

# RM00264

PNEV5190MB module board

Rev. 1.0 — 15 March 2021

662110

Reference manual  
COMPANY PUBLIC

## Document information

Information	Content
Keywords	PN5190, PNEV5190MB, customer development board, NFC Frontend, NFC reader, RFID, EMVCo, access, payment
Abstract	The PNEV5190MB is a NFC module using the high-power NFC-IC PN5190. This module is intended for fast prototyping.



## Revision history

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### Revision history

Rev	Date	Description
v.1.0	20210323	Initial version

## 1 General description

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This document describes the functionality and electrical specification of the PNEV5190MB, a flexible NFC module using the high-power NFC-IC PN5190.

Additional documents supporting a design-in of the PN5190 are available from NXP, this additional design-in information is not part of this document.

The PNEV5190MB is a small module which includes all components which are essential to ensure a performant functionality of the PN5190.

A dedicated host controller is required to be connected to operate the PN5190. An example for connecting a host controller Kinetis K82 can be found on the NXP customer development board PNEV5190BP (the PNEV5190BP makes use of the PNEV5190MB module).

The electrical functionality of the PNEV5190MB is defined by the characteristics and limiting values of the NFC Frontend which is implemented. Due to pin compatibility within the product family, different versions of the PN5190 NFC Frontend might exist in the future. Please refer to the relevant data sheet of the NFC Frontend used on the PNEV5190MB for latest electrical parameters.

Performance critical components are EMV Filter inductors and the inductor used for the DC-DC (L1,L2,L3). It is recommended using the proposed components.

## 2 Application environment and connections

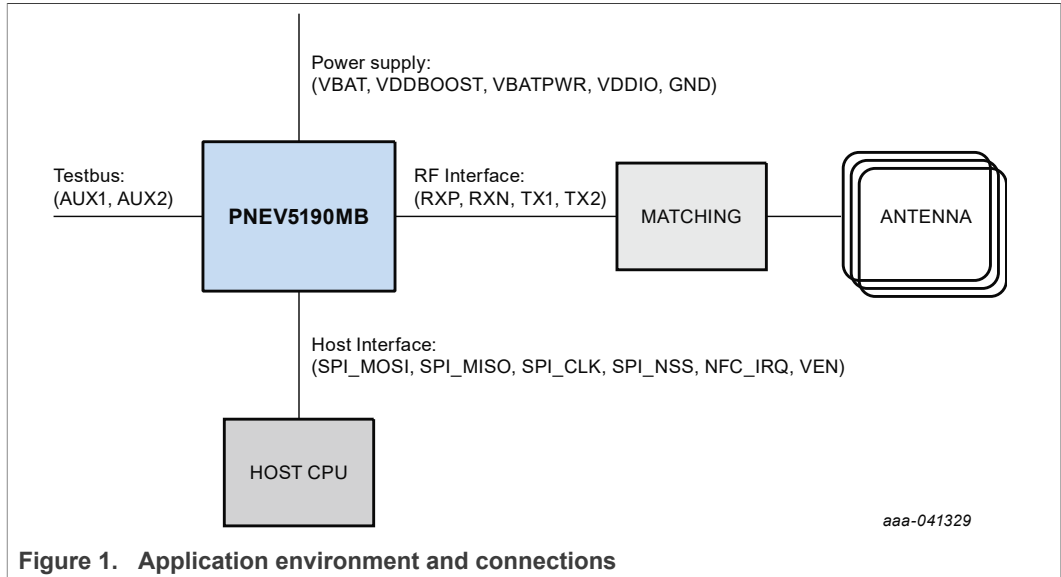


Figure 1. Application environment and connections

3 Schematics

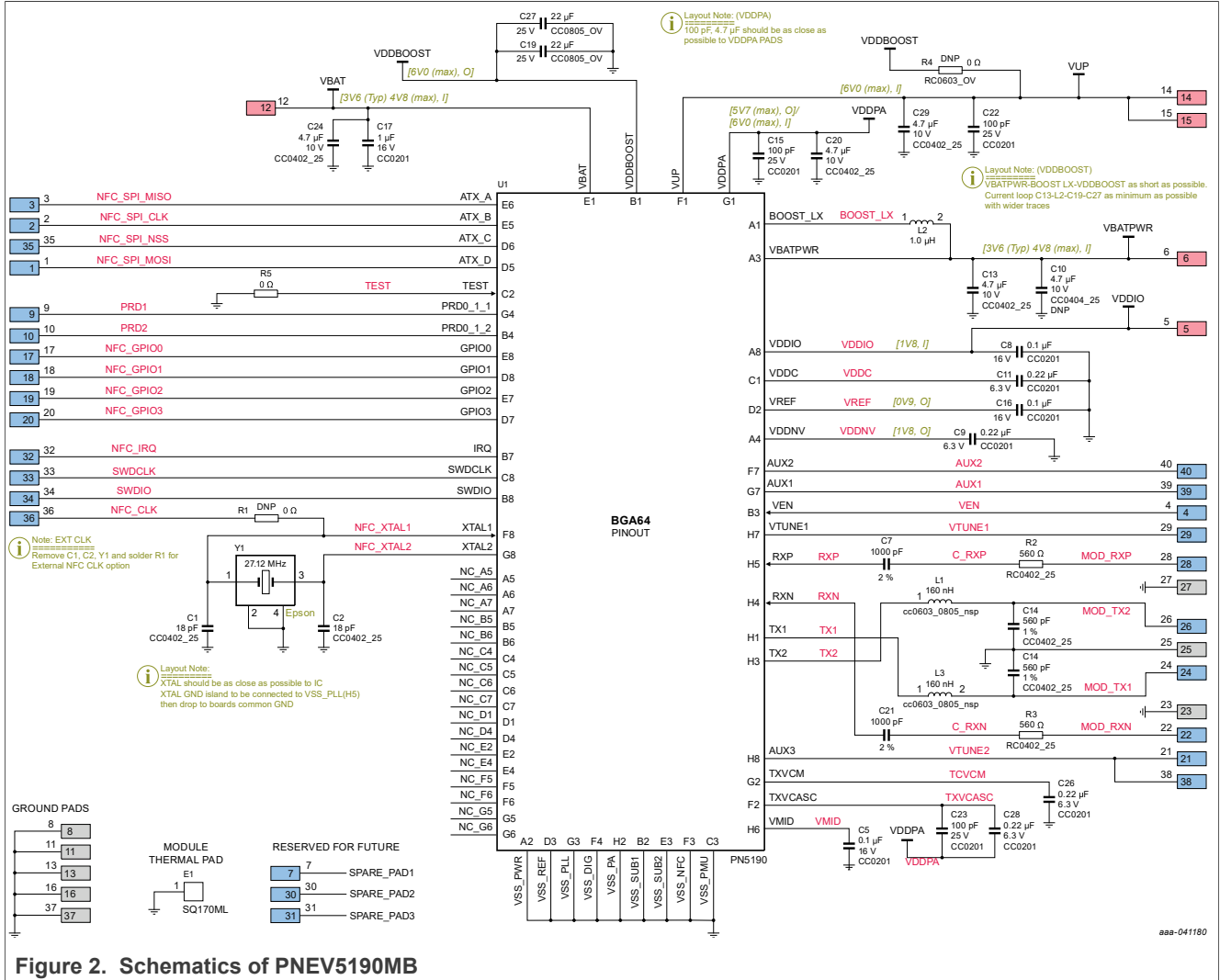


Figure 2. Schematics of PNEV5190MB

!!! ATTENTION !!!

The default pin configuration and routing on the module is based on the use case with the PN5190 DC-DC being used.

The R4 must be removed and the DC-DC must be bypassed (EEPROM settings!), before VUP can be externally supplied.

## 4 Bill of material

Table 1. Components used

Item	Reference	Value	Max. tolerance (%)	Description	Manufacturer part number
1	C1,C2	18 pF	1	CAP CER 18PF 50 V 1% C0G 0402	AVX: 04025A180FAT2A; Capax technologies: 0402G180F500SNT; Yageo: CC0402FRNPO9BN180
2	C5,C8,C16	0.1 uF	10	CAP CER 0.1 μF 16 V 10% X5R 0201	MURATA: GRM21BR61E226ME44
3	C7,C21	1000 pF	1	CAP CER 1000 pF 50 V 1% C0G 0402	KEMET: C0402C102F5GEC7411
4	C9, C11, C26,C28	0.22 uF	10	CAP CER 0.22 μF 6.3 V 10% X5R 0201	MURATA: GRM033R60J224KE15D
5	C10	Do not place	-	-	-
6	C12, C14	560 pF	1	CAP CER 560 pF 50 V 1% C0G AEC-Q200 0402	MURATA: GCM1555C1H561FA16D
7	C13,C20,C24, C29	4.7 μF	10	CAP CER 4.7 μF 10 V 10% X5R 0402_WIDE	TDK: C1005X5R1A475K050BC
8	C15,C22,C23	100 pF	5	CAP CER 100PF 25 V 5% COG CC0201	SAMSUNG: CL03C101JA3NNNC; YAGEO AMERICA: CC0201JRNPO8BN101
9	C17	1 uF	20	CAP CER 1 uF 16 V 20% X5R 0201	SAMSUNG: CL03A105MO3NRNH
10	C19	22 μF	20	CAP CER 22 μF 25 V 20% X5R 0805	MURATA: GRM21BR61E226ME44
11	C27	Do not place	-	-	-
13	L1, L3	160 nH	2	IND PWR 160nH@100MHZ 930 mA 2% 0805	MURATA: LQW2BANR16G00L
14	L2	1,0H	20	IND PWR 1.0UH@1MHZ 1.6A 20% 1008	MURATA: LQM2HPN1R0MG0L
15	R1	Do not place	-	-	-
16	R2,R3,R5	0R	5	RES MF ZERO OHM 1/16W 5% 0402	BURNS: CR0402-J/-000GLF; PANASONIC: ERJ2GE0R00X
17	R4	0R	5	RES MF ZERO OHM 1/10W -- AEC-Q200 0603	PANASONIC: ERJ-3GEY0R00V; VISHAY INTERTECHNOLOGY: CRCW06030000Z0EA
18	U1	-	-	IC SINGLE CHIP NFC CONTROLLER PN5190 VBGA64	NXP SEMICONDUCTORS: PN5190B1EV - order part number depends on Factory Firmware. Check data sheet in case of doubts

Table 1. Components used ...continued

Item	Reference	Value	Max. tolerance (%)	Description	Manufacturer part number
19	Y1	27.12 MHz	30 ppm	XTAL 27.12 MHz 30 ppm 10 pF SMD	EPSON: FA-118T 27.1200MD50Z-K3

## Comment:

Manufacturer part number is a general recommendation only. Components from alternative manufacturers are possible to be used. Maximum tolerance is mandatory to be fulfilled. Ensure the usage of high quality components.

Characteristics (e.g. electrical losses) of L1,L2,L3 will impact performance and function of the NFC module.

## 5 Pin description PNEV5190MB

Table 2. Pin description PNEV5190MB

Pin Number	Symbol	Type	Description
1	SPI_MOSI	HOST INTERFACE	
2	SPI_CLK	HOST INTERFACE	
3	SPI_MISO	HOST INTERFACE	
4	VEN (~RESET)	HOST INTERFACE	
5	VDDIO	SUPPLY	
6	VBATPWR	SUPPLY	
7	N.C.	-	
8	GND	SUPPLY GND	
9	PRD_1	TAMPER DETECTION 1	
10	PRD_2	TAMPER DETECTION 2	
11	GND	SUPPLY GND	
12	VBAT	SUPPLY	
13	GND	SUPPLY GND	
14	VUP	SUPPLY	
15	VUP	SUPPLY	
16	GND	SUPPLY GND	
17	GPIO_0	I/O	
18	GPIO_1	I/O	
19	GPIO_2	I/O	
20	GPIO_3	I/O	
21	VTUNE2	RF INTERFACE	
22	MOD_RXN	RF INTERFACE	
23	GND	SUPPLY GND	
24	MOD_TX1	RF INTERFACE	
25	GND	SUPPLY GND	
26	MOD_TX2	RF INTERFACE	
27	GND	SUPPLY GND	
28	MOD_RXP	RF INTERFACE	
29	VTUNE1	RF INTERFACE (optional)	
30	N.C.	-	
31	N.C.	-	
32	IRQ	HOST INTERFACE	
33	RFU (SWDCLK)	-	Not available on PN5190
34	RFU (SWDIO)	-	Not available on PN5190



Table 2. Pin description PNEV5190MB ...continued

Pin Number	Symbol	Type	Description
35	SPI_NSS	HOST INTERFACE	
36	CLK_EXT	OPTIONAL CLOCK INPUT	
37	GND	SUPPLY	
38	VTUNE2	RF INTERFACE (optional)	
39	AUX1	DEBUG INTERFACE (optional)	
40	AUX2	DEBUG INTERFACE (optional)	

6 PCB outline

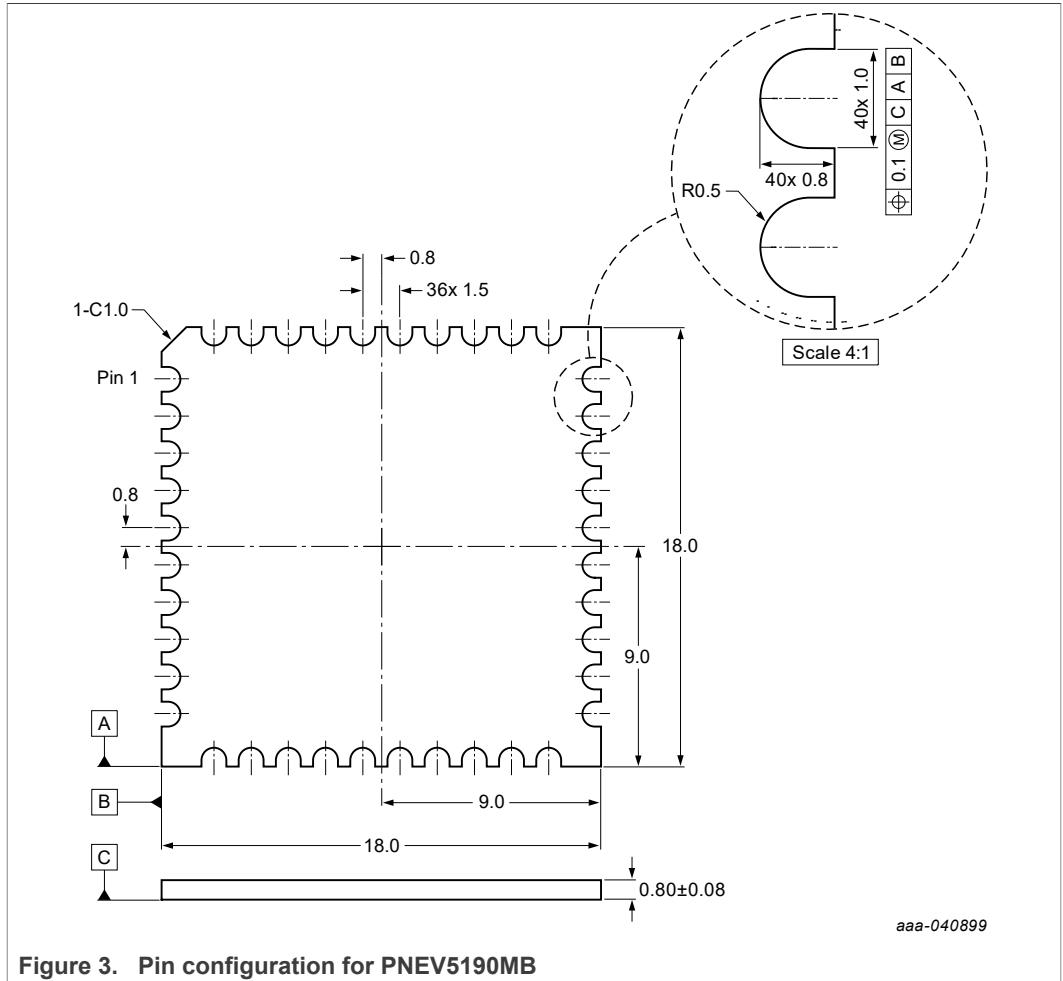


Figure 3. Pin configuration for PNEV5190MB

## 7 Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PNEV5190MB	Module	Module for PN5190 with BGA package	1.0



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The PN5190MB had been verified for functionality. Intended is the usage for development and prototype purposes. It intended to serve as well as a design template for customer designs.

The PN5190MB sourced from NXP is not intended for usage in commercial applications.

NXP did not perform any lifetime tests and board level qualifications of this module PN5190MB.

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**Tables**

Tab. 1. Components used ..... 6      Tab. 3. Ordering information ..... 11  
Tab. 2. Pin description PNEV5190MB ..... 8



## Figures

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Fig. 1.	Application environment and connections .....	4	Fig. 3.	Pin configuration for PNEV5190MB .....	10
Fig. 2.	Schematics of PNEV5190MB .....	5	Fig. 4.	Schematics of PNEV5190MB .....	12

## Contents

---

1	General description .....	3
2	Application environment and connections .....	4
3	Schematics .....	5
4	Bill of material .....	6
5	Pin description PNEV5190MB .....	8
6	PCB outline .....	10
7	Ordering information .....	11
8	Example application .....	12
9	Disclaimer .....	13
10	Legal information .....	14

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Date of release: 15 March 2021

Document identifier: RM00264

Document number: 662110