

PN7160_PN7161

Near Field Communication (NFC) controller

Rev. 4.2 — 22 July 2026

Product short data sheet



1 Introduction

This data sheet describes the PN7160 and PN7161 NFC controllers with NCI interface and integrated firmware.

The PN7161 supports all features of PN7160 plus "Enhanced Contactless Polling" (ECP) by Apple (see [ref. \[11\]](#)). Note that the ECP feature is available after formal authorization only.

In the following document PN7160 refers to PN7160 and PN7161, unless stated otherwise.

This data sheet requires additional documents for functional chip description and design-in. Refer to the references listed in [Section 9](#) of this document for the full list of documentation provided by NXP.

For more information, refer to the PN7160 product page [ref.\[1\]](#) and full data sheet [ref.\[2\]](#) on nxp.com.



2 General description

PN7160 is an NFC controller designed for integration in mobile devices and devices compliant with NFC standards (NFC Forum, NCI).

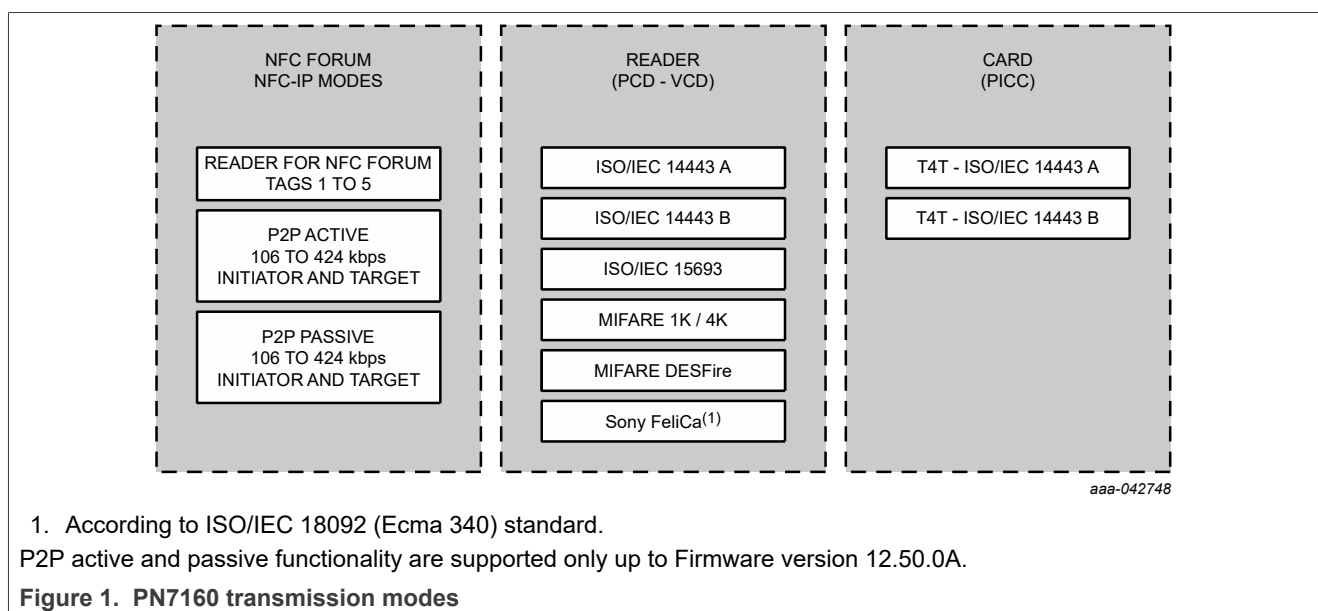
PN7160 is designed based on experience from previous NXP NFC device generation to ease the integration of NFC technology in mobile devices by providing:

- A low PCB footprint and a reduced external Bill of Material
- An optimized architecture for low-power consumption in different modes (Standby, low-power polling loop)
- A highly efficient integrated power management unit allowing direct supply from an extended battery supply range (2.8 V to 5.5 V).
- Support of an external DC-to-DC like NXP PCA941xA (with x = 0, 1 and 2), to provide more output power.

PN7160 embeds a new generation RF contactless front-end, supporting various transmission modes according to NFCIP-1 (see [ref.\[8\]](#)) and NFCIP-2 (see [ref.\[10\]](#)), ISO/IEC14443 (see [ref.\[5\]](#)), ISO/IEC 15693 (see [ref.\[9\]](#)), MIFARE, and FeliCa specifications. This new contactless front-end design brings a major performance step-up with on one hand a higher sensitivity and on the other hand the capability to work in active load modulation communication enabling the support of small antenna form factor. It also allows to provide a higher output power by supplying the transmitter output stage from 2.7 V to 5.25 V.

- Enhanced Dynamic LMA (DLMA) to optimize and to enhance load modulation amplitude depending on external field strength. It allows higher range communication distance in card mode.
- Independent LMA phase adjustment by step of 5° for type A, B, and F
- Dynamic power control, which allows to make use of the maximum power in reader mode without exceeding the maximum power allowed by the standard in 0 distance.
- Card mode receiver sensitivity of 20 mV_(p-p)
- Support of single ended receiver
- 1.3 W output transmitter power

Supported transmission modes are listed in [Figure 1](#). For contactless card functionality, the PN7160 can act autonomously if previously configured by the host in such a manner. PICC functionality can be supported without the host being turned on.



3 Features and benefits

- Highly integrated demodulator and decoder
- Buffered output drivers to connect an antenna with a minimum number of external components
- Integrated RF level detector
- Integrated Polling Loop for automatic device discovery
- RF protocols supported
 - ISO/IEC 14443A, ISO/IEC 14443B PICC mode
 - ISO/IEC 14443A, ISO/IEC 14443B PCD mode designed according to NFC Forum digital protocol T4T platform and ISO-DEP (see [ref.\[3\]](#))
 - FeliCa PCD mode (only available up to FW version 12.50.0A)
 - MIFARE PCD encryption mechanism (MIFARE 1K/4K)
 - NFC Forum tags T1T, T2T, T3T, T4T, and T5T (see [ref.\[3\]](#))
 - NFCIP-1, NFCIP-2 protocol (see [ref.\[8\]](#) and [ref.\[10\]](#))
 - *Only up to Firmware version 12.50.0A*: NFC Forum certification for P2P, reader and card mode (see [ref.\[3\]](#))
 - ISO/IEC 15693/ICODE VCD mode (see [ref.\[9\]](#))
 - NFC Forum-compliant embedded T4T for NDEF short record
 - Support for "Enhanced Contactless Polling" by Apple (see [ref.\[11\]](#)) (PN7161 only)
- Supported host interfaces
 - NCI 2.0 protocol interface according to NFC Forum standardization (see [ref.\[4\]](#))
 - I²C-bus High-speed mode (see [ref.\[6\]](#))
 - SPI-bus (see [ref.\[7\]](#))
- Flexible clock supply concept to facilitate PN7160 integration
 - Internal oscillator for 27.12 MHz crystal connection
 - Integrated PLL unit to make use of device reference clock and facilitate PN7160 integration
- Integrated power management unit
 - Direct connection to a battery (2.5 V to 5.5 V voltage supply range)
 - Support different low-power states configuration: Hard Power-Down state and Standby state activated by firmware
 - Autonomous mode when host is shut down
- Automatic wake-up via RF field, internal timer, and host interfaces
- Integrated non-volatile memory to store data and executable code for customization
 - Anti tearing support to recover from tearing events
- Standards compliance
 - NFC Forum Device Requirements (see [ref.\[3\]](#))
 - NCI 2.0

4 Applications

- Mobile devices
- Portable equipment (personal digital assistants, tablet, notebook, wearable)
- Consumer devices
- Smart home gateways

5 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{BAT}	battery supply voltage	Card Emulation and Passive Target; V _{SS} = 0 V	[1]	2.5	-	5.5	V
		Reader, Active Initiator, and Active Target; V _{SS} = 0 V	[1]	2.8	-	5.5	V
V _{DD(UP)}	V _{DD(UP)} input supply voltage	Reader, Active Initiator, and Active Target; V _{SS} = 0 V	[1]	2.8	-	5.8	V
		All other cases except Hard Power Down state; V _{SS} = 0 V	[1] [2]	2.5	-	5.8	V
V _{DD(PAD)}	V _{DD(PAD)} supply voltage	supply voltage for host interface; V _{SS} = 0 V	[1]	1.65	1.8	1.95	V
				3.0	3.3	3.6	V
I _{BAT}	battery supply current	in Hard Power Down state; V _{BAT} = 3.6 V; T = 25 °C	[3]	-	10.5	16	μA
		in Standby state; V _{BAT} = 3.6 V					
		enhanced RF detector		-	32	52	μA
		low sensitivity RF detector		-	21	36	μA
		in low-power polling loop; V _{BAT} = 3.6 V; T = 25 °C; loop time = 500 ms		-	100	-	μA
		continuous total current consumption in PCD mode at V _{BAT} = 3.6 V	[4]	-	-	290	mA
I _{th(Ilim)}	current limit threshold	current limiter on transmitter	[4]	270	300	330	mA
P _{tot}	total power dissipation	PCD mode at typical V _{DD(TX)} = 5.25 V, V _{DD(UP)} = 5.8 V and V _{BAT} = 3.6 V; includes power from V _{BAT} and V _{DD(UP)}		-	-	620	mW
T _{amb}	ambient operating temperature	JEDEC PCB-0.5		-30	-	+85	°C

[1] V_{SS} represents V_{SS(PAD)} and V_{SS(TX)}.

[2] When V_{DD(UP)} is below 2.8 V the TXLDO can be in follower mode (see TXLDO in the full data sheet [ref.\[2\]](#)), there will be no more V_{DD(UP)} noise rejection. Any noise below 848 kbit/s will affect the performance.

[3] External clock on NFC_CLK_XTAL1 must be LOW.

[4] This is considering an antenna tuned to sink maximum 250 mA continuous current from the transmitter. The antenna shall be tuned to never exceed this 250 mA maximum current.

6 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
PN7160xyzz/C100 ^[1] ^[2] ^[3]	VFBGA64	plastic very thin fine-pitch ball grid array package; 64 balls	SOT1860-1
	HVQFN40	plastic thermal enhanced very thin quad flat package; no leads; 40 terminals	SOT618-1
PN7161xyzz/C100 ^[1] ^[2] ^[3]	VFBGA64	plastic very thin fine-pitch ball grid array package; 64 balls	SOT1860-1
	HVQFN40	plastic thermal enhanced very thin quad flat package; no leads; 40 terminals	SOT618-1

[1] x: A = I²C-bus interface; B = SPI-bus interface.

[2] y: correspond to firmware variant.

[3] zz: correspond to package variant. HN = HVQFN40 package; EV = VFBGA64 package.

PN7160 is available in different configurations:

Table 3. Product variants PN7160

Part number	Control interface / firmware version	Package	Packing	MOQ	Marking	12NC
PN7160A1EV/C100Y	I ² C / 12.50.05	VFBGA64	Reel	4500	71601	9354 166 64518
PN7160A1EV/C100K	I ² C / 12.50.05	VFBGA64	5-Tray	2450	71601	9354 166 64557
PN7160A1HN/C100Y	I ² C / 12.50.05	HVQFN40	Reel	4000	71601	9354 166 65518
PN7160A1HN/C100E	I ² C / 12.50.05	HVQFN40	1-Tray	490	71601	9354 166 65551
PN7160B1EV/C100Y	SPI / 12.50.05	VFBGA64	Reel	4500	71602	9354 237 43518
PN7160B1EV/C100K	SPI / 12.50.05	VFBGA64	5-Tray	2450	71602	9354 237 43557
PN7160B1HN/C100Y	SPI / 12.50.05	HVQFN40	Reel	4000	71602	9354 237 44518
PN7160B1HN/C100E	SPI / 12.50.05	HVQFN40	1-Tray	490	71602	9354 237 44551
PN7160A1EV/C101Y	I ² C / 12.50.11	VFBGA64	Reel	4500	71603	935467647518
PN7160A1EV/C101K	I ² C / 12.50.11	VFBGA64	5-Tray	2450	71603	935467646557
PN7160A1HN/C101Y	I ² C / 12.50.11	HVQFN40	Reel	4000	71603	935467647518

Table 3. Product variants PN7160...continued

Part number	Control interface / firmware version	Package	Packing	MOQ	Marking	12NC
PN7160A1HN/C101E	I ² C / 12.50.11	HVQFN40	1-Tray	490	71603	935467647551
PN7160B1EV/C101Y	SPI / 12.50.11	VFBGA64	Reel	4500	71604	935467648518
PN7160B1EV/C101K	SPI / 12.50.11	VFBGA64	5-Tray	2450	71604	935467648557
PN7160B1HN/C101Y	SPI / 12.50.11	HVQFN40	Reel	4000	71604	935467649518
PN7160B1HN/C101E	SPI / 12.50.11	HVQFN40	1-Tray	490	71604	935467649551

Table 4. Product variants PN7161

Part number	Control interface / firmware version	Package	Packing	MOQ	Marking	12NC
PN7161A1EV/C100Y	I ² C / 12.50.05	VFBGA64	Reel	4500	71611	9354 237 58518
PN7161A1EV/C100K	I ² C / 12.50.05	VFBGA64	5-Tray	2450	71611	9354 237 58557
PN7161A1HN/C100Y	I ² C / 12.50.05	HVQFN40	Reel	4000	71611	9354 237 59518
PN7161A1HN/C100E	I ² C / 12.50.05	HVQFN40	1-Tray	490	71611	9354 237 59551
PN7161B1EV/C100Y	SPI / 12.50.05	VFBGA64	Reel	4500	71612	9354 237 61518
PN7161B1EV/C100K	SPI / 12.50.05	VFBGA64	5-Tray	2450	71612	9354 237 61557
PN7161B1HN/C100Y	SPI / 12.50.05	HVQFN40	Reel	4000	71612	9354 237 62518
PN7161B1HN/C100E	SPI / 12.50.05	HVQFN40	1-Tray	490	71612	9354 237 62551
PN7161A1EV/C101Y	I ² C / 12.50.11	VFBGA64	Reel	4500	71613	935467652518
PN7161A1EV/C101K	I ² C / 12.50.11	VFBGA64	5-Tray	2450	71613	935467652557
PN7161A1HN/C101Y	I ² C / 12.50.11	HVQFN40	Reel	4000	71613	935467650518
PN7161A1HN/C101E	I ² C / 12.50.11	HVQFN40	1-Tray	490	71613	935467650551

Table 4. Product variants PN7161...continued

Part number	Control interface / firmware version	Package	Packing	MOQ	Marking	12NC
PN7161B1EV/C101Y	SPI / 12.50.11	VFBGA64	Reel	4500	71614	935467653518
PN7161B1EV/C101K	SPI / 12.50.11	VFBGA64	5-Tray	2450	71614	935467653557
PN7161B1HN/C101Y	SPI / 12.50.11	HVQFN40	Reel	4000	71614	935467651518
PN7161B1HN/C101E	SPI / 12.50.11	HVQFN40	1-Tray	490	71614	935467651551

7 Block diagram

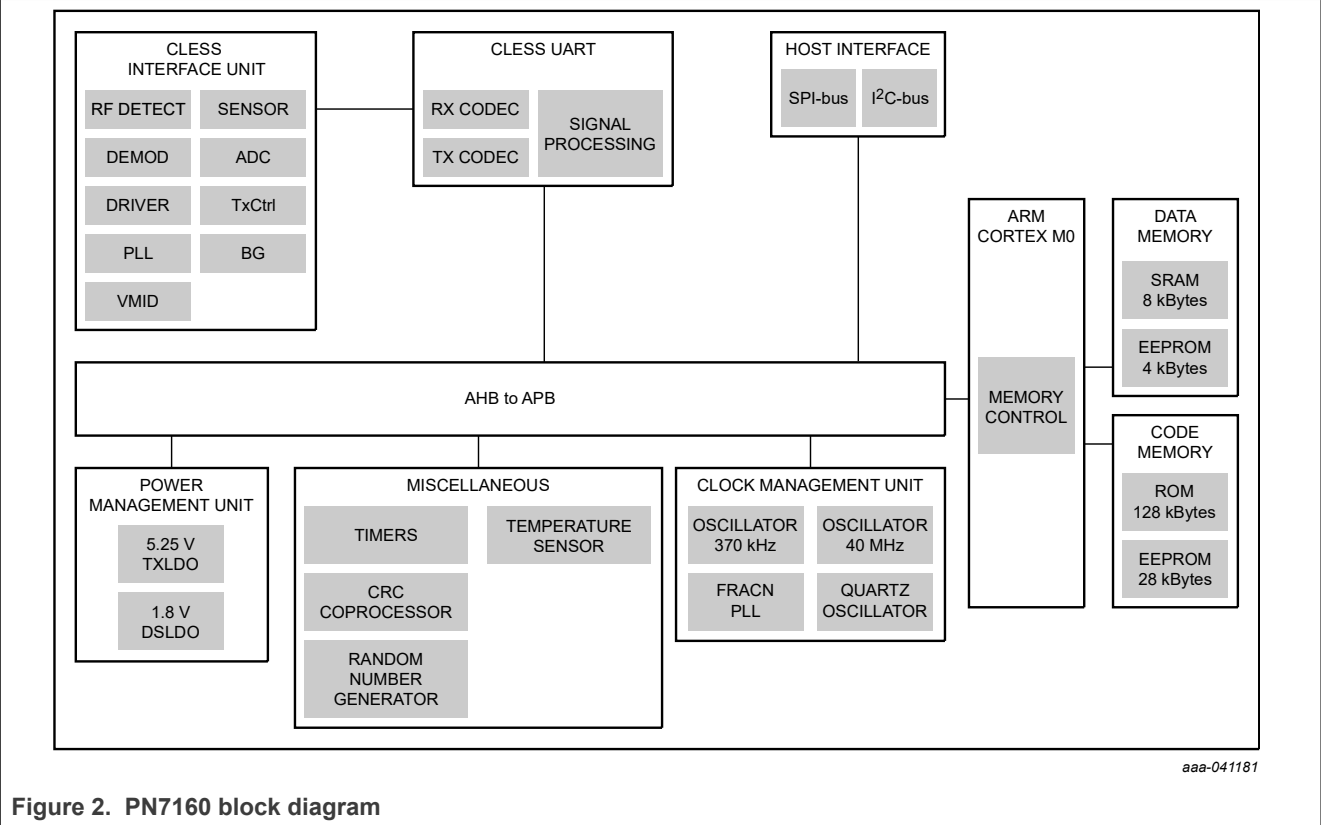


Figure 2. PN7160 block diagram

8 Abbreviations

Table 5. Abbreviations

Acronym	Description
ASK	Amplitude Shift keying
ASK modulation index	The ASK modulation index is defined as the voltage ratio $(V_{max} - V_{min}) / (V_{max} + V_{min}) \times 100\%$
Automatic device discovery	Detect and recognize any NFC peer devices (NFC Initiator or NFC Target) like: NFC Initiator or NFC Target, ISO/IEC 14443-3, -4 Type A&B PICC, MIFARE Classic and MIFARE Ultralight PICC, ISO/IEC 15693 VICC
BPSK	Bit Phase Shift Keying
Card Emulation	The IC is capable of handling a PICC emulation on the RF interface including part of the protocol management. The application handling is done by the host controller
DEP	Data Exchange Protocol
DSLDO	Dual Supplied LDO
FW	FirmWare
HPD	Hard Power Down
LDO	Low Drop Out
LFO	Low Frequency Oscillator
MISO	Controller In Target Out (for SPI-bus interface)
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MOSI	Controller Out Target In (for SPI-bus interface)
MSL	Moisture Sensitivity Level
NCI	NFC Controller Interface
NFC	Near Field Communication
NFCC	NFC Controller, PN7160 in this data sheet
NFC Initiator	Initiator as defined in ISO/IEC 18092 or Ecma 340: NFCIP-1 communication
NFCIP	NFC Interface and Protocol
NFC Target	Target as defined in ISO/IEC 18092 or Ecma 340: NFCIP-1 communication
NRZ	Non Return to Zero
NSS	Not Target Select (for SPI-bus interface)
P2P	Peer to Peer
PCD	Proximity Coupling Device. Definition for a Card reader/writer device according to the ISO/IEC 14443 specification or MIFARE
PCD -> PICC	Communication flow between a PCD and a PICC according to the ISO/IEC 14443 specification or MIFARE
PICC	Proximity Interface Coupling Card. Definition for a contactless Smart Card according to the ISO/IEC 14443 specification or MIFARE
PICC-> PCD	Communication flow between a PICC and a PCD according to the ISO/IEC 14443 specification or MIFARE
PMOS	P-channel MOSFET
PMU	Power Management Unit

Table 5. Abbreviations...continued

Acronym	Description
PSL	Parameter SeLection
SCK	Serial Clock (for SPI interface)
SPI-bus	Serial Peripheral Interface bus
TXLDO	Transmitter LDO
UM	User Manual
VCD	Vicinity Coupling Device. Definition for a reader/writer device according to the ISO/IEC 15693 specification
VCO	Voltage Controlled Oscillator
VICC	Vicinity Integrated Circuit Card
WUC	Wake-up Counter

9 References

- [1] Webpage – PN7160: NFC Plug and Play Controller with Integrated Firmware and NCI Interface ([link](#))
- [2] Data sheet – PN7160 ([link](#))
- [3] NFC Forum Device Requirements V2.0
- [4] NFC Controller Interface (NCI) Technical Specification V2.0
- [5] ISO/IEC 14443 parts 2: 2001 COR 1 2007 (01/11/2007), part 3: 2001 COR 1 2006 (01/09/2006) and part 4: 2nd edition 2008 (15/07/2008)
- [6] I²C Specification, UM10204 rev4 (13/02/2012)
- [7] SPI Motorola de-facto standard described in Motorola 68HC11 data sheet
- [8] ISO/IEC 18092 (NFCIP-1) edition, 15/03/2013. This is similar to Ecma 340.
- [9] ISO/IEC15693 part 2: 2nd edition (15/12/2006), part 3: 1st edition (01/04/2001)
- [10] ISO/IEC 21481 (NFCIP-2) edition, 01/07/2012. This is similar to Ecma 352.
- [11] Apple Enhanced Contactless Polling Specification: Version 1.1.

10 Revision history

Table 6. Revision history

Document ID	Release date	Description
PN7160_PN7161_SDS v.4.2	22 July 2026	Released alongside data sheet update.

Legal information

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Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Tables

Tab. 1.	Quick reference data	5	Tab. 4.	Product variants PN7161	7
Tab. 2.	Ordering information	6	Tab. 5.	Abbreviations	10
Tab. 3.	Product variants PN7160	6	Tab. 6.	Revision history	13

Figures

Fig. 1. PN7160 transmission modes 2 Fig. 2. PN7160 block diagram9

Contents

1 Introduction 1

2 General description 2

3 Features and benefits 3

4 Applications 4

5 Quick reference data 5

6 Ordering information 6

7 Block diagram 9

8 Abbreviations 10

9 References 12

10 Revision history 13

Legal information 14

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