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PRODUCT DATASHEET

# Notecard Datasheet

## NOTE-LORA v2.1

An affordable, embeddable module for low-power LoRa/LoRaWAN connectivity.

# Blues Notecard® Datasheet: NOTE-LORA v2.1

*An affordable, embeddable module for low-power LoRa/LoRaWAN connectivity.*

**Notecard for LoRa** is a version of the Blues Notecard that allows for connecting to LoRaWAN gateways. The device follows the same M.2 pinout as the cellular and WiFi Notecards. What's more, Notecard for LoRa uses the same powerful JSON-based programming interface, meaning that developers can easily add LoRa as a deployment option for their IoT solutions, with minimal impact to their existing host applications.

## Functional Description

Notecard is an embeddable device-to-cloud data pump designed to remove the complexity and friction inherent in traditional IoT solutions. The Notecard family includes models supporting secure cellular, WiFi, LoRa, or satellite connectivity, enabling rapid development and iteration at a predictable, low cost. With as little as two lines of code on your host MCU, and no external libraries or dependencies, any Notecard model can securely move data from device to cloud.

*Specifically, the Notecard NOTE-LORA v2.1 is:*

- A drop-in embeddable data storage and transport module for [LoRa IoT](#) products, pumping JSON-formatted or binary data ("Notes") bi-directionally between device and cloud:
  - JSON from/to MCU application using I2C, Serial, or USB.
  - JSON to/from your cloud app using HTTPS or MQTT.
  - JSON is auto-tagged with date/time.
- A removable and field-upgradable 30mm x 35mm system-on-a-module (SOM).

## Features

- **Low-power.** Designed to operate on battery power, be "always-on", maintain time & location, while typically drawing less than ~8µA when idle.
- **MCU-agnostic.** Will support any MCU or single-board computer as your app processor - even low-memory, 8-bit microcontrollers.
- **Simple.** Uses a JSON command interface over I2C, UART, or USB. Allows you to connect your 3.3V MCU.
- **Power-conscious.** Mostly-offline data sync mode for low power.

- **Efficient.** Battery-powered LoRa without the complexity of managing connections, queues, or storage.
- **Integrated.** Utilizes an extremely thin cloud infrastructure that directly routes your data to where it belongs: AWS, Azure, GCP, or your own cloud.
- **Built for data.** Data routing and simple "no code/low code" visual data stream analysis through Notehub.io (SaaS), or host and integrate Notehub functionality into your own app (OSS).
- **Embeddable.** Castellated edges enable product builder to embed the Notecard for LoRa directly onto a PCB for volume production.

# Package Configuration

## NOTE-LORA

- Product Name: Notecard for LoRa
- Module: STM32WLE5
- LoRa Frequency: Either 868 MHz (Europe) or 915 MHz (United States). Set by Blues during provisioning.

[View in Store](#) 

## Module Datasheet

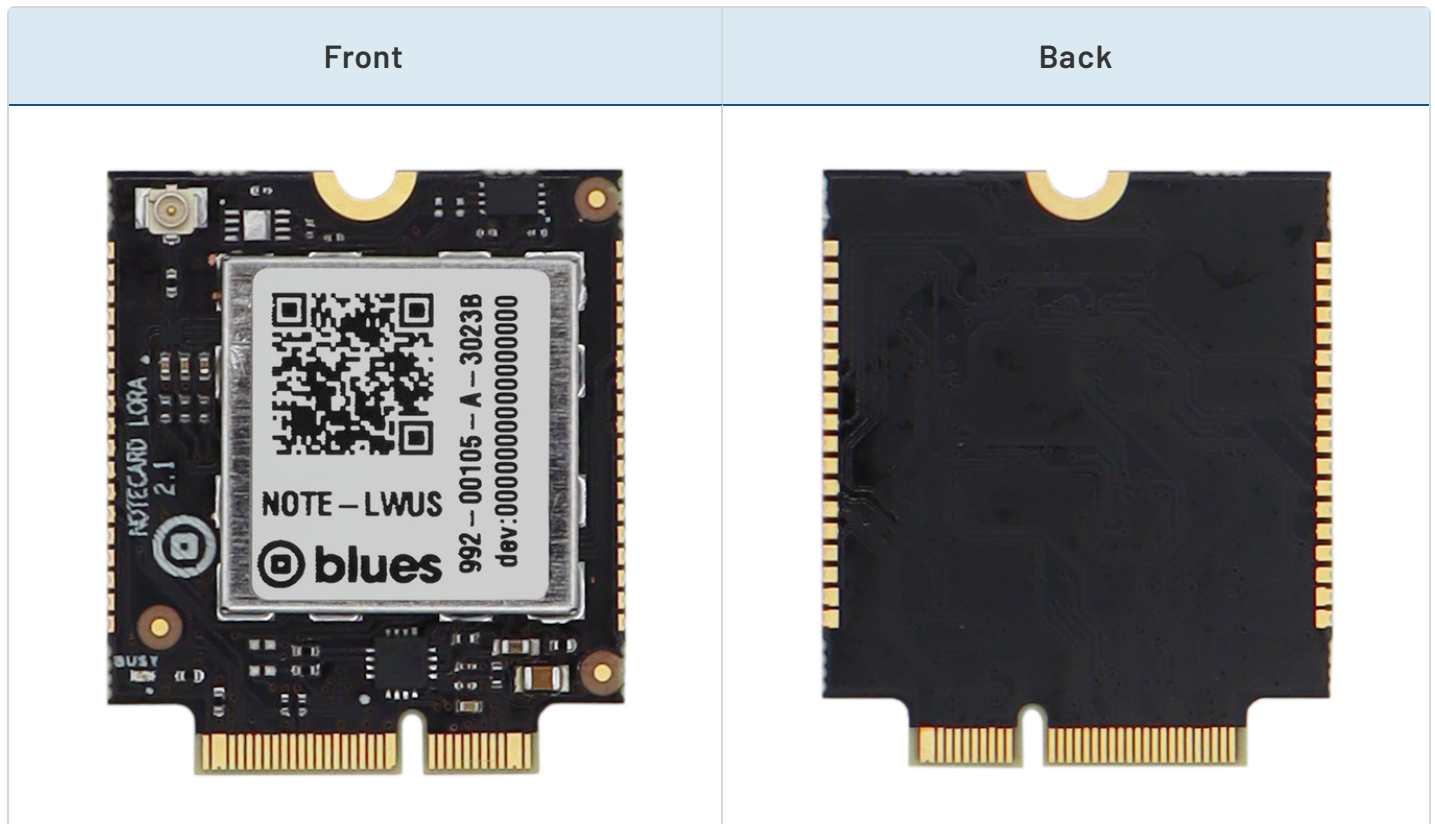
- [STM32WLE5](#) 

## Block Diagram

Notecard for LoRa is packaged using a compact removable form factor, 30mm x 35mm.

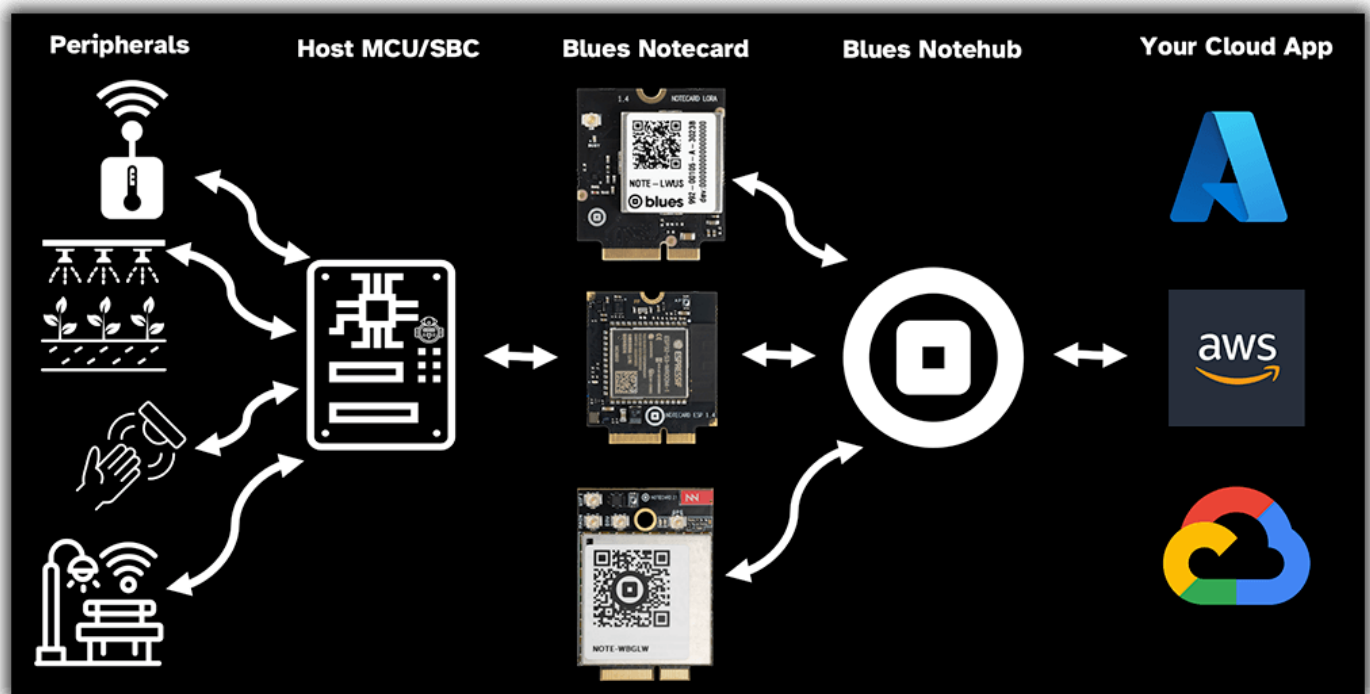
Open hardware schematics for both the Notecard and Notecarrier boards [are available on GitHub](#)<sup>🔗</sup>, making it a straightforward task to embed the Notecard into a broad variety of host device designs.

The Notecard can interface with the host MCU at 3.3v levels.



## Typical Application

As shown below, Notecard is not an application processor and hosts no customer application code. It can be used as a data pump peripheral that is focused on bidirectional, asynchronous, secure data staging and transfer of [JSON Notes](#).



## Key Features

- **Low Power Consumption**

The Notecard has sophisticated power control and makes heavy use of variable clock speeds. This enables the Notecard to have a typical idle current consumption of  $\sim 8\mu\text{A}$ , while still supporting active UART and I2C communication.

# Power Information

Notecard for LoRa is powered by the logic voltage supply ( `VIO_P` ), provided by the Notecarrier or host system; it must be 3.3V. Because this supply powers the STM32WL module and the LoRa radio, it should be designed with a 150mA budget allocated to the Notecard, and PCB traces for `VIO_P` and `GND` should be designed to handle that current.

Unlike cellular and WiFi Notecards, the `VMODEM_P` pins on Notecard for LoRa do not power the radio. `VMODEM_P` is used only to monitor the supply/battery voltage (for example, in response to a `card.voltage` request). It presents a negligible (sub- $\mu$ A) load, and any voltage in the range of 2.5V to 5.5V may be provided.

Notecard for LoRa typically draws  $\sim 8\mu$ A on `VIO_P` when sitting idle waiting for a request from the host MCU, however the Notecard current draw increases when the LoRa radio is active (consult the [STM32WLE5 datasheet](#) for details). The module also draws 10's of mA when the CPU is performing session encryption.

| Pin Name | Direction | Pin Numbers                      | Usage                                                                                             |
|----------|-----------|----------------------------------|---------------------------------------------------------------------------------------------------|
| GND      | --        | 3,5,6,11,18,33,39,45,51,57,71,73 | Ground                                                                                            |
| VIO_P    | IN        | 2,4                              | 3.3V @ 150mA (powers the module and LoRa radio)                                                   |
| VUSB     | IN        | 13                               | <a href="#">USB Serial</a> proxy for "line power", with respect to dynamic line voltage detection |
| VMODEM_P | IN        | 70,72,74                         | 2.5V to 5.5V, battery-voltage monitoring only (negligible draw)                                   |

## Reset and Loss of Power

**Warning**

A power-loss event occurs whenever the Notecard loses power on `VIO_P`, or the Notecard's `NRST` pin is pulled low. (On Notecard for LoRa, `VMODEM_P` is a battery-monitoring input only and does not power the Notecard.)

Upon recovering from any power-loss event, the Notecard initiates a procedure to ensure filesystem integrity. The Notecard also conducts a procedure upon first connection to Notehub after power loss to ensure consistency between Notecard's file system and Notehub's replica copy of those files. This verification procedure is done to protect and ensure the integrity of your product, and you should expect additional use of network bandwidth when these rare events occur.

It is the responsibility of every product designer to ensure that designs utilizing Notecard provide constant power to `VIO_P`, at the cost of as little as 8  $\mu\text{A}$ , so as to ensure that power-loss events do not occur as a matter of course from the perspective of the Notecard.

If repeated power failures are expected and unavoidable in a product's use, designs must incorporate a small battery or lithium ion capacitor to provide backup power, and the Notecard firmware should be configured to enter a quiescent state when operating on its backup supply.

Frequent power-loss events will result in the voiding of the Notecard warranty. In addition, since repeated Notecard resets can be indistinguishable from "denial of service" attacks on the Notehub, Blues also reserves the right to deny access to devices that exhibit such behavior.

# Antenna Requirements

Notecard for LoRa requires usage of an external antenna attached to its u.FL connector. The external antenna must support a frequency band appropriate for the region-specific LoRa frequency in use.

# Cellular Service

*This section does not apply to Notecard for LoRa.*

# Pin Information

## Pin Definitions

| Pin Name | Pin Description                                                           |
|----------|---------------------------------------------------------------------------|
| ATTN_P   | Attention pin (requires protection)                                       |
| AUX_RX   | Auxiliary UART receive (requires protection)                              |
| AUX_TX   | Auxiliary UART transmit (requires protection)                             |
| AUX1     | Auxiliary GPIO pin 1                                                      |
| AUX2     | Auxiliary GPIO pin 2                                                      |
| AUX3     | Auxiliary GPIO pin 3                                                      |
| AUX4     | Auxiliary GPIO pin 4                                                      |
| BOOT     | Test/debug pin used to force Notecard into its <a href="#">bootloader</a> |
| GND      | Ground                                                                    |
| NC       | No connection (must be left open)                                         |
| NRST     | Active-low (not) reset*                                                   |
| RSVD     | Reserved for internal use (electrically connected and must be left open)  |
| RX_P     | UART receive (requires protection)                                        |
| SCL_P    | I2C clock (requires protection)                                           |
| SDA_P    | I2C data (requires protection)                                            |

| Pin Name | Pin Description                          |
|----------|------------------------------------------|
| TX_P     | UART transmit (requires protection)      |
| USB_DN   | USB data negative                        |
| USB_DP   | USB data positive                        |
| VIO_P    | I/O Voltage (requires protection)*       |
| VMODEM_P | Voltage supply/battery monitoring input* |
| VUSB     | USB Active indicator from 3V3 to 5V      |

\* See the [power information](#) section for important product design considerations related to reset and loss of power conditions.

## Pin Description

### Notecard M.2 Key E, Edge Connector Pinout

| Pin # | Pin Name | Func. Interface | Func. Interface | Pin Name | Pin # |
|-------|----------|-----------------|-----------------|----------|-------|
| 1     | NC       |                 | Power           | VIO_P    | 2     |
| 3     | GND      | Power           | Power           | VIO_P    | 4     |
| 5     | GND      | Power           | Power           | GND      | 6     |
| 7     | USB_DP   | USB Serial      |                 | NC       | 8     |
| 9     | USB_DN   | USB Serial      |                 | NC       | 10    |
| 11    | GND      | Power           |                 | NC       | 12    |

| Pin # | Pin Name | Func. Interface | Func. Interface | Pin Name | Pin # |
|-------|----------|-----------------|-----------------|----------|-------|
| 13    | VUSB     | USB Serial      |                 | NC       | 14    |
| 15    | NC       |                 |                 | NC       | 16    |
| 17    | NC       |                 | Power           | GND      | 18    |
| 19    | NC       |                 |                 | NC       | 20    |
| 21    | NC       |                 |                 | NC       | 22    |
| 23    | NC       |                 |                 | NC       | 24    |
| 25    | NC       |                 |                 | NC       | 26    |
| 27    | NC       |                 |                 | NC       | 28    |
| 29    | NC       |                 |                 | NC       | 30    |
| 31    | NC       |                 |                 | NC       | 32    |
| 33    | GND      | Power           |                 | NC       | 34    |
| 35    | NC       |                 |                 | NC       | 36    |
| 37    | NC       |                 |                 | NC       | 38    |
| 39    | GND      | Power           | I2C Serial      | SCL_P    | 40    |
| 41    | NC       |                 | I2C Serial      | SDA_P    | 42    |
| 43    | NC       |                 |                 | NC       | 44    |
| 45    | GND      | Power           | Auxiliary Ports | AUX1     | 46    |

| Pin # | Pin Name | Func. Interface | Func. Interface | Pin Name | Pin # |
|-------|----------|-----------------|-----------------|----------|-------|
| 47    | NC       |                 | Auxiliary Ports | AUX2     | 48    |
| 49    | NC       |                 | Auxiliary Ports | AUX3     | 50    |
| 51    | GND      | Power           | Auxiliary Ports | AUX4     | 52    |
| 53    | RSVD     |                 | Attention       | ATTN_P   | 54    |
| 55    | RSVD     |                 |                 | NC       | 56    |
| 57    | GND      | Power           | Auxiliary Ports | AUX_RX   | 58    |
| 59    | NC       |                 | Auxiliary Ports | AUX_TX   | 60    |
| 61    | NC       |                 | UART Serial     | RX_P     | 62    |
| 63    | RSVD     |                 | UART Serial     | TX_P     | 64    |
| 65    | BOOT     | Bootloader      |                 | NC       | 66    |
| 67    | NRST     | Reset           |                 | NC       | 68    |
| 69    | NC       |                 | Power           | VMODEM_P | 70    |
| 71    | GND      | Power           | Power           | VMODEM_P | 72    |
| 73    | GND      | Power           | Power           | VMODEM_P | 74    |
| 75    | NC       |                 |                 |          |       |

# Notecard for LoRa v2.1Castellated Edge Pinout

| Pin # | Pin Name | Func. Interface | Func. Interface | Pin Name | Pin # |
|-------|----------|-----------------|-----------------|----------|-------|
| 1     | NC       |                 |                 | NC       | 19    |
| 2     | AUX_TX   | Auxiliary Ports |                 | NC       | 20    |
| 3     | AUX_RX   | Auxiliary Ports |                 | NC       | 21    |
| 4     | NC       |                 |                 | NC       | 22    |
| 5     | AUX1     | Auxiliary Ports |                 | NC       | 23    |
| 6     | AUX2     | Auxiliary Ports | I2C Serial      | SCL      | 24    |
| 7     | AUX3     | Auxiliary Ports | I2C Serial      | SDA      | 25    |
| 8     | AUX4     | Auxiliary Ports |                 | NC       | 26    |
| 9     | RX       | UART Serial     | Attention       | ATTN     | 27    |
| 10    | TX       | UART Serial     |                 | NC       | 28    |
| 11    | SWDIO    |                 |                 | NC       | 29    |
| 12    | SWCLK    |                 | USB Serial      | VUSB     | 30    |
| 13    | LED_BUSY |                 | USB Serial      | USB_DP   | 31    |
| 14    | NRST     | Reset           | USB Serial      | USB_DN   | 32    |
| 15    | VIN      | Power           | Power           | VIO      | 33    |
| 16    | VIN      | Power           | Power           | VIO      | 34    |

| Pin # | Pin Name | Func. Interface | Func. Interface | Pin Name | Pin # |
|-------|----------|-----------------|-----------------|----------|-------|
| 17    | GND      | Power           | Power           | GND      | 35    |
| 18    | GND      | Power           | Power           | GND      | 36    |

Link: [Digi-Key part number of the connector](#) - Both Digi-Key and Mouser have pictures for this part number that show a component with a different key, but both have links to datasheet/drawing/CAD models.

## Note

All pins whose **Functional Interface** is marked "Power" must be connected.

All pins named **NC** have no connection on the Notecard and must be left open.

All pins named **RSVD** are reserved for internal use. These pins are electrically connected on the Notecard and MUST be left open. Furthermore, any pin not used in a design MUST also be left open.

**BOOT** (pin 65) is a test/debug pin, not a functional interface. It is not required for normal operation and should be left open, but routing it to a test point on your carrier board makes it possible to recover a Notecard whose firmware update was interrupted. See [Bootloader](#) for details.

Those pins ending with **\_P** may be optionally protected from anomalous external conditions on some Notecarrier designs, depending upon use-case specific requirements.

# Technical Details

## Host Microcontroller API

Notecard supports a rich, simple API whose syntax is standard JSON. The developer can communicate requests to Notecard, generally by using little more than `printf` functions available in most programming languages.

## Serial Communication

JSON requests and responses (the Notecard's Application Programming Interface "API") may be sent over any of the following interfaces:

- USB Serial Interface
- UART Serial Interface
- I2C Interface

## API Reference

For API usage, names, and parameters, please refer to the [Notecard API Reference](#).

## USB Serial Interface

The USB Serial Interface appears to the host as a USB 2.0 Full Speed CDC device. You can access it from Linux, Windows, or macOS without a device driver using terminal emulation software. Newline-delimited JSON requests may be sent directly as UTF-8 text over this port, or you may use the open-source Blues libraries for C, Python, Go, and Arduino.

| Pin Name | Direction | Pin Number | Usage              |
|----------|-----------|------------|--------------------|
| USB_DN   | I/O       | 9          | USB D- data signal |
| USB_DP   | I/O       | 7          | USB D+ data signal |
| VUSB     | IN        | 13         | +5V from USB       |

| Pin Name | Direction | Pin Number | Usage           |
|----------|-----------|------------|-----------------|
| GND      | I/O       | 11         | Ground from USB |

## UART Serial Interface

The UART Serial Interface operates at `VIO_P` at a fixed baud rate of 9600 using eight data bits, no parity bit, and one stop bit. Newline-delimited JSON requests may be sent directly as UTF-8 text over this port, or you may use the open-source Blues libraries for C, Python, Go, and Arduino.

| Pin Name | Direction | Pin Number | Usage                |
|----------|-----------|------------|----------------------|
| RX_P     | IN        | 62         | Receive data signal  |
| TX_P     | OUT       | 64         | Transmit data signal |

## I2C Interface

The Notecard acts as an I2C secondary device operating at `VIO_P`, and it implements a simple [Serial-over-I2C protocol](#). You can access it from an embedded host using open-source Blues libraries for C, Python, Go, and Arduino.

| Pin Name | Direction | Pin Number | Usage     |
|----------|-----------|------------|-----------|
| SCL_P    | IN        | 40         | I2C clock |
| SDA_P    | I/O       | 42         | I2C data  |

## Host Microcontroller Hardware Interface

### Attention Interrupt

Using software, you can optionally configure Notecard to use the `ATTN` output pin to:

- Inform the host MCU of certain asynchronous events (such as incoming data availability) in an interrupt-driven manner rather than just polling.
- Place the host MCU into a power-off sleep state and wake it back up again.

| Pin Name | Direction | Pin Number | Usage         |
|----------|-----------|------------|---------------|
| ATTN_P   | OUT       | 54         | Attention pin |

**Note**

This pin operates at `VIO_P`. If it is unused it can be left disconnected.

**Auxiliary Ports**

The AUX1-4 pins operate at `VIO_P` and can be configured in software to operate in several optional modes such as GPS Tracking Mode, GPIO Mode, and Internet Button Mode. If these pins are unused, they can be left disconnected.

| Pin Name | Direction | Pin Number | Usage                   |
|----------|-----------|------------|-------------------------|
| AUX_RX   | IN        | 58         | Auxiliary UART receive  |
| AUX_TX   | OUT       | 60         | Auxiliary UART transmit |
| AUX1     | I/O       | 46         | General Purpose IO      |
| AUX2     | I/O       | 48         | General Purpose IO      |
| AUX3     | I/O       | 50         | General Purpose IO      |
| AUX4     | I/O       | 52         | General Purpose IO      |

## Reset

Use of this pin is optional. If the host system has a global reset line, caution should be used when connecting this pin to the host system's reset because the Notecard may independently pull the line low in software. Restrictions on this pin are:

- If this pin is not used, it must remain not connected( **NC** ).
- The pin is active-low. It must be held low for at least 350nS for a clean reset.
- This pin must never be pulled-up. A pull-up would interfere with the Notecard's own internal watchdog timer and thus will prevent reliable operations.
- Some Notecarriers may invert this signal to be active-high.

| Pin Name | Direction | Pin Number | Usage            |
|----------|-----------|------------|------------------|
| NRST     | I/O       | 67         | Active-low reset |

## Bootloader

**BOOT** (pin 65) is a test/debug pin that forces Notecard into its bootloader instead of running its firmware. Its primary use is recovering a Notecard whose firmware update was interrupted, leaving it unable to boot normally. This pin plays no part in normal operation and use of it is optional.

To enter the bootloader, hold **BOOT** at **VIO\_P** while resetting the Notecard, then release **NRST** (pin 67) before releasing **BOOT**. Notecard will stay in its bootloader, ready to accept firmware over the [USB serial interface](#).

Restrictions on this pin are:

- If this pin is not used, it must remain not connected( **NC** ).
- Never apply a voltage above **VIO\_P** to this pin.
- Never hold this pin **HIGH** in normal operation, or Notecard will enter its bootloader on every reset rather than running its firmware.

| Pin Name | Direction | Pin Number | Usage                                       |
|----------|-----------|------------|---------------------------------------------|
| BOOT     | IN        | 65         | Force Notecard into its bootloader on reset |

## Tip

For the step-by-step procedure on using a Notecarrier to recover a Notecard, see [Recovering a Bricked Notecard](#).

## Network Communication Behavior

The Notecard includes a built-in connection to Notehub.io and communicates through any available (and in-range) LoRaWAN gateway and LoRaWAN Network Server (LNS) with a secure connection to Notehub.io. Outbound connections communicate with Notehub via the LNS for provisioning and device authentication. By default, the connection is unidirectional, but can operate bi-directionally, if needed.

# Specifications

## General Characteristics

| Description | Value       |
|-------------|-------------|
| Dimensions  | 30mm x 35mm |
| Weight      | 3 grams     |

## Electrical Characteristics

### Absolute Maximum Ratings

| Description                   | Minimum | Maximum | Unit |
|-------------------------------|---------|---------|------|
| Storage temperature           | -40     | 90      | °C   |
| Ambient operating temperature | -40     | 85      | °C   |

## DC Characteristics

| Description               | Minimum | Typical | Maximum | Unit |
|---------------------------|---------|---------|---------|------|
| VIO Supply Voltage        |         | 3.3     |         | V    |
| VIO Operating Current     |         |         | 150     | mA   |
| VMODEM Monitoring Voltage | 2.5     |         | 5.5     | V    |

# Ordering Information

[Blues Shop](#)

# Certifications

## CE

*For the EU variant of Notecard for LoRa.*

[CE certification](#) indicates that a product complies with the essential requirements of relevant European health, safety, and environmental protection legislation. It is a mandatory conformity mark for products sold within the European Economic Area (EEA).

| Certification                                   | Date        |
|-------------------------------------------------|-------------|
| <a href="#">EN 301 489-1 V2.2.3</a>             | August 2024 |
| <a href="#">EN 301 489-3 V2.3.2</a>             | August 2024 |
| <a href="#">EN 55032:2015+A11:2020, Class B</a> | August 2024 |
| <a href="#">EN 55035:2017+A11:2020</a>          | August 2024 |
| <a href="#">EN IEC 62311:2020</a>               | August 2024 |
| <a href="#">EN 300 220-1 V3.1.1</a>             | August 2024 |
| <a href="#">EN 300 220-2 V3.2.1</a>             | August 2024 |

## FCC

*For the US variant of Notecard for LoRa.*

[FCC certification](#) indicates that a product complies with the regulations set forth by the Federal Communications Commission (FCC) in the United States. This certification ensures that electronic devices do not emit electromagnetic interference that could disrupt other electronic devices and communication systems.

| Certification                                  | Date        |
|------------------------------------------------|-------------|
| 47 CFR FCC Part 15, Subpart B, Class B         | August 2024 |
| 47 CFR Part 2, Section 2.1091                  | August 2024 |
| 47 CFR FCC Part 15, Subpart C (Section 15.249) | August 2024 |

## ISED

*For the US variant of Notecard for LoRa.*

ISED/ISED certification is issued by Innovation, Science and Economic Development Canada (ISED), formerly known as Industry Canada (IC). This certification ensures that electronic devices comply with Canadian regulations regarding radio frequency (RF) emissions and electromagnetic interference (EMI).

| Certification                 | Date         |
|-------------------------------|--------------|
| RSS-210 Issue 10              | October 2024 |
| RSS-Gen Issue 5 + Amendment 2 | October 2024 |
| RSS-102 Issue 5 + Amendment 1 | October 2024 |

# Board Errata

# Terms and Conditions

Visit [Blues Hardware Terms & Conditions](#) 

# Security and Vulnerability Scanning

As a part of our regular audit and scanning process, Blues Inc. performs full vulnerability scanning every six months. Any identified vulnerabilities will be analyzed, reported, and patched in a timely fashion, where appropriate.

# Revision History

| Author            | Date        | Summary                                        |
|-------------------|-------------|------------------------------------------------|
| Ray Ozzie         | 2019-2020   | Document drafted                               |
| John Wiedey       | 2020        | Various improvements                           |
| Sean Taylor       | 2020        | Various improvements                           |
| Zachary J. Fields | 11 SEP 2020 | Updated information and translated to markdown |
| Brandon Satrom    | 13 APR 2021 | Updated Country list based on carrier audit    |
| Carlton Henderson | 12 JUL 2021 | Update coverage information                    |
| Carlton Henderson | 12 JUL 2021 | Fix block diagram photo                        |
| Brandon Satrom    | 11 NOV 2021 | Added Certification Dates                      |
| Brandon Satrom    | 07 JAN 2022 | Added RoHS Certification Dates                 |
| Brandon Satrom    | 15 FEB 2022 | Add WiFi Notecard Datasheet                    |
| Rob Lauer         | 25 AUG 2022 | Added updated certification data               |
| Rob Lauer         | 27 OCT 2022 | Update country coverage information            |

| Author          | Date        | Summary                                                                                |
|-----------------|-------------|----------------------------------------------------------------------------------------|
| Rob Lauer       | 13 JAN 2023 | Added RF performance information                                                       |
| Rob Lauer       | 2 FEB 2023  | Warning re: STM32 light sensitivity                                                    |
| Kimball Johnson | 21 SEP 2023 | Updated for new Cell+WiFi, LoRa, and WiFi Notecards                                    |
| Rob Lauer       | 23 OCT 2023 | Update and clarify power consumption values                                            |
| Rob Lauer       | 31 JAN 2024 | Update Notecard for LoRa datasheet details                                             |
| Rob Lauer       | 16 APR 2024 | Updated for new Cellular (black PCB) Notecards, MB Cellular Notecards, and Notecard XP |
| Rob Lauer       | 6 JUN 2024  | Added cell band support for Cellular Notecards                                         |
| Rob Lauer       | 23 JUL 2024 | Update pin definitions                                                                 |
| TJ VanToll      | 24 SEP 2024 | Adding Notecard for LoRa v2.1 information                                              |
| Rob Lauer       | 01 NOV 2024 | Adding Notecard for LoRa v2.1 castellated pin info                                     |
| Rob Lauer       | 06 NOV 2024 | Added errata for Notecard Cell+WiFi                                                    |
| Brandon Satrom  | 06 DEC 2024 | Expanded reset and loss of power guidance                                              |

| Author     | Date        | Summary                                                |
|------------|-------------|--------------------------------------------------------|
| Rob Lauer  | 20 DEC 2024 | Added PTCRB certifications for WBNAN, NBNAN, NBGLN     |
| Rob Lauer  | 5 MAR 2025  | Update AUX5 to AUX_CHARGING                            |
| Rob Lauer  | 22 MAY 2025 | Fix labelling of NC pins                               |
| Rob Lauer  | 13 JUN 2025 | Update certifications                                  |
| Rob Lauer  | 21 JUL 2025 | Update certifications for WBNAN, NBNAN, NBGLN          |
| Rob Lauer  | 28 JUL 2025 | Update certifications for all Notecard SKUs            |
| Rob Lauer  | 17 NOV 2025 | Add FCC and IC IDs for all Notecard Cellular SKUs      |
| TJ VanToll | 21 JAN 2026 | Added Notecard for Skylo                               |
| Rob Lauer  | 23 JUL 2026 | Accuracy review vs. hardware design files              |
| Rob Lauer  | 03 AUG 2026 | Document the <b>BOOT</b> pin (65) on all Notecard SKUs |

# Contact Information

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