P541x072 (V0P/V0Q)

JCOP41/72B4 V2.2.1 on Secure Triple Interface PKI Smart Card Controller

Rev. 1.0 — 16 August 2006 Objective short data sheet
128610

1. General description

1.1 Family description

Philips Semiconductors offers a JavaCard Open Platform operating system called JCOP V2.2.1 based on independent, third party specifications, i.e. by Sun Microsystems, the Global Platform consortium, the International Organization for Standards (ISO), EMV and others.

JCOP V2.2.1 family based on the Smart*MX* family which is manufactured in most advanced CMOS 0.18 µm 5 metal layer technology is positioned to service high volume, mono- and multi-application markets such as eGovernment e.g. Smart Passport, banking/finance, mobile communications, public transportation, pay TV, conditional access, network access and digital rights management.

The JavaCard, GlobalPlatform and ISO industry standards together ensure application interoperability for card issuers as well as application providers. By adhering not just to the standards themselves, but also to their spirit as evidenced in numerous heritage applications, JCOP V2.2.1 ensures largely interoperability with third-party applets as well as all existing smart card infrastructures. With JCOP V2.2.1 the promise of multi-sourcing any component in smart card solutions becomes true. Even in existing infrastructures, JCOP V2.2.1 equipped with proper applications can substitute any existing smart card.

Within its targeted segments, the new JCOP V2.2.1 platform on Smart*MX* is the most advanced solution available, combining exceptionally standard interfaces as defined in JavaCard 2.2.1, GlobalPlatform Card Specification 2.1.1 and the powerful cryptographic capabilities by using co-processors for public and secret key encryption supporting RSA, ECC and Triple-DES, within the high security, ultra low power, performance optimized design concept of Philips Semiconductors' handshaking technology. The platform supports Class “C”, “B” and “A” voltage ranges (1.62 - 5.5 V) as required by application standards such as 3G Mobile Communication (3GPP) and the credit/debit card standard (EMV).

For further details on general JCOP V2.2.1 platform features refer to Section 2.2 “JCOP V2.2.1 Product Family Features”.

1.2 Cryptographic Functionality

JCOP V2.2.1 security products support only Triple-DES.

JCOP V2.2.1 PKI products support additionally RSA, ECC and Korean SEED algorithm. It includes RSA keys of up to 2432 bit length, the ability to generate all RSA keys on the card for maximum security, as well as the MD5 and SHA1 hashing methods. For more information see also Section 5.1.4 “Standard Cryptographic Algorithms”.

1.3 Custom Mask Process

A technology process has been developed to create transparent blends between any of the JCOP V2.2.1 versions and any set of applets into a so-called Custom Mask.

This way, **standard applications** of a particular card issuer **can be put into the ROM** thus reducing the EEPROM requirements significantly. For high-volume roll-outs, this can mean substantial savings. This allows the card issuer to select a JCOP V2.2.1 product with 10 kB EEPROM in place of a JCOP V2.2.1 product with 72 kB EEPROM that has to be used without using the JCOP V2.2.1 Custom Mask process.

JCOP V2.2.1 is supporting **Custom Mask Process**. This unique customization process has been developed to create transparent blends between any of the JCOP V2.2.1 versions and any set of applets into a so-called custom mask. This way, standard applications of a particular card issuer can be put into the ROM thus reducing the EEPROM requirements significantly.

Additionally the card production time is significantly reduced as it is now no longer necessary to load the standard applets into the EEPROM during card initialization.

This became possible due to the very low footprint implementation of the JCOP V2.2.1 base system, fitting into 88 kB of ROM; consequently, leaving additionally 70 kB of ROM space for card issuer applets, i.e. overall **140 kB of applet code and data space** on JCOP41/72 V2.2.1.

1.4 Low Overall Card Lifecycle costs

By the development of technologies for customization of base system and application configuration and the strict adherence to industry standards ensures further cost savings over any proprietary smart card software.

All personalization software is standardized, equally standardized card life cycle management systems can be deployed, thus ensuring a low overall card life cycle cost as compared to any proprietary solution which would require customized personalization and card management software.

Via the pre-personalization of JCOP V2.2.1 the communication protocols as T=0, T=1 or T=CL, the communication speeds, the UID types (fixed or randomize), the Global Platform parameter, the Card Manager keys and other parameters can be set.

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

1.5 Hardware Features

The non-volatile memory consists of high reliability memory cells to guarantee data integrity, which is especially important when the EEPROM is used as program memory.

The device operates either with a single 1.8 V, 3 V or 5 V (voltage classes C, B, A) power supply at a maximum external clock frequency of 10 MHz supplied by the contact pads (internally up to 30 MHz) or via the antenna pads (LA/LB) with a power supply generated from the RF-field emitted by an RF-reader.

1.6 Interfaces

JCOP V2.2.1 uses the contact and the contactless interface. The same level of security, functionality and flexibility applies for the contact interface as for the contactless interface.

1.6.1 The Contact Interface

Operating in accordance with ISO/IEC 7816, the JCOP V2.2.1 contact interface supports typical baud rates, transmission protocols T = 0 and T = 1, both for direct and inverse convention.

1.6.2 The USB 2.0 (Low Speed) Interface

Via the USB 2.0 (Low Speed) interface JCOP41 V2.2.1 functionality on P541G072 based IC cards enables “Plug and Play” compatible access with the whole PC world without the use of complex reader devices or extra external components.

The USB interface uses the ISO contact module and works via a 4-wire connection to any PC supporting “hot Plug and Play”. The card automatically recognizes an ISO or USB environment and is able to work with external frequency of up to 6 MHz, in addition to the internal usable frequencies.

The use of USB interfaces on smart cards is currently in the process of becoming standardized within ISO/IEC 7816-12.

1.6.3 The Contactless Interface

The contactless interface is available on all Dual Interface smart card controller ICs with JCOP V2.2.1 and is fully compatible with ISO/IEC 14443A and with Philips Semiconductors’ field proven Mifare technology. The contactless interface manages and supports communication at data rates of up to 424 kbit/s.

The contactless interface can be used to communicate via

- T=CL protocol (acc. ISO/IEC 14443-4A)
- Mifare protocol (configuration B1 and B4)

Compatibility with existing Mifare reader infrastructure and the optional free of charge Mifare emulation operating system enables fast system integration and backward compatibility of Mifare standard and ProX family based cards inclusive JCOP V2.2.1 Mifare access functionality.

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

1.7 Design-in Support

- Development Environment
  - JCOP Tools Plug-in 3.1.x in Eclipse 3.1 runs under JDK 1.4.2 or higher (see Ref. 11)

    - JCOP IDE (Integrated Development Environment)

    - JCShell Shell-like APDU command execution environment

    - BugZ JCOP source-level debugger
  - MifareWnd demo software (see Ref. 13)
  - SCCommUI Smart Card Communication User Interface:

    - the standard GUI for Smart Card Operating Systems
- JCOP V2.2.1 sample modules or cards
- Philips Semiconductors Customer Application Support
- Other tools
  - Sun Java Card Kit

1.8 JCOP Product Type definition

The family members of JCOP products are split into two categories:

- **Security products** have a Triple-DES hardware co-processor as standard crypto processor
- **PKI products** have an additional PKI hardware co-processor called Fame*XE*.

1.8.1 JCOP PKI products (Fame*XE* supported versions)

OS	Cryptographic		Interface and Products			Mifare
	Triple-DES	PKI	ISO/IEC 7816 T=0, T=1	ISO/IEC 14443A T=CL	USB2.0	
JCOP41 V2.2.1	yes	yes	x	x	x	no/1K/4K
JCOP31 V2.2	yes	yes	x	x	-	no/1K
JCOP21 V2.2	yes	yes	x	-	-	no
JCOPS30 V2.2[1]	yes	yes	x	x	-	no/1K/4K
JCOPS20 V2.2[1]	yes	yes	x	-	-	no

[1] JCOPS = JavaCard “S”

1.8.2 JCOP Security products (DES only versions)

OS	Cryptographic		Interface and Products		Mifare
	Triple-DES	PKI	ISO/IEC 7816 T=0, T=1	ISO/IEC 14443A T=CL	
JCOP10 V2.2	yes	no	x	-	no
JCOPS10 V2.2[1]	yes	no	x	-	no

[1] JCOPS = JavaCard “S”

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

2. Features

2.1 JCOP V2.2.1 Portfolio

Overview about P541x072 V0P platform features and version map see Section 4 “Ordering information”

2.2 JCOP V2.2.1 Product Family Features

General features for all JCOP V2.2.1 products

- JavaCard 2.2.1
- GlobalPlatform Card Specification 2.1.1
- Data Encryption Standard (DES) and Dual/Triple key DES3 via co-processor
- Contact interface with T = 0 and T = 1 protocols according to ISO/IEC 7816-3

2.3 JCOP V2.2.1 Product Specific Features on P541x072

- Visa GlobalPlatform 2.1.1 Card with Configuration 3 (only for VISA approved customers) inclusive Errata 2.1; Ref. 12
- PKI (Public Key Infrastructure) via co-processor for RSA and ECC
- Advanced Encryption Standard (AES) via co-processor
- Other cryptographic support as SHA-1, MD5 and CRC support
- Additional JCOP V2.2.1 APIs: Biometry, SEED and Mifare API
- Contactless interface with T = CL protocol according to ISO/IEC 14443-4A
- USB 2.0 Low Speed contact interface protocol according to ISO/IEC 7816-12
- UID options (single [fixed or random number] or double number UID support) according ISO/IEC 14443-3A
- Mifare OS emulation option
- EMV 4.1 Integrated Circuit Card Specification for Payment Systems compliant
- up to 69 kB EEPROM free for applets
- up to 70 kB ROM free for applets

The JCOP V2.2.1 on the P541x072 is an open operating system based on a Secure PKI Smart Card Controller of the Smart*MX* platform. Operating both in contact mode (ISO/IEC 7816) and in contactless mode (ISO/IEC 14443A) the user defines the final function of the application running on JCOP41 V2.2.1.

3. Applications

3.1 Application areas

- Banking
- eGovernment (e-Passport and Identification cards)
- Secure access
- Mobile applications
- Transportation

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

4. Ordering information

Table 1: JCOP41 V2.2.1 Platform Overview

Product Type	Java Card	Global Platform	VGP Config 1, 2, 3	Appl. Backward Compatible VGP 2.0.1’	Mifare	Interface & Protocols			IC EEPROM [kB]	Free EEPROM Data space [kB]	ROM [kB]	Free ROM Data space [kB]
						ISO/IEC 7816 T=0, T=1	ISO/IEC 14443A T=CL	USB 2.0				
JCOP41/72B4 V2.2	2.2.1	2.1.1	3	x	4K	x	x	x	72	65	160	70

Table 2: JCOP41 V2.2.1 Product Commercial Type and Versions Map

Product Type	Commercial Type[1]	Cryptographic Features								Additional Features				
		Triple-DES	RSA [bit]	ECC (2*n) [bit]	On Card Key Gen[2]	SHA1	MD5	SEED	CRC	Global PIN	MSD/DAP	Applet loading	BIO API	Mifare API
JCOP41/72B4 V2.2	P541x072	x	2432	239	x	x	x	x	x	x	x	x	x	yes

[1] x = G. For information refer to Data sheet, Section “JCOP V2.2 product naming conventions”

[2] only for RSA and ECC

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

5. Supported Additional JCOP V2.2.1 Features

Certain features are not defined to be mandatory. Those implemented in JCOP V2.2.1 are listed below.

5.1 Java Card

5.1.1 Garbage Collection

- Fully implemented (see Ref. 1): Deleted objects, applets, and packages are fully reclaimed and the space can be used for other purposes after deletion.
- Fully implemented: Complete memory reclamation incl. compactification.
- => javacard.framework.JCSystem.requestObjectDeletion()

5.1.2 Remote Method Invocation (RMI)

- Fully implemented as defined in Ref. 1 (JCRE, chapter 8).
- => javacard.framework.service and java.rmi.

5.1.3 Supplementary Logical Channel Support

- For GlobalPlatform 2.1.1 compatibility reasons JCOP V2.2.1 supports as default only the basic logical channel
- Fully implemented as defined in Ref. 1 (JCRE, chapter 4).

  Restriction: this mode is not GlobalPlatform 2.1.1 compliant

5.1.4 Standard Cryptographic Algorithms

The following JavaCard API constants (see Ref. 1) are implemented by JCOP V2.2.1:

- Ciphers:
  - ALG_DES_CBC_NOPAD
  - ALG_DES_CBC_ISO9797_M1
  - ALG_DES_CBC_ISO9797_M2
  - ALG_DES_ECB_NOPAD
  - ALG_DES_ECB_ISO9797_M1
  - ALG_DES_ECB_ISO9797_M2
  - ALG_RSA_NOPAD[1]
  - ALG_RSA_PKCS1
  - ALG_AES_BLOCK_128_CBC_NOPAD
  - ALG_AES_BLOCK_128_ECB_NOPAD

[1] The input data must be the same size as the key length

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

- Signatures:
  - ALG_DES_MAC8_NOPAD
  - ALG_DES_MAC8_ISO9797_M1
  - ALG_DES_MAC8_ISO9797_M2
  - ALG_DES_MAC8_ISO9797_1_M2_ALG3
  - ALG_ECDSA_SHA
  - ALG_RSA_MD5_PKCS1
  - ALG_RSA_SHA_ISO9796
  - ALG_RSA_SHA_PKCS1
  - ALG_AES_MAC_128_NOPAD
- MessageDigest:
  - SHA1 is available on all PKI products of JCOP V2.2.1
  - MD5 is available on all PKI products of JCOP V2.2.1
- RandomData:
  - ALG_SECURE_RANDOM
  - ALG_PSEUDO_RANDOM
- Key Types:

  All JCOP V2.2.1 based systems support DES and Triple-DES (with both double and triple-length keys). AES is supported on JCOP41 V2.2.1. JCOP V2.2.1 PKI products support RSA and ECC cryptography. The supported key lengths are denoted below:
  - LENGTH_DES
  - LENGTH_DES3_2KEY
  - LENGTH_DES3_3KEY
  - LENGTH_AES_128
  - LENGTH_AES_192
  - LENGTH_AES_256
  - LENGTH_RSA_512 up to LENGTH_RSA_2432[2]
  - LENGTH_EC_F2M_113 up to 239 (no constant defined in JC 2.2.1 API)
- KeyPairs

  On-card key generation (RSA CRT and ECC) available on JCOP V2.2.1 PKI products:
  - ALG_RSA_CRT
  - ALG_EC_F2M
- Checksum
  - ALG_ISO3309_CRC16

[2] All multiples of 32 bit valid RSA key lengths.

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

5.1.5 Non-standard Cryptographic Algorithms

The following non JavaCard API constant is implemented by JCOP V2.2.1:

- Signature:
  - ALG_DES_MAC8_ISO9797_1_M1_ALG3

5.2 GlobalPlatform

All mandatory features mentioned in Section 5.2.1 are implemented. Optional features are listed below:

- CVM Management (Global PIN)
  - Fully implemented: All described APDU and API interfaces for this feature are present.
- Supplementary Security Domains and Data Authentication Pattern (DAP) verification
  - Supplementary SD and DAP are available in JCOP41.
- Secure Channel Protocol (SCP)
  - By default SCP02 is supported.
  - Optionally, SCP01 may be selected.

5.2.1 GP Profile

GlobalPlatform permits and requires certain clarifications to the definite operation of an implementation according to Ref. 2. This section describes the non-obvious profile adaptations of JCOP V2.2.1.

The card is compliant with the 'GlobalPlatform Card Specification 2.1 & 2.1.1 Compliance Packages Version 2.0 September 2004', 'Package 0 Core GP functionality', 'Package 24 SCP01 support', 'Package 25 SCP02 support', 'Package 26 SCP02 explicit secure channel initiation' and 'Package 28 Selection of the Key Version Number in P1 of INITIALIZE UPDATE' with the following restrictions:

5.3 Additional Application Programming Interfaces (APIs)

5.3.1 Biometry Application Programming Interface (BioAPI)

JCOP V2.2.1 has an implementation of the Biometry API as defined in Ref. 7.

5.3.2 SEED API - Korean Cryptographic Application Programming Interface

JCOP V2.2.1 has an implementation of the SEED API as defined in Ref. 8.

5.3.3 Mifare

JCOP has an implementation of the Mifare API as defined in Ref. 9.

Via JCOP order entry forms (OEF) the options with or without Mifare standard can be selected.

For details of Mifare memory organization see Ref. 5.

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

5.4 Supported Communication Protocols

- ISO/IEC 7816-3 T = 1 direct convention [default]
- ISO/IEC 7816-3 T = 0 direct convention
- ISO/IEC 7816-3 T = 1 inverse convention
- ISO/IEC 7816-3 T = 0 inverse convention
- ISO/IEC 14443-4A T = CL
- contact interface acc. ISO/IEC 7816-12 USB (2.0) - low speed

5.5 Supported Communication Speed Parameters

Communication speed for contact or contactless communication can be set via pre-personalization.

- In the **contact mode** if the default clock rate is 3.57 MHz, the following communication speeds are supported:
  - 9600 bit/s [default]
  - 19200 bit/s
  - 38400 bit/s
  - 57600 bit/s
  - 115200 bit/s
  - 230400 bit/s
- In the **contactless mode** the following communication speeds according to ISO/IEC 14443A are supported:
  - 106 kbit/s
  - 212 kbit/s
  - 424 kbit/s

5.6 Supported Unique Identifiers (UIDs)

JCOP V2.2.1 support single and double UIDs according to ISO/IEC 14443-3A which can be ordered via Order Entry Form in following the configurations:

- configuration B1 and B4 with 4 byte fixed single UID:
  - via Mifare API (see Ref. 9) the 4 byte fixed single UID can be changed to 4 byte Random UID
- configuration A with 7 byte double UID:
  - during pre-personalization of JCOP V2.2.1 the 7 byte double UID can be changed to 4 byte Random UID

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

6. Limiting values

Table 3. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to VSS (ground = 0 V).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DD}	supply voltage			-0.5	+6.0	V
V_I	input voltage	any signal pad		-0.5	V_{DD} +0.5	V
I_I	input current	pad IO1, IO2		-	± 15.0	mA
I_O	output current	pad IO		-	± 15.0	mA
I_{lu}	latch-up current	$V_I < 0$ V or $V_I > V_{DD}$		-	± 100	mA
V_{esd}	electrostatic discharge voltage	pads VDD, VSS, CLK, RST, IO1, IO2, DP, DM	[1]		± 4.0	kV
		pads LA, LB	[1]		± 2.0	kV
P_{tot}	Total power dissipation		[2]	-	1	W
T_{stg}	Storage temperature		[3]			

[1] MIL Standard 883-D method 3015; human body model; C = 100 pF, R = 1.5 kΩ; T_{amb} = –25 °C to +85 °C.

[2] Depending on appropriate thermal resistance of the package.

[3] Depending on delivery type, refer to *Philips Semiconductors General Specification for 8 " Wafers* and to *Philips Semiconductors Contact & Dual Interface Chip Card Module Specification*.

7. Abbreviations

Table 4: Abbreviations

Acronym	Description
ACM	Access Condition Matrix
APDU	Application Protocol Data Unit as defined in ISO/IEC 7816
ATR	Answer to Reset as defined in ISO/IEC 7816
ATS	Answer to Select as defined in ISO/IEC 14443A
CLK	External clock signal input contact pad
CPLC	Card Production Life Cycle (information): Defined by VISA GlobalPlatform; among other data, it contains card serial number, release number and date. Usually used for derivation of card-specific keys
CPU	Central Processing Unit
CRC	Cyclic redundancy check
DES	Data Encryption Standard
D_i	Baud rate adjustment factor as defined in ISO/IEC 7816-3
EEPROM	Electrically Erasable Programmable Read Only Memory
ESD	Electrostatic Discharge
Fame*XE*	Fast Accelerator for Modular Exponentiation -eXtended
f_{CLK}	CLK signal frequency. The timing reference points of a CLK cycle (period $1/f_{CLK}$) are defined at signal level 50% of V_{DD} measured from rising to rising edge or falling to falling edge.
F_i	Clock rate conversion factor as defined in ISO/IEC 7816-3
HW	Hardware
ICV	Initial Chaining Vector
I_{DD}	Supply current into contact pad VDD
IFSC	Information Field Size Card as defined in ISO/IEC 7816 (“APDU size”)
IFSD	Information Field Size interface Device (= card reader) as defined in ISO/IEC 7816 (“APDU size”)
I_I	Input current at a signal contact pad
I_{IH}	High level input current
I_{IL}	Low level input current
IO	Input Output
I/O	Generic name for all existing I/O contact pads (I/O1, I/O2, ..) and their I/O line signals
I_{OH}	High level output current
I_{OL}	Low level output current
i.r.t.	In relation to
ISO	International Standardization Organization
ISO/IEC 7816	The respective smart card communications standard; second edition, 1997
LSB	Least Significant Byte/bit
kB	1024 bytes
K_T	Transport key / password
Mifarestandard	Mifare Standard IC MF1 ICS50 compatible emulation

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

Table 4: Abbreviations …continued

Acronym	Description
Mifare4K	Mifare Standard IC MF1 ICS70 compatible emulation
MSB	Most Significant Byte/bit
OpenPlatform	Specification of the GlobalPlatform consortium; version 2.0.1', dated April 7, 2000
OS	Operating System
PCD	Proximity Coupling Device
PICC	Proximity IC Card
PKI	Public Key Infrastructure
PPS	Protocol Type Selection Protocol as defined in ISO/IEC 7816-3
R	Resistor
RAM	Random Access Memory
ROM	Read Only Memory
RF	Radio Frequency
RNG	Random Number Generator
RST	External reset signal (active low) input contact pad
SFI	Single Fault Injection
SFR	Special Function Register
SM	System Mode
SW	Status Word as defined in ISO/IEC 7816-3
<tbd>	To be defined
-	reserved for future use, the user software must not write '1' to bits defined as "-"
t_F	Fall time, between 90% and 10% of signal amplitude
TLV	Tag-Length-Value
t_R	Rise time, between 10% and 90% of signal amplitude
UART	Universal Asynchronous Receiver Transmitter
UM	User Mode
USB	Universal Serial Bus
VDD	Power supply contact pad
V_{DD}	Power supply voltage at contact pad VDD, referenced to pad VSS
V_I	Input voltage at a signal contact pad
V_{OH}	High level output voltage
V_{OL}	Low level output voltage
VSS	Ground contact pad
V_{SS}	Ground potential at contact pad VSS

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

8. References

Optional section for document references. The bold reference title is optional.

[1] Sun Microsystems: JavaCard 2.2.1 **http://java.sun.com/products/javacard**

[2] Global Platform Consortium: **GlobalPlatform Card Specification 2.1.1 http://www.globalplatform.org/**

[3] ISO/IEC 7816 series; Information technology – Identification cards – Integrated circuit(s) cards with contacts

[4] ISO/IEC 14443A series; Information technology – Identification cards – Contactless integrated circuit(s) cards – Proximity cards

[5] Philips Semiconductors: Mifare Standard Card IC MF1 IC S50 Functional Specification

[6] Philips Semiconductors: Mifare Standard 4 kB Card IC MF1 IC S70 Functional Specification

[7] Java Card Forum: Biometry API specification (BioAPI): **http://www.javacardforum.org/Documents/Biometry/biometry.html http://www.javacardforum.org/JCFBioAPIV1A.pdf http://www.javacardforum.org/Documents/Biometry/BCWG_JCBiometricsAPI_v01_1.pdf** Title: Biometric Application Programming Interface (API) for Java Card, 7 August 2002, Version 1.1 Author: NIST/Biometric Consortium: Biometric Interoperability, Assurance, and Performance Working Group

[8] SEED: **http://www.kisa.or.kr/seed/seed_eng.html**

[9] Mifare API: **JZSystem.html**

[10] **Anomaly Sheet for JCOP41 V2.2.1 P541x072 (V0P/V0Q) Platform Products**, Doc.No. 1160xx

[11] International Machine Corporation: **http://www.zurich.ibm.com/jcop/products/tools.html**

[12] Visa International: **Visa GlobalPlatform 2.1.1 Card Implementation Requirements Version 1.0, June 2005, Errata 2.1**

[13] **http:// www.semiconductors.philips.com/products/identification/datasheets/index.html Æ** Mifare **Æ Chapter Application Notes**

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

9. Revision history

Table 5. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
128610	16 August 2006	Objective short data sheet	-	Revision 1.0
Modifications:	• Initial version			

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

10. Legal information

10.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term ‘short data sheet’ is explained in section “Definitions”.

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.semiconductors.philips.com.

10.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Philips Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Philips Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

10.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, Philips Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — Philips Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Philips Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of a Philips Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Philips Semiconductors accepts no liability for inclusion and/or use of Philips Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — Philips Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at http://www.semiconductors.philips.com/profile/terms, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by Philips Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

10.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Mifare — is a trademark of Koninklijke Philips Electronics N.V.

11. Contact information

For additional information, please visit: **http://www.semiconductors.philips.com**

For sales office addresses, send an email to: **sales.addresses@www.semiconductors.philips.com**

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

12. Tables

13. Contents

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section ‘Legal information’.

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

For more information, please visit: http://www.semiconductors.philips.com.
For sales office addresses, email to: sales.addresses@www.semiconductors.philips.com.

Date of release: 16 August 2006

Document identifier: 128610

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.

© Koninklijke Philips Electronics N.V. 2006. All rights reserved.