#### **POS TERMINALS AND NFC**

JORDI JOFRE NFC READERS NFC EVERYWHERE 05/12/2017





SECURE CONNECTIONS FOR A SMARTER WORLD



#### Agenda

- NFC payment market.
- POS and mPOS system architecture.
- NFC and reader ICs portfolio for payments.
- NFC and reader ICs support package.
- POS reader design support package
  - SLN-POS-RDR reference design
  - POS certification support



## NFC payment market



### The evolution of payments

Form factors have followed the customer needs and available technology







3

#### Payment terminals: POS and mPOS

#### **TRADITIONAL POS**



- Standalone solutions that allow the authorized acceptance of credit cards for financial transactions
- Their own screens and PIN pads to be able to process contact, contactless, and mag-stripe payments, often with a receipt printer included or attached.

#### • Secure accessory to a phone, tablet or PDA.

- Provide a solution for card reading using the connectivity of a handset/tablet to authenticate online
- Cost-efficient, portable and fast to install
- Small merchants, taxis, POS-multiplication







**MOBILE POS (MPOS)** 





#### Payment terminals: Worldwide market dynamics

More than 70% of POS / mPOS solutions shipped are integrated with contactless card interface in 2016. By 2020, the percentage will be over 90%.

Global traditional POS market (wo china low end) kept double digital growth of 12% in 2016. PCI 5.0 (release end 2016) will also trigger new market increase.

mPOS total shipment in 2016 has increased by 14% since 2015 and is expected to show 5% CAGR for 2017~2022.

Low end mPOS (China). It moved to contact interface in 2016, with some contact-less penetration in 2017; expected to decrease due to stronger regulation.



#### **Payment terminal shipments (Mp)**



Sources: POS, mPOS ABI research Q4 2017, China low end : NXP internal





# POS and mPOS system architecture



## **POS and mPOS architecture**

#### Payment terminal architecture is evolving



Training Mobile Knowledge

### Tablet POS, POS/mPOS split architecture – Trending!



Trair

Knowledge

# NFC and reader ICs for payment: Product details



## CLRC663 plus – push your design further



Best performance at lowest power consumption

- Full RF standard compliance
- High performance and more flexible antenna design
- EMVCo 2.6 ready (analog & digital compliance)
- Longer battery life: Power-saving modes and extended LPCD options.
- Industrial / Automotive temperature range (-40 °C 105° C)
- Multiple interfaces and support for high-security reader implementations
- Compact package (HVQFN32 with wettable flanks)







### CLRC663 plus vs CLRC663







Maximum operating transmitter current increases by 40% for CLRC663 plus with 2x the limiting value of the CLRC663

CLRC663 plus has new configuration options(2) enabling up-to 2.5x the detection range in LPCD(1) mode

CLRC663 plus has an automotive or industrial operating temperature range: -40 to +105°C

CLRC663 plus enables better support for battery powered systems





1. Low Power Card Detection

2. New LPCD configuration options are Charge Pump (enabled/disabled) and LPCD Filter (enabled/disabled)

## **PN5180 – The Best full NFC frontend in the market**



The best full NFC frontend in the market

- Multi-protocol and high RF performance
- Full NFC Forum and EMVCo compliant frontend
- Flexible low power card detection
- Efficient, robust and reliable operation even in harsh conditions
- Maximum interoperability for next generation of NFC phones
- Onboard Dynamic Power Control (DPC) for optimized RF performance
- Fast SPI host interface with optimized commands for use with 32-bit host controllers
- Small, industry-standard packages with BGA form factor for PCI compliancy.







#### PN5180 – DPC in more detail







## PN7462 – NFC and contact interfaces, MCU, and SW one chip









#### PN7462 as a payment co-processor for a POS system



5 Training Mobile .

15

# NFC and reader ICs for payment: Product comparison



## NXP offers a complete CL/NFC portfolio for POS/mPOS







### NXP offers a complete CT reader portfolio for POS & mPOS







# NFC and reader ICs for payment: Support package



## CLRC663 plus, PN5180 and PN7462 development kits



#### Ordering details

- Orderable part number: OM26630FDK
- 12NC: 935339151699
- URL: <u>www.nxp.com/demoboard/OM26630</u>











- Straightforward antenna design with NFC Cockpit tool
   Different antenna PCBs for easy antenna matching
- Easy application development with NFC Reader Library



## NFC Reader Library support for multiple products and platforms



Info and more information: www.nxp.com/pages/:NFC-READER-LIBRARY

\* NFC Reader Library v5.02.00

#### Supported products:\*

- CLRC663 plus
- PN5180
- PN7462AU

#### Supported dev boards:\*

- CLEV6630B
- PNEV5180B
- PNEV7462B

#### Supported platforms:\*

- LPC1769, LPC11U68
- FRDM-K82F
- Raspberry Pi Model 3
- ... and portable to other MCUs and platforms.





#### **NFC** cockpit

NP NXP NFC Cockpit v3.10.0 / VCOM_RC663 @\\.\COM23 IC: v0.1.1		
Registers/EEProm access Operation	Reader LPCD Secondary FW Test Signal Rx Matrix	
▼ Read ◎ EEPROM ▼	Type A Type B Type F ISO15693	
Register address: Write   Register	Protocol Layer	
	Layer 14443-3a Load Protocol ISO14443-A	
Bit selection:         D <thd< th="">         D         <thd< th=""> <t< th=""><th>Activate Layer3 Halt 106 kBd/s   Load Protocol</th></t<></thd<></thd<>	Activate Layer3 Halt 106 kBd/s   Load Protocol	
	ATOA: Re-Activate L3 Perform Single/Engless REOA	
	UID:	
Write Operation	Layer 14443-4a Cycle-Time: 0 ms	
Single bit	Select a baud rate: 106 kBd/s	
	Activate Layer4 Deselect Card RF OFF Duration: 0 ms	
FEPROM Single Ryte Access	ATS: Single REQA	
Address 0x00 Read EEPROM	Layer 14443-4: Data Exchange with PICC	
Data 0x00 Write EEPROM Dump EEProm Rf Field On Rf Field Off Rf Field Reset	Data to be send:	
Log Monitor	TXCRC Enable RXCRC Enable Send Data	
[2017.04.24 12:53:06]:INFO:ServiceFactory:Generating Services for VCOM_RC663 @\\\COM23 [2017.04.24 12:53:07]:INFO:EEPROMService RC663:Read from EE address:0x03. Value=0x00	Card response:	
[2017.04.24 12:53:07]:INFO:EEPROMService P 163:Read from EE address:0x00 3bytes. Value=00 01 01 [2017.04.24 12:53:08]:INFO:SalviceFactory V Version: NNC uC VCOM 01.01.00 20170130 (Compiled on Feb. 2 2017 14:36:40)	Application Layer	
	Command GetAppIds MF DesFire	
	GetAppIds	
Plug & play	Applications on the card:	
PNEV5180		
PNEV7462B		
Close Port Soft Reset Help + INFO: uC FW Version: NNC uC VCOM 01.01.00 20170130 (Compiled on Feb 2 2017 14:36:40)		

#### - NFC Cockpit features

- Direct access to registers and EEPROM memory.
- Reader for card activation and card communication.
- Low Power Card Detection (LPCD) calibration and configuration.
- Test signal unlocking and routing.
- RX matrix test for receiver settings optimization.

• Helps to speed up the design, allows quick and easy configuration of registers (USB interface connection to PC) using the development board .



• Get familiar with the IC (on line information of register bits ), a fast antenna tuning, a quick DPC parameter setting and to perform some tests with NFC devices (cards or mobile phones).



# POS reader design support package SLN-POS-RDR reference design



### **SLN-POS-RDR reference design**

HW	<ul> <li>Reference design</li> <li>Secure Touch PIN Pad, CT/CL</li> </ul>
SW	<ul> <li>Professional Grade EMV L1/L2</li> <li>Full Transaction Simulation</li> </ul>
Support	<ul><li> Application Expertise</li><li> Detailed software documentation</li></ul>

PCI 4.1 PED Certification
EMV L1/L2 CT/CL pre-certification

- Reduced Time to Market
- Benefits:
- Reduced Risk
  - Reduced Development Cost



NXP Point of Sale (POS) Reader Solution SLN-POS-RDR





### Point of Sale (POS) Reader Solution Architecture SLN\_POS\_RDR



25 Training Mobile Knowledge

NP

NO

SOLUTIONS

# POS reader design support package Certification support



#### **EMVCo contact & contactless certifications**

Certification	NXP support	End customer
EMVCo L1 contact analog	Application notes; demo board; Report from test house Customer schematic validation	Final device need to be tested at a certified lab
EMVCo L1 contact digital	Application note; source code; ICS example; internal test report Support on NXP stack integration Support on EMV test suite errors	Final device need to be tested at a certified lab
EMVCo L2 contact	Link to partners for stack ; Pre integration support if NXP L1 stack is used	Final device need to be tested at a certified lab

Certification	NXP support	End customer
EMVCo L1 contactless analog	Antenna design guide, loop back example; internal test report; demo board Antenna design support & RF support from CAS team	Final device need to be tested at a certified lab
EMVCo L1 contactless digital	Source code; application note ICS example; internal test report Support on NXP stack integration Support on EMV test suite errors	Final device need to be tested at a certified lab
EMVCo L2 contactless	Link to partners for stack ; Pre integration support if NXP L1 stack is used	Final device need to be tested at a certified lab









### **Other POS reader certifications**

Certification	NXP support	End customer
PCI PTS 4.0 (security certification of the terminal)	Link to PCI test lab or external consultant	Certification



Certification	NXP support	End customer
Country specific security certifications ( UKCC, SEPA,)		Certification
CEM Regulatory certification	Guidelines for contact-less	Certification
ROHS	Provides ROHS compliance report of NXP components	Request document from manufacturing entity
Card acceptance scheme validation (Mastercard PayPass, VISA PayWave, Amex ExpressPay, DiscoverZip for contactless)		To be checked with EMVL2 supplier.







#### Payment ecosystem is going cashless

- By 2020, almost 100% of new point of sales terminals (POS) deployed are expected to support contactless technology.
- NXP offers a complete contact and contactless reader IC portfolio for POS terminals.
- NXP SLN-POS-RDR platform is providing a solid base for POS or mPOS development
  - Security controller or processor with PCI pre evaluation
  - Strong expertise in contact and contact-less readers
  - Fully qualified EMVL1 software stack
  - Partners for EMVL2









Software development in Android and iOS Embedded software for MCUs JCOP, Java Card operating Systems Hardware design and development Digital, analog, sensor acquisition, power management Wireless communications WiFi, ZigBee, Bluetooth, BLE Contactless antenna RF design, evaluation and testing

**MIFARE® product-based** applications End-to-end systems, readers and card-related designs **EMVco** applications Readers, cards, design for test compliancy (including PCI) Secure Element management GlobalPlatform compliant backend solutions Secure services provisioning OTA, TSM services



We help companies leverage the mobile and contactless revolution



MobileKnowledge

Roc Boronat 117, P3M3 08018 Barcelona (Spain)

Get in touch with us





WORLD CAPITAL







### **POS terminals and NFC**

Jordi Jofre (Speaker) Angela Gemio (Host)

#### Thank you for your kind attention!

Please remember to fill out our evaluation survey (pop-up)

Check your email for material download and on-demand video addresses

Please check NXP and MobileKnowledge websites for upcoming webinars and training sessions

http://www.nxp.com/support/classroom-training-events:CLASSROOM-TRAINING-EVENTS www.themobileknowledge.com/content/knowledge-catalog-0

