

Seeed Studio XIAO nRF54L15 Manual

1. Overview

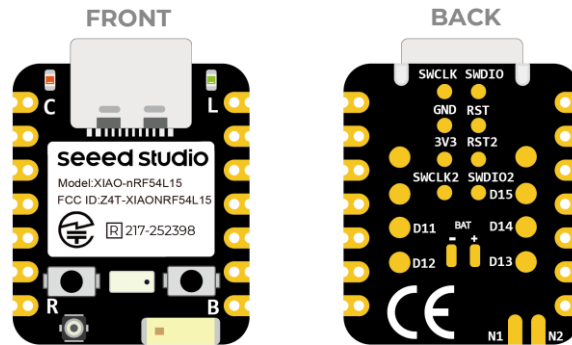


Figure 1-1. Seeed Studio XIAO nRF54L15 Sense

Seeed Studio XIAO nRF54L15 is a compact, high-performance development board featuring the cutting-edge Nordic nRF54L15 chip. This next-generation SoC integrates an ultra-low power 2.4 GHz radio and an MCU with a 128 MHz Arm® Cortex®-M33 processor and an Arm® Cortex®-M0+ for advanced power management. It offers scalable memory up to 1.5 MB NVM and 256 KB RAM.

Designed for exceptional ultra-low power consumption, it significantly extends battery life. Its robust radio supports Bluetooth® Low Energy. The board includes a comprehensive set of peripherals, an integrated 128 MHz RISC-V coprocessor, and advanced security features like TrustZone® isolation and cryptographic engine protection. With built-in lithium battery management, XIAO nRF54L15 is ideal for compact, secure, and energy-efficient IoT solutions such as smart wearables, industrial sensors, and advanced human-machine interfaces.

2. Hardware

- 128 MHz Arm® Cortex®-M33 processor
- Scalable memory configurations up to 1.5 MB NVM and up to 256 KB RAM
- 2.4 GHz radio supporting Bluetooth Low Energy
- Comprehensive set of peripherals including new Global RTC available in System OFF, 14-bit ADC, and high-speed serial interfaces
- 128 MHz RISC-V coprocessor
- Advanced security including TrustZone® isolation, tamper detection, and cryptographic engine side-channel leakage protection

3. Pin Definition

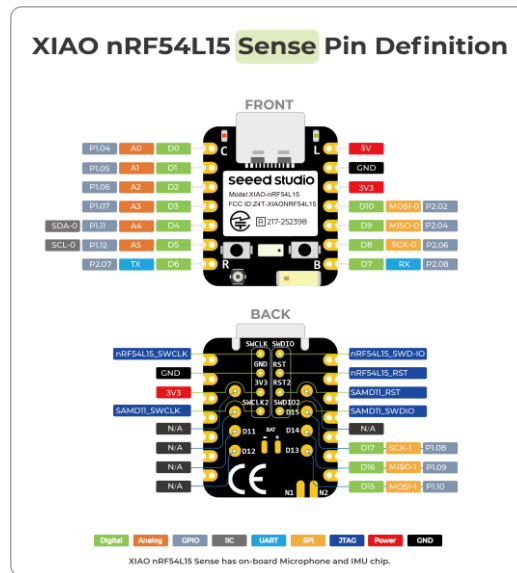


Figure 3-1. Seeed Studio XIAO nRF54L15 Sense Pin Definition

4. Getting Started with Platform IO IDE

This is the procedure for flashing the zephyr-blink example firmware onto the Seeed Studio XIAO nRF54L15 development board using the PlatformIO IDE extension in Visual Studio Code.

4.1. Prerequisites

Before starting, please ensure the following software is installed on your computer:

- **Visual Studio Code (VS Code):** A powerful code editor. If not yet installed, please download it from its [Visual Studio Code - Code Editing. Redefined](https://code.visualstudio.com/).

PlatformIO IDE Extension: An extension for VS Code that provides a complete environment for embedded development. Please search for and install PlatformIO IDE from the VS Code Extensions Marketplace.

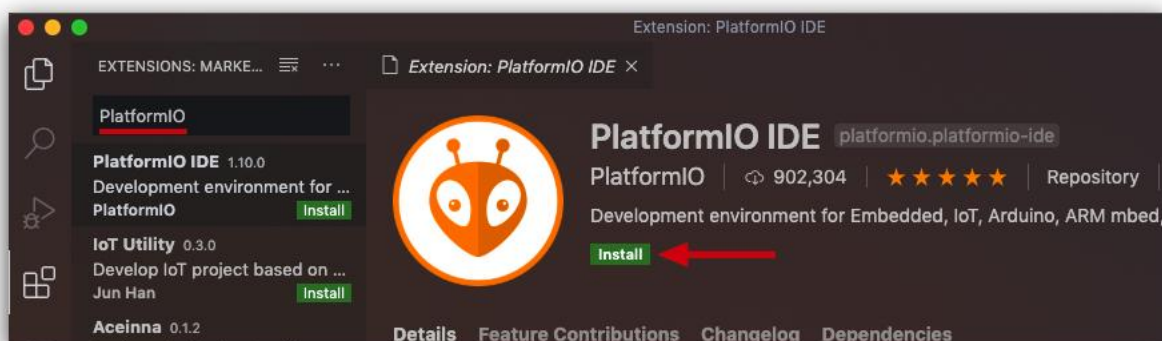


Figure 4-1. Install PlatformIO IDE

4.2. Getting the Example Code

You will need to obtain the zephyr-blink example code from Seeed Studio's official GitHub repository.

1. **Download the Code:** Visit the following URL to download the entire platform-seeedboards repository to your local computer and unzip it. [GitHub - Seeed-Studio/platform-seeedboards: Seeed Boards: development platform for PlatformIO](https://github.com/Seeed-Studio/platform-seeedboards)
2. **Locate the Example:** After unzipping, find the zephyr-blink example within the directory. The path will be: .../platform-seeedboards-main/examples/zephyr-blink/

4.3. Configuration and Building in PlatformIO

1. **Open Project:**
 - a. Launch VS Code.
 - b. From the PlatformIO Home screen (click the alien head icon in the left sidebar), select "Open Project".
 - c. In the file explorer that appears, navigate to and select the zephyr-blink folder you located earlier, then click "Open".
2. **Configure the platformio.ini file:**
 - a. In the VS Code file explorer, open the platformio.ini file.
 - b. Confirm or modify the configuration to ensure it is set up for the XIAO nRF54L15. The key configuration is as follows:

```
[env:seeed-xiao-nrf54l15]
platform = https://github.com/Seeed-Studio/platform-seeedboards.git
framework = zephyr
board = seeed-xiao-nrf54l15
```

3. Connect the Seeed Studio XIAO nRF54L15 board to your computer using a USB Type-C cable.
4. **Build the Firmware and Upload:**

Enter the following commands in order in the "PlatformIO Core CLI".

```
# Change directory to example
$ cd platform-seedboards/examples/zephyr-blink

# Build project
$ pio run

# Upload firmware
$ pio run --target upload
# Build specific environment
$ pio run -e seeed-xiao-nrf54l15

# Upload firmware for the specific environment
$ pio run -e seeed-xiao-nrf54l15 --target upload
```

5. PlatformIO will automatically detect the port and begin flashing the firmware.

6. Upon completion, a "SUCCESS" message will appear in the terminal.

4.4. Verify the Result

After the upload is complete, the board will automatically restart and run the new program. You will observe the onboard LED begin to blink at a steady rate (typically once per second), indicating that the zephyr-blink firmware is running successfully.

FCC Warning Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

“Contains Transmitter Module FCC ID: Z4T-XIAONRF54L15 or Contains FCC ID: Z4T-XIAONRF54L15”

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1. The module is limited to OEM installation ONLY

2. The OEM integrator is responsible for ensuring that the end-user has no manual instructions to remove or install module.

3. The module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).

4. The separate approval is required for all other operating configurations, including portable configurations with respect to configurations.

The device must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with single modular approval should perform the test of radiated emission and spurious emission according to FCC part 15.247 requirement, only if the test result comply with FCC part 15.247 requirement, then the host can be sold legally.

Antenna Type: Ceramic Antenna

Antenna Gain: 4.97 dBi