UM11496

PN7160 evaluation board

Rev. 1.3 — 24 November 2022 **User manual**

Document information

Information	Content
Keywords	OM27160, PN7160, PN7161, evaluation kit
Abstract	This document is the user manual of the PN7160/PN7161 evaluation board.

1 Revision history

Revision history

Rev	Date	Description
1.3	20221124	• Section 2 "Introduction": IMPORTANT NOTICE added • Section 7 "Radio Equipment Directive (RED)": added • Table 5: updated the terms "Master/Slave" to "Controller/Target" and "MOSI/MISO" to "COTI/CITO" to align with the recommendation of the NXP - I2C standards organization.
1.2	20210913	Security status changed into "Company public", no content change
1.1	20210825	• Web link updated • Security status changed into "Company proprietary"
1.0	20210706	Initial version

2 Introduction

The present document describes the OM27160 evaluation board, a flexible and easy-to-use NFC controller board featuring PN7160.

It enables the development of an NFC solution based on PN7160 in a Linux or Android environment or even in system based on RTOS or without OS.

It exists in 2 configurations, the only difference is then physical host interface exposed:

- OM27160A1HN featuring PN7160A1HN sample offering I^2C host interface
- OM27160B1HN featuring PN7160B1HN sample offering SPI host interface

This document presents first an overview of the board, then it gives printed circuit boards details, and finally it provides information for reuse of the kit in different environments.

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3 OM27160 board overview

The OM27160 board is high performance fully NFC-compliant expansion board, meeting compliance with reader mode, P2P mode and card emulation mode standards.

The board features an integrated high performance 40 mm * 40 mm RF antenna to insure high interoperability level with NFC devices.

It has to be used in association with one interface board according to the targeted user environment. For this purpose, it integrates the NFC generic interface allowing assembly with OM29110 Interface boards (see [1]).

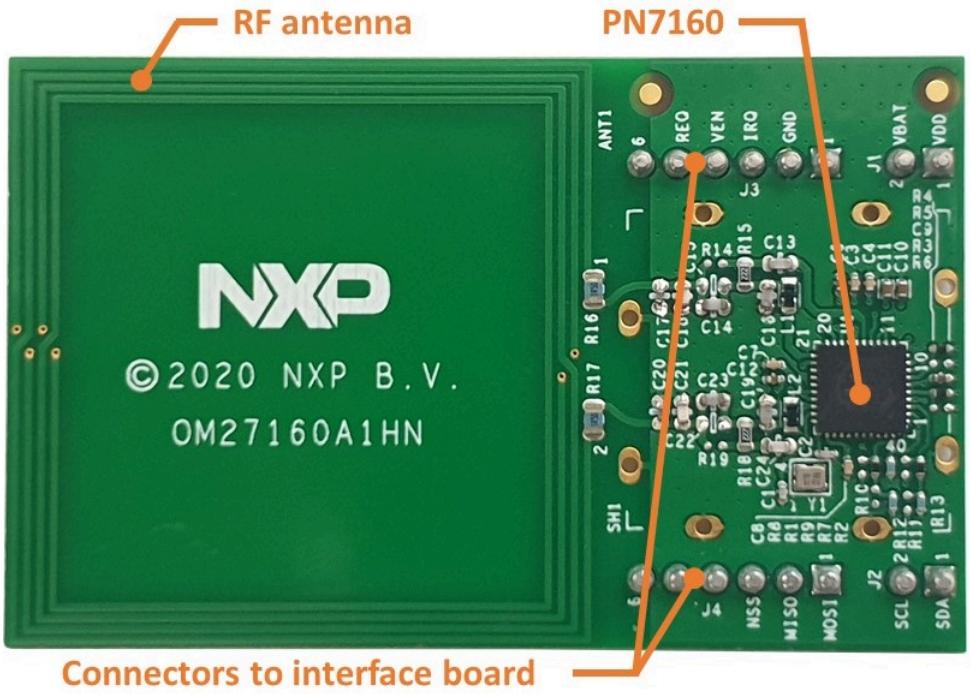

Figure 1. OM27160 board overview

4 OM27160 board details

4.1 Schematics

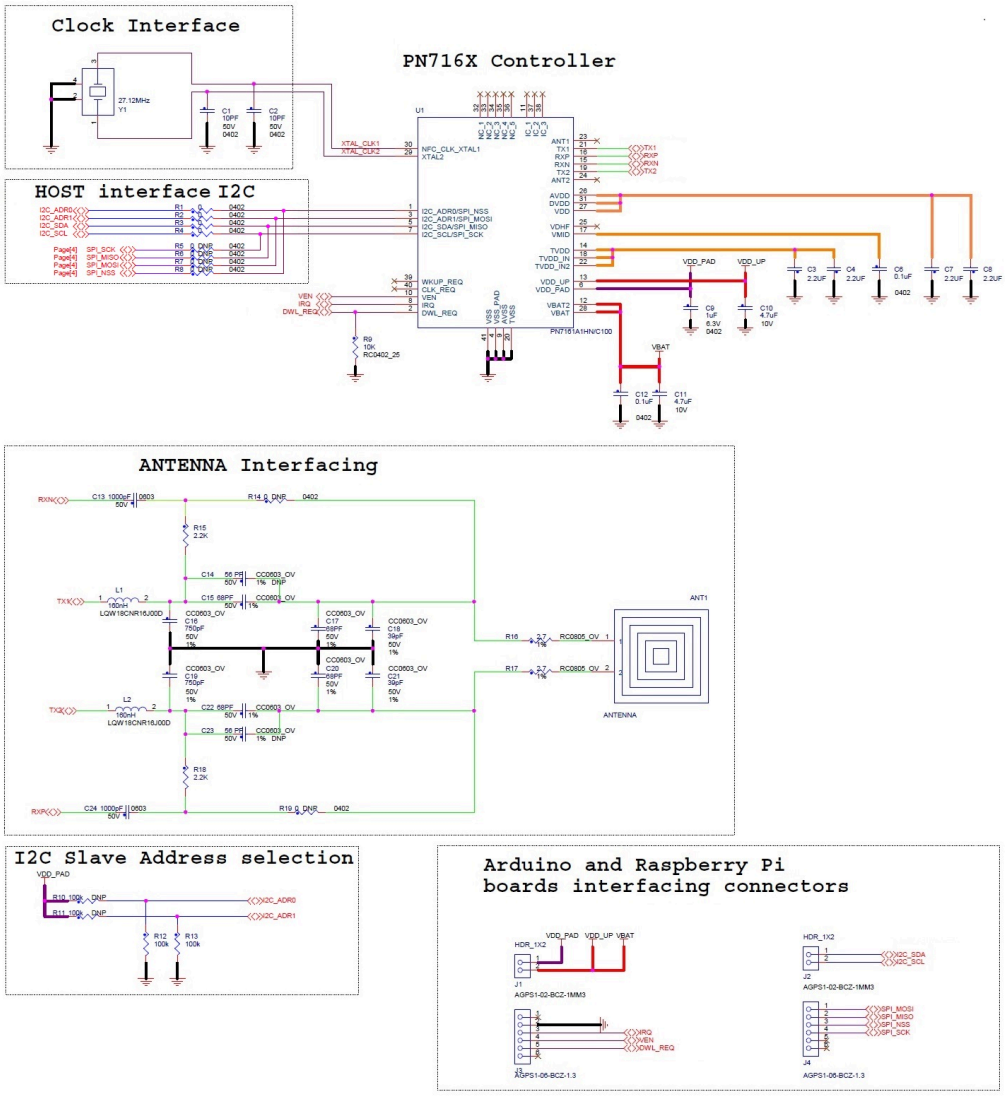

Figure 2. OM27160A1HN board schematics

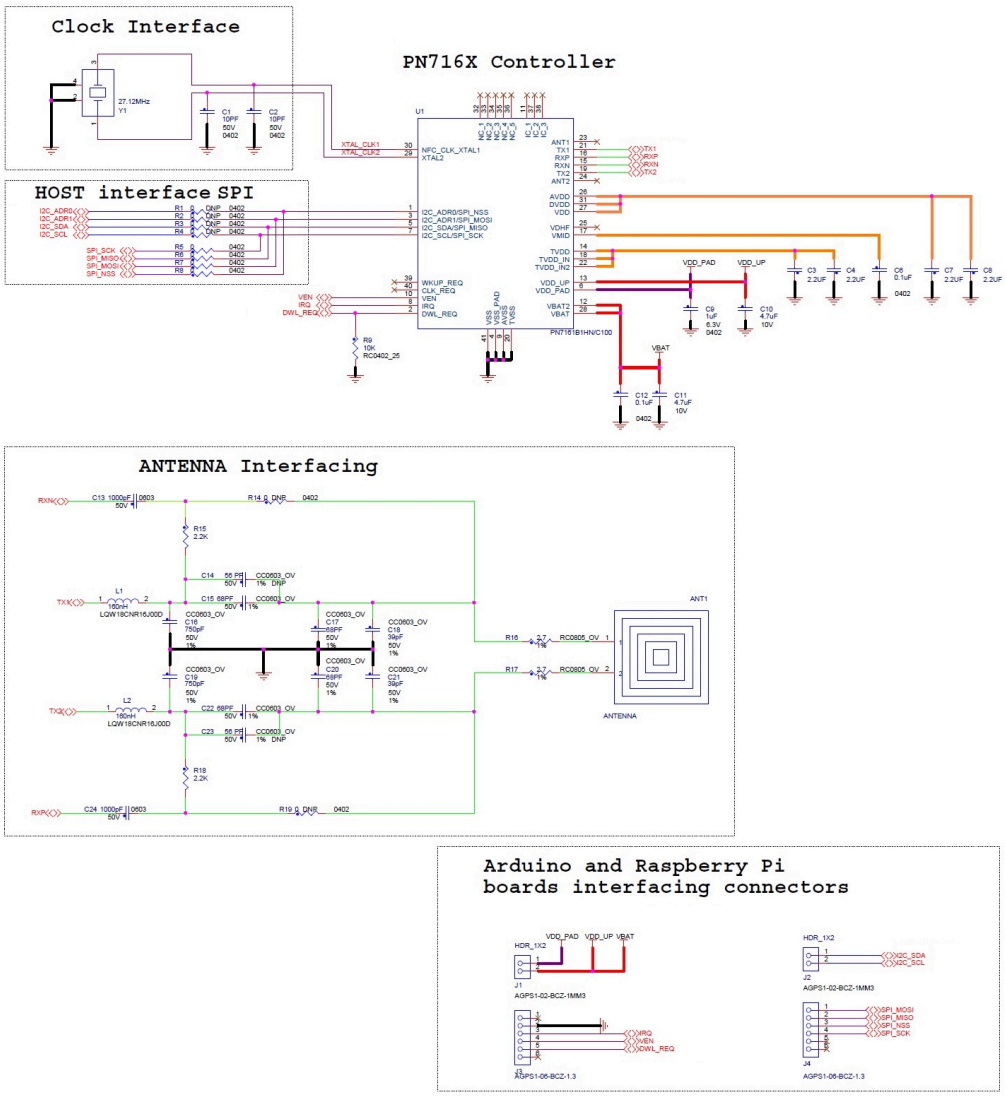

Figure 3. OM27160B1HN board schematics

4.2 Layout

4.2.1 Components layers

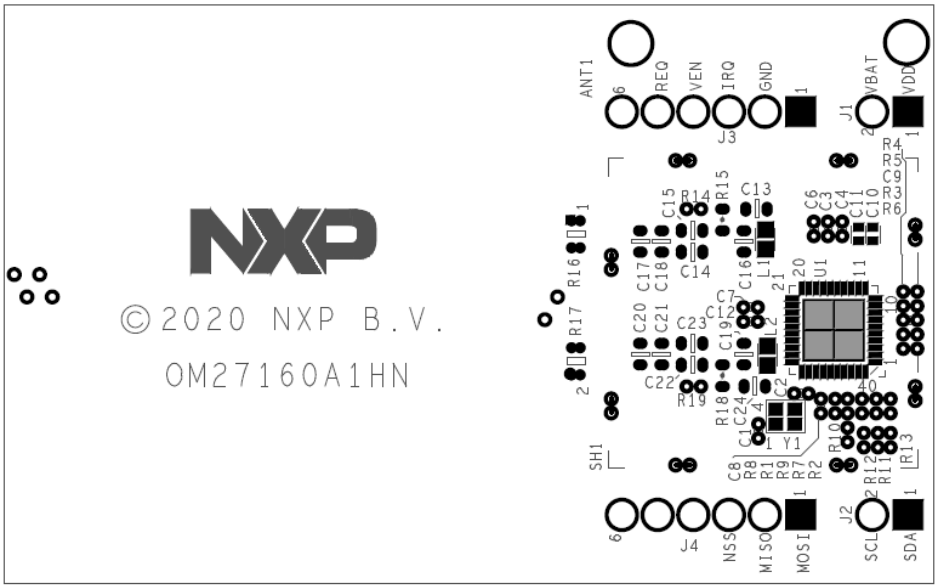

Figure 4. OM27160 board components layers

4.2.2 Layer 1

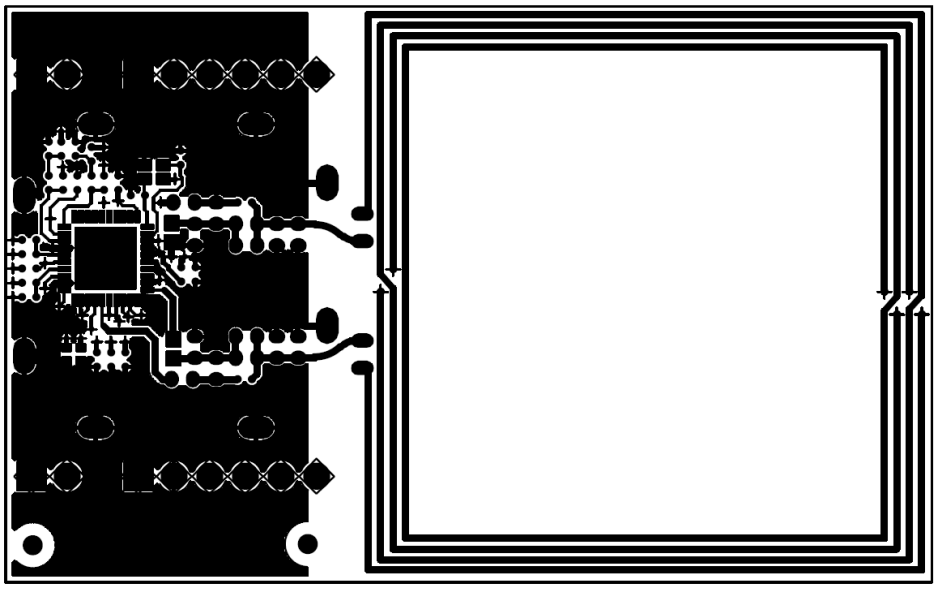

Figure 5. OM27160 board layer 1

4.2.3 Layer 2

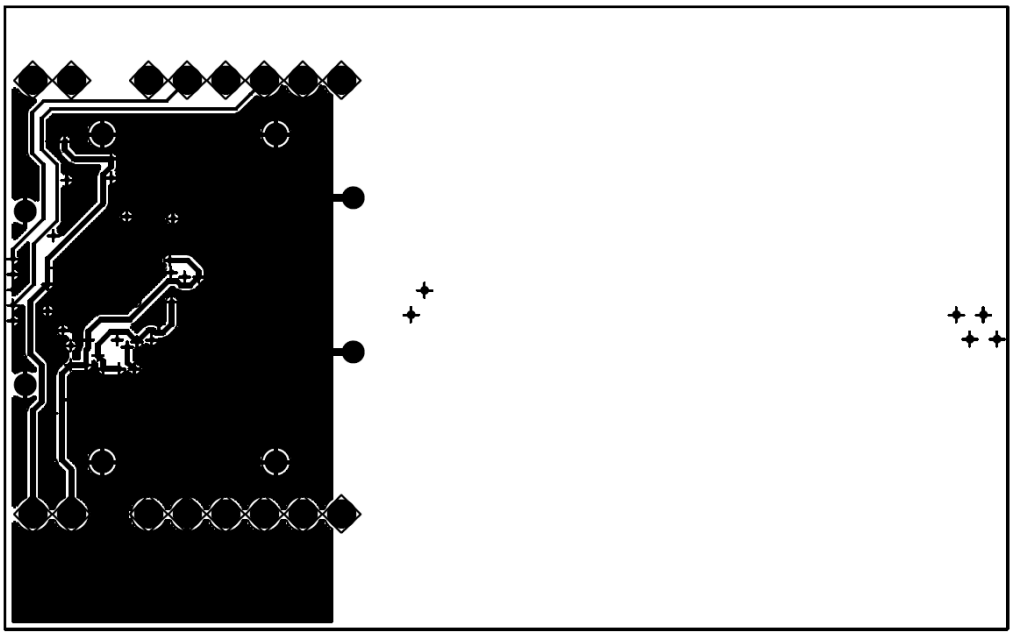

Figure 6. OM27160 board layer 2

4.2.4 Layer 3

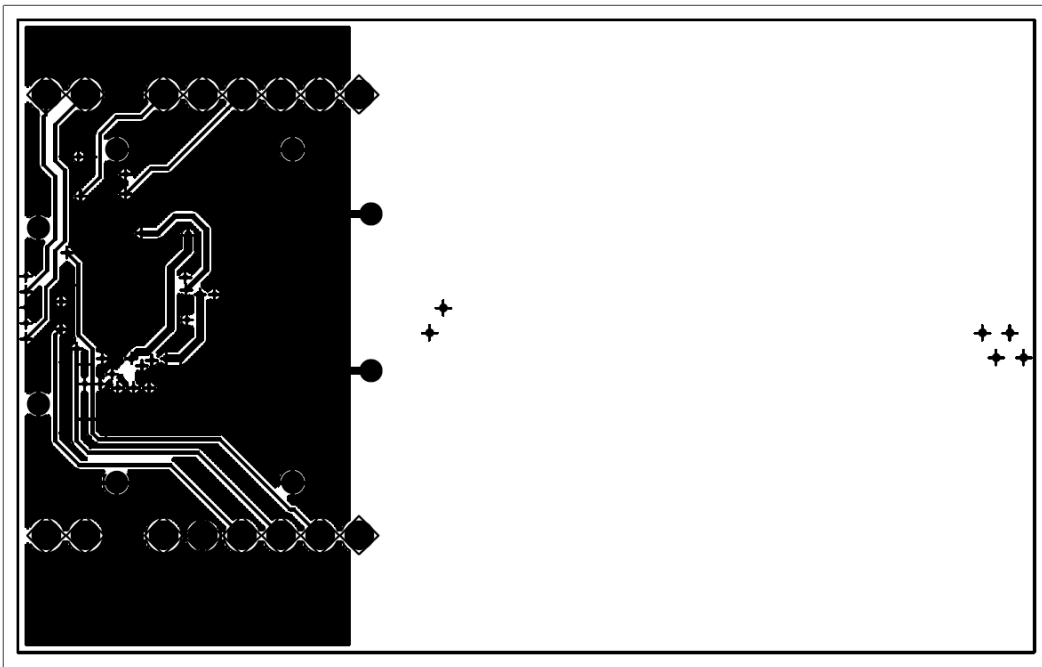

Figure 7. OM27160 board layer 3

4.2.5 Layer 4

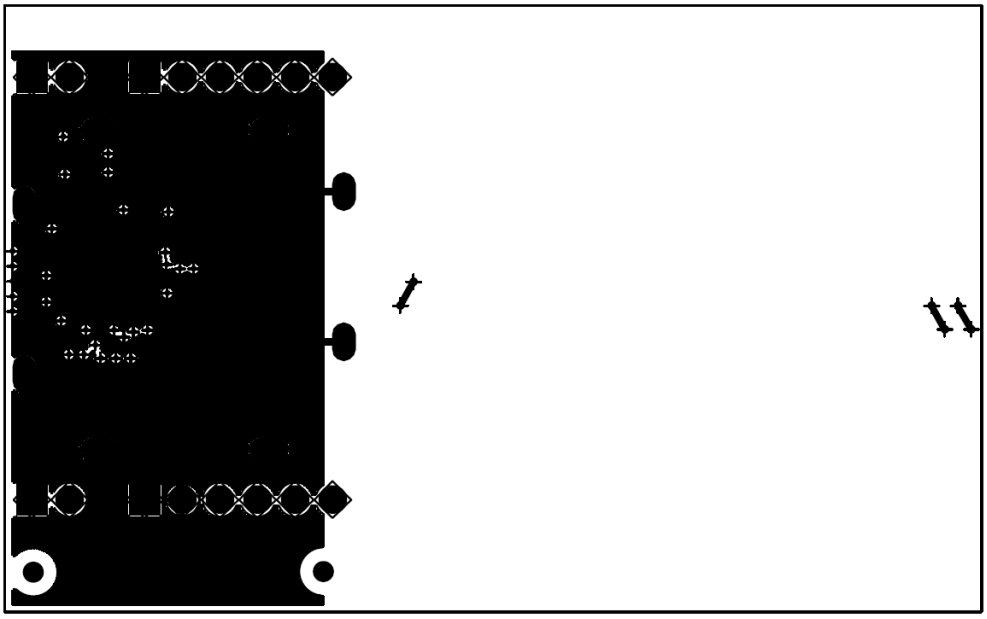

Figure 8. OM27160 board layer 4

5 Additional information

5.1 Using different I²C address

The OM27160A1HN board come with default 0x28 (7 bits) I²C PN7160 slave address.

However, it is still possible to change it (between 0x28 and 0x2B) by setting of R10, R11, R12 and R13 resistors.

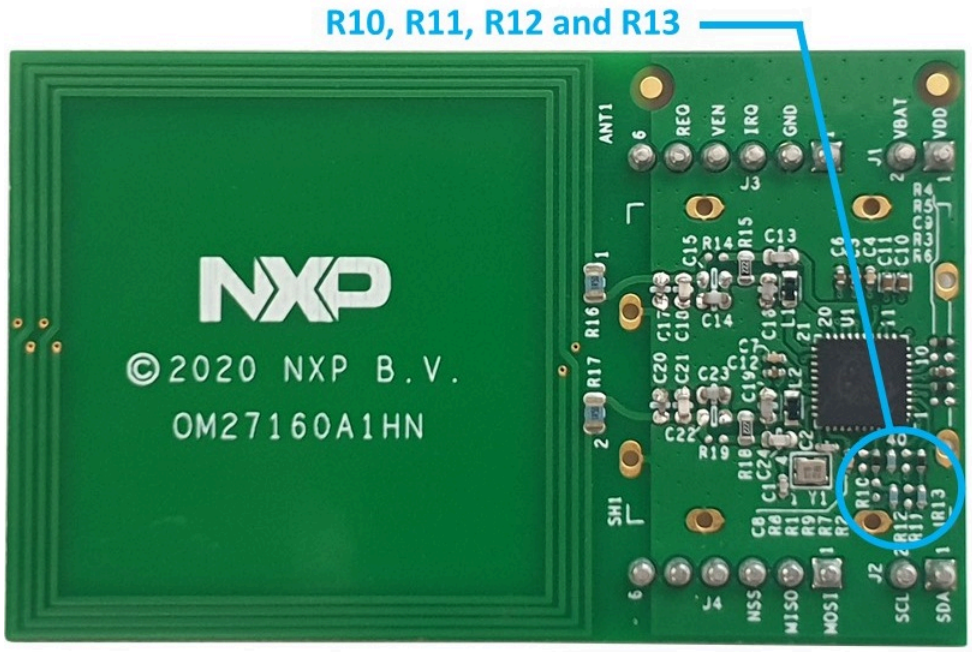

Figure 9. OM27160A1HN NFC controller I²C address configuration

Table 1. I²C address configuration

I²C address	R10	R11	R12	R13
0x28	Open	Open	Short	Short
0x29	Short	Open	Open	Short
0x2A	Open	Short	Short	Open
0x2B	Short	Short	Open	Open

5.2 Using in another system

The OM27160 board can be reuse in another system (different from Raspberry Pi or BeagleBone, and not offering Arduino compatible interface). Indeed, the board provides all required signals on J1, J2, J3 and J4 connectors to interface any host device.

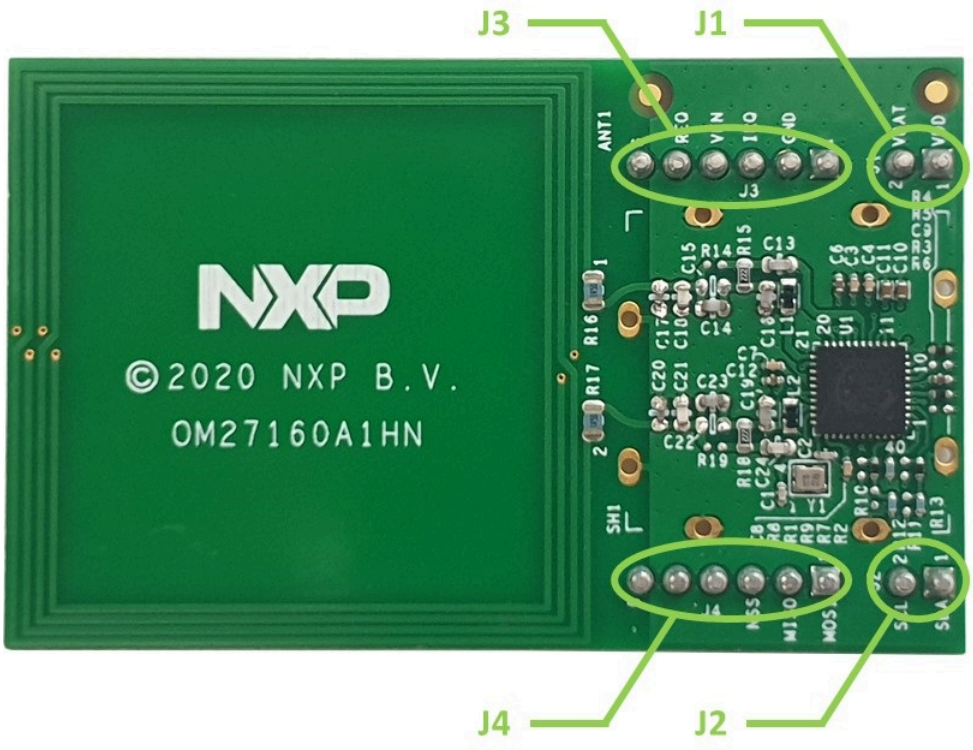

Figure 10. OM27160 board interface connectors

Table 2. OM27160 board J1 connector pinout

J1	PN7160 signal
#1	VDD(PAD): 1.8 V or 3.3 V host interface voltage reference
#2	VDD(UP/VBAT: 2.8 V to 5.5 V supply voltage

Table 3. OM27160 board J2 connector pinout (only relevant for OM27160A1HN version)

J2	PN7160 signal
#1	I2C_SDA: I2C-bus serial data
#2	I2C_SCL: I2C-bus serial clock input

Table 4. OM27160 board J3 connector pinout

J3	PN7160 signal
#1	Not connected
#2	GND: ground
#3	IRQ: interrupt request output
#4	VEN: reset pin
#5	DWL_REQ: download request pin

Table 4. OM27160 board J3 connector pinout*...continued*

J3	PN7160 signal
#6	Not connected

Table 5. OM27160 board J4 connector pinout (only relevant for OM27160B1HN version)

J4	PN7160 signal [1]
#1	SPI_COTI: SPI-bus Controller Output, Target Input data
#2	SPI_CITO: SPI-bus Controller Input, Target Output data
#3	SPI_NSS: SPI-bus Target Select
#4	SPI_SCK: SPI-bus Serial Clock
#5	Not connected
#6	Not connected

[1] Updated the terms "Master/Slave" to "Controller/Target" and "MOSI/MISO" to "COTI/CITO" to align with the recommendation of the NXP - I2C standards organization.

6 References

[1] The OM29110 Interface boards are used to connect NFC's demo boards (e.g. OM5579 related to PN7150 NFC controller or OM27160 related to PN7160 NFC controller) to Single-Board-Computer (like Raspberry Pi, BeagleBone, or board featuring Arduino header).
More details in the related UM10956 - OM29110 NFC's SBC interface boards user manual: https://www.nxp.com/doc/UM10956

7 Radio Equipment Directive (RED)

The following information is provided per Article 10.8 of the Radio Equipment Directive 2014/53/EU:

(a) Frequency bands in which the equipment operates.

(b) The maximum RF power transmitted.

Table 6. Characteristics

PN	RF Technology	(a) Freq Ranges (EU)	(b) Max Transmitted Power
OM27160B1EVK	Near Field Communication	13.56 MHz +/- 7 kHz	40 µW / -44 dBi

EUROPEAN DECLARATION OF CONFORMITY (Simplified DoC per Article 10.9 of the Radio Equipment Directive 2014/53/EU). This apparatus, namely OM27160B1EVK Evaluation Kit, conforms to the Radio Equipment Directive 2014/53/EU.

The full EU Declaration of Conformity for this apparatus can be found at this location: https://www.nxp.com/products/:PN7160-EVK

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