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PN5190 B2 firmware release v03.01

Rev. 1.1 — 8 September 2023

Release notes

Document information

Information	Content
Keywords	PN5190, PN5190 B2, NFC frontend controller
Abstract	Contains information about a specific release product and component information

1 Revision history

Revision history

Rev	Date	Description
1.1	20230908	PN5190 B2 firmware v03.01 release, same as that of PN5190 B1 FW v02.07
1.0	20230503	PN5190 B2 firmware v03.00 release, same as that of PN5190 B1 FW v02.06

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2   Document purpose

This document describes the tested functionality and limitations of the firmware PN5190 B2 FW v03.01.

PN5190 B2 FW v03.01 is identical in features and functionality with PN5190 B1 FW v02.07.

It also describes the release summary, release history, known issues, work-arounds, limitations, and recommendations.

The functionality and limitations of the hardware and product support material (e.g. customer development board and support software) is described in separate documents.

3   PN5190 B2 firmware version information

PN5190 B2 software package version (including host utilities): v03.01

PN5190 B2 secure firmware version: v03.01

Note: *This firmware version is meant only for PN5190 B2 IC. This firmware cannot be used in PN5190 B1 IC version.*

For new designs, it is recommended to use always the latest available firmware version.

4   Features supported in this release

This section provides the features supported in this firmware/software version release.

4.1 RF protocols

Table 1. RF protocols

Feature/functionality
Reader mode A (106/212/424/848 kbit/s)
Reader mode B (106/212/424/848 kbit/s)
Reader mode FeliCa (212/424 kbit/s)
Reader mode ISO/IEC15693 (26/53/106/212Kbps) - all data rates as specified in data sheet
Reader mode ISO/IEC18000 3M3 - all data rates as specified in data sheet
Host card emulation / Card mode ISO/IEC 14443 A-106, A-212, A-424, A-848
Peer-Peer passive communication (ISO18092, PI106, PI212, PI424, PT106, PT212, PT424)
Peer-Peer passive communication with proprietary baud rates (PI212, PI424, PI848, PT212, PT424, PT848)

4.2 Other system features/functionality protocols

Table 2. Other system features

Feature/functionality
Low-power card detection (LPCD) and ultra low-power card detection (ULPCD)
Dynamic power control
Automatic waveshape control
Automatic receiver control

Table 2. Other system features...*continued*

Feature/functionality
Internal DC-DC for TX driver
Over temperature protection (automatic shutdown of TX drivers and entering low-power mode (Standby), over temperature event on GPIO)
Current limiter (automatic shutdown of TX drivers and event notification to host)
Supported to route analog and digital signal on AUX1(analog) and GPIO0 (digital).
Trimming of RF parameters (TX_NOV, current sensor, NFCLD, RFLD).

4.3 Compliancy with this firmware and PNEV5190B hardware (customer development board)

Table 3. Compliancy with this firmware and PNEV5190B hardware (customer development board)

Feature/Functionality
EMVCo L1 digital compliance
ISO 10373-PCD digital compliance
ISO 10373-PICC digital compliance
NFC Forum CR11 analog and digital compliance. NFC Forum CR13 internally qualified.
ISO 23917 Peer-Peer Passive compliance

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5 Version history

This section contains the firmware release version history.

The previously released hardware version had been **"B1"**.

The new hardware version is **"B2"**. There is no change in hardware functionality or software functionality features compared with **"B1"**.

Only the ROM code has been updated for the **"B2"** IC version.

The below table provides the firmware version history including feature updates and issues fixes.

Table 4. Firmware updates from v03.00 to v03.01

SI No.	Function/feature update
1	Fixed an issue where in commands UPDATE_RF_CONFIGRUATION and GET_RF_CONFIGURATION commands when used for TX index 0x0F (ISO180003m3_TARI_18.88us) and 0x10 (ISO180003m3_TARI_9.44us).
2	Fixed an issue of not-restoring the analog TX settings when switching from reader mode to card mode. Removing of type-b detection during Autocoll. Supporting only Type-A and Type-F detection as part of Autocoll procedure.
3	Introduced a new EEPROM configuration: ENABLE_ULFO_TRIM_CALIBRATION (0xCEC). This configuration enables/disables the calibration of wake-up counter value based on the ULFO accuracy measured with frequency meter with Xtal as reference. *Note: This feature must be used only when Xtal is available and configured for use*
4	Deprecated the P2P active communication target mode functionality.

Table 5. Firmware updates in v03.00

SI No.	Function/feature update
1	All of the features and functionalities present in PN5190 B1 FW v02.06 is included in this FW version. In a nut-shell, below are incremental features are added in PN5190 B2 v03.00 and PN5190 B1 v02.06. • Added new command:GET_CRC_USER_AREA[0x29]: This command is used to calculate the CRC for the complete User area including Protocol area. This command helps customer to ensure the integrity of their RF and analog settings by detecting manipulation of this area. • Modified SOF timing: In this FW version, we have modified the protocol settings of TypeB106 such that it supports SOF timing adjustment. We also provide better results during the EMVCo L1 analog test.

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6 Recommendations, known limitations, and precautions

This section provides the known limitations in the FW/HW recommendations

6.1 Known limitations

With the default FDT settings for ISO18000 (dwFDT_18000_DefVal parameter which is 1.26 ms), performance @ -40C is reduced for only when TARI=18.88 µs.

This shall be appropriately adjusted for better performance.

6.2 Recommendations

The following clock parameters for Xtal are recommended for active communication on the customer development board PNEV5190B and 45 mm x 45 mm antenna.

Table 6. Recommendations for v03.00 and above

Address	Parameter name	Default value	Value for active communication
1	ANA_PLL_CTRL_XTAL	0x00	0xC1
2	ANA_PLL_CTRL_XTAL	0x8A	0x13
3	ANA_PLL_CTRL_XTAL	0xEA	0xE8
4	ANA_PLL_CTRL_XTAL	0xA6	0xA6

6.3 Precautionary notes

1. Do not disable the DPC and activate the RF field for IC's connected to antennas matched "Symmetric" (e.g. customer development board antenna). Possible damage of the transmitter drivers due to overcurrent over long period might occur.
2. PN5190 B1 samples cannot be upgraded with the PN5190 B2 FW.
   However PN5190 B2 samples can be updated with this FW version.
3. The ULPCD requires a specific power configuration with no DC-DC active and requires modifications to both the customer development board PNEV5190B EEPROM settings as described in the application notes.

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