nice!nano

The nice!nano is a Pro Micro replacement development board offering BLE using the nRF52840 chip. It has the same pinout as the Pro Micro meaning it will work with almost any Pro Micro keyboard. The nice!nano also has a 3.7V lithium battery charger on board as well as a software level switch to cut off power to LEDs, which can eat 1mA each even when off!

Check out **FAQs** if you have more questions. To get your nice!nano up and running check out **Getting Started**.

If you're a hardware designer interested to learn more about the pinout and schematic check out the **Pinout and Schematic**.

Recommended batteries and sockets

To run your nice!nano wirelessly, you need a battery. In specific, you need a 3.7v rechargeable lithium battery that is at least 100mAh large (you can probably get away with 80mAh). Note when choosing a battery, the recharge rate is 100mA, so a 2,000mAh battery will take 20 hours to charge. **The overall recommended battery for most low power (no LEDs or extra power sinks) is the 301230 battery**. This battery is 3mm thick and fits underneath a socketed nice!nano very nicely. These can be found on some vendors' stores as well as on AliExpress.

It's also highly recommended that you socket your nice!nano. It offers ease of access to the battery and makes debugging your keyboard so much easier. In short, it's a small investment to save you lots of time and possibly money in the future. **Standard female machine pin sockets are recommended to go along with the 301230 battery**. In most cases the battery should fit underneath the socketed nice!nano. Be weary o flipped nice!nanos *with* pins and other parts underneath (you don't want to puncture your battery!). You can find these on AliExpress all over the place.

Bootloader

The nice!nano uses the Adafruit nRF52 Bootloader. Currently it doesn't have a release of the nice!nano bootloader yet, so please use this one I've generated and put on every nice!nano thus far. Click here to download.

Specifications

- Mid mount USB-C port making the board a 3.2mm total thickness (thinner than a Pro Micro)
- nRF52840 chip on board with 1MB of Flash and 256KB of RAM
- Adafruit Bootloader loaded offering DFU flashing as well as flashing via UF2 storage (similar to dragging a file to a flash drive!)

- Programmable indicator (blue) LED as well as a charging indicator (orange) LED
- Battery voltage reader to report battery percentage to main device
- External power can be cut off using an on board MOSFET saving power from LEDs (each can draw 1mA when off!)
- 5 extra GPIO pins (3 thru holes and 2 pads on the back) offering a total of 23 GPIO pins
- 3.3V out of the VCC pin to power external features
- 32.768 kHz oscillator on board for real-time clock capabilities
- Clean design with matte black solder mask, immersion gold plating, and Tg 170 FR4 for durability (picture coming soon)
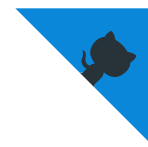
Getting Started

This document will guide you through installing your nice!nano and flashing. After following this document, you can move on to the Wireless Firmware page to pick out your software.

Before you start

Before you install your nice!nano please note these tips/warnings:

- Do not install sockets or post headers to the B+ or B- pins (top pin on each side)
  - If you need to use these pins with your PCB, RAW and GND are the respective equivalents to B+ and B-
- The square post headers that come with the nice!nano cannot be used with the machine sockets
  - Use Mill-Max pin legs or diode legs and folow the directions in installing your nice!nano
- Only use 3.7V rechargeable lithium batteries with the nice!nano. Connecting non-rechargeable batteries is unsafe
- If you choose to solder your battery, use the B+ and B- pins. B+ is for the positive, red wire, and the B- pin is for the negative, black wire. Minimize how long you are holding the soldering iron to the battery. High amounts of heat are dangerous to connect the battery to.
- If you are using a JST connector on the PCB to connect the battery, double or even quadruple check the polarity of the JST connector before plugging it in. Some batteries come with positive on the first pin and some come with negative on the first pin.

Installing your nice!nano

Installing your nice!nano is almost the same as any other Pro Micro like board. The only difference is related to ignore the B+ and B- pins when adding sockets or headers and the battery. It's highly recommended to get your firmware on and functioning before adding the battery.

If you aren't socketing, you probably want to get the firmware up and running before you even attach the square post headers. You'll want to install the firmware, confirm everything is working, and install your square post headers and battery.

If you are socketing, you can socket your nice!nano, install the firmware, confirm everything is working, and finally add the battery.

Socketing the nice!nano

Socketing the nice!nano is *extremely* recommended. It offers ease of access to the battery, helps you if you need to debug your keyboard, and lets you move the board to another keyboard if ever needed.

For a great guide with pictures check out 40percentclub's guide.

Socketing steps:

1. First install the socket into the PCB trying to keep it as straight as possible.
2. Once the sockets are in, place tape over the top of each side.
3. Poke holes where each socket hole is into the tape
4. Place down the nice!nano (to assure alignment, make sure the B+ and B- pins are not being put into the socket)
5. Put MillMax pin legs (or diode legs) into each hole and push all the way down
6. Solder the legs to the nice!nano (this is where the tape helps, solder wont seep down into the socket and fuse the socket and legs)
7. Take the nice!nano out by using a pry tool of some sort. Slowly pry back and forth on all sides.
8. Take away the tape and put the nice!nano back in.
9. Done!

# Flashing, Firmware, and Bootloaders

One of the great things about the nice!nano is how easy it is to flash the device. To jump into the bootloader all you need to do is double tap reset. You can do this by either double tapping your reset button on your keyboard, or you can double tap RST and GND pins on the nice!nano quickly with tweezers.

Once you are into the bootloader, connect your nice!nano via USB to your computer if you haven't already. Your nice!nano should now show up in your OS as a USB storage device named "NICENANO".

Flashing is now as easy as copying a .uf2 firmware file to the storage device. You can do this by copying in the terminal, dragging and dropping it in your file explorer, or however else you copy files to a storage device in your OS.

Now you may be wondering how to get one of these mystical .uf2 files. You get them by building one of the firmwares available. Checkout the Wireless Firmware page to get information on how to configure and build a few different types of firmwares along with some recommendations.

The bootloader the nice!nano uses is the Adafruit nRF52 Bootloader. You can read more about its features, updating the bootloader, and using DFU to flash firmware on its GitHub.

Home   nice!nano   Wireless Firmware
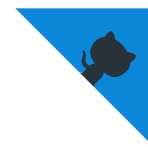
Pinout
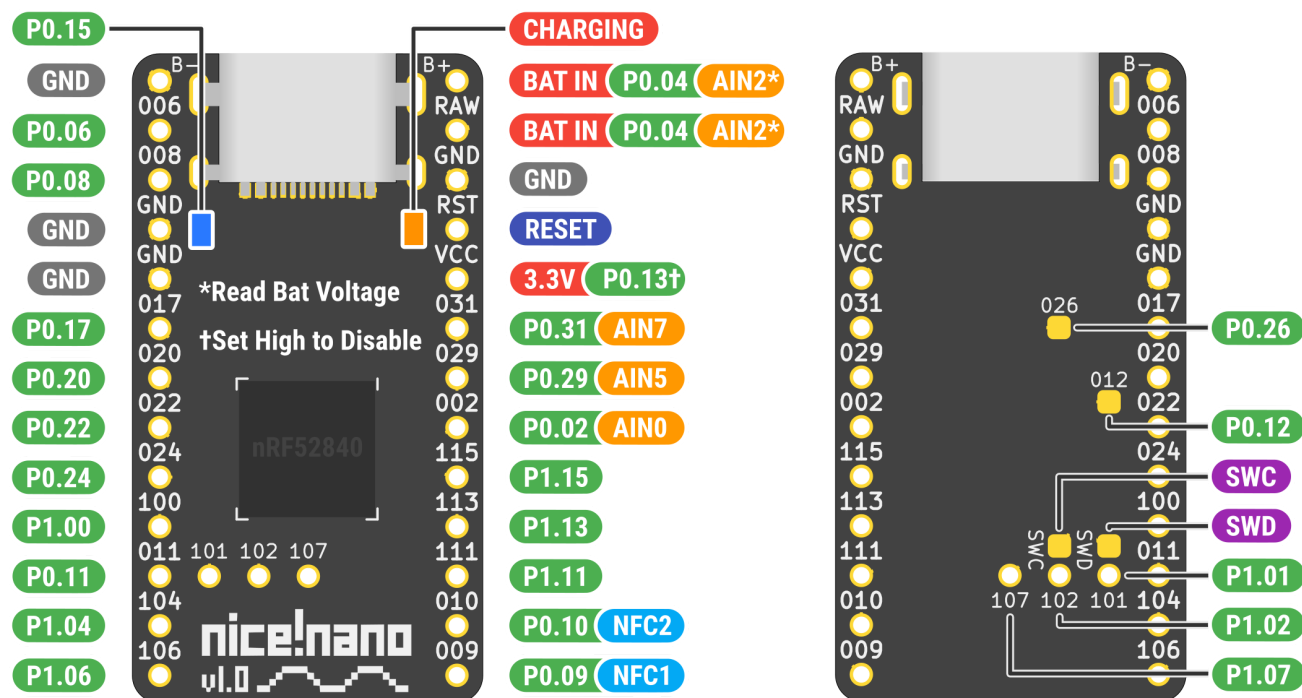
To further clarify:

- P0.04 (AIN2) is used to read the voltage of the battery via ADC. It can't be used for any other function.
- P0.13 on VCC shuts off the power to VCC when you set it to high
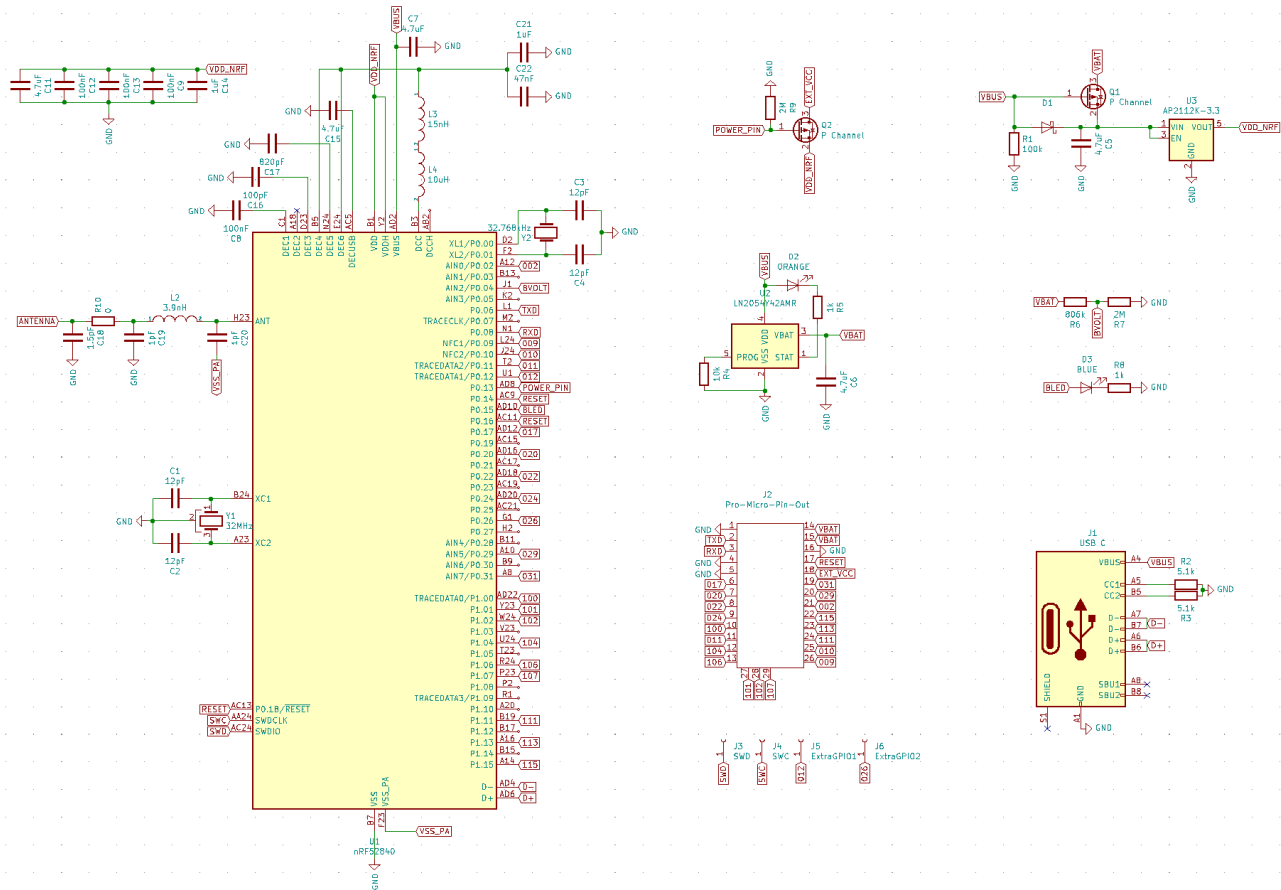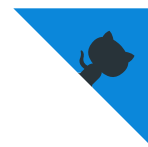 - This saves on battery immensely for LEDs of all kinds that eat power even when off

Schematic

VBUS
C7 4.7uF
GND
C21 1uF
GND
VDD_NRF
C11 4.7uF
C12 100nF
C13 100nF
C9 100nF
C14 1uF
VDD_NRF
GND
VDD_NRF
C22 47nF
GND

EXT_VCC
GND
POWER_PIN
R9 2M
Q2 P Channel
VDD_NRF

VBAT
VBUS
D1
Q1 P Channel
U3 AP2112K-3.3
R1 100k
C5 4.7uF
VIN VOUT
EN
GND
VDD_NRF
GND
GND
GND

GND
C15 4.7u
GND
C17 820pF
GND
C16 100pF
C8 100nF
L3 15nH
L4 10uH
C3 12pF
GND
C4 12pF
Y2 32.768kHz

D2 ORANGE
VBUS
U2 LN2054Y42AMR
R5 1k
PROG VDD VSS VBAT STAT
VBAT
R3 10k
C6 4.7uF
GND
GND

VBAT
R6 806k
R7 2M
GND
BVOLT
D3 BLUE
R8 1k
BLED
GND

ANTENNA
R10 0
L2 3.9nH
H23 ANT
C18 1.5pF
C19 1pF
C20 1pF
GND GND VSS_PA

XL1/P0.00 D2
XL2/P0.01 F2
AIND/P0.02 A12 O02
AIN1/P0.03 B13
AIN2/P0.04 J1 BVOLT
AIN3/P0.05 K2 TXD
P0.06 L4
TRACECLK/P0.07 M2 RXD
P0.08 N1 O09
NFC1/P0.09 L24 O10
NFC2/P0.10 J24 O11
TRACEDATA2/P0.11 T2 O12
TRACEDATA1/P0.12 U1 POWER_PIN
P0.13 AD8 BLED
P0.14 AC9 RESET
P0.15 AD10 RESET
P0.16 AC11 O17
P0.17 AD12 AC13
P0.19 AD16 O20
P0.20 AC17 O22
P0.21 AD18 AC19
P0.22 AD20 O24
P0.23 AC21
P0.24 AC21
P0.25 G1 O26
P0.26 H2
P0.27 B11
AIN4/P0.28 A10 O29
AIN5/P0.29 B9
AIN6/P0.30 A8 O31
AIN7/P0.31

C1 12pF
B24 XC1
Y1 32MHz
A23 XC2
C2 12pF
GND

TRACEDATA0/P1.00 AD22 IO0
P1.01 Y23 IO1
P1.02 W24 IO2
P1.03 V23
P1.04 U24 IO4
P1.05 T22
P1.06 R24 IO6
P1.07 P23 IO7
P1.08 R1
TRACEDATA3/P1.09
P1.10 A20
P1.11 B19 I11
P1.12 B17
P1.13 A16 I13
P1.14 B16
P1.15 A14 I15

RESET AC13
SWC AA24
SWD AC24
P0.18/RESET
SWDCLK
SWDIO

VSS VSS_PA
B7 F24
VSS_PA
U1 nRF52840
GND

AD4 D-
AD6 D+

J2 Pro-Micro-Pin-Out
GND VBAT
TXD VBAT
RXD GND
GND RESET
GND EXT_VCC
IO17 O31
O20 O29
O22 O02
O24 I15
IO0 I13
IO1 I11
IO4 O10
IO6 O09
IO7

J1 USB_C
VBUS VBUS R2 5.1k
CC1 GND
CC2 B5 R3 5.1k
D- D-
D+ D+
SBU1
SBU2
SHIELD
GND

J3 SWD
J4 SWC
J5 ExtraGPIO1
J6 ExtraGPIO2

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FAQ

Will the nice!nano work on x keyboard?

Probably. Almost every Pro Micro based keyboard should work with the nice!nano. Limitations would be around height of the board (fitting a battery underneath will make the entire module + battery 6mm tall when hotswapped for example) and running at 3.3V rather than 5V, which shouldn't be much of an issue. Tested on the Lily58, Semaphore, and Kyria so far.

> The nice!nano will *NOT* work with the Gherkin unless you don't connect the RAW pin to the board.

How is the nice!nano powered/how do the split boards power each other?

They don't charge each other, each has an individual Li-Po battery connected to it via 2 extra pins at the top of the board (called B+ and B-).

How do you charge the nice!nano?

The nice!nano has a Li-Po charger built in that uses the USB-C port to charge the Li-Po at a rate of 100mA.

How long does the nice!nano last on battery?

This is highly dependent on the battery size and features of the keyboard. With no extra OLEDs or LEDs, my Lily58 lasts a couple weeks on a 110mAh battery. It charges back up in an hour and can be used while charging.

Does the nice!nano work over USB?

Yes, but not every firmware supports it.

QMK firmware support?

This is complicated. Nordic's nRF52 line has some licensing issues with its SDK making it not possible to be upstreamed to the main QMK repo. There are some QMK forks such as sekigon's, but the legality is questionable at best. At the same time the BlueMicro firmware (https://github.com/jpconstantineau/BlueMicro_BLE) is available and promising in my opinion. Take a look and contribute! It works with the nice!nano.

Can I get more information on nRF52840 hardware?

Joric's nRFmicro wiki is an amazing resource to get some basic and advanced information on the nRF52 line in terms of keyboards: https://github.com/joric/nrfmicro/wiki

How is this different from the nRFMicro or BlueMicro?

The nRFmicro is extremely similar to the nice!nano. The main difference is depending on the version of the nRFMicro, the power system would be slightly different from the nice!nano. From a usability standpoint, very little is different. The nice!nano exposes more pins and is thinner than older versions of the nRFMicro. The biggest difference is that the nice!nano is assembly ready, so they can be mass produced more easily than the nRFMicro (hence the GB). The BlueMicro is basically the same story except for the nRF52832 versions don't support USB.

Do you still need a TRRS jack?

No, there's a connection via BLE between the two boards. The master reports back the keystrokes of both sides.