## Rakstore PN5180

# Rakstore PN5180 NFC Module User Manual

Model: PN5180

## 1. Introduction

The Rakstore PN5180 NFC Module is a high-frequency RFID IC card reader and writer designed for various applications including payment systems, physical access control, e-government, and industrial control. This module supports multiple protocols, enhancing its versatility for different RFID and NFC tag types. It features a Serial Peripheral Interface (SPI) for communication with microcontrollers and other host systems.

## 2. Safety Information

- **Power Supply:** Ensure the module is powered with the correct voltage (typically 3.3V or 5V as indicated on the board) to prevent damage.
- **Electrostatic Discharge (ESD):** Handle the module with care, preferably in an ESD-safe environment, to avoid damage from static electricity.
- **Connections:** Double-check all wiring connections before applying power to prevent short circuits or incorrect operation.
- **Operating Environment:** Avoid exposing the module to extreme temperatures, humidity, or corrosive substances.

## 3. Package Contents

The standard package for the Rakstore PN5180 NFC Module typically includes:

- 1 x PN5180 NFC Module
- Optional: Test RFID/NFC cards or key fobs (*Note: Verify compatibility of included tags with the module's supported protocols upon receipt.*)

## 4. Product Overview

### 4.1 Key Features

- Supports multiple protocols: ISO/IEC 18092.14443 A/B, FeliCa, and ISO15693.

- Integrated DPS (Dynamic Power Saving) function to enhance reception stability and improve antenna feedback.
- Supports card emulation mode, allowing the module to act as an NFC tag.
- Supports peer-to-peer mode for direct communication between two NFC devices.
- Utilizes Serial Peripheral Interface (SPI) for communication.

### 4.2 Module Layout and Pinout

The PN5180 module features a compact design with clearly labeled pins for easy integration. The main components include the PN5180 chip, passive components, and an integrated antenna coil.

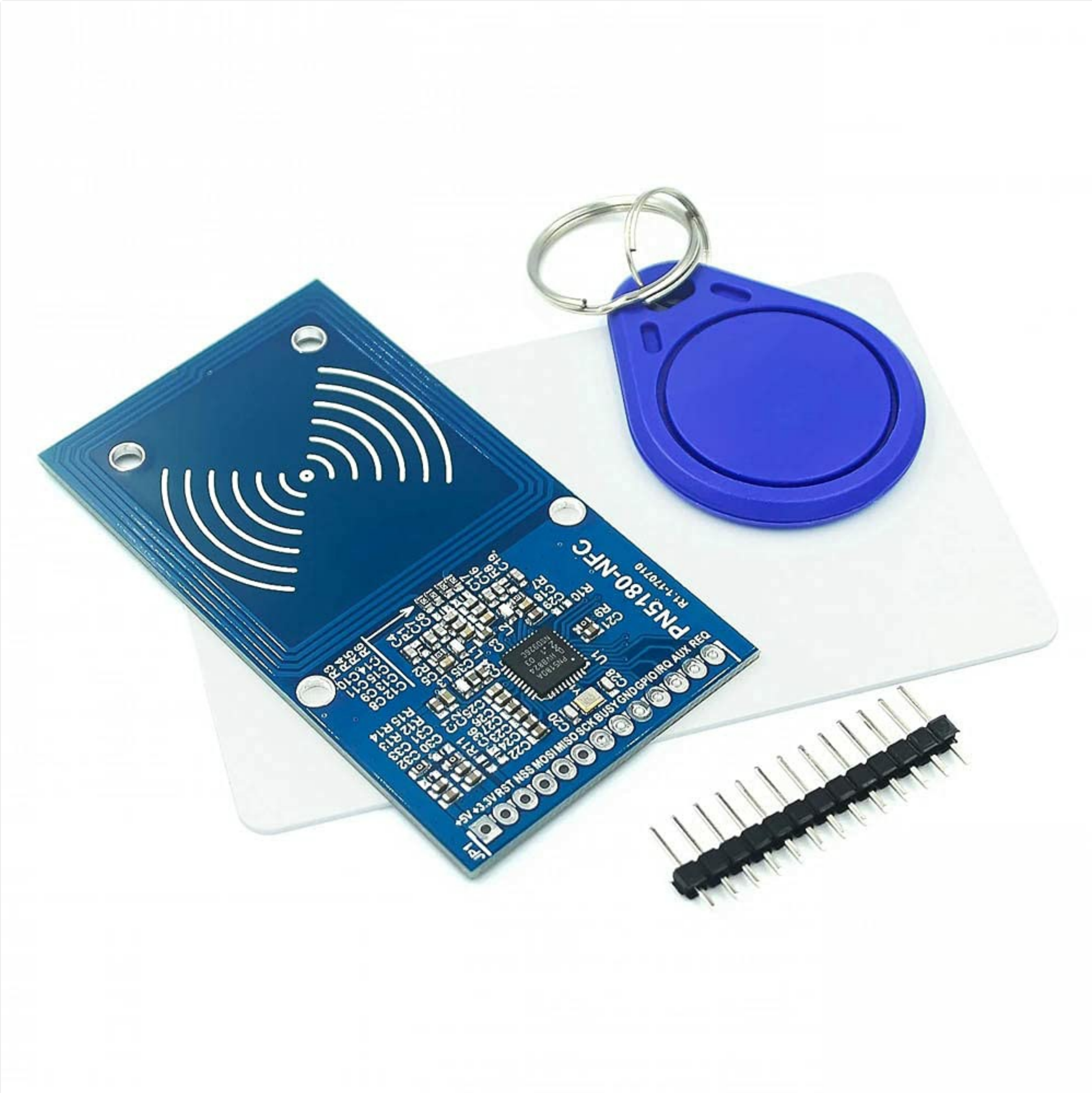


*Figure 1: Top view of the PN5180 NFC Module.*

The pin header (JP1) provides connections for power, ground, and the SPI communication lines. Common pins include:

- **+5V** / **+3.3V:** Power supply input.
- **GND:** Ground connection.
- **MOSI (Master Out Slave In):** SPI data line from master to slave.
- **MISO (Master In Slave Out):** SPI data line from slave to master.
- **SCK (Serial Clock):** SPI clock signal.

- **SS (Slave Select) / NSS:** Chip select for SPI communication.
- **BUSY / IRQ:** Interrupt request or busy signal.
- **AUX:** Auxiliary pin.

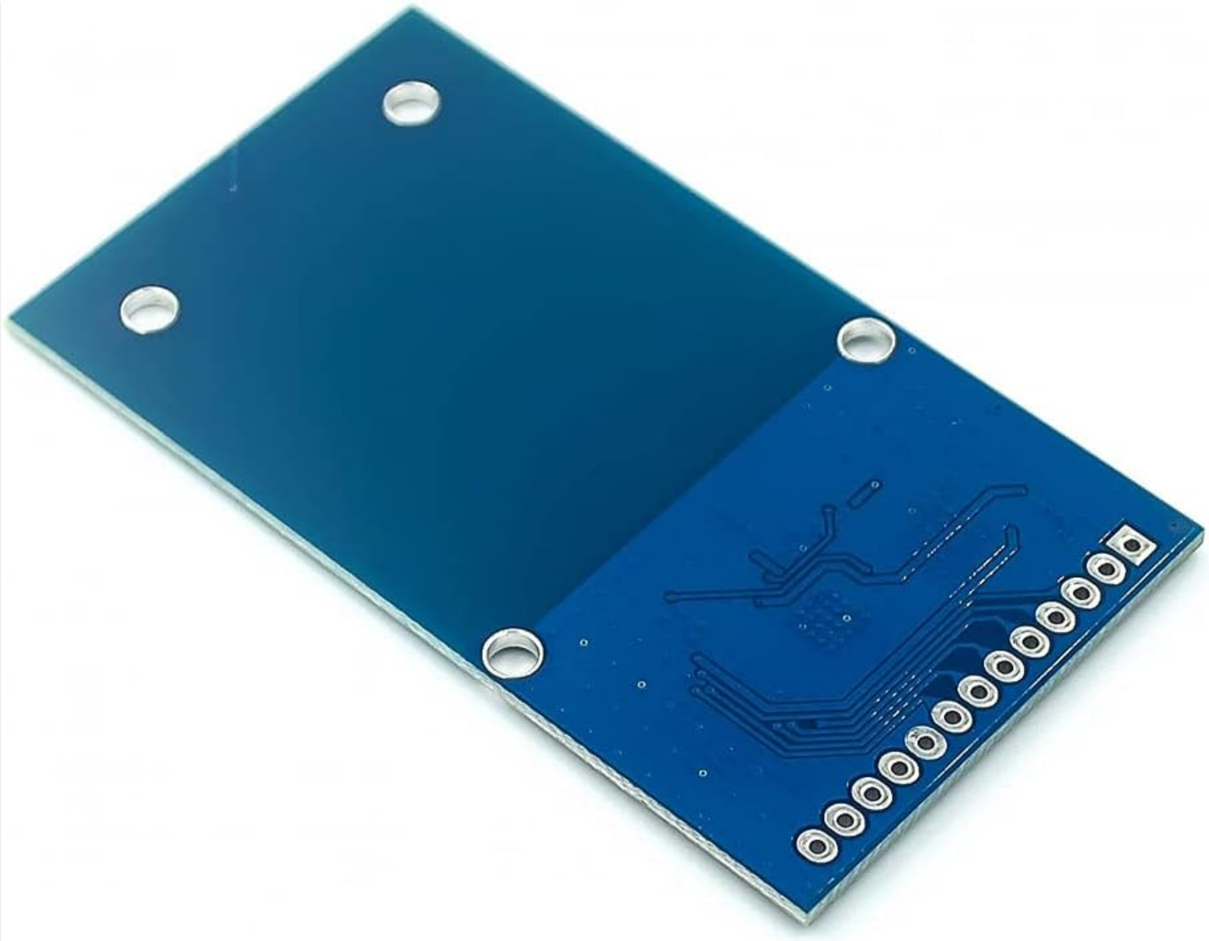

*Figure 2: Bottom view of the PN5180 NFC Module.*

## 5. Setup

To set up the PN5180 NFC Module, follow these steps:

1. **Power Connection:** Connect the +5V or +3.3V pin to your power supply and the GND pin to your system's ground. Refer to the module's specific voltage requirements.
2. **SPI Connection:** Connect the MOSI, MISO, SCK, and SS (NSS) pins to the corresponding SPI pins on your microcontroller or host system.
3. **Optional Connections:** Connect the BUSY/IRQ pin to an interrupt-capable pin on your microcontroller if you plan to use interrupt-driven communication.
4. **Software Setup:** Install the necessary libraries or drivers for the PN5180 module on your host system. Many microcontrollers (e.g., Arduino, Raspberry Pi) have community-developed libraries available for NFC/RFID modules.
5. **Antenna Placement:** Ensure the module's antenna is not obstructed by metal objects, which can interfere with its read/write capabilities.

## 6. Operating Instructions

Operating the PN5180 module typically involves sending commands via the SPI interface to perform various NFC/RFID functions.

### 6.1 Basic Tag Reading

1. Initialize the PN5180 module using your chosen software library.
2. Configure the module to operate in reader mode for the desired protocol (e.g., ISO15693, ISO14443A).
3. Place an RFID/NFC tag within the module's reading range.
4. Send a command to detect and read the tag's Unique Identifier (UID) or other data.
5. Process the received data on your host system.

### 6.2 Tag Writing (if supported by tag type)

1. Ensure the tag is writable and compatible with the module's writing capabilities.
2. Initialize the module and configure it for writing.
3. Place the tag within range.
4. Send the data you wish to write to the tag, specifying the memory block or address.
5. Verify the write operation by attempting to read the data back.

### 6.3 Card Emulation and Peer-to-Peer Modes

Refer to the PN5180 datasheet and specific library documentation for detailed instructions on configuring and utilizing card emulation and peer-to-peer communication modes, as these require more advanced setup and protocol handling.

## 7. Maintenance

- **Cleaning:** Keep the module clean and free from dust and debris. Use a soft, dry cloth for cleaning. Avoid liquid cleaners.
- **Storage:** Store the module in a dry, cool environment, away from direct sunlight and strong electromagnetic fields.
- **Handling:** Avoid bending or applying excessive force to the module, especially the antenna coil, to prevent physical damage.

## 8. Troubleshooting

- **Module Not Responding:**
  - Check power supply connections and voltage levels.
  - Verify SPI wiring (MOSI, MISO, SCK, SS) for correct connections and continuity.
  - Ensure your software library is correctly initialized and communicating with the module.
- **Tags Not Reading:**
  - Confirm the tag type (e.g., ISO15693, ISO14443A) is supported by the PN5180 module and configured in your software.
  - Ensure the tag is placed within the optimal reading range and orientation of the module's antenna.
  - Check for metallic objects near the antenna that might interfere with the RF field.
  - If using included tags, verify their actual protocol. Some included tags may not be compatible with the module's primary advertised protocol (e.g., ISO14443 tags with an ISO15693-focused reader).
- **Inconsistent Reads/Writes:**
  - Ensure a stable power supply.
  - Minimize electromagnetic interference from other electronic devices.
  - Adjust the distance and orientation of the tag relative to the module.

## 9. Specifications

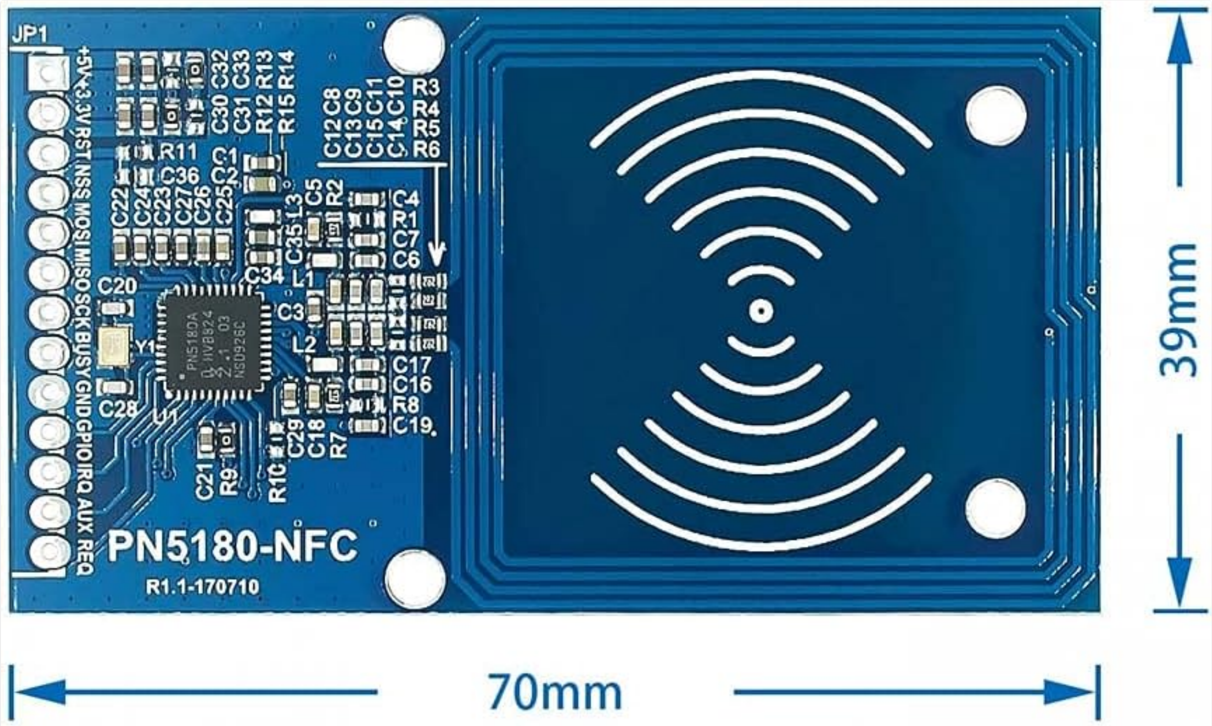


*Figure 3: PN5180 NFC Module with dimensions.*

| Feature | Description |
| --- | --- |
| Model Number | PN5180 |
| Manufacturer | Rakstore |
| Supported Protocols | ISO/IEC 18092.14443 A/B, FeliCa, ISO15693 |
| Interface | SPI (Serial Peripheral Interface) |
| Operating Modes | Reader/Writer, Card Emulation, Peer-to-Peer |
| Dimensions (L x W) | 70mm x 39mm (approx. 2.76 x 1.54 inches) |
| Item Weight | Approx. 0.634 ounces (18 grams) |
| Special Features | DPS function for reception stability |

## 10. Warranty and Support

This product is covered by the standard manufacturer's warranty. For specific warranty details, technical support, or inquiries regarding the PN5180 NFC Module, please contact Rakstore directly through their official support channels or the retailer from whom the product was purchased. Please provide your product model number (PN5180) and purchase information when seeking support.