepted, or Z9 if the signature is not accepted.
5	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.23.2 SIG Response Message

#	Field	Value
1	Object	**txn**
2	Action	**sig**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

4.23.3 Possible Return Codes

ReCo	Meaning
00	Signature Approved. The 'Signature required' flag is cleard, and subsequent GET1 requests will reflect that.
Z9	The signature is not approved. SIG returns this when the Signature Result in the request is Z9, indicating that the SIG operation completed correctly. Subsequent GET1 requests will also reflect the Z9 result.
VE	Not initialized (CFG+SETD is not done)
VF	Transaction Reference or Sequence Number Error
VK	Invalid message (fields are malformed)

4.24 GETR

The GETR action returns a formatted transaction receipt intended to be provided to the cardholder for the most recent transaction. If you are using slots then it provides the receipt for the most recent transaction on the specified slot.

Note that a receipt may exceed the size of the buffer. The POS specifies the number of lines and the offset to fetch.

Currently only a default receipt format is available. We anticipate in future that different receipt formats will be configurable on a per integrator basis. Custom receipts need to be negotiated with Payment Express

4.24.1 GETR Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**GETR**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	LineNumber	The offset into the receipt to start returning lines. The default is line 1 (the start of the receipt).
5	LineCount	The number of lines to return from the starting line offset (LineNumber above)
6	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.
7	Receipt Type	Indicates receipt type (format in 14.6)

4.24.2 GETR Response Message

#	Field	Value
1	Object	**txn**
2	Action	**getr**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	ReceiptText	Receipt for printing in space padded lines, maximum 20 lines (up to buffer size). The space

		padding is up to the width of the receipt, so all lines are the same width. The width is determined by configuration at the host, usually 30 characters, sometimes 20 characters.
6	LineNumber	The offset into the receipt to start returning lines.
7	LineCount	The number of lines to return from the starting line offset
8	TxnRef	Transaction reference (format in 14.6).
9	Width	Receipt width. The number of characters in the ReceiptText field will be a multiple of this value.

4.24.3 Possible Return Codes

ReCo	Meaning
00	Approved
VF	Transaction Reference Not Found
VY	Requested line number is beyond the end of the data, or line count would exceed buffer size
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
VK	Invalid message. One or more fields are malformed or too long

4.24.4 Example Communications

```
POS  TXN~GETR~1000~1~10~1~
SCR  txn~getr~1000~00~Catid     4919410401953972224Card        ……....2228Amount   NZD          1.25Auth   204
Ref          1         APPROVED         ~1~10~1~
```

4.24.5 Example Receipt

```
      Catid       4919410401953972224
      Card           …….....2228
      Amount    NZD              1.25
      Auth    204 Ref                1
                  APPROVED
```

Note the default receipt is currently 30 characters wide. It includes:

- Card Acceptor Terminal ID
- Masked card number
- Amount
- Authorisation Code
- Device specific transaction reference
- Status of the transaction: APPROVED, DECLINED

4.25 OEMD

The OEMD action requests the OemData field returned from the host for a particular transaction. OemData is a field that can be used to tie additional data to a transaction, and it can be manipulated by upstream services and the altered text is available via this command once the response comes back from the host, provided no other transaction has been started on the same SlotId. If another transaction has started, then the data returned will relate to that new transaction.

4.25.1 OEMD Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**OEMD**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

4	SlotId	Allows a slot to be configured for customers that have multi-merchant facility configured with Payment Express. The default is 1. Do not populate this field if you are not using slots.

4.25.2 OEMD Response Message

#	Field	Value
1	Object	**Txn**
2	Action	**oemd**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	OemDataFormat	Indicates the format of the data in the OemData field.
6	OemData	Text corresponding to the OemData of the last transaction on this slot. It may have been modified by upstream services. It is only available if a response has been received back from the host, so in the case of a COMP it may be some time after the COMP response has returned, or it could be a long time if there are communications issues.

4.25.3 Possible Return Codes

ReCo	Meaning
00	Success
76	Transaction response from the host has not been received yet.
VF	Transaction Reference Not Found
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
VK	Invalid message. One or more fields are malformed or too long

4.26 CINFO

The CINFO action does not perform any transaction itself, however it allows a cash transaction performed by the POS to be recorded in Payment Express systems, and to show up in reports from Payment Express. If the transaction is recorded successfully then the reco returned will be 00, and a subsequent GET1 will return transaction state 12, “Cash Info Transaction recorded”. The SCR has a limited amount of space to store these messages if it is offline. These records will be uploaded to the host immediately if the host connection is available, or at the next opportunity when comms are available again.

4.26.1 CINFO Request Message

#	Field	Value
1	Object	**TXN**
2	Action	**CINFO**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	Amount	Amount of the cash transaction (format in 14.6)
5	NotesAmount	Amount tendered in notes. This might be 0 or it might be more than the overall Amount if change was given.
6	Data1	A small amount of text that can be associated with the transaction. It will show up in field TxnData1 in the transaction. For example for a vending machine it might record the vending lane selected. The field can be up to 32 characters.

4.26.2 CINFO Response Message

#	Field	Value

1	Object	**txn**
2	Action	**cinfo**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

4.26.3 Possible Return Codes

ReCo	Meaning
00	Approved
VK	Invalid message (fields are malformed)
WN	Insufficient storage space

5 DIAGNOSTIC COMMANDS

The following commands are available for integrators wishing to implement a self-test in their integration. They are not required for an integration, but may provide a significant benefit to an integrator.

The commands allow confirmation that the device is functioning correctly:

- Each card reader type connected is working correctly
- The PIN Entry device is working correctly if present (not yet implemented)
- The display is working correctly if present (not yet implemented)

5.1 MSR TEST

Magnetic swipe read test. The request returns when either a card is read, or the call times out.

5.1.1 MSR Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**MSR**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.1.2 MSR Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**msr**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)
5	Track1	1 = Track 1 read successfully, 0 = Track 1 read failed
6	Track2	1 = Track 2 read successfully, 0 = Track 2 read failed

5.1.3 Possible Return Codes

ReCo	Meaning
00	Approved
VB	Card read timeout

5.2 ICC TEST

Integrated Chip Card Test. The request returns when either a card is read, or the call times out.

5.2.1 ICC Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**ICC**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.2.2 ICC Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**icc**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	“00” indicates a successful ICC read “76” indicates a failed ICC read

5.2.3 Possible Return Codes

ReCo	Meaning
00	Successful ICC read
76	Failed ICC read
V6	Card read error
VB	Card read timeout

5.3 NFC TEST

Near field card (FRC) read test. The request returns when either a card is read, or the call times out.

5.3.1 NFC Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**NFC**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.3.2 NFC Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**nfc**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	“00” indicates a successful ICC read “76” indicates a failed ICC read

5.3.3 Possible Return Codes

ReCo	Meaning
00	Successful near field card communications
76	Failed near field card communications
VB	Card read timeout

5.4 GRID TEST

This feature is not available in the current general release, but will be provided in future revisions of firmware.

Confirms that the tamper grids are operating correctly

5.4.1 GRIDS Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**GRIDS**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.4.2 GRIDS Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**grids**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (always “00” for this test)
5	Status	“PASS”, “FAIL” or “OK”. Pass indicates a perfect pass. Fail indicates that the device is tampered. OK indicates that the device is in correctly working condition – but has been running for some time.
6	Grid version	Indicates the grid test version of the device. This is useful to Payment Express when commissioning new devices.

5.4.3 Possible Return Codes

ReCo	Meaning
00	All keys were correctly pressed in sequence

5.5 BRFLEDS TEST

Flashes the LEDs on the contactess card reader. The response is always “00”, the technician should visually confirm that all LEDs flash in sequence.

5.5.1 BRFLEDS Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**BRFLEDS**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.5.2 BRFLEDS Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**brfleds**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (always “00” for this test)

5.5.3 Possible Return Codes

ReCo	Meaning
00	All keys were correctly pressed in sequence

5.6 PED TEST

This feature is not available in the current general release, but will be provided in future revisions of firmware.

PIN Pad test. The test will return when it detects that all keys have been pressed in sequence from top left to bottom right – or on a time out.

5.6.1 PED Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**PED**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.6.2 PED Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**ped**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

5.6.3 Possible Return Codes

ReCo	Meaning
00	All keys were correctly pressed in sequence

5.7 TEST RECEIPTS

This command provides diagnostic data useful for L3 EMV integration tests. There are several different reports available, selected via the ReportNum field.

5.7.1 ITR Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**ITR**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	StartLine	Line number of the start of the section of the report to fetch (multiple messages may be needed depending on the output buffer size). Indexing begins at 1, which is also the default value
5	LineCount	Requested number of lines of the report to output. The default is 1. Fewer lines of output may output if there is not enough buffer space.
6	ReportNum	Selects the report to output:

ReportNum	Report
0 (default)	ICC Test Receipt Outputs a test receipt of ICC tags from the prior EMV transaction for diagnostic purposes. This is required for L3 EMV integration tests. Note that sensitive data (e.g. card number and expiry) is masked.
1	EMV Public key load report Outputs the EMV public keys that have been downloaded into the SCR. This must not be made available to the merchant.

		2	EMV Parameters report Outputs all of the EMV parameters required to be configured for the terminal. This must not be made available to the merchant.
		3	EMV Statistics report Outputs the numbers of various types of failure since the report was last reset.
		4	Offline declined transaction report Outputs various EMV tags useful for diagnostics from the last offline declined EMV report. Senstive data is masked.
7	ResetReport	Set this to 1 to reset the selected report (only relevant for the EMV Statistics report). Default is 0.	
8	LineSeparator	Set this to the ascii code (in decimal) of a character to separate lines with if the ReportNum selects a receipt that is not fixed width. Leaving this field empty defaults to 124	

5.7.2 ITR Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**itr**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Always “00”
5	ReportLines	Text making up the report. If there are multiple lines, they are delimited with the ‘|’ character.
6	StartLineNum	Line number of the first line in ReportLines
7	TotalLines	The total number of lines in the report

5.8 DSP

This feature is not yet implemented

Display test. This request will always return a response code of “00”. The technician must confirm the display is working correctly by observation of the display output

5.8.1 DSP Request Message

#	Field	Value
1	Object	**DGN**
2	Action	**DSP**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

5.8.2 DSP Response Message

#	Field	Value
1	Object	**dgn**
2	Action	**dsp**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Always “00”

5.8.3 Possible Return Codes

ReCo	Meaning
00	Successful near field card communications

6 STATUS

6.1 STATUS OVERVIEW

The Status (STS) object provides the POS with the ability to retrieve status and information about the attached SCR.

NOTE: During a firmware upgrade the GS1 command may not respond for up to 60 seconds.

6.2 GS1

The GS1 action requests the status information from the SCR.

6.2.1 GS1 Request Message

#	Field	Description
1	Object	**STS**
2	Action	**GS1**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

6.2.2 GS1 Response Message

#	Field	Description
1	Object	**sts**
2	Action	**gs1**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). A get status message should always return “00”
5	MsgCount	Message Count. Count of messages ready for transmission (0-999). 0 indicates no messages for transmission. If non zero, POS should retrieve the message as soon as it can forward the message to the Host. This is done using the MSG object.
6	CardPresent	Card Present. Returns 1 if card is present in the slot. 0 if no card present.
7	Status	System Status. 0 – Configuration data is not downloaded 1 – Device is not initialized (CFG+SETD is needed) 2 – Idle/Ready 3 – Busy. SCR is busy handling other requests. 4 – Offline limit exceeded
8	TxnState	Transaction State. Refer to 14.7.5 for a detailed list of transaction state values and their meanings. When using multiple slots, this refers to the slot most recently operated on.
9	Time	Current Time obtained from the SCR real-time clock and converted to the local time zone configured in SCR. Time format is described in 14.6
10	Online	Returns the detected network status to Payment Express servers. 0 = Offline, 1 = Online. Offline status is only detected when the SCR attempts to send a message and fails.
11	NumOffline	The number of offline transactions
12	FirmwarePending	A firmware upgrade is pending (0 = false, 1 = true)

6.2.3 Possible Return Codes

ReCo	Meaning
00	Approved
VK	Invalid message. One or more fields are malformed or too long

6.2.4 Example Communications

System is ready, no messages to transmit:

```
POS  STS~GS1~124~
SCR  sts~gs1~124~00~0~0~00~0~320110831121103~1~
```

The system is ready, 10 messages to transmit, a card is currently inserted

```
POS  STS~GS1~124~
SCR  sts~gs1~124~00~10~1~00~2~320110831121103~1~
```

6.3 GSX

The GSX action requests extended status information

#	Field	Description
1	Object	**STS**
2	Action	**GSX**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)

6.3.1 GSX Response Message

#	Field	Description
1	Object	**sts**
2	Action	**gsx**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). A get status message should always return “00”
5	SignedOn	“1” If the terminal has signed on to Payment Express servers and downloaded site specific configuration. “0” if a sign on has not yet occurred.
6	SignOnTime	Sign on date time in ISO format yyyymmddThhmmss UTC, e.g. 20110901T144500
7	TimeZone	Timezone this unit is configured for [TBD] Alpha or numeric time zone format?
8	Serial	The device’s serial number
9	CurrencyId	The devices configured currency ID (empty if it has not been synchronised with the Payment Express Host)
10	Timeout	The timeout (in seconds) that the POS should apply when waiting for serial message responses.
11	DpsPinPad	“1” if a Payment Express certified PIN Entry Device is connected to the SCR200, “0” if it is not
12	FirmwareVersion	The version of firmware currently loaded on the device
13	ScrRemovalDetection	Secure Card Reader Removal Detection. “1” if the SCR200 has been removed from its mounting “0” if the device is correctly installed.
14	SkpRemovalDetection	Secure Key Pad Removal Detection. “1” if the SKP has been removed from its mounting “0” if the device is correctly installed.
15	ContactlessAntenna	“1” if a Payment Express certified contactless card antenna is connected to the SCR200, “0” if it is not
16	SimDetection	A bitmask indicating detection for SIMs inserted in the SCR200 Bit 0: Snapper PSAM present (allow deductions and refunds) Bit 1: Snapper LSAM present (allow value to be loaded onto a card)
17	StationId	The ID that identifies the deployment of this device in the Payment Express database
18	MerchantId	The Merchant ID that identifies your organisation to the acquirer. If multi-merchant feature is enabled then there will be multiple comma separated MerchantIds, and there will also be the same number of TerminalIds in the next field.
19	TerminalId	The Terminal ID that (along with the MerchantId) identifies this device to the acquirer. If multi-merchant feature is enabled for the merchant, there will be multiple comma separated TerminalIds, each one corresponding to the same index in the list of MerchantIds in the prior field

6.3.2 Possible Return Codes

ReCo	Meaning
00	Approved
VK	Invalid message. One or more fields are malformed or too long

6.3.3 Example Communications

```
POS  STS~GSX~124~
SCR  sts~gsx~124~00~1~20110901T144500~~1234567890~60~0~1.005~
```

6.4 BTN

This message indicates to the SCR that a button has been pressed (currently only used for indicating the cancel button has been pressed).

NOTE: A BTN request may be sent while an AUTH is in progress, however if the POS receives a “00” response to an AUTH, a VOID must be sent to the SCR to cancel the transaction.

6.4.1 BTN Request Message

#	Field	Value
1	Object	**STS**
2	Action	**BTN**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ButtonId	The ID of the button. Currently on the SCR200 cancel button ‘X’ is available

6.4.2 btn Response Message

#	Field	Value
1	Object	**sts**
2	Action	**btn**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). A get status message should always return “00”

6.4.3 Example Communications

```
POS STS~BTN~124~00~
SCR sts~btn~124~X~
```

6.5 LOG COMMAND

This command allows the retrieval of the last 10 critical events systems events. In this release of documentation these includes only firmware updates and critical failures. When more than 10 events are generated the first log message will be overwritten.

These log events can be regularly retrieved by polling this command on the serial port. An integrator can use this facility to store log events from the SCR200 in a central log storage facility.

6.5.1 LOG Request Message

#	Field	Value
1	Object	**STS**
2	Action	**LOG**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	LogIndex	The log record number (valid values are 1-10)

6.5.2 log Response Message

#	Field	Value
1	Object	**sts**
2	Action	**log**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). A log message should always return “00”. The message will be empty if the log message has not been populated
5	DateTime	Uses the time format described in 14.6
6	Description	Text describing the event
7	Success	1 = Successful, 0 = Failure
8	Origination	Where did the command originate (at the time of writing valid strings were “Host” and “POS”)

Please note: There is no concept of users for the Payment Express SCR200 (this is implicit in the origination of an event). The messages always pertain to the SCR200 (hence this is always the effected system)

7 DISPLAY

7.1 DISPLAY OVERVIEW

If the SCR incorporates a built in LCD display it will use this display to provide cardholder guidance during a transaction. The DSP object also provides access to the POS to display messages and graphics on behalf of the POS.

7.2 DISP

The DISP action requests the SCR display the specified text on the attached SCR display. Text for the prompts must be arranged with Payment Express, which will be configured on the host and downloaded to the SCR as part of its configuration. Images can be configured to display with the text also in configurations where there is a screen, such as when using a Payment Express Pinpad or an SCR200VM. Text may be up to two lines of 16 characters each, or just a single line if an image is being displayed also.

7.2.1 DISP Request Message

#	Field	Description
1	Object	**DSP**
2	Action	**DISP**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	PromptId	POS Prompts: 101-9999. System prompts are not available to the POS except through the use of AUTH and similar commands, however Payment Express can customise those on request also.
5	Param1	Optional Parameter 1 (e.g. If PromptId = 105 describes a fuel pumping prompt “Use pump “, the optional parameter might provide the number “1”)
6	Param2	Optional Parameter 2. As for optional parameter 1.
7	Timeout	1-300. Time in seconds to display the message. If a transaction is started, or another DISP or ENTD message with a timeout is received, then the existing timeout is cancelled. When the new timeout expires the display will revert to the idle image. “0” Indicates that this prompt (or image) should become the new “Idle” message, once any existing timeout expires.
8	Backlight	0-100. This indicates the strength of the backlight on the display. “0” indicates that the backlight is off.
9	Target	0 (or leave the field empty). Default behaviour, which is to put the message on the SKP display if one is attached, and to ask the POS to display it as well with a dsp~pdsp message (provided the SETD flag enabled that message). 1 – Send the display message to the SKP only 2 – Send the display request back to the POS only as a dsp~pdsp message.

7.2.2 DISP Response Message

#	Field	Description
1	Object	**Dsp**
2	Action	**Disp**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code. “00” on success, another code on failure.

7.2.3 Possible Return Codes

ReCo	Meaning
00	Approved
V4	Invalid prompt ID
V9	Unable to display message (returned if there is no display available)
VF	Invalid command sequence
VL	Configuration update needed (communications with Payment Express host required)

VK	Invalid message. One or more fields are malformed or too long

7.2.4 Example Communications

Display a simple message (e.g. 104 == “Insert Card”). Prompts are specific to the firmware loaded into an SCR200.

```
POS  DSP~DISP~124~100~~~10~50~
SCR  dsp~disp~124~00~
```

Display a prompt with an optional argument. Display a simple message (e.g. 72 == “GO TO PUMP 5”). Prompts are specific to the firmware loaded into an SCR200. Note the use of an optional argument.

```
POS  DSP~DISP~124~72~5~~10~50~
SCR  dsp~disp~124~00~
```

A bad transaction reference is supplied:

```
POS  DSP~DISP~999~100~~~10~50~
SCR  dsp~disp~999~VF~
```

An unsupported prompt was supplied:

```
POS  DSP~DISP~999~100~~~10~50~
SCR  dsp~disp~999~V4~
```

7.3 PDSP

The PDSP action (from the SCR to the POS) requests the POS display the specified text on an attached the attached POS managed display. This message is generated if the SCR does not include an attached display. If a built in display is present for SCR, then no pdsp message is sent to POS.

7.3.1 PDSP Request Message

#	Field	Description
1	Object	**dsp**
2	Action	**pdsp**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	Line1	Line 1 text. Up to 16 alphanumeric characters.
5	Line 2	Line 2 text. Up to 16 alphanumeric characters.
6	Timeout	1-300. Time in seconds to display the message. “0” Indicates that this prompt (or image) should become the new “Idle” prompt.
7	Backlight	0-100. This indicates the backlight strength for the image – zero means the backlight is off
8	PromptId	The numeric ID of the prompt. This will not change even if the text of the prompt does. For integrators wanting to respond to specific display events – this is the information you should use. System Prompt Ids (<= 100) are tabulated in 14.7.4, non-system prompts are integration specific and numbered above 100.

7.3.2 pdsp Response Message

The POS confirms successful display of a pdsp request from the SCR.

#	Field	Description
1	Object	**DSP**

2	Action	**PDSP**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). “00” indicates successful outcome. If the POS is unable to display the message a non “00” code needs to be returned the POS.

7.3.3 Possible Return Codes

ReCo	Meaning
00	Approved
V9	Unable to display message
VK	Invalid message. One or more fields are malformed or too long

7.3.4 Example Communications

8 PIN PAD

The following are commands for retrieving input from the Payment Express SKP-200 pin pad.

8.1 ENTD

The ENTD action requests the Pinpad display the specified text. It also reads the input on the pin pad, either a single key press, or an input string as requested.

Please note that for security reasons customer specific prompts and entry types must be reviewed by Payment Express, and the configurations stored and downloaded from Payment Express.

The following parameters are stored on a per customer basis on Payment Express servers:

- The type of data entry (is this a single key press or a string terminated by pressing the OK (check mark) key
- Is the entered data displayed or obscured?
- If the data is displayed what is the format of the display (e.g. Pump X, $X.XX)?
- What is the mask of available keys (e.g. numeric only, select keys only, all keys)?

The one time definition of this data (keyed by the PromptId) also makes serial communications more concise.

8.1.1 ENTD Request Message

#	Field	Description
1	Object	**PP**
2	Action	**ENTD**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	PromptId	POS Prompts: 101-9999
5	Param1	Optional Parameter 1 (e.g. If PromptId = 105 describes a fuel pumping prompt “Use pump “, the optional parameter might provide the number “1”)
6	Param2	Optional Parameter 2. As for optional parameter 1.
7	Timeout	1-300. Time in seconds to display the message, before keypad entry will time out. “0” Indicates that the default timeout (30 seconds) will be used. If a DISP message with a timeout is in effect, that timeout is cancelled.
8	Backlight	0-100. This indicates the strength of the backlight on the display. “0” indicates that the backlight is off.

8.1.2 ENTD Response Message

#	Field	Description
1	Object	**pp**
2	Action	**entd**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code. “00” on success, another code on failure.
5	EnteredData	The button string entered by the card holder

8.1.3 Possible Return Codes

ReCo	Meaning
00	Approved
V4	Invalid prompt ID
V9	Unable to display message (returned if there is no pin pad available)
VF	Invalid command sequence

VL	Configuration update needed (communications with Payment Express host required)
VK	Invalid message. One or more fields are malformed or too long

9 MESSAGING

9.1 MESSAGE PROCESSING OVERVIEW

If the POS provides real-time communication to the Host, messages are exchanged between the Host and the SCR using the MSG object. Certain configurations of SCR are able to provide built in wireless messaging. If the SCR is configured to utilise a built in communications module, then the MSG object is not used to exchange messages via the POS attached network, but in this case can provide the POS with access to a communications channel.

If the POS is providing communications to the Host, the POS needs to be able to handle MSG requests initiated by the SCR during transactions processing. The POS also needs to poll the SCR at least hourly to process any messages for transmission by the SCR.

"tx" messages will only be sent by the SCR when "TXEN" has been set to true.

NB: Your implementation must provide appropriate buffers for communications from the SCR200 and from the Payment Express host. Please refer to 3.11.

9.2 TXEN (TRANSMIT ENABLE)

The TXEN (Transmit Enable) action indicates to the SCR that the POS is ready to accept messages generated by the SCR for forward to the Host. Periodically, the SCR will need to communicate with the Host and the POS should check for the presence of transmit messages at least hourly. The TXEN action can be used by the POS to determine if the SCR has any messages waiting for transmission by examining the NumMsgToSend parameter.

- The default state of the transmission link (at start) is **DISABLED. This state is reset when the device is power cycled**
- TXEN will return immediately when enabled. Transmission requests will then be received asynchronously by the POS.

9.2.1 TXEN Request Message

#	Field	Value
1	Object	**MSG**
2	Action	**TXEN**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	Enable	1=enable message transfer, 0=disable message transfer. If message transfer is enabled, the POS should be ready to accept messages sent by the SCR immediately after the TXEN request. The SCR will assume communications are available until it receives a TXEN with enable set to 0

9.2.2 TXEN Response Message

#	Field	Value
1	Object	**msg**
2	Action	**txen**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	NumMsgToSend	The number of messages outstanding. 0 = No messages to be sent

9.2.3 Possible Return Codes

ReCo	Meaning
00	Approved
VK	Invalid message. One or more fields are malformed or too long

9.3 RX

The RX action, requested by the POS, provides a message to the SCR as received from the Host.

9.3.1 RX Request Message

#	Field	Value
1	Object	**MSG**
2	Action	**RX**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	MsgData	Message Data. This data will be in the ASCII ranges specified, and will exclude the '~' character. Maximum size of this field is 498 bytes (512 – 14 assuming a 4 digit CmdSeq & CR, less if CRC is enabled), where the buffer size is 512 bytes

9.3.2 RX Response Message

The RX response confirms reception of the RX message by SCR from POS.

#	Field	Value
1	Object	**msg**
2	Action	**rx**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

9.3.3 Possible Return Codes

ReCo	Meaning
00	Approved
VK	Invalid message. One or more fields are malformed or too long

9.4 TX

The tx action, requested by the SCR, requests the POS transmit the attached message to the Host. The SCR will only transmit messages (using the tx request from SCR to POS) if the POS has previously indicated (using MSG~TXEN) that it is ready to receive messages.

The tx action currently has two timeouts:

- A five second timeout for receiving a response from the POS saying the message was received. If this timeout occurs, the SCR may retry the message up to 3 times.
- A second timeout (usually 30 seconds) for receiving a response message from the Payment Express Host. (NB: This second timeout may be revised in a future release to meet Auth timeout requirements)

9.4.1 tx Request Message

#	Field	Value
1	Object	**msg**
2	Action	**tx**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	This is a dummy variable to ease parsing requirements on the POS. It is always "00"
5	MsgData	Message Data. This data will be in the ASCII ranges specified, and will exclude the '~' character. Maximum size of this field is 498 bytes (512 – 14 assuming a 4 digit CmdSeq & CR, less if CRC is enabled), where the buffer size is 512 bytes

9.4.2 tx Response Message

#	Field	Value
1	Object	**MSG**
2	Action	**TX**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1)

9.4.3 Possible Return Codes

ReCo	Meaning
00	Approved
V5	Transmit message failed (could not transmit at this time)
VK	Invalid message. One or more fields are malformed or too long
VF	Transaction Reference Not Found

9.4.4 Example Communications

Successful communications:

SCR msg~tx~123~00~D74A652E67850750C0370878D26B76E16DFE3468F1CD7F595B9D5A6
74620610CDB296454E2F2952F04CDAE37F0F6FCF60AE3730109D167BA02F0C64FDCBD7278F8931EDA32F97D2D
570A443C4432277B94BA77781C4A362E82F9AD630CBA1B3F637EBA01F6347CEBC6BA4EE346AF225C1FF0B9D98
88FECFDE1A5764DC0A0E7149D0ECB5ABB1027D1242CEB71CDD4CE7CEFD6D0701EC2AB2AE9134BFF5A207BC
54E011D0D3BC904AF5DF57DDD412C374694CD5803DA8E017BDD8DA6020549F309C5D64862EC02258CD86457D
D9E34410A162FBA7E281DED350CEE66EE593412F1C9DC3C0507B14488919F2F1B2F8C225D5E22FEC87360FA5B
408D76C545372B8D4722760125C3DA11BB36420B7B1585411725904958C7BF99EA1F5E52FD53C005B4C4473375
C2A5CA146AE604~

POS MSG~TX~123~00~

POS MSG~RX~124~D74A652E67850750C0370878D26B76E16DFE3468F1CD7F595B9D5A674
620610CDB296454E2F2952F04CDAE37F0F6FCF60AE3730109D167BA02F0C64FDCBD7278F8931EDA32F97D2D57
0A443C4432277B94BA77781C4A362E82F9AD630CBA1B3F637EBA01F6347CEBC6BA4EE346AF225C1FF0B9D9888
FECFDE1A5764DC0A0E7149D0ECB5ABB1027D1242CEB71CDD4CE7CEFD6D0701EC2AB2AE9134BFF5A207BC54
E011D0D3BC904AF5DF57DDD412C374694CD5803DA8E017BDD8DA6020549F309C5D64862EC02258CD86457DD9
E34410A162FBA7E281DED350CEE66EE593412F1C9DC3C0507B14488919F2F1B2F8C225D5E22FEC87360FA5B40
8D76C545372B8D4722760125C3DA11BB36420B7B1585411725904958C7BF99EA1F5E52FD53C005B4C4473375C2
A5CA146AE604~1C0C17BF8CD507E987E1DCBE2323E1B28BE5FF376E8B825FD534D5F7EC4D7C45FB651F5D3E
C2657686267FB99DF5B7BAF72BC666DE7667B60C7216045A9BC101F6995861EEBC4E5D048CFF58B2FFC1C27B3
8BD4C8C26B39BE8665969C1061EB3AA0286142AE32601ACBC6A0D793B778F05FEA64AA8DA67224E182480A50F
0A2ACA129A5416DE6D24CDBBC2F251C84601DE62C284073DE62612E10966414BCBFF312D3B608DC6EC41A38E
0C210D29522B860A1D716B472EFDA7D5711D67687B077A1ACC17C2E55651E4A42B662F991BFA95CA9451842290
8AB42F6F6FC11D7AF669F79FD292A02DFC2C34798031B0B5696F8842AB0305A58A42A7FDB7691AE67427A6CC7
A0BEE99EA117D5B8FD311D765642D4C82E4669EC72FA6804B5551CC466A0AD05AA4E3DDEBE8155C0FE~

SCR msg~rx~124~00~

10 LEVEL 1 ICC

These messages provide low level information on cards used in the system. The

10.1 CDI

This unsolicited event informs the POS that a card has been inserted. If the POS does not respond to the event it is retransmitted (maximum three transmissions in total). This event will not be transmitted if a transaction is in progress.

10.1.1 CDI Event Message

#	Field	Description
1	Object	**l1**
2	Action	**cdi**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	CardType	Card types are listed in 14.5

10.1.2 CDI Response Message

#	Field	Value
1	Object	**L1**
2	Action	**CDI**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). "00" indicates the message was received

10.1.3 Possible Response Codes

ReCo	Meaning
00	Approved

10.2 CDO

This unsolicited event informs the POS that a card has been removed. If the POS does not respond to the event it is retransmitted (maximum three transmissions in total). This event will not be transmitted if a transaction is in progress.

10.2.1 CDO Event Message

#	Field	Description
1	Object	**l1**
2	Action	**cdo**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	CardType	Card types are listed in 14.5

10.2.2 CDO Response Message

#	Field	Value
1	Object	**L1**
2	Action	**CDO**
3	CmdSeq	Command sequence number for pairing requests and responses (format in 14.6)
4	ReCo	Response Code (reference 14.7.1). "00" indicates the message was received

10.2.3 Possible Response Codes

ReCo	Meaning
00	Approved

10.3 CDTK

Many applications require entry exit tokens, e.g. where a card is read on entry (eg. to a carpark) and used as a parking token, and same card is read at exit to calculate the time spent parking and charge accordingly. The CDTK (Card Token) command facilitates this by allowing a card to be read, and generating a 68 character value which cannot be traced back to the original card, and can be used as an entry / exit token. CDTK on the same card always produces the same token (except after a key update, see below). This token can be stored at entry with a time stamp or other information, and map onto a local synthetic card number if needed by a vendor's systems (e.g. in the parking context).

In order to maintain PCI compliant security, the security keys used to generate these tokens have to be updated periodically (PCI-DSS requirement 3.6.4). More frequent key updates means theoretically greater protection against certain attacks to compromise the key, but less frequent updates may be more convenient. The system will default to 12 months between key change. Payment Express can configure a longer period suitable to your application. You should obtain independent advice from a qualified PCI expert if you want to extend the valid period.

Each time the keys are updated, the token CDTK generates for a given card will change too. While the key remains the same, the token generated from a given card is the same. Therefore, in order to be able to match a token from before and after a key change, CDTK actually produces two tokens, one from the current key, and one from the prior key (which can be used to match a previously generated token prior to the last key update).

On customer exit, CDTK will be used to retrieve the current token for that customer's card, and can be matched against the current set of entry tokens. Because a customer may enter shortly before a token changeover and exit shortly afterward, CDTK provides both current and prior versions of the token for matching against entry tokens.

There is a separate guide provided by Payment Express for entry / exit which can be obtained by contacting Payment Express.

10.3.1 CDTK Request Message

#	Field	Value
1	Object	**L1**
2	Action	**CDTK**
3	CmdSeq	Command sequence (format in 14.6).
5	OneSwipeFlag	0 or 1, default 0. This flag is to allow CDRD, CDTK, and AUTH/PUR to be performed with just one card swipe even when the card is mag stripe. Set it to 1 if this is not the first operation in the sequence, and if the prior operation was a CDRD and the card was mag stripe then instead of needing a second card swipe, the securely cached card data from the prior CDRD will be used. For contact EMV the card will still be present and will be re-read. For contactless cards, the card should still be presented to the reader and it will be reread, or an error will be returned.
6	FinishTransactionFlag	0 or 1, default 0. This flag is to allow CDTK to indicate the end of a transaction. Call CDTK first with this flag set to 0. If no other operation is needed on the card, call CDTK again with this flag set to 1. The card will not be read, but any action to indicate the transaction is complete will be taken. For a contactless card, customers expect a beep and 4 green LEDs to light up. For a contact chip card the 'remove card' prompt will be displayed and the SCR will wait for the card to be removed.
7	AlternateInitialPromptId	Use this field to prompt for card presentation with a different message than usual, for example you could select a prompt ID corresponding to "Swipe Loyalty Card". This field can be left empty for default functionality, which uses the same prompts as for a normal transaction.

10.3.2 CDTK Response Message

#	Field	Value

1	Object	**I1**
2	Action	**cdtk**
3	CmdSeq	Command sequence (format in 14.6).
4	ReCo	Response Code (reference 14.7.1)
5	CardType	Card types are listed in 14.5
6	CardToken	A 34 byte (68 character) hex encoded token for the card data. This token is site specific. This token is guaranteed unique to a high probability for any given card on a given site. **This field is only returned if configured for a site at the Payment Express Host.**
7	CardTokenExpiry	ISO format date and time for expiry of the card token. yyyymmddThhmmss UTC, e.g. 20110901T144500
8	PriorCardToken	A 34 byte (68 character) hex encoded token for the card data. This token is site specific. This token is guaranteed unique to a high probability for any given card on a given site. This field is only returned if configured for a site at the Payment Express Host. This field wll be empty if CDTK is called during the first token period.
9	PriorCardTokenExpiry	ISO format date and time for expiry of the card token. yyyymmddThhmmss UTC, e.g. 20110901T144500. This field wll be empty if CDTK is called during the first token period.
10	Card Suffix	Card Suffix 4 digit card suffix suitable for storing by POS application
11	Card ID	CardID Refer Appendix 14.4 for a list of card types. Note the card ID is a string e.g. VISA, MASTERCARD. Not a numeric value

10.3.3 Possible Return Codes

ReCo	Meaning
00	Approved
VV	ICC response data exceeds maximum message length
VX	Access to restricted card types prohibited
W1	Feature disabled
WR	Keys not available
WB	Card Expired. When used in carparking, a card might not yet be expired on entry, but could have expired on exit. The token is still produced.
WD	Invalid card.
V6	Card read failure
VK	Invalid message. One or more fields are malformed or too long

10.4 CDRD

The CDRD command can be used for reading a card of any supported type (contactless, mag stripe or ICC). Currently it can retrieve the track2 data from a magnetic stripe card, or from an ICC or Contactless card it can retrieve masked track2 equivalent data. Card number masking is required for compliance with the PCI DSS. The return code will be 76 in that case, indicating that fully reading card data is not allowed by PCI DSS. Card bin ranges can be submitted to Payment Express, and (if confirmed not to be in PCI card bin ranges) can be configured to return full track 2 equivalent data using this command.

10.4.1 CDRD Request Message

#	Field	Value
1	Object	**L1**
2	Action	**CDRD**
3	CmdSeq	Command sequence (format in 14.6).
4	CardRequest	This field is reserved for future functionality, leave it empty.

5	OneSwipeFlag	0 or 1, default 0. This flag is to allow CDRD, CDTK, and AUTH/PUR to be performed with just one card swipe even when the card is mag stripe. Set it to 1 if this is not the first operation in the sequence, and if the prior operation was a CDTK and the card was mag stripe then instead of needing a second card swipe, the securely cached card data from the prior CDTK will be used. For contact EMV the card will still be present and will be re-read. For contactless cards, the card should still be presented to the reader and it will be reread, or an error will be returned.
6	FinishTransactionFlag	0 or 1, default 0. This flag is to allow CDRD to indicate the end of a transaction. Call CDRD first with this flag set to 0. If no other operation is needed on the card, call CDRD again with this flag set to 1. The card will not be read, but any action to indicate the transaction is complete will be taken. For a contactless card, customers expect a beep and 4 green LEDs to light up. For a contact chip card the 'remove card' prompt will be displayed and the SCR will wait for the card to be removed.
7	AlternateInitialPromptId	Use this field to prompt for card presentation with a different message than usual, for example you could select a prompt ID corresponding to "Swipe Loyalty Card". This field can be left empty for default functionality, which uses the same prompts as for a normal transaction.

10.4.2 CDRD Response Message

#	Field	Value
1	Object	**I1**
2	Action	**cdrd**
3	CmdSeq	Command sequence (format in 14.6).
4	ReCo	Response Code (reference 14.7.1)
5	CardType	Card types are listed in 14.5
6	CardBin	The first six digits of the card number (this is also allowed for PCI cards). NB: This is currently independent of the card prefix table settings. Future revisions may force the number of digits in this field to conform to the card prefix table.
7	Reserved	This field is under revision and may change in future.
8	CardData	Track2 Data or Track2 equivalent read from the card. If the card is a PCI card, this data will be masked with * characters, and the masking may vary according to host configuration and the card provider. Additionally the return code is 76 in that case. **Card data can only be read for non-PCI cards which are defined at the Payment Express host. For PCI cards the provided data will be masked or empty.**
9	Contactless Card UID	Unique card identifier for the type of card presented. Returned in hex format, usually 8, 14, or 20 hex digits. If the card is not contactless then this field will be blank. Supported 1.3.3.X or higher.
10	Card Issuer Name	Name of the card Issuer, eg Visa, Mastercard
11	Private Card Data	Returns special tags specific to the card type, please contact Payment Express to set up configuration to retrieve this data, which must not be PCI data. Eg. Can contain loyalty card data.

10.4.3 Possible Return Codes

ReCo	Meaning
00	Approved
76	Declined. The card is PCI and so the card number may not be revealed. CardData may hold a masked version of the Track2 data or may be empty.
VV	ICC response data exceeds maximum message length
VX	Access to restricted card types prohibited
VK	Invalid message. One or more fields are malformed or too long

10.4.4 Example Communcations

Below are example CDRD commands for PCI cards. A magnetic stripe card, chip card and contactless card are shown interacting with the reader. NB: The exact masking of the cards is a function of the card prefix table. Here there are zero

initial digits and the last four digits are unmasked. The expiry is always masked, as is the proprietary data following the service code.

```
SCR  TX  L1~CDRD~100001~~0~0~
SCR  RX  dsp~pdsp~38~TAP OR~INSERT CARD~~100~1~
SCR  RX  l1~cdi~39~1~
SCR  TX  L1~CDI~39~00
SCR  RX  dsp~pdsp~40~REMOVE CARD~~~100~2~
SCR  RX  l1~cdo~41~1~
SCR  TX  L1~CDO~41~00
SCR  RX  l1~cdrd~100001~76~1~438616~~**********2228=****101*********~
SCR  TX  L1~CDRD~100002~~0~0~
SCR  RX  dsp~pdsp~42~TAP OR~INSERT CARD~~100~1~
SCR  RX  l1~cdi~43~3~
SCR  TX  L1~CDI~43~00
SCR  RX  dsp~pdsp~44~PROCESSING NOW~~~100~4~
SCR  RX  l1~cdrd~100002~76~3~476173~~**********0010=****201**********~
SCR  RX  l1~cdo~45~3~
SCR  TX  L1~CDO~45~00
SCR  TX  L1~CDRD~100003~~0~0~
SCR  RX  dsp~pdsp~46~TAP OR~INSERT CARD~~100~1~
SCR  RX  l1~cdi~47~2~
SCR  TX  L1~CDI~47~00
SCR  RX  dsp~pdsp~48~PROCESSING NOW~~~100~4~
SCR  RX  l1~cdrd~100003~76~2~476173~VISA ACQUIRER TEST 01~**********0119=****201*********~
```

11 SENDING MESSAGES TO PAYMENT EXPRESS

For integrators implementing communications to Payment Express there are a number of options. Which option is preferred by the integrator will depend on what previous integrations a vendor has with Payment Express.

11.1 GPRS PROTOCOL

For new integrations the most likely communications gateway is via the GPRS server (this is the same one used by the simulator). This is also the simplest option. “msg + tx” messages can be sent verbatim to port 60 of the QA machine, do not strip the message envelope or the message will not process correctly.

The response messages can be sent verbatim back to the SCR200

11.2 PXPOST INTERFACE

An HTTP POST, XML based interface (similar to https://qa4.paymentexpress.com/post.aspx) is available at: https://qa4.paymentexpress.com/scr.aspx

An example POST message is shown below (this is as sent by the SCR200 emulator to the Payment Express Host):

```
Accept:*/*
Content-Type: text/plain
User-Agent: PXUPTEMUL_1.0.0.8
Content-Length:194
Connection: Keep-Alive

<MifXmlMessage action=”doScr”>
<ScrData>REVBskjUAAA0XiPrLNKCbQxdSp812Ybw1NWCcg0nd6AdpMkWtjn/9Kizv2RugjRHlz1mQ7VK9ptr8MYT
X7W363eBIeOoxPItUgj53v7UJXbP0uy5fzQDCYhkZNN8+VcT3Y7Kkn2liArZnrrY+qW3XzaTi2nFV8bCecvXRq/hQ
zbYzdXWaOdo/97002osJQ==</ScrData>
<ScrTxnRef>1</ScrTxnRef>
</MifXmlMessage>
```

Here “ScrTxnRef” is field 3, and “ScrData” is field 5 of the tx message specified in 9.4.1.

An example response is:

```
HTTP/1.1 200 OK
Cache-Control: private
Content-Length: 455
Content-Type: text/html; charset=utf-8
Expires: Mon, 07 May 2012 20:16:57 GMT
Server: Microsoft-IIS/7.5
X-AspNet-Version: 2.0.50727
Date: Mon, 07 May 2012 20:17:57 GMT

<MifXmlMessage action=”doScr” feptxnref=”TA405070087a8e3”>
<ScrData>REVBskjUAAA0Xx/GgO53D4qzQBSZAab9DV1XgWvcIj1tsMu8LAe2qHQ15mRedbASTuJnrDFYbXlgPjY0
WNk69NYNDp7OtBy4/ZiyGR0xcB+JCQZdgvcgbtRqSYo1RlxlFZ6NhrjlM7FYunCDgR2CvsMTjzurbo0RNGnzEHb36
3JUHByq29o=</ScrData>
<ScrTxnRef>1</ScrTxnRef>
</MifXmlMessage>
```

This data should be sent to the SCR in the following format, keeping in mind that the ScrData is allowed to be empty (9.3.1):

```
MSG~RX~1~REVBskjUAAA0Xx/GgO53D4qzQBSZAab9DV1XgWvcIj1tsMu8LAe2qHQ15mRedbASTuJnrDFYbXlgPjY0
WNk69NYNDp7OtBy4/ZiyGR0xcB+JCQZdgvcgbtRqSYo1RlxlFZ6NhrjlM7FYunCDgR2CvsMTjzurbo0RNGnzEHb36
3JUHByq29o=~
```

12 TROUBLESHOOTING

The following section is to aid with unexpected problems when working with SCR200 hardware.

12.1 THE SCR200 DOES NOT REPOND

The SCR200 should always respond to serial commands when powered.

If the device has experienced a non-recoverable error (usually due to physical damage or tampering), all transactional commands, and commands which access encrypted data will return an error code (WH). An event will be generated and sent to Payment Express if the device is tampered.

The SCR200 uses its status LED to indicate working status. Under normal conditions, the status LED is turned on when SCR200 is powered on and is turned off shortly (less than a second) when the hardware initialization and self-check is done. When the status LED flashes continuously, an error condition has occurred.

The error condition can be recoverable or unrecoverable. Recoverable error condition vanishes after the SCR200 is restarted, whereas the unrecoverable error condition can only be solved by return the device to Payment Express.

Different error conditions are indicated by the colour and flashing frequency of the status LED. The following are the meaning of status LED

Color	Frequency	Category	Description
Red	1	Unrecoverable	Internal non-volatile memory corrupted
Red	2	Unrecoverable	Self integrity check failed
Red	3	Unrecoverable	Grid tampered. KEK lost
Red	4	Unrecoverable	End of life (DUKPT keys exhausted)
Red+Green	1-5	Recoverable	Fatal runtime error

If your device shows any of these errors you should contact Payment Express support.

12.2 TROUBLESHOOTING CUSTOMER PROBLEMS

The Payment Express serial API has been designed such that there is no mechanism for PCI sensitive information to have been emitted. There are no special debug or logging modes which allow sensitive data can be extracted from the device.

If transaction references are needed to debug transaction processing: the transaction ID, merchant reference and masked card number can all be used to identify a transaction. These are not in PCI scope, and do not present a leakage of card holder information.

13 PA-DSS COMPLIANCE

The following security requirements must be addressed in order for PA-DSS compliance. These features are broadly addressed by the Payment Express solution.

13.1 ISSUES ADDRESSED BY PAYMENT EXPRESS

13.1.1 Data Encryption Over All Networks

Since all payment related data is sent from the SCR200 and encrypted by Payment Express there is no additional requirement on the integrator. Unauthorised traffic sent to Payment Express over any network is ignored.

13.1.2 Sensitive Data

This section describes how sensitive data is protected on the Pinpad and the POS system, and what steps can be taken to ensure sensitive is not compromised.

13.1.2.1 SCR200

The SCR doesn't store data such as pins or cardholder data permanently. Furthermore, this information is immediately encrypted by the device. If the device is tampered (due to access into the secure area), the master key encrypting key is erased, making the encrypted data in memory undecipherable. Hence there is no data to remove in the case of upgrading, uninstallation, or when a pinpad must be returned.

The memory (RAM) used on the SCR200 is inside the secure area – it cannot be accessed without tampering the device and wiping the RAM.

13.1.2.2 POS

No sensitive data can be obtained by the integrators part of the POS – hence no sensitive data can be logged.

13.1.2.3 Logging

No logging is done on the SCR200 other than the logging required by PCI. No sensitive data can be obtained by the integrators part of the POS – hence no sensitive data can be logged.

13.1.3 Tamper or Malfunction

If the pinpad is unresponsive or displays a tamper message then the unit will need to be replaced, return the unit to Payment Express. A tampered device no longer contains any sensitive data which can be deciphered. Any offline transactions stored on the device can only be decrypted by the Payment Express host if they can be recovered from the device.

13.1.4 Administration Functions

The SCR200 cannot be remotely controlled, only configuration data can be changed. Hence there are no issues of compliance around local or remote administration.

13.1.5 SYSTEM LOGGING REQUIREMENTS

The SCR200 logs updates to the firmware. This information can be extracted by the and integrator's Point of Sale software and logged in a central location if required.

13.2 ISSUES ADDRESSED BY A POINT OF SALE PROVIDER

Ther are no PCI PA-DSS requirements which are relevant to a Payment Express point of sale integrator, provided that only Payment Express equipment described in this document interacts with card holder. This relates to reading of the card, and entry of sensitive card related information.

14 APPENDICES

14.1 ELECTRICAL AND ELECTROMAGNETIC COMPLIANCE

14.1.1 EMC Compliance

Payment Express has performed pre-compliance testing on both SCR200 and SKP200 Rev A at EMC Technologies Auckland facility (http://www.emctech.com.au/) and have passed all initial testing using their indoor test chamber. The relevant standards are:

CISPR22 Class A emissions

EN61000-4-2 ESD susceptibility

EN61000-4-3 radiated RF susceptibility

EN61000-4-6 conducted RF susceptibility

Final production testing will be receive a certified report which will be done at their outdoor open-air test site

[TBD] Waiting on wording from Richard for compliance on FCC, A-Tick, C-Tick. Full statement on production approvals

14.2 PAYMENT SECURITY STANDARDS COMPLIANCE

[TBD] Payment Express is in the process of being tested for security compliance.

(Details of EMV L1, L2, PTS, UPT here)

14.3 CURRENCY CODES

The following are currency codes supported by Payment Express

Code	Currency Name
AED	U.A.E. Dirham
AFN	Afghani
ALL	Lek
AMD	Armenian Dram
ANG	Netherlands Antillian Guilder
AOA	Kwanza
ARS	Argentine Peso
AUD	Australian Dollars
AWG	Aruban Guilder
AZM	Azerbaijan Manat
AZN	Azerbaijan Manat
BAM	Convertible MarkS
BBD	Barbados Dollar
BDT	Taka
BGN	Bulgarian Lev
BHD	Bahraini Dinar
BIF	Burundi Franc
BMD	Bermudian Dollar
BND	Brunei Dollar
BOB	Boliviano
BRL	Brazilian Real
BSD	Bahamian Dollar
BWP	Pula
BYR	Belarussian Ruble
BZD	Belize Dollar
CAD	Canadian Dollars
CDF	Franc Congolais (formerly New Zaire)
CHF	Swiss FrancS

CLP	Chilean Peso
CNY	Yuan Renminbi
COP	Colombian Peso
CRC	Costa Rican Colon
CUP	Cuban Peso
CVE	Cape Verde Escudo
CZK	Czech Koruna
DJF	Djibouti Franc
DKK	Danish KroneS
DOP	Dominican Peso
DZD	Algerian Dinar
ECS	Sucre
EEK	Kroon
EGP	Egyptian Pound
ERN	Eritean Nakfa
ETB	Ethiopian Birr
EUR	EuroS
FJD	Fiji Dollar
FKP	Falkland Is. Pound
GBP	Pound SterlingS
GEL	Lari
GHS	Cedi
GIP	Gibraltar Pound
GMD	Dalasi
GNF	Guinea Franc
GTQ	Quetzal
GYD	Guyana Dollar
HKD	Hong Kong Dollars
HNL	Lempira
HRK	Croatian Kuna
HTG	Gourde
HUF	Forint
IDR	Rupiah
ILS	New Israeli Shequel
INR	Indian RupeeS
IQD	Iraqi Dinar
IRR	Iranian Rial
ISK	Iceland KronaS
JMD	Jamaican Dollar
JOD	Jordanian Dinar
JPY	YenS
KES	Kenyan Shilling
KGS	Som
KHR	Riel
KMF	Comoro Franc
KPW	North Korean Won
KRW	Won
KWD	Kuwaiti Dinar
KYD	Cayman Is. Dollar
KZT	Tenge
LAK	Kip
LBP	Lebanese Pound
LKR	Sri Lanka Rupee
LRD	Liberian Dollar
LTL	Lithuanian Litas
LVL	Latvian Lats
LYD	Libyan Dinar
MAD	Moroccan Dirham
MDL	Moldovan Leu
MGA	Malagasy Ariary
MKD	Denar

MMK	Kyat
MNT	Tugrik
MOP	Pataca
MRO	Ouguiya
MUR	Mauritius Rupee
MVR	Rufiyaa
MWK	Malawi Kwacha
MXN	Mexican Peso
MYR	Malaysian RinggitS
MZN	Mozambique Metical
NAD	Namibia Dollar
NGN	Naira
NIO	Cordoba Oro
NOK	Norwegian KroneS
NPR	Nepalese Rupee
NZD	New Zealand Dollars
OMR	Rial Omani
PAB	Balboa
PEN	Nuevo Sol
PGK	Kina
PHP	Philippine Peso
PKR	Pakistan Rupee
PLN	Zloty
PYG	Guarani
QAR	Qatari Rial
RON	Leu
RSD	Serbian Dinar
RUB	Russian Ruble (International)
RWF	Rwanda Franc
SAR	Saudi Riyal
SBD	Solomon Is. Dollar
SCR	Seychelles Rupee
SDD	Sudanese Dinar
SDG	Sudanese Pound
SEK	Swedish KronaS
SGD	Singapore Dollars
SHP	St. Helena Pound
SLL	Leone
SOS	Somali Shilling
SRD	Surinam Dollar
STD	Dobra
SYP	Syrian Pound
SZL	Lilangeni
THB	BahtS
TJS	Somoni
TMT	Manat
TND	Tunisian Dinar
TOP	Paanga
TRY	Turkish Lira
TTD	Trinidad and Tobago Dollar
TWD	New Taiwan Dollar
TZS	Tanzanian Shilling
UAH	Ukrainian Hryvnia
UGX	Uganda Shilling
USD	U.S. Dollars
UYU	Peso Uruguayo
UZS	Uzbekistan Sum
VEF	Bolivar
VND	Dong
VUV	Vatu
WST	Tala

XAF	CFA Franc BEAC
XCD	E. Caribbean Dollar
XEU	European Currency Unit
XOF	CFA Franc BCEAO
XPF	CFP Franc
YER	Yemeni Rial
ZAR	RandS
ZMK	Zambian Kwacha
ZWD	Zimbabwe Dollar

14.4 LIST OF CARD ISSUERS

Card issuers. Additional types may be loaded on a customer specific basis.

Id	Card Issuers
1	MasterCard
2	Visa
3	JCB
6	Amex
7	Diners

14.5 CARD TYPES

Id	Card Types
1	Magnetic Stripe / Non-ICC readable card
2	EMV/Chip Card
3	Contactless Card (non-stored value)
4	Stored Value Card
5	RFID Tags (e.g. building access card)

14.6 PARAMETERS

Note: The tilde (~) is a reserved character and may not be present in any parameter.

For Alphanumeric values, the permitted range is ASCII space to decimal 126.

Parameter Name	Description	Format
DeviceId	Mandatory POS Identifier supplied by the SETD command.	ASCII 1 to 16 characters, printable ASCII characters 0x20 to 0x7D (hex) are allowed
MerchantReference	Optional identifier for a transaction, provided by the POS to the SCR with the AUTH request.	Ascii printable from 0 to 64 characters characters 0x20 to 0x7D (hex) are allowed.
MsgData	Message Data	Alphanumeric from 0-500 characters
Time	Time including date and time.	wYYYYmmddhhmmss w=Day Of Week 1-7 where Sunday is 1 and Saturday is 7. Months 1-12. Date is calendar date 1-31. Hours are military 0-24.
TxnRef	Unique Per Transaction Reference provided to SCR by POS for each transaction or request	ASCII 1 to 40 characters, printable ASCII characters 0x20 to 0x7D (hex) are allowed. Must not be empty.
CmdSeq	Command Sequence Number	Pairs a request and response message. Numeric from 1 to 899999 (Rollover to 1 when count reaches 899999). 900000 to 999999 are reserved for integration purposes by Payment Express.
TxnState	Current Transaction State	00-99 – Refer to Appendix 14.7.5
ProtocolVersionPos	Protocol Version	Four ASCII numerals, version at time

		of writing was 0005
Amount	Transaction amount	Numeric value with implied decimal point according to the transaction currency. Value range 0-9999999
OemDataFormat	Free text	Leave this field blank to indicate the OemData is free form text. If upstream processing is to be performed on the data then Payment Express will provide a suitable string. Maximum 6 characters.
OemData	Free text	Free text, but cannot contain a '~'. If the OemDataFormat is specified then the text should follow that format. Maximum of 127 characters.
Receipt Type	Single Digit	1 for a customer receipt that requires a signature. 2 for a customer receipt without signature 3 for a merchant receipt. 4 for a Logon receipt, indicating the result of the last manual logon attempt. Supported 1.3.3.X or higher.

14.7 OUTPUT PARAMETERS AND CALCULATIONS

The following section outlines values returned by the SCR200, and the nature of calculations performed (where this is relevant for integration)

14.7.1 Response Codes

The bold fields are values returned by the POS to the SCR.

ReCo	Meaning
00	Approved (signature may be required on a receipt, check the other reply fields)
76	Declined
V0	Protocol Version Mismatch
V1	Currency Mismatch
V2	Completion amount did not match authorised amount and AuthCompleteSame was set to 1 (4.2.2)
V3	Completion amount exceed authorised amount
V4	Invalid prompt ID
V5	Transmit message failed
V6	Card read error (will be reported if the card read is bad, or an EMV or contactless card is removed before reading can be completed)
V8	Maximum authorisation amount exceeded
V9	Unable to display message
VA	Busy
VB	Card read timeout
VC	Self-test failed
VD	Hardware Failure
VE	Not initialized (CFG+SETD is not done)
VF	Transaction Reference or Sequence Number Error
VG	Invalid object
VH	Invalid action
VJ	More than max outstanding voids / completions outstanding (8 outstanding transactions not settled with

	Payment Express internet servers)
VK	Invalid message (fields are malformed)
VL	Configuration update needed (communications with Payment Express host required)
VM	Stored Value Card Presented
VN	Non-Stored Value Card Presented
VP	CRC Error
VQ	Invalid Amount
VR	Invalid Merchant Reference
VS	Unsupported Baud Rate
VT	Unsupported Maximum Message Size
VV	ICC response data exceeds maximum message length
VW	Transaction cancelled
VX	Access to restricted card data prohibited
VY	Requested line number is beyond the end of the data, or line count would exceed buffer size
VZ	Cannot execute command – TXEN is not enabled
W0	Removal detected – financial transactions disabled (applies to SCR200 and SKP removal)
W1	Feature is disabled. This message is received when you attempt an operation which has not been enabled at Payment Express for this device
W2	ICC Declined. The ICC Card locally declined a transaction
W3	Data not available (e.g. When using GETT to retrieve a token that has not been retrieved, or is not configured on the Payment Express host)
W5	Stored Value Card state is unknown. The card needs to be represented to confirm the correct card state (with an SVE command).
W6	Stored Value Transaction could not be settled – POS should reverse the transaction with an SVR
W7	A previous stored value transaction failed due to power failure
W8	Wrong card presented
W9	No error to recover from (during an SVE). This means that no value was deducted from the card
WA	Either a slot was provided where no multi-merchant facility is configured, or no slot was provided when a multi-merchant facility is configured
WB	Card is expired
WC	Transaction is declined because a PIN is required (but no PED is present)
WD	Invalid Card
WE	Card not allowed (the card was not represented in the card prefix table)
WF	Offline conditions exceeded.
WG	No PIN pad (a PIN could not be entered)
WH	Security error. The device was tampered or grids are not enabled
WI	DeviceId does not match the required DeviceIdPrefix configured at the host
WJ	Transaction was offline, operation not allowed
WK	Root key not ready
WL	Session expired
WM	Session failed
WN	Insufficient storage space
WO	Wrong sequence
WP	Unknown MIFARE card
WQ	EMV Terminal Configuration UiCapability must be 0 for this function
WR	Feature not available because Key Transport Key is not installed
WS	Necessary data not provided via Logon, eg Merchant ID, CATID.

WT	Card or account not suitable for Cash Out
WU	Logon request too frequent
U9	Timeout (No Response from Host)
Z9	Signature Declined

14.7.2 CRC Calculation

Use the CCITT 16 bit CRC standard.

14.7.3 Hardware Status Codes

State	Meaning
00	Ready
VC	Self-test failed
VD	Hardware Failure

14.7.4 System Prompts

Different system prompts may be loaded on request to Payment Express. The following shows the default prompts and their meanings

PromptId	Default Text	Notes
0		Blank screen
1	`TAP OR\nINSERT CARD`	Present any kind of card
2	`REMOVE CARD`	Remove swipe card
3	`REMOVE CARD`	Remove chip (EMV) card
4	`PROCESSING NOW`	Processing
5	`SELECT APP`	Select EMV Application
6	`ENTER PIN`	Enter PIN (this may NOT be displayed as a user prompt)
7	`PIN OR ENTER`	PIN or Enter
8	`REMOVE CARD`	Remove Contactless Card
9	`INSERT CARD`	Present card, but not a contactless card (contactless is disabled)

14.7.5 Transaction State

The following are transaction states on the SCR200

State	Meaning
0	Idle/Ready
1	Authorization in progress
2	Authorization done
3	Reversal in progress
4	Complete in progress
5	Stored Value Purchase in progress
6	Stored Value Refund in progress
7	Reversal Completed
8	Complete Completed
9	Authorization Failed
10	Stored Value Purchase Complete
11	Stored Value Refund Complete
12	Stored Value Balance Read Complete

13	Purchase in progress
14	Purchase completed
15	Purchase failed
16	Refund in progress
17	Refund completed
18	Refund failed

The state diagrams for initialisation of the SCR200 and the transaction state machine are shown in Figure 4 and Figure 5.

The UML state diagram formalism is used: On the main arcs between states are there are triggers/effects. The diamond branches show “guards”, (if/else conditions) in square braces. These are based on “state” (rather than incoming events) which is not formalised in the state machine (queue lengths etc.).

Hence the response messages from the SCR are shown as effects.

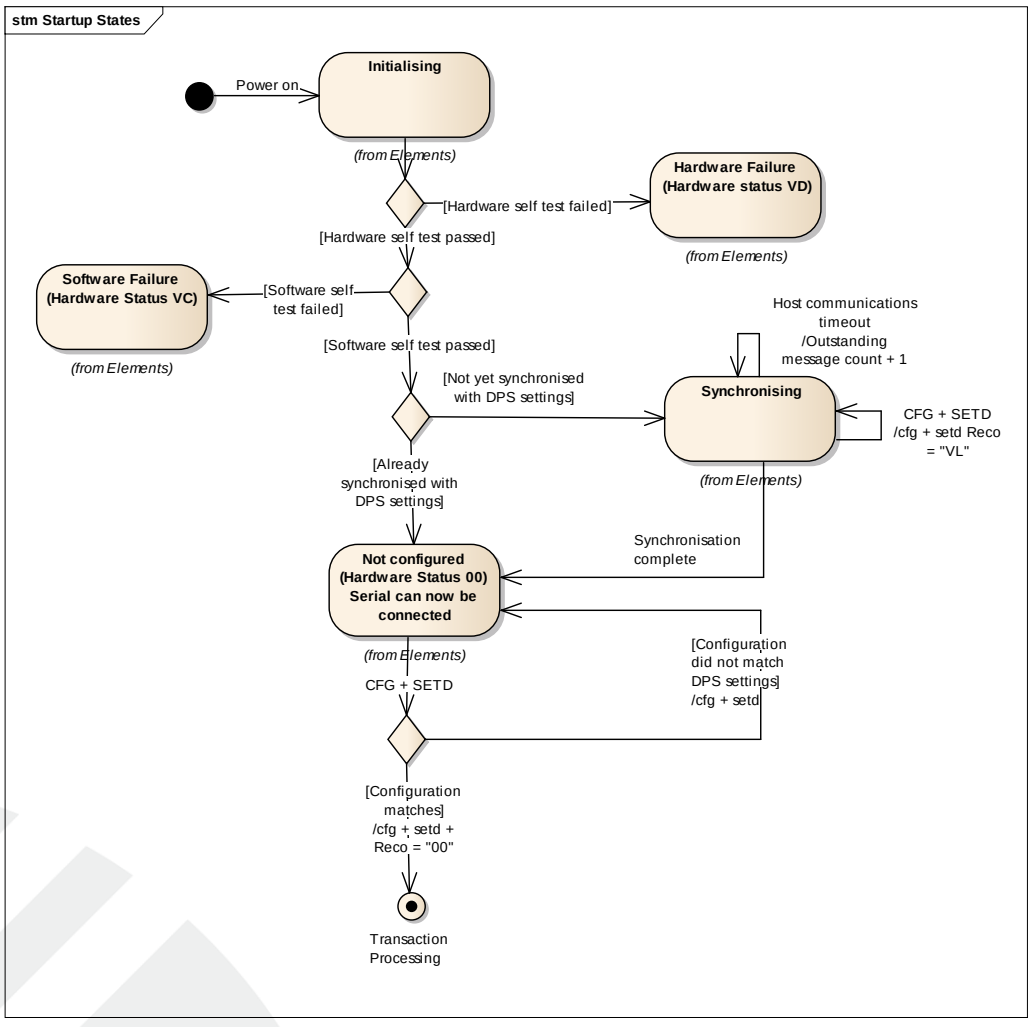


Figure 4: The initialisation state machine

18	Refund failed

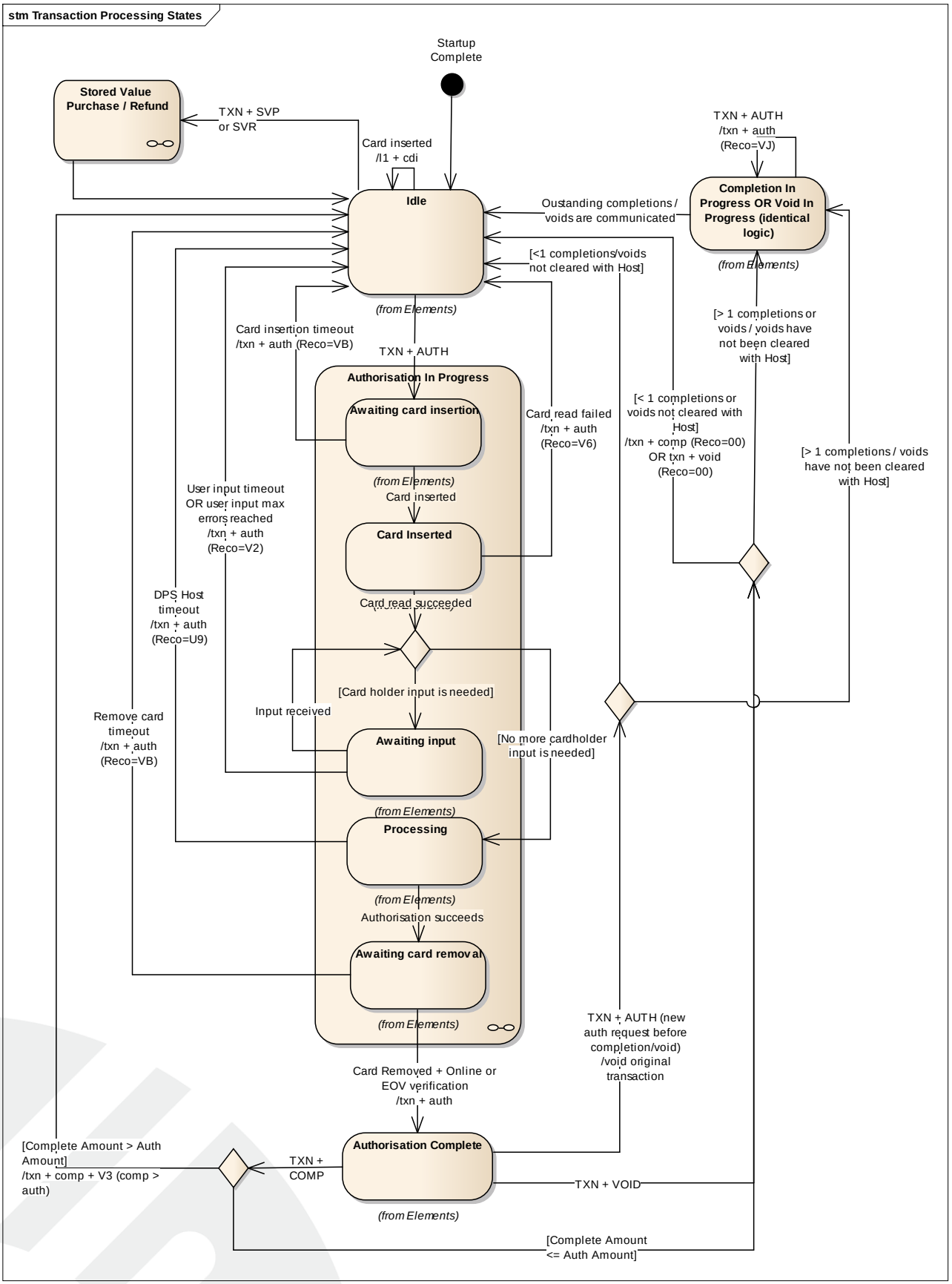


Figure 5: The transaction state machine

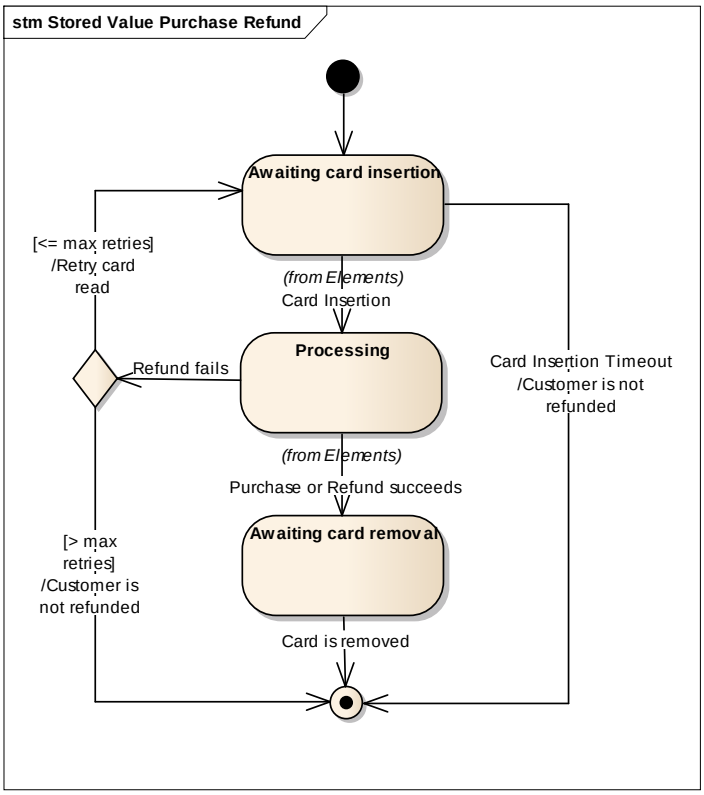


Figure 6: Electronic Purse Refund State Machine

14.8 CONNECTOR PINOUTS

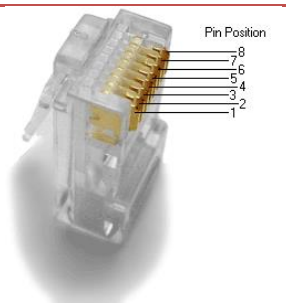
14.8.1 RJ45 Connector Pin-Out

Pin ID	Signal	Type	Description
1	TX	Output	Transmit out. RS232 level, 115Kbps max
2	RTS	Output	Request-To-Send. RS232 level
3	RX	Input	Receive in. RS232 level, 115Kbps max
4	PWR	Power	5 to 42Vdc. Daisy-chained through connectors so can be input or output
5	PWR	Power	
6	CTS	Input	Clear-To-Send. RS232 level. Also used to enter secure boot-loader mode on power up
7	GND	-	System Ground
8	GND	-	

14.8.2 Cross-Over Cable For SKP200 Connection

The cable for SKP200 connection from the SCR200 is a 2pr crossed, 2pr uncrossed 10/100BASE-T crossover cable. Newer off-the-shelf cross over cables are 4pr crossed 10/100/1000BASE-T cables

Pin	Conn 1: T568A (Normal)			Conn 2: T568B (Cross-Over)			Pins on plug face
	Signal	Pair	Colour	Signal	Pair	Colour	

1	TX	3		RX	2		
2	RTS	3		CTS	2		
3	RX	2		TX	3		
4	PWR	1		PWR	1		
5	PWR	1		PWR	1		
6	CTS	2		RTS	3		
7	GND	4		GND	4		
8	GND	4		GND	4		

14.8.3 Blade (Pico) Connector

Pin ID	Signal	Type	Description
1	TX	Input	Receive in. RS232 level, 115Kbps max
2	RX		
3	PWR	Power	5 to 25Vdc. Daisy-chained through connectors so can be input or output
4	GND	-	