NXP Near Field Communication (NFC) controller PN533

Extensive proximity connectivity capabilities for USB-enabled devices

NXP Semiconductors' PN533 is a highly integrated transmission module for contactless communication at 13.56 MHz including a microcontroller. It is specially designed to provide USB-enabled devices with the most widely deployed contactless communication protocols.

Key features
▸ Full peer-to-peer functionality
▸ Reader/ writer functionality compatible to ISO/IEC 14443 A&B, MIFARE, FeliCa and NFC Forum tag types (MIFARE UltraLight, Topaz, FeliCa, MIFARE DESFire)
▸ Card emulation functionality when connected to secure controller (P5CN072)
▸ Up to 10cm operating distance[1]
▸ 80C51 core processor with embedded firmware
▸ USB host interface
▸ PN533 software is certified by Cetecom for eGovernment and by FIME for banking application
▸ NFC Sec for USB wireless and BT enabler support
▸ PC/SC driver WHQL pre-certified

Key benefits
▸ Supports the most widely deployed contactless protocols with a single state-of-the-art chip
▸ Relieves the device host from contactless protocol real-time processing tasks and reduces device OS changes
▸ Device hosts connection flexibility thanks to the support of multiple interfaces besides USB

1) depending on antenna design and device integration

▸ Small footprint
▸ Worldwide support for design-in: antenna design, software
▸ Easy access to NFC technology, benefiting from NXP expertise and experience with major device manufacturers

Target segments
Making it possible to create infrastructure devices that enable a revolutionary 'touch' experience in the computing, infrastructure, and business application segments.
▸ E-government and banking applications
▸ Ease the pairing of Bluetooth, Wi-Fi or WUSB devices
▸ Exchange objects such as vCards, digital rights
▸ Read a user-carried token or device for authentication before granting access to the device: logical access control, remote or proximity payment
▸ Read a user-carried token or device to authenticate before granting entry to a venue: physical access control

NXP
founded by Philips
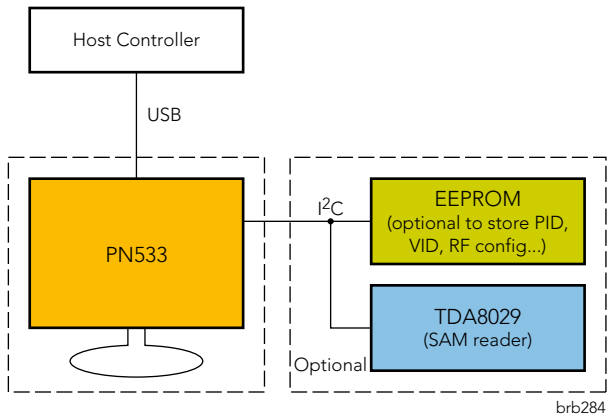
Key applications

Computing application
PC and peripheral
- On-line banking
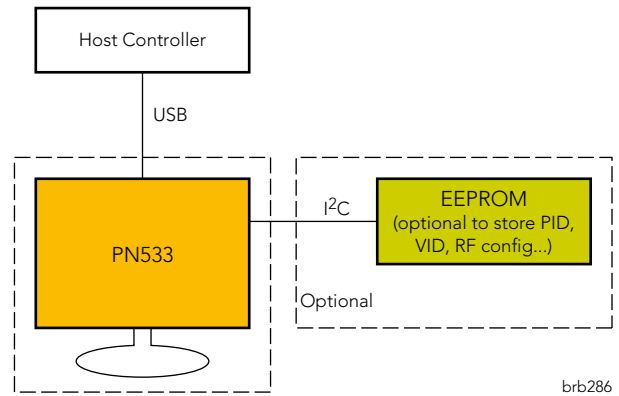- E-commerce
- E-government on-line access
- PC secure log-in

Home reader application
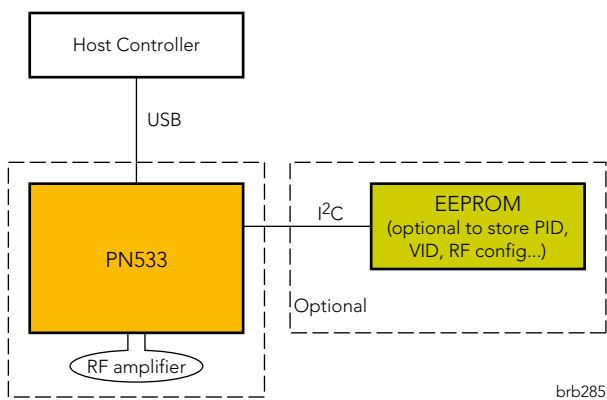- On-line banking
- E-commerce
- E-government on-line access

```
┌─────────────────┐
│ Host Controller │
└─────────────────┘
         │
        USB
         │
┌ ─ ─ ─ ─ ┼ ─ ─ ┐   ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
         │              I²C  ┌──────────────────┐
│ ┌─────────────┐ │ │       │     EEPROM       │ │
  │             │──┼────────│ (optional to store PID,│
│ │    PN533    │ │ │       │  VID, RF config...)  │ │
  │             │          └──────────────────┘
│ └─────────────┘ │ │                          │
       ◯            ┌──────────────────┐
└ ─ ─ ─ ─ ─ ─ ─ ┘ │ │     TDA8029      │      │
                      │   (SAM reader)   │
                  │ └──────────────────┘      │
                   Optional
                  └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
                                   brb284
```

Infrastructure (POS) application
- Contactless payment
- E-coupon management

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┌─────────────────┐
│ Host Controller │
└─────────────────┘
         │
        USB
         │
┌ ─ ─ ─ ─ ┼ ─ ─ ┐   ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
         │              I²C  ┌──────────────────┐
│ ┌─────────────┐ │ │       │     EEPROM       │ │
  │             │──┼────────│ (optional to store PID,│
│ │    PN533    │ │ │       │  VID, RF config...)  │ │
  │             │          └──────────────────┘
│ └─────────────┘ │ │  Optional                │
   ( RF amplifier )  └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
└ ─ ─ ─ ─ ─ ─ ─ ┘            brb285
```

Contactless terminal application
- Access control for building, transport gate
- Reader module for vending machine, kiosk

```
┌─────────────────┐
│ Host Controller │
└─────────────────┘
         │
        USB
         │
┌ ─ ─ ─ ─ ┼ ─ ─ ┐   ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
         │              I²C  ┌──────────────────┐
│ ┌─────────────┐ │ │       │     EEPROM       │ │
  │             │──┼────────│ (optional to store PID,│
│ │    PN533    │ │ │       │  VID, RF config...)  │ │
  │             │          └──────────────────┘
│ └─────────────┘ │ │  Optional                │
       ◯            └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
└ ─ ─ ─ ─ ─ ─ ─ ┘            brb286
```

Key technical data		PN533
Contactless protocols	Peer-to-peer	Full ISO 18092 (up to 424 Kbits/s)
	Reader/writer	ISO 14443 A&B (up to 848 Kbits/s), MIFARE, FeliCa, NFC Forum tags
Host interface	USB 2.0 (full speed)	Yes
Extensions	I²C master interface	Available
	Connection to external EEPROM	Available
	Connection to Contact Reader	Available
Power characteristics	Supply voltage	2.5 V - 3.6 V
	USB bus power supply	4.2 V - 5.5 V
	Power down mode	12µA
	Typical RF active current	60mA
Temperature range		-25°C / +85°C

Ordering information				
Partnumber		PN5331B3HN/C270		
Sales description	Package	HVQFN40 (6mmx6mmx1,0mm)		
	Status	Available		
Ordering information	12NC	9352 878 68518	MOQ=4000	
		9352 878 68551	MOQ=490	
		9352 878 68557	MOQ=2450	

Block diagram

brb278
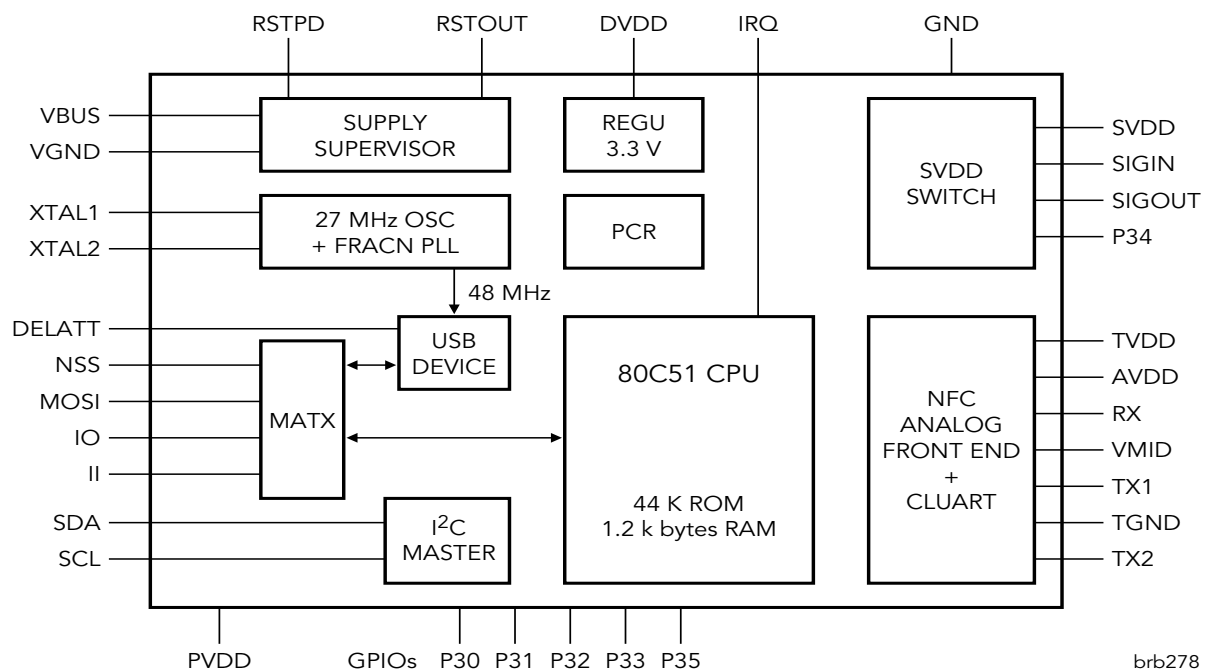
Design-in kit

To support your product development and to enable easy access to NFC technology, NXP has prepared a design-in kit with all the necessary hardware, software and documentation:

▸ 12NC: 9352 865 87699
▸ 1 USB board
▸ 1 USB dongle demoboard (reference design)
▸ Cables and power supply
▸ Possibility to have contactless smart cards depending on export regulation restrictions
▸ Documentation: datasheet, user manual, application note
▸ Drivers, source code and examples (Windows, Linux)

NXP can also provide a NFC Forum protocol stack reference implementation.

Useful Links

NFC Forum specifications: http://www.nfc-forum.org/specs/
EMVco: http://www.emvco.com
MIFARE: http://www.mifare.net
CETECOM: http://www.cetecom.de
FIME: http://www.fime.com

How to order documentation, samples, design-in kit

▸ A list with technical NFC documentation is available for each IC (http://www.nxp.com/nfc)
▸ NFC documentation can be requested by filling in the request form:
  http://www.nxp.com/acrobat_download/other/identification/NFC_request_final.pdf
▸ The samples and design-in kits can be ordered:
  - for NXP distributors via our portal: https://extranet.nxp.com
  - for customers a list of distributors is available at http://www.nxp.com/nfc

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[NXP]():
  [PN5331B3HN/C270,51]() [PN5331B3HN/C270:55]()