

RM00230

NTAG 5 link and switch development board - Getting started guide

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Reference manual
COMPANY PUBLIC

Document information

Information	Content
Keywords	OM2NTP5332 development board, evaluation board, how to start
Abstract	Document describes how to get started and evaluate NTAG 5 using OM2NTP5332



Revision history

Rev	Date	Description
v.1.0	20200429	First official released version

1 Abbreviations

Table 1. Abbreviations

Acronym	Description
EEPROM	Electrically Erasable Programmable Read-Only Memory
GPIO	General-purpose input/output
I ² C	Inter-Integrated Circuit
NFC	Near field communication
PHDC	Personal Health Device Communication
POR	Power On Reset
PWM	Pulse width modulation
RF	radio frequency
SRAM	Static random-access memory

2 Introduction

This board provides an easy and quick evaluation and development environment for NTAG 5 enabled applications, especially for those leveraging I²C master, I²C slave, GPIO or PWM use cases. A broad selection of software packages is available, which are based on modular examples. These examples can be easily extracted and reused on any other platform. The NTAG 5 link/switch development board can be stacked on single-board computer boards, MCU evaluation boards (e.g. NXP LPCXpresso Boards, NXP Freedom Boards), or be used standalone. Note, the antenna part can be broken-off and replaced by any other antenna to fit the desired application.

2.1 Potential applications

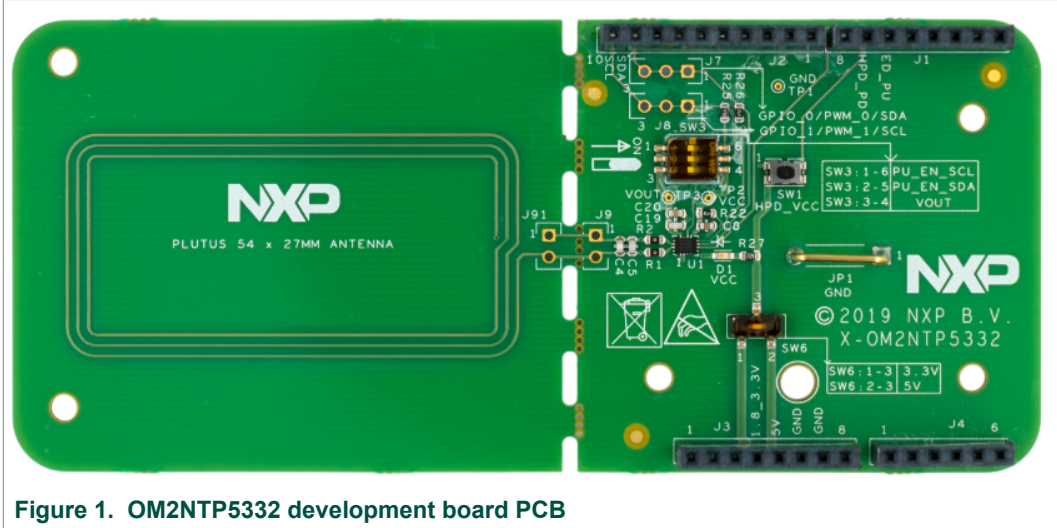
- Read out of data collected in an embedded device (logging data)
- Upload new data in the embedded device (e.g. firmware update of the microcontroller)
- Bidirectional communication with exchange of commands and data (e.g. execute functions in the microcontroller or execute authentication schemes)

3 Getting started

OM2NTP5332 NTAG 5 development board package includes:

Table 2. OM2NTP5332 board contents

Item 1
NTAG 5 development board board



3.1 Hardware description

3.1.1 Connector PINOUT description

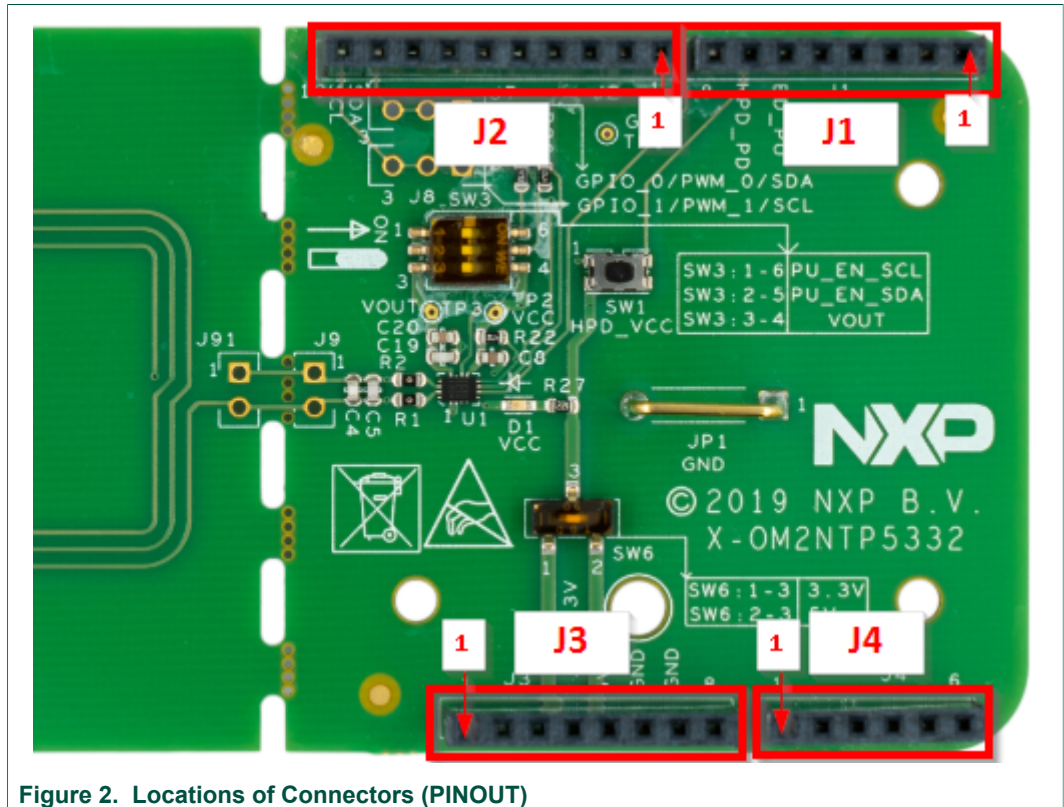


Figure 2. Locations of Connectors (PINOUT)

Table 3. OM2NTP5332 pinout description

Connector: Pin number	Net name	Description
J1:6	ED_PU	Event detection pin (can be configured as PWM0 mirror). Open drain. Pulled up to Vcc by R22 (4.7k Ohm).
J1:7	HPD_PD	Hard Power Down pin. Pulled down to GND by R24 (10 kOhm).
J2:7	GND	Ground
J2:9	SDA	Multiplexed pin: I ² C SDA data line / GPIO1 / PWM1. Can be optionally pulled up to Vcc by switch SW3:2 on position. R26 (4.7 kOhm).
J2:10	SCL	Multiplexed pin: I ² C SCL data line / GPIO0 / PWM0. Can be optionally pulled up to Vcc by switch SW3:1 on position. R25 (4.7 kOhm).
J3:4	P1V8_3V3_BRD	Lower voltage source from underlying board (e.g. MCU board). Usually 3.3 V.
J3:5	P5V0	Higher voltage source from underlying board (e.g. MCU board). Usually 5 V.
J3:6	GND	Ground
J3:7	GND	Ground

3.1.2 Switches and other components description

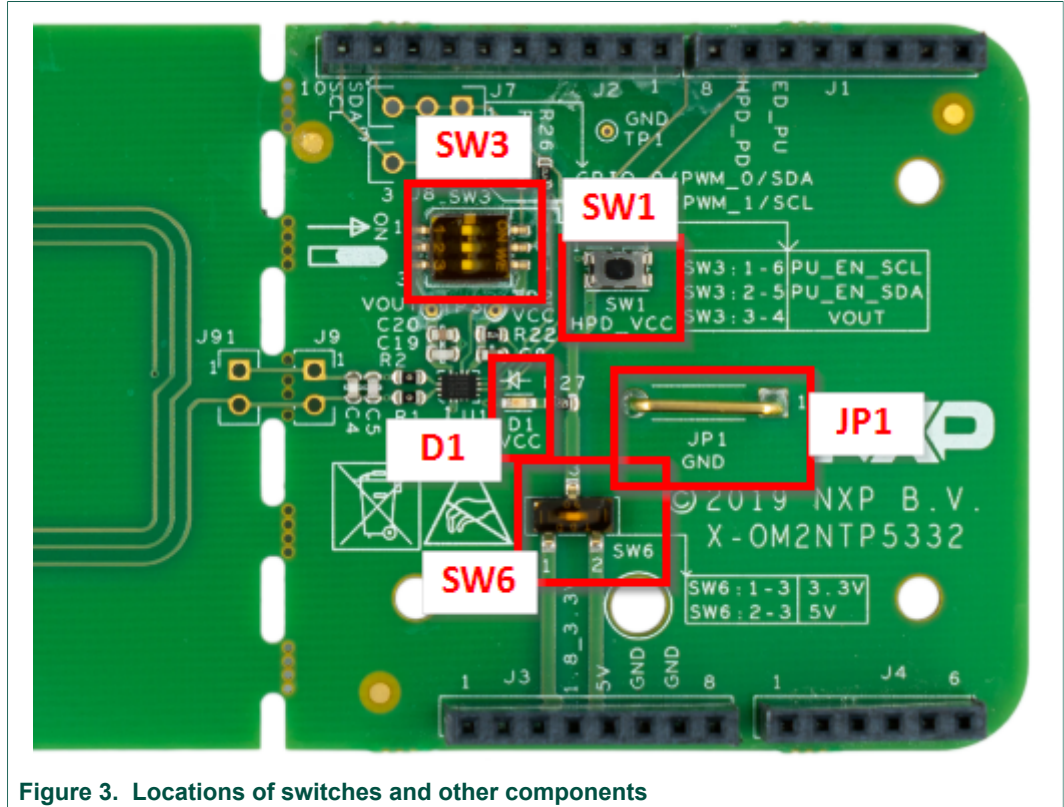


Figure 3. Locations of switches and other components

Table 4. OM2NTP5332 switches and other components description

Connector: Pin number	Net name / Options	Description
SW3	1. 1-6: PU_EN_SCL 2. 2-5: PU_EN_SDA 3. 3-4: VOUT	1. With ON position, Pull up R25 engaged. 2. With ON position, Pull up R26 engaged 3. With ON position, NTAG 5's VOUT connected to VCC. (a must for energy harvesting)
SW1	HPD_VCC	When HPD is pulled to VCC, NTAG 5 enters High Power-down mode. When released, NTAG 5 exits from HPD mode. Can be used as NTAG 5 reset. For more details on HPD mode, see refer to [datasheet].
SW6	1. 1.8 - 3.3 V 2. 5 V	VCC chooser. It only connects voltage from underlying board or source to the NTAG 5 and whole PCB.
D1	D1	Green LED
JP1	GND	Jumper for easy access to GND.

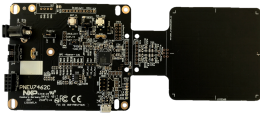
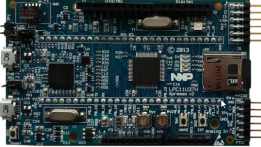
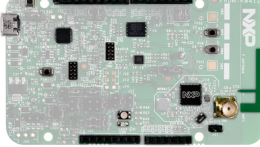
3.1.3 Schematics

Please refer to [SCH-45997].

4 Optional hardware which is supported for development

This chapter lists optional supported hardware which is NOT included in the board. It eases evaluation and enables faster integration or portation to other similar devices. Optional hardware needs to be ordered separately.

Table 5. Supported optional hardware (NOT included in the board). Needs to be ordered separately.

	Item 1	Item 2	Item 3	Item 4
Description	NFC mobile	RF (ISO15693) reader	MCU development board	MCU development board
Purpose	Developing iOS or Android based applications	Developing VCD (RF, NFC) applications. Either FW or higher software layer.	Developing MCU based I ² C Slave, GPIO, PWM use cases.	Developing MCU based I ² C Slave, GPIO, PWM use cases.
Picture		 <p>Figure 4. pnev7462c reader development board</p>	 <p>Figure 5. LPCXpresso board for LPC11U37H</p>	 <p>Figure 6. FRDM-KW41Z development board</p>
Chapter in this document	[Section 4.1]	[Section 4.2]	[Section 4.3]	[Section 4.3]
Buying options		Via NXP's distribution or through nxp.com.	Via NXP's distribution or through nxp.com.	Via NXP's distribution or through nxp.com.

4.1 Mobile NFC application development

Developing iOS and Android-based applications.

Hardware:

1. Device with integrated NFC.

Software:

1. TapLinx (Android only) (mifare.net)
2. Use cases examples using native Android NFC [SW5870]
3. iOS Apps development quick startup guide [ANxx]

Additional documentation:

- NTAG 5 configuration from RF interface
- NFC Forum Type 5 Tag configuration: [[NFC Forum specification, Type 5 Tag](#)]
- NFC Forum NDEF: [[NFC Forum specification, Tag NDEF Exchange Protocol - Technical Specification Version](#)]
- I²C Master: [[AN12368 - NTAG 5 Link I2C Master mode](#)]
- I²C Slave: [[AN12364 - NTAG 5 Bidirectional data exchange](#)]
- Pass-through mode: [[AN12364 - NTAG 5 Bidirectional data exchange](#)]
- PHDC data transfer: [[AN12364 - NTAG 5 Bidirectional data exchange](#)], [[NFC Forum Personal Health Care Devices \(PHDC\) specification](#)]
- Energy harvesting: [[AN11201 - NTAG 5 How to use energy harvesting](#)]

- GPIO: [[AN11203 - NTAG 5 Use of PWM, GPIO and Event detection](#)]
- PWM: [[AN11203 - NTAG 5 Use of PWM, GPIO and Event detection](#)]
- Event detection: [[AN11203 - NTAG 5 Use of PWM, GPIO and Event detection](#)]
- Low-power modes: [[AN12429 - NTAG 5 Stand-by and Hard Power down modes of operation](#)]
- Protecting User memory and features, Security: [[AN12366 - NTAG 5 Memory Configuration and Scalable Security](#)]

4.2 RF (ISO15693) reader development

Easy RF evaluation of NTAG 5 features. Also for developing VCD (RF, NFC) applications, either FW or higher layer software.

Hardware:

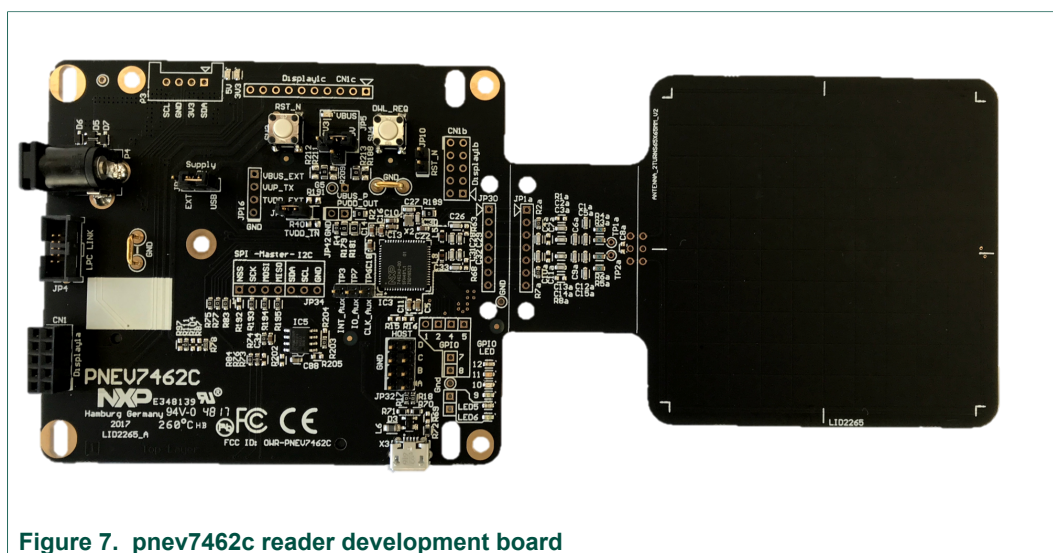


Figure 7. pnev7462c reader development board

Software:

- GUI
 - RFIDDiscover ([DocStore](#))
 - NFCCockpit ([nxp.com webpage](#))
- Firmware: NFC Reader Library ([DocStore](#))
- .NET: NXP Reader Library ([DocStore](#))

Additional Documentation:

- NTAG 5 configuration from RF interface
- I²C Master: [AN12368 - NTAG 5 Link I2C Master mode](#)
- I²C Slave: [AN12364 - NTAG 5 Bidirectional data exchange](#)
- Pass-through mode: [AN12364 - NTAG 5 Bidirectional data exchange](#)
- PHDC data transfer: [AN12364 - NTAG 5 Bidirectional data exchange](#)
- Energy harvesting: [AN11201 - NTAG 5 How to use energy harvesting](#)
- GPIO: [AN11203 - NTAG 5 Use of PWM, GPIO and Event detection](#)
- PWM: [AN11203 - NTAG 5 Use of PWM, GPIO and Event detection](#)
- Event detection: [AN11203 - NTAG 5 Use of PWM, GPIO and Event detection](#)

4.3 MCU FW development

Easy I²C evaluation of NTAG 5 features. Also for Developing MCU firmware-based energy harvesting, I²C Slave, GPIO, PWM use cases.

4.3.1 LPC11U37H MCU based

Hardware:

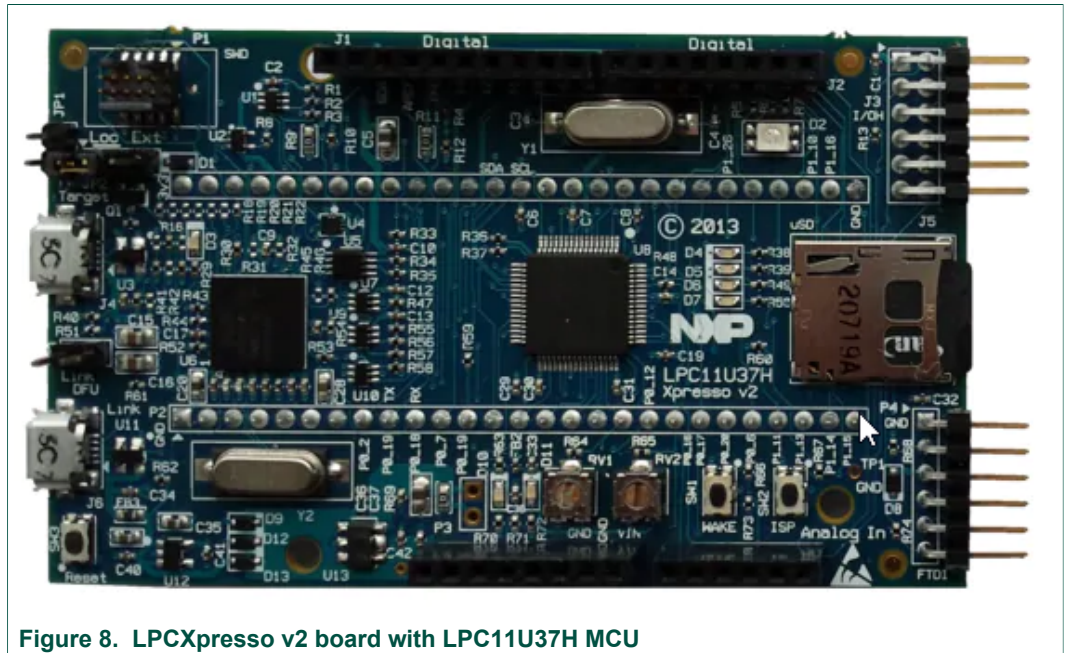


Figure 8. LPCXpresso v2 board with LPC11U37H MCU

Software:

- Use cases Code examples [SW6090]:
 - GPIO
 - PWM
 - Pass-through mode
- GUI - NTAG 5 Cockpit (easy I²C access)

Documentation:

- NTAG 5 configuration from I²C interface
- NFC Forum Type 5 Tag configuration: [NFC Forum specification, Type 5 Tag]
- NFC Forum NDEF: [NFC Forum specification, Tag NDEF Exchange Protocol - Technical Specification Version]
- I²C Slave: [AN12364 - NTAG 5 Bidirectional data exchange]
- Pass-through mode: [AN12364 - NTAG 5 Bidirectional data exchange]
- PHDC data transfer: [AN12364 - NTAG 5 Bidirectional data exchange], [NFC Forum Personal Health Care Devices (PHDC) specification]
- Energy harvesting: [AN11201 - NTAG 5 How to use energy harvesting]
- GPIO: [AN11203 - NTAG 5 Use of PWM, GPIO and Event detection]
- PWM: [AN11203 - NTAG 5 Use of PWM, GPIO and Event detection]
- Event detection: [AN11203 - NTAG 5 Use of PWM, GPIO and Event detection]
- NTAG 5 middleware porting guide: [RM00229 - NTAG 5 Middleware portation guide]

5 References

- [1] NTA5332 - NTAG 5 boost, NFC Forum-compliant I²C bridge for tiny devices, doc.no. 5475xx
<https://www.nxp.com/docs/en/data-sheet/NTA5332.pdf>
- [2] NFC Forum specification, Type 5 Tag - Technical Specification Version 1.0 2018-04-27 [T5T] NFC Forum™
<https://nfc-forum.org/product-category/specification/>
- [3] NFC Forum specification, Tag NDEF Exchange Protocol - Technical Specification Version 1.0 2019-04-24 [TNEP] NFC Forum™
<https://nfc-forum.org/our-work/specifications-and-application-documents/specifications/nfc-forum-candidate-technical-specifications/>
- [4] NFC Forum Personal Health Care Devices (PHDC) specification
<https://nfc-forum.org/product-category/specification/>
- [5] AN11203 - NTAG 5 Use of PWM, GPIO and Event detection, doc.no. 5302xx
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- [6] AN12364 - NTAG 5 Bidirectional data exchange, doc.no. 5303xx
<https://www.nxp.com/docs/en/application-note/AN12364.pdf>
- [7] AN11201 - NTAG 5 How to use energy harvesting, doc.no. 5304xx
<https://www.nxp.com/docs/en/application-note/AN11201.pdf>
- [8] AN12366 - NTAG 5 Memory Configuration and Scalable Security, doc.no. 5305xx
<https://www.nxp.com/docs/en/application-note/AN12366.pdf>
- [9] AN12368 - NTAG 5 Link I²C Master mode, doc.no. 5306xx
<https://www.nxp.com/docs/en/application-note/AN12368.pdf>
- [10] AN12429 - NTAG 5 Stand-by and Hard Power down modes of operation
<https://www.nxp.com/docs/en/application-note/AN12429.pdf>
- [11] SW6090 - NTAG 5 Development kit source code and library for LPC microcontrollers. Contains NTAG 5 middleware library, Pass-through mode, GPIO and PWM examples
<https://www.nxp.com/downloads/en/nxp/software/SW6090.zip>
- [12] SW5870 - NTAG 5 Development kit Android application source code. NTAG 5 Development kit Android application source code
<https://www.nxp.com/downloads/en/nxp/software/SW5870.zip>
- [13] SCH-45997 - OM2NTP5332 NTAG 5 link - Development Board Schematic
<https://www.nxp.com/docs/en/supporting-information/SCH-45997.pdf>
- [14] RM00229 - NTAG 5 Middleware portation guide, doc.no.

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