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Abstract:	This document is the Specification for the PIN Pad intended for use on the NWB expansion of Pathway's Horizon project.
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0 Document Control

Document History

Version No.	Date	Reason for Issue	Associated CP/PinICL No.
0.1	07/03/02	First draft for initial comment	
0.2	26/03/02	Second Draft after comments received	
0.3	03/04/02	Third Draft after second comment cycle	
0.4	27/04/02	Fourth Draft after third comment cycle	
0.5	12/05/02	Fifth Draft after comments on version 4	
1.0	13/05/02	Approved for signature	
1.1	21/05/02	Requested changes	
2.0	21/05/02	Approved for signature	
2.1	27/05/02	Draft for comment	
3.0	31/05/02	Approved for signature	
3.1	17/06/02	For review after additional information requested by Post Office Limited.	
4.0	19/06/02	Approved version	

Associated Documents

Ref	Reference	Version	Date	Title	Source
[a]		1.0	25/10/01	PIN pad Service Definition and Change to NB Requirements reflecting the use of PIN verification	POL

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[b]	IM/SPE/026	0.1		Pay Pole Product Specification	Pathway

Abbreviations/Definitions

Abbreviation	Definition
ANSI	American National Standards Institute
BS	British Standard
COTS	Commercial Off-The-Shelf (i.e. already available through normal commercial channels
DES	Data Encryption Standard
DUKPT	Derived Unique Key Per Transaction
EMC	ElectroMagnetic Compatibility
EMV	Europay/Mastercard/Visa – the Europe-wide standards agency for smartcard technology.
EN	European Norm
IEC	International Electrotechnical Commission
ISO	International Standards Organisation
LAN	Local Area Network
MAC	Message Authentication Code
OPS	Office Platform Service. The provision and support of the hardware and software at outlets including the Desktop environment of the Horizon system.
PC	Personal Computer
PIN	Personal Identity Number
PSU	Power Supply Unit – the means whereby mains voltage of 240VAC is reduced to the operating voltage required by the PINpad.
RFI	Radio Frequency Interference – interference specifically within that part of the electromagnetic spectrum normally used for radio/television broadcasts, and any other broadcast purposes. RFI shielding is required in order to protect the equipment from the effects of radiated and conducted electromagnetic interference, and to prevent (or reduce) the emission of such interference from the equipment.

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RJ11/RJ12	An Industry-standard connect configuration comprising either 6 pins (RJ11) or 10 pins (RJ12), both configurations being based on the same overall connector housing design.
SAM	Secure Application Module
SLA	Service Level Agreement
TBA	To Be Agreed – refers to specification parameters not yet agreed. Typically requires specification by the Supplier, and agreement from Fujitsu Services.
TBD	To Be Defined – refers to specification parameters to be provided by the Supplier. Agreement by Fujitsu Services to the actual values provided, is assumed on the basis that this device is a commodity product.
UKPT	Unique Key Per Transaction
UL	Underwriter's Laboratory – the major Standards Certification authority in the USA.

Changes in this Version

Version	Changes
0.1	None – this is the first Draft.
0.2	Various grammatical changes
0.2	Section 2.1 – Paragraph regarding Mobiles re-worded
0.2	Section 2.1.1 – Change to add 12-volt DC power.
	Section 2.1.1 - Change to include reference to ISO 9564 Section 2.1.12 – Removal of port specification for the contact-less reader.
0.2	Section 2.2.2 – Change to include reference to Pay Pole Description.
0.2	Section 2.2.2 – Change to add details of Pay Pole turning capacity
0.2	Section 2.2.6 – Change to add the PIN Pad interface functionality.
0.2	Section 2.2.7 – Changes to add details of SAM modules.

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0.2	Section 2.2.9 – Changes to the description of character set
0.2	Section 2.2.10 – Changes to describe the tamper proof protection for the Smart Card interface.
0.2	Section 2.2.11 – Changes to update the physical interfaces on the PIN Pad and removal of the description of the Contactless card reader.
0.2	Section 3.1.3 – Update to clarify EMC conformance.
0.2	Section 3.2 – Update to remove details of installation
0.2	Section 3.3 – Correction of Physical Attributes to width, update of diagrams.
0.2	Section 4.0 – Removal of Standards Section.
0.2	Section 5.1.1 – Clarification how PIN entries are masked Section 5.1.1 – Clarification of timeout. Section 5.12 – Update of EMV statement
0.2	Section 6.1.2 – Clarification of DUKPT standard
0.2	Section 7 – Update of environmental operating conditions
0.2	Section 8.2 – Update of acceptance test.
	[issue 0.3 changes to be supplied]
0.4	Change of Title
0.4	Update to include Hypercom as Supplier
0.4	2.1.10Change of description for the backlight
0.4	2.1.3 Addition of Paypole reference
0.4	2.1.3 Deletion of redundant Pay pole part.
0.4	2.1.8, 2.1.2, Change of description to RSA Encryption Chip
0.4	2.1.2 – Inclusion of SMART Card Cable Cover part number
0.4	Section 8 – Inclusion of MTBF statement
0.4	Inclusion of Standards – Updated with current version under review
0.5	Update of Performance timings
0.5	Update of DDA wording
1.0	Removal of DDA wording as this has now moved to commercial.
1.0	Removal of “Checksum ETX excluded in LRC” as it was seen as unnecessary.

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1.0	Update of ISO 9564 for clarification.
1.1	Removal of Timing measurement methods
1.1	Return of ISO 9564 6.3.3c in 2.1.1
1.1	6.1.1 Additional bullet added to reflect ISO 9564 6.3.1
2.1	Corruption of font corrected 2.1.10
2.1	Addition of 4 after ISO 7816 in the standards section
3.0	For Authorisation
3.1	Update to include new appendix covering the second RS232 interface
4.0	Approved Version

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Table of content

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1 Introduction

Document Precedence

This document defines the characteristics of the HFT 117 PIN Pad device.

Purpose

This document has been produced to specify the PIN Pad counter device, intended for use in the Network Banking expansion of the Horizon System delivered to operate in UK Post Offices.

Readership

This document is intended for use by Fujitsu Services staff involved in the Project and the Customer. This document will be included in Schedule B3 and able to be used and released on the terms of that Schedule.

Related Documents

Documents that should be read in conjunction with this document are as follows:

Ref	Title/reference number	Comments – source etc.
1	"PINpad Service Definition"	Document provided by the Customer as a "Statement of requirements". This document was produced by James Brett and is currently at issue 1.0 dated 25/10/01.

2 Detailed Specification

Summary Definition of the PIN Pad

The device is a stand-alone PIN Pad with a keyboard, and display for connection to a Post Office counter PC to provide a PIN entry facility for network banking and other similar services including future use for EFTPOS and SMART card applications, when these requirements are

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defined. Only one type of PIN Pad is proposed. PIN Pads will be capable of being fitted to every customer facing position which supports the Pathway's Network Banking Service installed in the Horizon system.

Note:

- There will be no hand held version.
- Mobile Positions - security restrictions dictate that the same PIN Pad must be plugged into the Mobile unit whenever the Mobile unit is in use, including when it is transported and used at a different location. The PIN Pad does not need to remain connected during transport. The method of connection is via the RJ12 connector to the Specialix card
- Note – A design change to the Mobile Unit is advised to enable an easy mechanism for connection and disconnection.

2.1.1 Overview

1. The hardware includes a keyboard, display, security module, integrated smart card reader and interface to four (4) SAM modules. It is capable of being externally interfaced to connect to a contact-less card reader. It consists of the following :-
    a. Mains cable assembly, comprising a mains (230 volt, a.c., 50Hz) adaptor to allow connection to the rear of the Horizon counter equipment. This is plugged into the counter PC in place of the normal IEC320 mains power connection, and provides a suitable connector into which the normal mains connector is plugged.
    b. Mains power supply unit (PSU), comprising a transformer unit with IEC320 male connector, and a 12 volt DC cable to connect to the data cable adaptor.
    c. Data cable assembly to enable connection of the PIN Pad to the Horizon counter equipment. The data cable includes a d.c. power adaptor as part of the construction, to provide 12 volt DC power supply connection to the mains PSU.
2. A support arrangement comprising brackets and supporting metalwork ("Pay Pole") to enable the PIN Pad to be mounted on or near the counter position. Detailed drawings of the support arrangement are provided later in this specification.
3. The device is provided with software for basic device management functions and a secure method of PIN entry. The PIN Pad shall be supplied certified to EMV 3.1.1 Level 1. The PIN Pad will be supplied, with the capability to be remotely upgraded to support EMV2000 Level 2.

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The PIN Pad shall meet the anti-tamper requirements of ISO 9564 as set out in §6.3.3c such that tampering with the device itself, for example in order to insert tapping or bugging equipment, shall result in sufficient damage to the device to cause it to become inoperable.

It shall be capable of being remotely upgradeable to triple DES(which will require a new key to be loaded into the PIN Pad)

Components

The basic hardware components of the PIN Pad include the following main parts:

2.1.2 FZ1172214 Consolidated ICLP HFT 117 Package

- PIN Pad Package - FZ1172214 Consolidated ICLP HFT 117
- Data Cable - FC012403
- Mains Adaptor - FRF15400
- Power cable - FC012601
- Cable Tie - FDM00925
- RSA encryption Chip - Type AT90SC6464C, Secure Micro controller for Smartcards
- PIN Pad Application Software (including Security Software)
- SMART Card Cover – A9401386

2.1.3 MOUNTING KIT otherwise known as the “Pay Pole”

The specification of the “Pay Pole” will be documented in Ref [B], and an outline is included in this document for information only.

This is a sturdy metal and plastic design, which will fix onto the counter. It will mount the PIN Pad in a secure way, such that removal of the PIN Pad from the counter area by anyone other than an authorised person would prove difficult. The pole and the terminal holder are painted in RAL 7021 black finish.

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- FAH21118 Special Triangle Pole Plastic filling

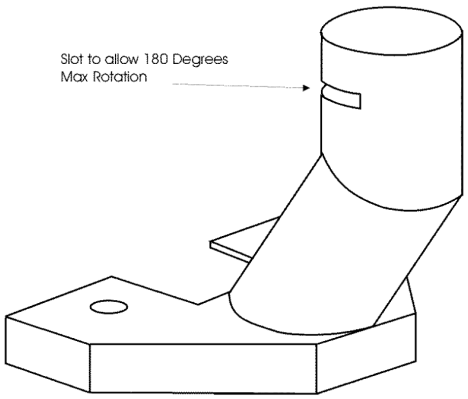

Illustration only

FAH30324 Multi-Angle Terminal Holder [Limited to 90 degrees turn to the left or right.]

-

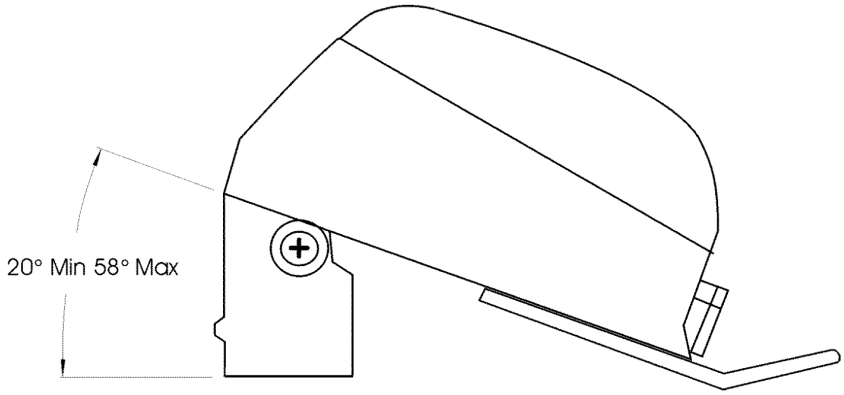

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Illustration only

- FAH91002 Plastic cover to hide cables at the rear of the unit.
- FAH91001 Plastic Inserts for Cable ducting
- The Terminal Holder addresses the requirements of ISO 9564-1 §5.4 & §F.3 to ensure that PIN entry is not overlooked.

2.1.4 SOFTWARE

- FG091010 DUKPT Key Generation (The details of key generation are subject to security classification, and not covered in this document).
- PIN Pad Application Software (including Security Software)

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2.1.5 Security Module

The security module includes both the security kernel of the PIN Pad and the physical keyboard and display.

The Security Module's electronics are molded together with the keyboard that consists of:

- A keyboard made of a hard plastic construction with Numeric keys and 10 Function keys (including Clear and Enter). See section 3.4 for detailed diagram showing key top positions and colours, and the dimensions of the PIN Pad.

- Security Processor, a DS5002FPM, has a number of security features including:
  - Hardware encryption, protecting code and data when stored in the Memory.
  - Pseudo random generator.
- Memory, 128 KB in total, 64 KB for code and 64 KB for data.

- Boot Guard, a second processor that secures the loading application.

2.1.6 Application Processor

The application processor is an AM186ED running at 40Mhz with the following memory configuration:

512 KB Flash memory

512 KB RAM battery-backed

512 KB Battery-backed RAM as data memory

It allows soft programming and updates of the application.

2.1.7 Application Programming Interface

An Application Programming Interface that delivers the following functionality: -

a. Determine the firmware versions(s) of the software currently installed on the PIN Pad.

b. Determine the status of the key version loaded on the PIN Pad

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c. Determine the unique serial number for the PIN Pad. Such serial number shall be unique to all Fujitsu Services (and other customers) purchases of PIN Pads from the supplier.

d. Update the software in the PIN Pad.

e. Display text

f. Read function keys

g. Change Character Set – to enable the application to load predefined characters.

h. Sound a 'beep' noise

i. Get an encrypted PIN

j. Get an exchange PIN (This is the facility to perform a PIN Change)

k. Load encryption keys (This gives the ability to down-line load applications into the PIN Pad Security Application with an updated key)

l. Request the PIN Pad to perform an internal diagnostic check and return the status of the device. Such diagnostic will return the battery status.

   The PIN Pad driver software will check the battery status every time it is initiated, i.e. every night as part of the desktop reload.

2.1.8 SAM Interface

The unit includes a Smartcard processor with interface to four (4) SAM connectors of ID-000 type. One RSA encryption Chip will be fitted (Type AT90SC6464C, Secure Microcontroller for Smartcards). , the remainder will be left empty providing for a later upgrade path. The SAM modules will be capable of being fitted to the existing PIN Pad by trained staff at Post Office premises, i.e. no need for PIN Pad swap out or return to the manufacturer.

2.1.9 Battery

The PIN Pad will contain a back-up battery capable of maintaining the applications and security keys when the power to the device is removed. It shall have an anticipated minimum life expectancy of 5 years. The PIN Pad is capable of monitoring the status of the internal backup battery. It will be possible to determine the state of the internal battery from the connected Horizon terminal. There are no 'Low Battery Indicator' warnings or lights displayed on the PIN Pad.

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2.1.10 Display

The display uses the large character LCD type with 4x16 characters and backlight. Each character shall be displayed on a matrix of 5(five) columns by 7(seven) rows. Each “cell” of 35 pixels is capable of displaying any character from the following table:-

	2	3	4	5	6	7
0		0	@	P	'	p
1	!	1	A	Q	a	q
2	"	2	B	R	b	r
3	£	3	C	S	c	s
4	$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K		k	
C	,	<	L		l	
D	-	=	M		m	
E	.	>	N		n	€
F	/	?	O		o	

The above table represents the basic character set. The PIN Pad has the functionality to enable local language variants to be downloaded and controlled by the application; this is achieved by downloading up to a maximum of six [6] soft [volatile] characters into the character set. Remaining unfilled positions are reserved by manufacturer.

The following table represents the standard characters :-

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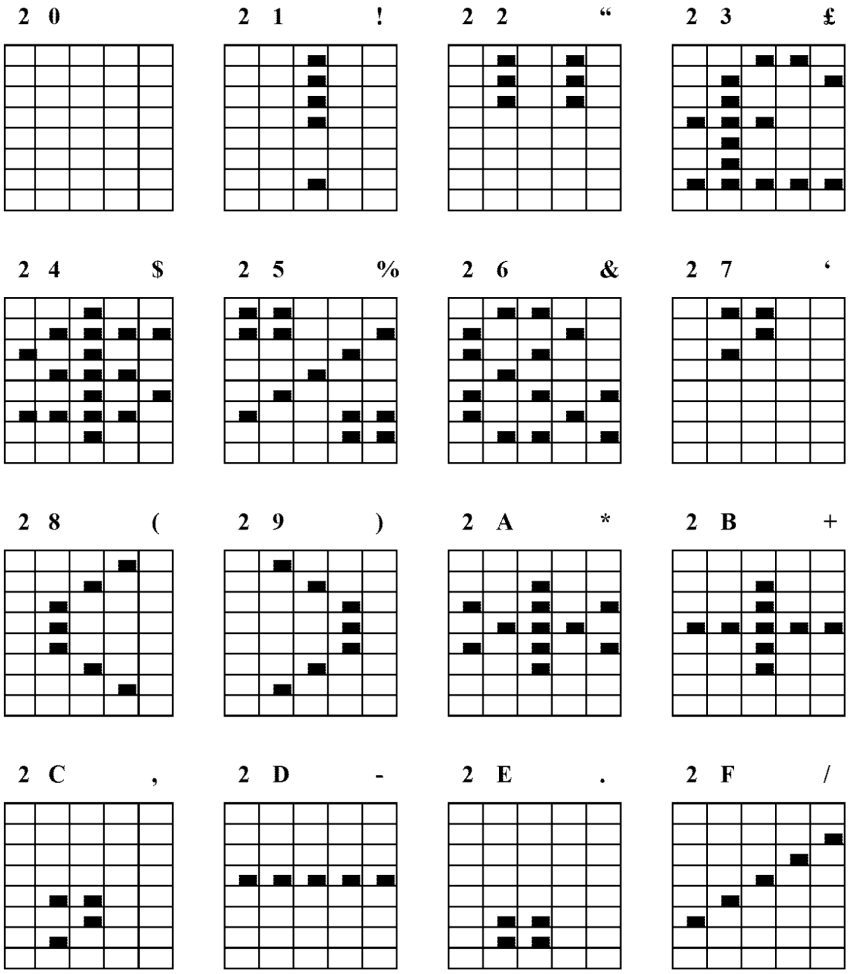

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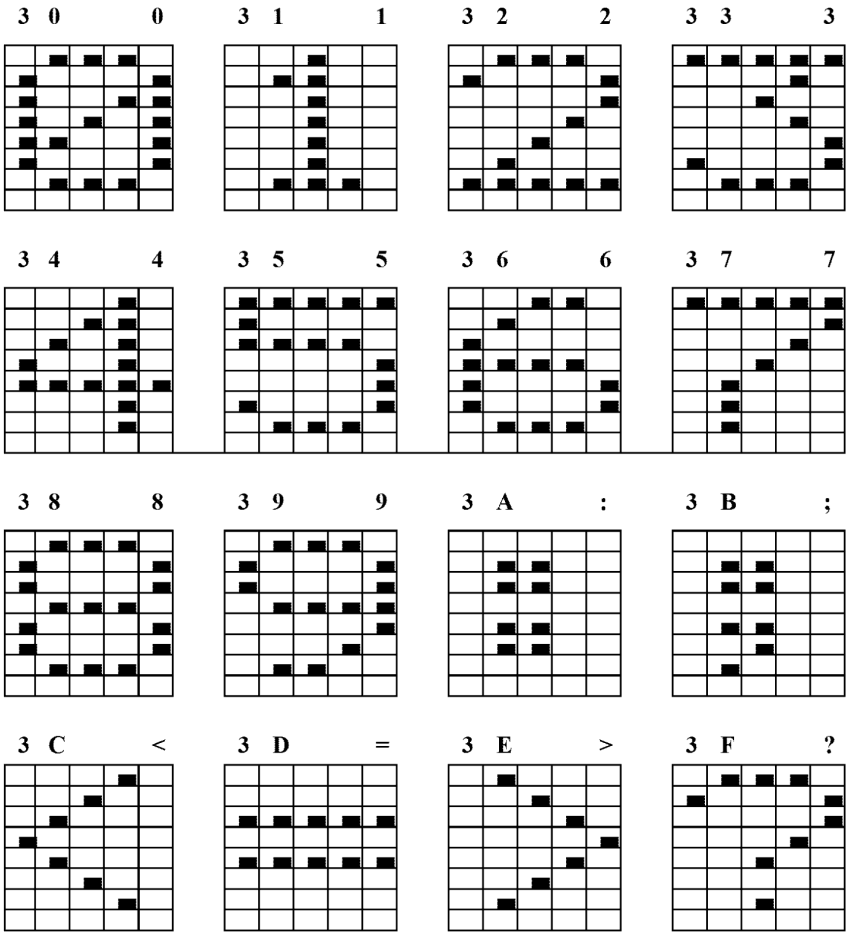

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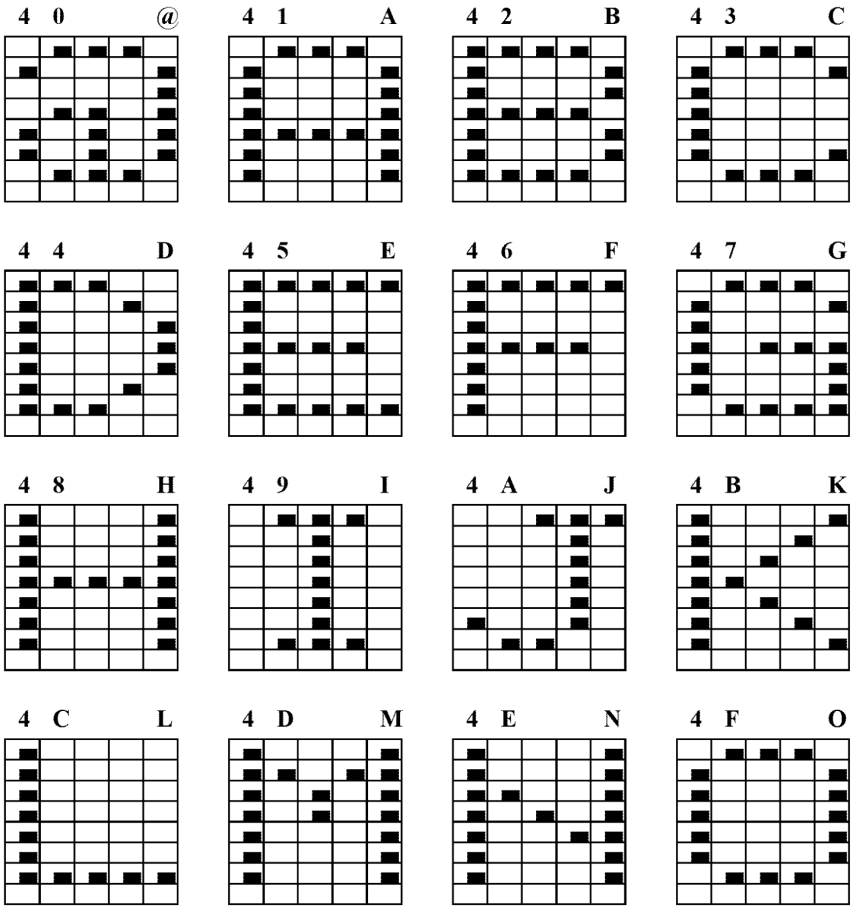

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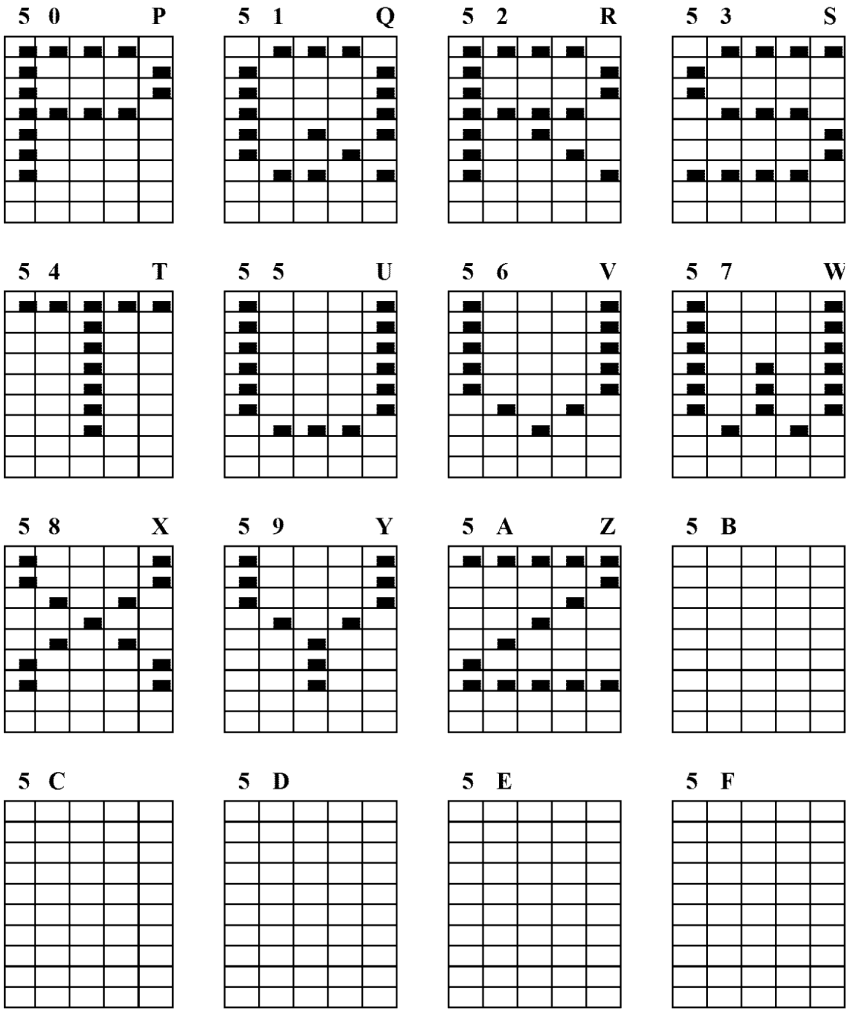

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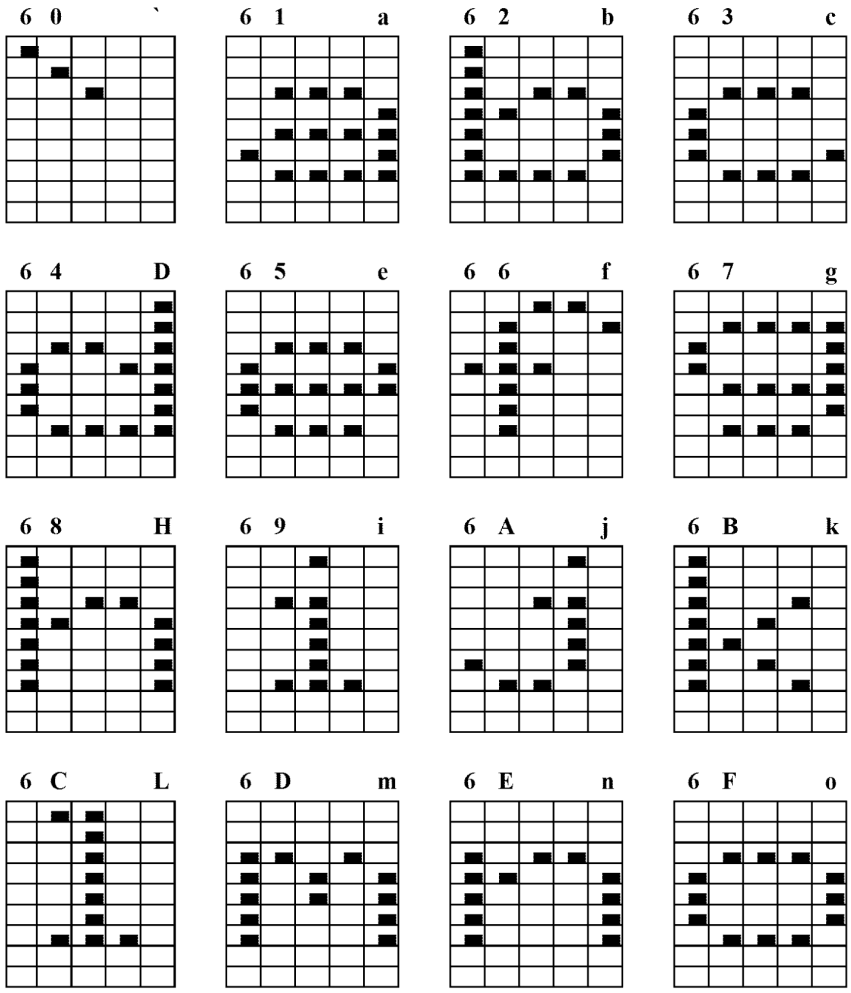

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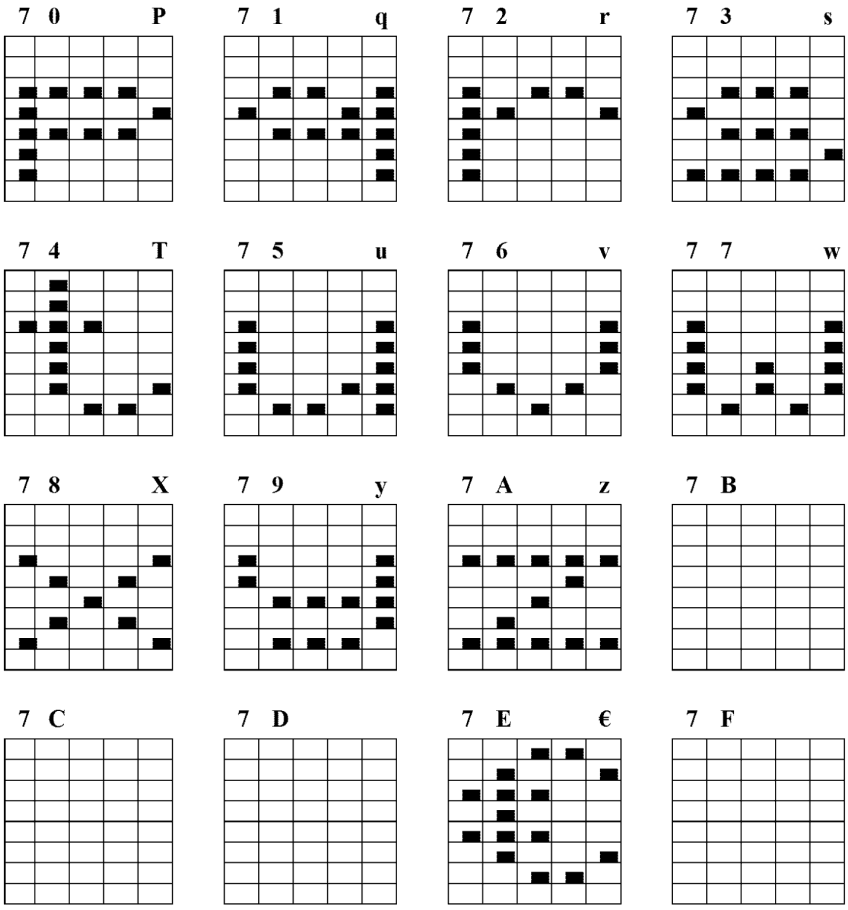

The display will be clearly legible at a distance of 1 metre with normal vision and a counter luminance of 250 lux.

Character Display Dimensions

Cell Height = 4.2mm

Cell Width = 2.92mm

The display is cleared by specific commands sent to the PIN Pad from the Horizon counter application. An example is the GET PIN command, which contains parameters to display a message before and after PIN entry.

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There is no timeout for clearing text after power up of the PIN Pad. The display is cleared by messages sent from the application running on the Horizon counter PC.

The backlight remains permanently illuminated when powered on

2.1.11 Card readers

The unit shall be delivered with a smart card reader for ISO7816 contact cards. The installed smart card reader shall support asynchronous cards conforming to the ISO 7816 -1,-2,-3 standard. Both T=0 and T=1 protocols shall be supported.

There shall be no locking mechanism.

The path between the key pad and the ICC contacts will be protected by the PIN Pad's tamper protection features.

An interface is provided to connect an external reader for ISO14443 Type A and Type B contact-less cards. Contact-less card reader support will be determined when a reader is chosen e.g. support for Mifare.

The unit does not contain a magnetic stripe reader.

2.1.12 Interface Connections

The PIN Pad has two RS-232 compatible ports, one, colour coded black, used to connect to a PC or other host terminal and the other, colour coded white, to connect an external contact-less card reader. See section 3 for pinouts.

Unused ports will not be blanked off.

The design will ensure that errant RJ12 connection (with the supplied equipment and cables) to the HFT117 port is non-destructive.

Both RS232 interfaces shall support both hardware and software handshake protocols provided within the international definition of RS232 Interfaces.

PINs will never be sent in plain text over either of the RS232 connections.

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Default RS232C protocol shall be set as follows for the communication with the counter PC:

Number of data bits	Eight
Parity	Even

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Number of stop bits	One
Baud rate	19,200

3 Cable Specification

Connectors

3.1.1 PIN Pad end.

There shall be two RJ12 connector positions on the PIN Pad. When viewed from the rear of the PIN Pad, connectors shall be fitted in the centre and left-most positions. The centre position shall be the data cable connector (10-pin RJ12). The leftmost connector is reserved for future connection of the Smartcard reader.

3.1.2 Counter end.

The PIN Pad shall be connected to the counter processor by a RJ11/RJ12 male connector to a port on the Specialix Serial IO adaptor.

3.1.3 Power Connector

A spur from the serial data cable close to RJ11/RJ12 connector allows connection to an external PSU to provide power to the PIN Pad. The spur shall be long enough to allow for shielding and or EMC/RFI suppression devices (Ferrites etc) to meet the necessary environmental requirements. At the end of the spur a connector shall be provided to allow the PSU to be disconnected or reconnected during installation.

The PIN Pad shall conform to EMC standards as specified in Schedule A02 and shall be tested for such while connected to counter equipment.

Cable type and construction.

The data cable shall be 3 metres long +10%, -0%. The cable type shall have at least the following attributes,

1. Shielded for RFI/EMC purposes.
2. UL 2464, UL VW-1 Flame test approval.
3. Bending radius of 1.5cm or better.
4. Flexible.

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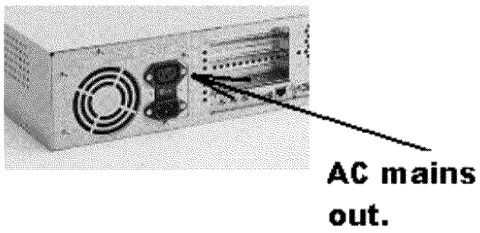
Power Supply Connection and cable

The PIN Pad power supply shall connect to the AC power out on the PC base unit.



The method used shall be as illustrated below (Figure 4).

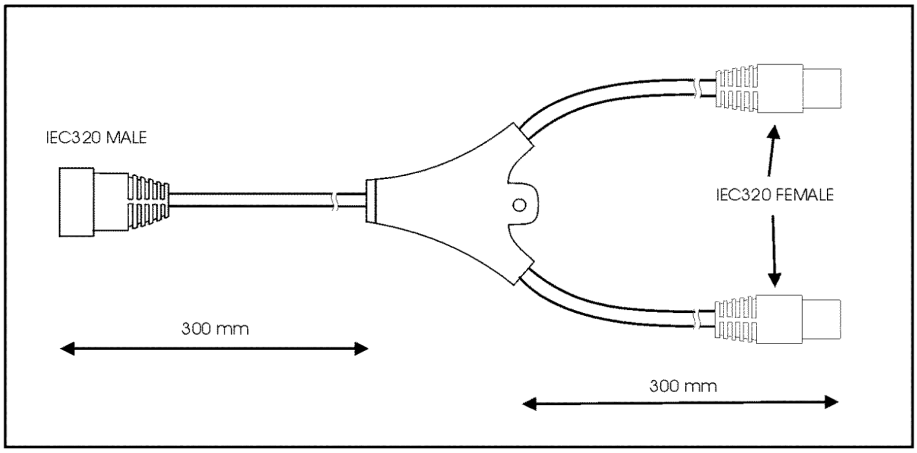


Illustration only

The cable is 300mm in length on both sides of the 'Y', made of flexible cable; this gives approximately 600mm from the PC power socket to the PIN Pad PSU.

The existing mains inlet cable is removed from the rear of the counter PC and reconnected to the IEC male connector on the "Y" cable. One of the IEC female connectors is then reinserted into the IEC male receptacle on the rear of the PC, the other being connected to the PIN Pad PSU.

12V Cable to PIN Pad = 2metres +/- 100mm

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Mains PSU is as follows:-

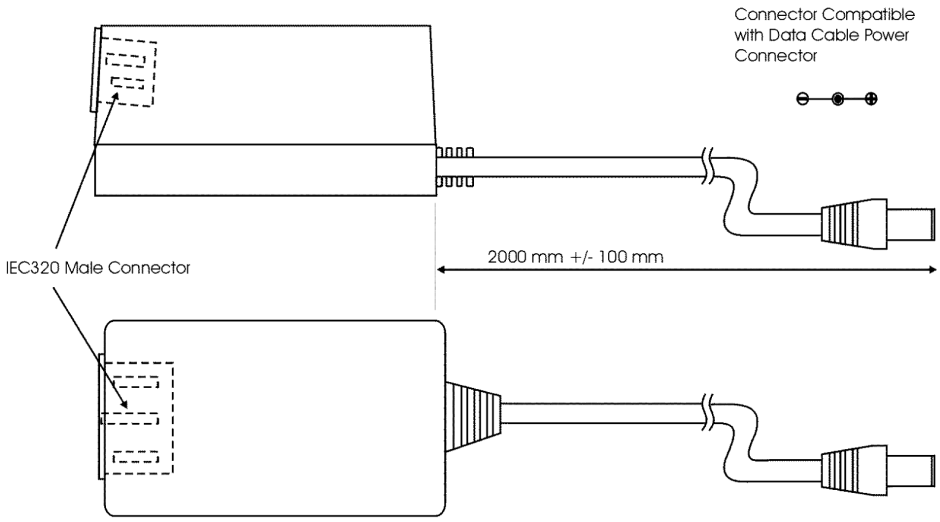

Illustration only

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Physical Characteristics

Size

The size of the selected PIN Pad shall be:

Width = 102mm

Length = 185 mm Height = 70mm. The exact measurements of the casing will be supplied in ref [b] Key top colours and legends are as shown

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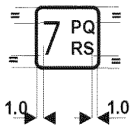
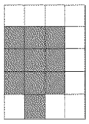
in the following diagram:-

PRINTING COLOUR: WHITE (RAL 9003) EXCEPT THE "CLR" KEY, WHICH IS BLACK (RAL 9005)
FONT: FRANKLIN GOTHIC DEMI, UNLESS OTHERWISE NOTED
ALL TEXT AND SYMBOLS CENTERED TO KEYCAP UNLESS OTHERWISE SPECIFIED.
ALL PRINTING SHALL BE COVERED WITH UV HARD COATING.
PRINTING ABRASION RESISTANCE SHALL BE HIGHER THAN
150 CYCLES, MEASURED WITH NORMAL TESTER EQUIPMENT.



TEXT HEIGHT NUMBERS 4.7mm
TEXT HEIGHT LETTERS: 2.0 mm
FONT LETTERS:FRANKLIN GOTHIC DEMI CONDENSED
KEYCAP COLOUR GREY (RAL 7037)
(Home pip on key number 5)



F1

TEXT HEIGHT: 3.1mm
KEYCAP COLOUR DARK GREY (RAL 7043)

BAL

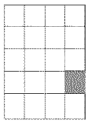
TEXT HEIGHT: 3.5mm
KEYCAP COLOUR: BLUE (RAL 5010)

CAN

TEXT HEIGHT: 3.5mm
KEYCAP COLOUR RED (RAL 3003)

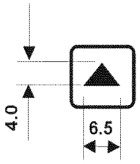
CLR

TEXT HEIGHT: 3.5mm
KEYCAP COLOUR YELLOW (RAL 1006)

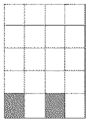


ENT

TEXT HEIGHT: 3.5mm
KEYCAP COLOUR: GREEN (RAL 6016)



KEYCAP COLOUR: DARK GREY (RAL 7043)



KEYTOP SET CONSISTS OF:

RUBBER KEYPAD	FDM00221A	1 pc
KEYCAP, GREY	FD00222.1A	9 pcs
KEYCAP, GREY H.P.	FD00222.2A	1 pc
KEYCAP, YELLOW	FD00222.3A	1 pc
KEYCAP, GREEN	FD00222.4A	1 pc
KEYCAP, RED	FD00222.5A	1 pc
KEYCAP, BLUE	FD00222.6A	1 pc
KEYCAP, DK. GREY	FD00222.7A	6 pcs

There shall be NO logo fitted to the PIN Pad.

Weight 680gms

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Key Cap dimensions

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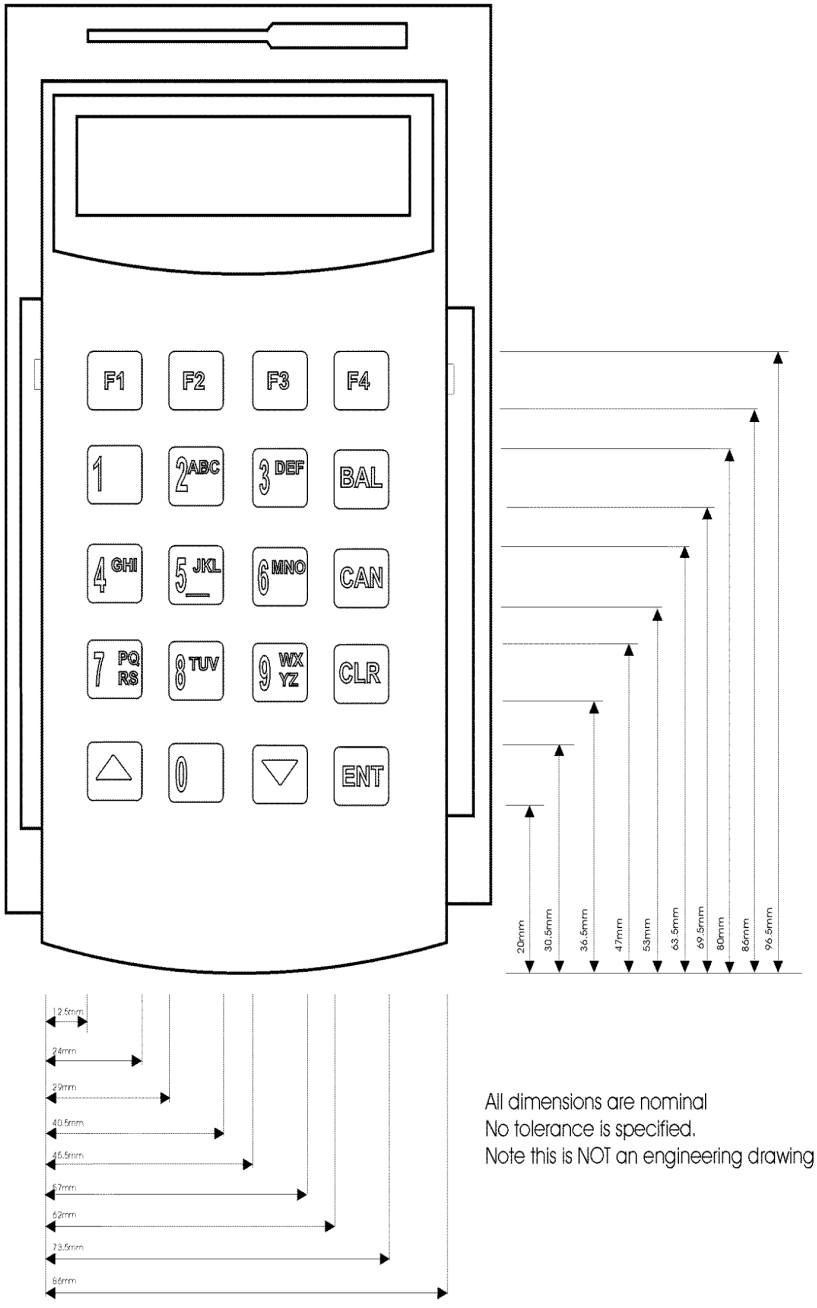

All dimensions are nominal
No tolerance is specified.
Note this is NOT an engineering drawing

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4 Standards

The PIN pad shall **meet** the following standards

I. BS EN60950 : 2000 - Safety of information technology equipment.

II. BS EN 60065:1994, BS 415:1994 - Safety requirements for mains operated electronic and related apparatus for household and similar general use. This standard applies only to the PIN Pad's Power Supply.
Note; all parts of the PIN Pad except the power supply are covered by BS EN60950: 2000

III. Electrical Equipment (Safety) Regulations 1994, which implement the Low Voltage Directive 73/23/EEC as amended by 93/68/EEC.

IV. Electromagnetic Compatibility (EMC) Regulations 1992, which implement Council Directive 89/336/EEC (as amended by 92/31/EEC).

V. BS EN 50082 – with the following severity levels

A. EN 61000-4-2 class 3, 4kV contact discharge, 8kV, air discharge; supercedes IEC 801 part 2

B. EN 61000-4-3 3V/m; - supersedes IEC 801 part 3

C. EN 61000-4-4 +/- 1kV injected onto mains AC supply; supersedes IEC 801 part 4

D. EN 61000-4-5; supersedes IEC 801 part 5 +/- 2kV

VI. An Index of Protection rating of IP3X as defined in BS EN 60529:1992, save for the card reader and the RS 232 ports. Note – the SMART Card reader has a cover, but will be removed once Services are introduced that require SMART capability. The RS232 ports do not have covers, but the one used to connect to the PC will have a cable permanently plugged in.

VII. EN55022 (Emissions)

VIII. Keys that could directly or indirectly expose plain text PIN values and any keys used in association with banking MACs shall be managed in accordance with the principles established in ISO 8732 or ISO 11568

IX. BS EN 55024
Note: this covers the requirements of BS EN 50081 - Electromagnetic compatibility. Generic emission standard; Part 1: Residential, commercial and light industry;

X. ISO 9564

XI. The following standards for PIN Pads and cards, noting that where the standards apply to the cards themselves rather than to the PIN pad or smart card reader, then the PIN Pad and smart card reader will be deemed as having met the standards for the purposes of this

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specification if the PIN pad is capable of working properly with cards which meet those standards:

A. ISO 7810

B. ISO 7811 part 1 and 3 (visual)

C. ISO 7812

D. ISO 7813

E. ISO 7816 parts 1, 2, 3 and 4

XII. Fujitsu are seeking alternatives for the following standards: The Health and Safety (Display Screen Equipment) Regulations 1992, which implement Council Directive 90/270/EEC, and ISO 9241:1992

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5 Functional Requirements

5.1.1 PIN Entry

- All PIN Pad displays associated with PIN entry will be controllable from the counter PC.
- The PIN Pad will allow the entry of multiple digit PINs of variable length, between 4 and 12 digits.
- The PIN length shall be unknown to the PIN Pad on PIN entry. The 'Enter' key must be used to terminate PIN entry. Use of the 'Enter' key before entry of 4 digits will not be permitted.
- The ‘CAN’ key will operate at any time during PIN entry to terminate the entry.
- The ‘CLR’ key, when pressed during PIN entry, shall erase the complete user input. There will be no limit to the number of times that the ‘CLR’ key can be pressed during PIN entry.
- Any digits entered after the 12th will be ignored. Only the 'Clear' and 'Enter' keys will be acceptable at this stage. (i.e. the maximum length of PIN acceptable is 12 digits in length. The Cancel key can be used at any time, in conjunction with the counter application to abort the customer’s session.
- The PIN will never be displayed in a readable form on the display; Asterisks will be displayed to represent each character entered as part of a PIN.
- Once the Customer presses the ‘Enter’ key, the PIN Pad will encrypt the PIN and transmit the encrypted PIN. The plain text PIN will never be transmitted. The timeout is not determined by the PIN pad.
- There is a timeout in the PIN Pad driver, which will clear the screen if there are no outstanding commands; this is configurable via Reference Data.

5.1.2 EMV

- The PIN Pad shall be supplied certified to EMV 3.1.1 Level 1. The PIN Pad will be supplied, with the capability to be remotely upgraded to support EMV2000 Level 2 when available.

DN – Details of accreditation to EMV 2000 Level 1 to be supplied when dates are available.

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6 Security

6.1.1 General

The PIN Pad shall comply with the requirements of ISO 9564. In particular:-

- It shall be a “tamper-evident”
- Penetration of the device when operated in its intended manner and environment shall cause the automatic and immediate erasure of all PINs, cryptographic keys and all useful residue of PINs and keys contained within the device as defined in 6.3.1 of ISO9564
- A PIN shall never appear outside the device in unencrypted form
- Successful penetration of the device shall not permit the disclosure of any previously entered PINs.
- There shall be no feasible way of determining any past encryption key from the data transmitted by the device.

6.1.2 Encryption method

The PIN Pad shall use DUKPT encryption in accordance with §4.7 and Appendix A of ANSI X9.24”.] i.e. with a Single DES key.

The PIN Pad will be capable of upgrade support to triple DES at a future date, after a key Management system has been introduced.

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7 Environmental

This section defines the conditions the item is to withstand in normal use.

Normal Operational Temperature and Humidity

The item shall be capable of full operational use within all its design parameters, under the following environmental conditions:

Temperature range:5° to 40°C, maximum rate of change of temperature not exceeding 15°C per hour.

Humidity:10 to 95% non-condensing over the range of temperature change as above.

8 Performance

Each of the following PIN Pad functions will be performed in under 1 second: -

1. During PIN Entry – The time from pressing a button on the keypad to an asterix appearing on the display screen.
2. After pressing ENTER on the keypad to complete the entry of a PIN - The time to encrypt the PIN number and send the PIN block to the communications link.
3. On receipt of a command from Horizon - The time to display Text on the PIN Pad screen.

9 MTBF

The PIN Pad will have an MTBF of 10 years

The battery has a lifespan of 5 years

10 Acceptance Tests

These tests are to be run by Pathway in conjunction with the PIN Pad supplier

Upgrade of the Open Terminal Application

1. Load the PIN Pad with an OTA application that does not support the battery low.

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2. Use the Device Attribute Report command to display the application version.
3. Use the PIN Pad command to attempt to test the battery condition – this should fail
4. Down line load an updated version of the Open Terminal Application that supports battery monitoring from the PC.
5. Log all messages
6. Use the DAR command to display the new application version.
7. Use the command to test battery status – this should now work successfully.

Upgrade of the SSCR application

1. This shows how the EMV software can be upgraded.
2. Use the DAR command to display the version of the OTA Kernel.
3. Down line load a new version of the OTA Kernel from the PC
4. Log all messages
5. Use the DAR command to display the new version of the OTA Kernel.
6. Show that data can be written and read from a SMART Card.

Upgrade of the Security Application Module

1. Run the PIN Pad proving application
2. Use the DAR command to display the version of the key loaded [BDK1 version]
3. Down line load a new version of the IK key
4. Log all messages
5. Use the DAR command to display the version of the IK Key [BDK2]
6. Run the PIN Pad proving application.

Show use of Battery Low

1. Use the DAR command to display the version of the Open Terminal Application
2. Use the battery status command to demonstrate that a good battery response is returned and reported.

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3. Re-run the above test with a PIN Pad with a known battery that has less than three months life.
4. Use the DAR command to show that the correct status is returned. i.e. the status reports battery condition as faulty.

Show that Down Load Line Fails are Reported Correctly

1. Repeat test to down line load the Open Terminal Application.
2. During the load, disconnect the data lead to the PIN Pad.
3. Show that error log messages are correctly reported.
4. Repeat test to down line load the Open Terminal Application
5. During the load, re-load the desktop.
6. Show that the PIN Pad can be successfully loaded once recovery has taken place.

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11 Appendix A – Slave RS232 Connection

Definition of the Second RS232 Port on the HFT117

Both RS232 interfaces shall support hardware and or software (Xon/Xoff) handshake protocols.

The default RS232 protocol for the serial ports are as follows:

Number of data bits	Eight
Parity	Even
Number of stop bits	One
Baud rate	19,200
Flow control	Hardware only

The PIN Pad's secondary RS232 serial interface port will provide on its RJ45-10 connector at PIN 5, a +5 volt D.C., 300mA power supply, this secondary port shall also be capable of being configured to support any standard Baud rate up to a maximum of 115k Baud.

Pin	Signal	Description
1		Not Used
2		Not Used
3	RXD	Receive Data (IN)
4	TXD	Transmit Data (OUT)
5		**Provides +5V at 300mA**
6	GND	Ground

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7	DSR	Data Set Ready (IN)
8	RTS	Request To Send (OUT)
9	CTS	Clear To Send
10		Not Used