T-Echo Lite Core
User Guide

LILYGO®

Version 1.0

About This Guide

This document is intended to help users set up the basic software development environment for developing applications using hardware based on the T-Echo Lite Core. Through a simple example, this document illustrates how to use Arduino, including the menu based configuration wizard, compiling the Arduino and firmware download to the NRF52840 module.

Release Notes

Date	Version	Release notes
2025.03	V1.0	First release.

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1. Introduction

1.1. T-Echo Lite Core

T-Echo Lite Core is a Developable Module. It consists of NRF52840 and LoRa Function

The nRF52840 is fully multiprotocol capable with full protocol concurrency. It has protocol support for Bluetooth LE.

The nRF52840 is built around the 32-bit ARM® Cortex™-M4 CPU with floating point unit running at 64 MHz. The ARM TrustZone® CryptoCell cryptographic unit is included on-chip and brings an extensive range of cryptographic options that execute highly efficiently independent of the CPU. It has numerous digital peripherals and interfaces such as high speed SPI and QSPI for interfacing to external flash and displays, PDM and I2S for digital microphones and audio, and a full speed USB device for data transfer and power supply for battery recharging.

Xinyuan provides the basic hardware and software resources that empowers application developers to build their ideas around the NRF52 series hardware. The software development framework provided by Xinyuan is intended for rapidly developing Internet-of-Things (IoT) applications, with LoRa, Bluetooth, and flexible power management and other advanced system features.

1.2. Arduino

A set of cross-platform applications written in Java. The Arduino Software IDE is derived from the Processing programming language and the integrated development environment of the Wiring program. Users can develop applications in Windows/Linux/MacOS based on **Arduino.** It is recommended to use Windows 10. Windows OS has been used as an example in this document for illustration purposes.

1.3. Preparation

To develop applications for NRF52840 you need:

- PC loaded with either Windows, Linux or Mac operating system
- Toolchain to build the Application for NRF52840
- Arduino that essentially contains API for NRF52840 and scripts to operate the Toolchain
- The NRF52840 board itself and a USB cable to connect it to the PC

2. Get Started

2.1. Download the Arduino Software

The quickest how to install the Arduino Software (IDE) on Windows machines

2.1.1. Quick Start Guide

The website provides a quick start tutorial

- Windows:

https://www.arduino.cc/en/Guide/Windows

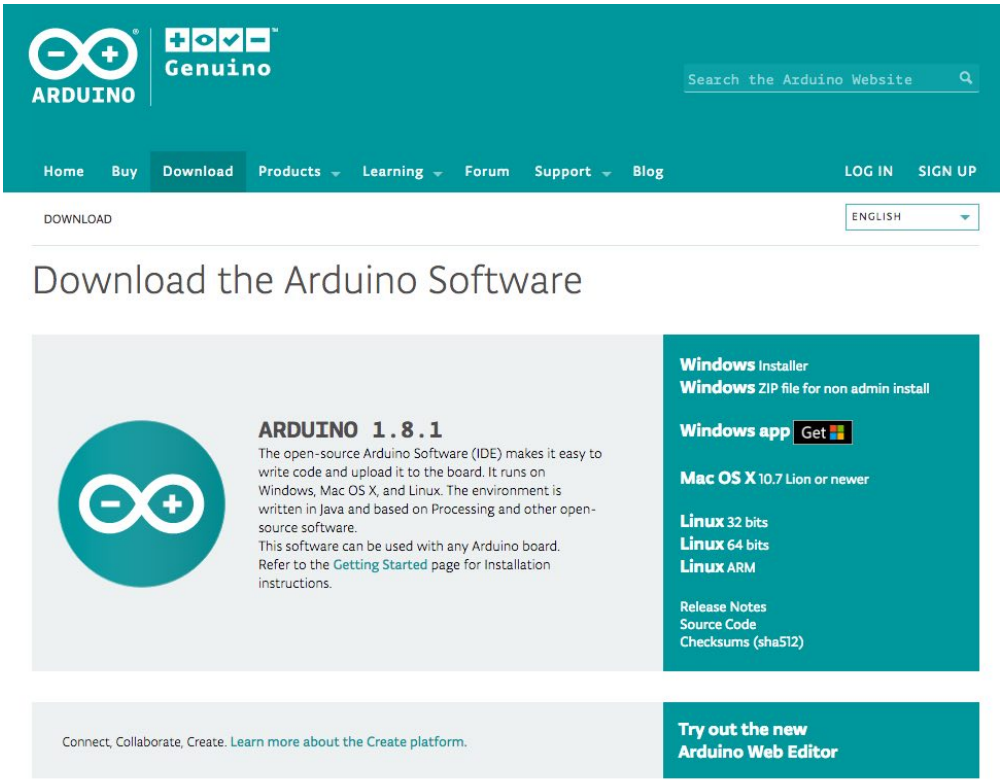
- Linux:

https://www.arduino.cc/en/Guide/Linux

- Mac OS X:

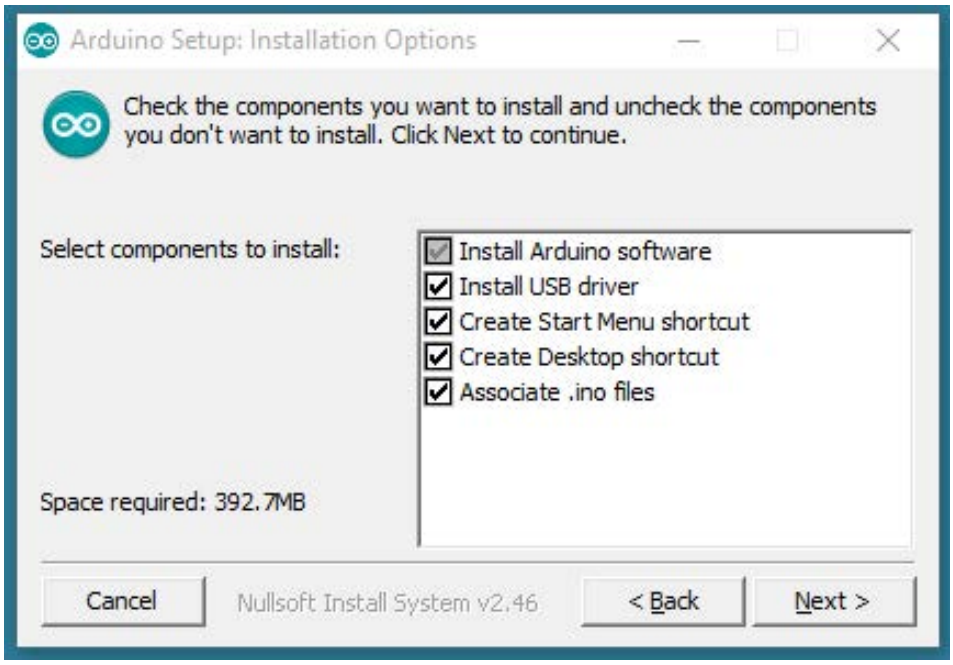
https://www.arduino.cc/en/Guide/MacOSX

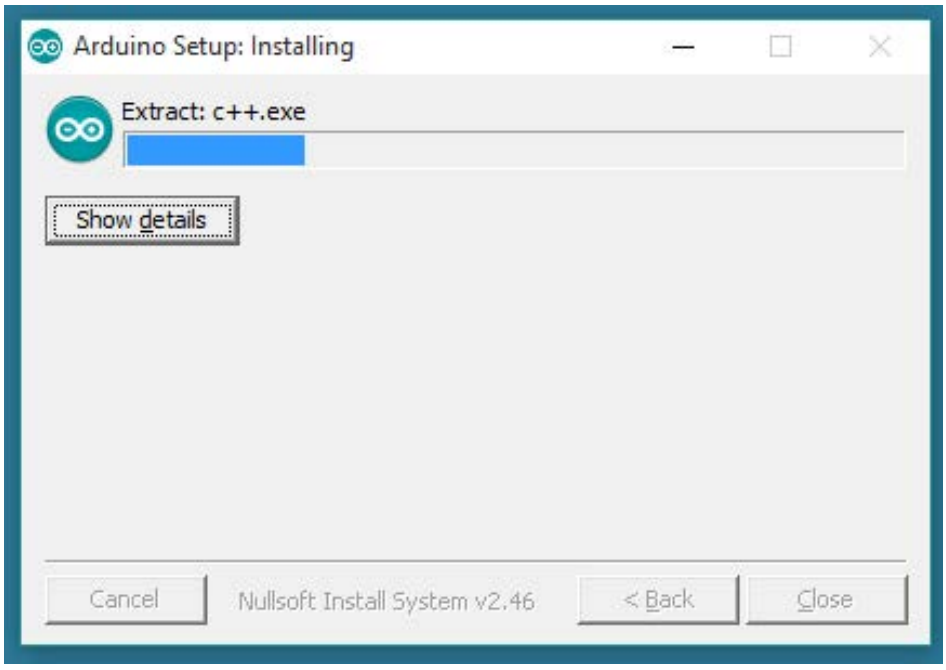
2.1.2. Installation steps for Windows platform Arduino



*Enter the download interface, select **Windows installer** to install directly*

2.2. Install the Arduino Software





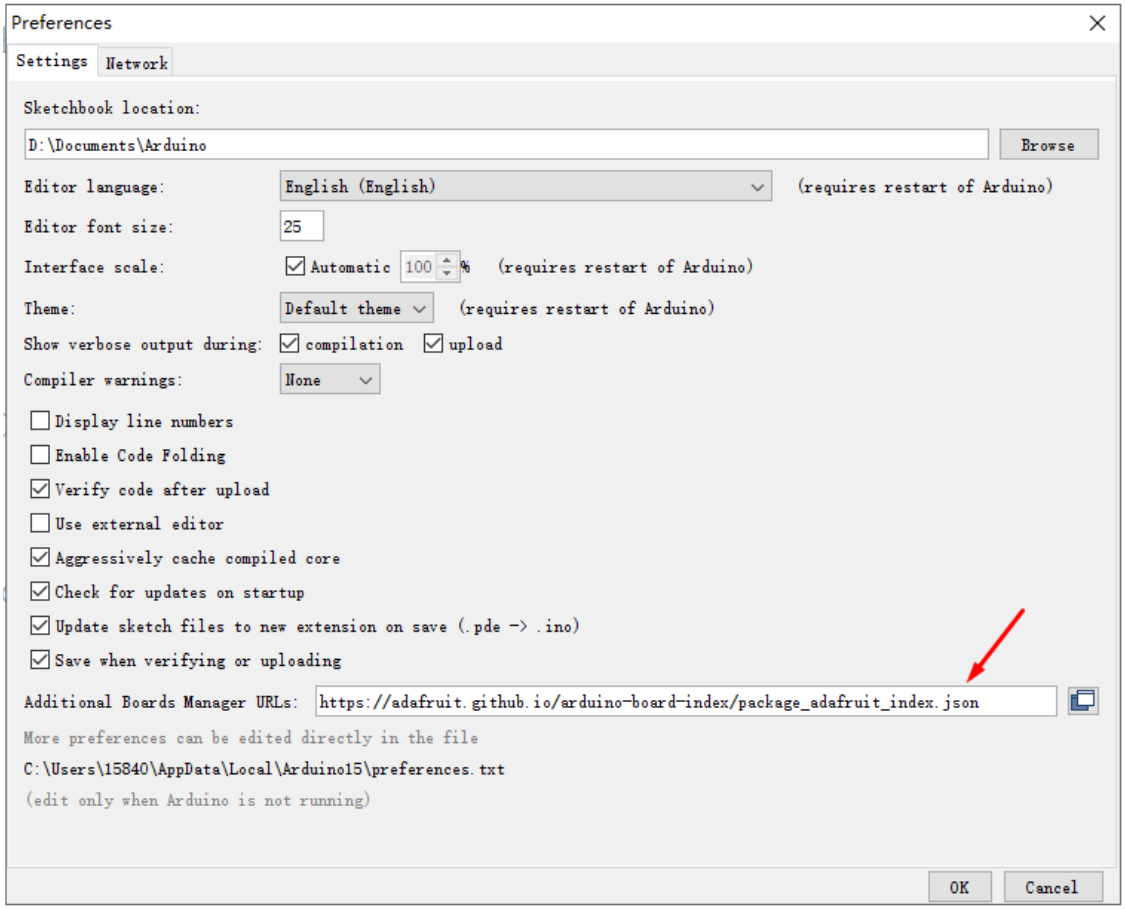
Wait for installation

3. Configure

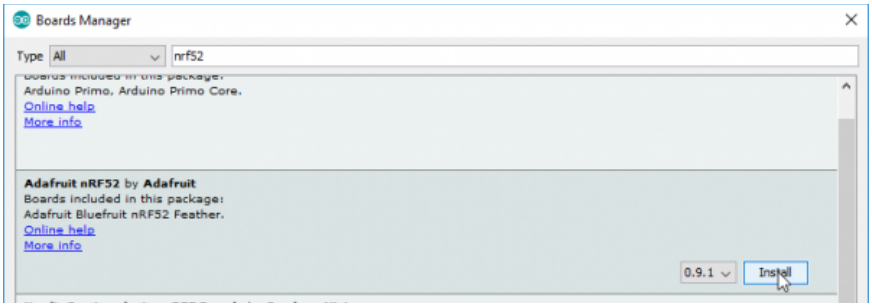
3.1 Install nRF52 Environment

Open Arduino, open preferences

-> add **https://adafruit.github.io/arduino-board-index/package_adafruit_index.json** to the board installation manager address list



Open the board installation manager, wait for the index update to complete, select **'Adafruit nRF52 by Adafruit'** and click install



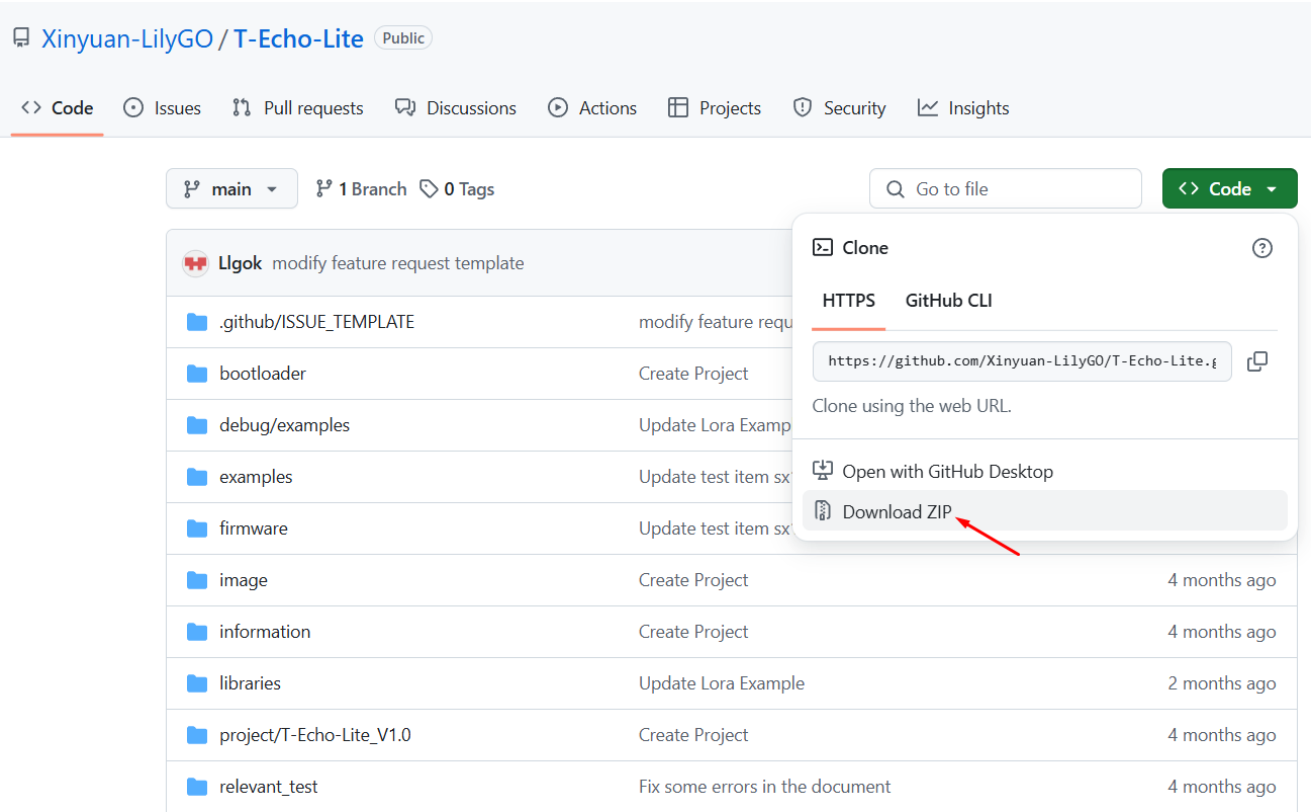
4. Connect

You are almost there. To be able to proceed further, connect board to PC, check under what serial port the board is visible and verify if serial communication works.

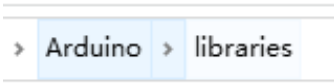
5. Test Demo

Open **https://github.com/Xinyuan-LilyGO/T-Echo-Lite**

Download the zip file



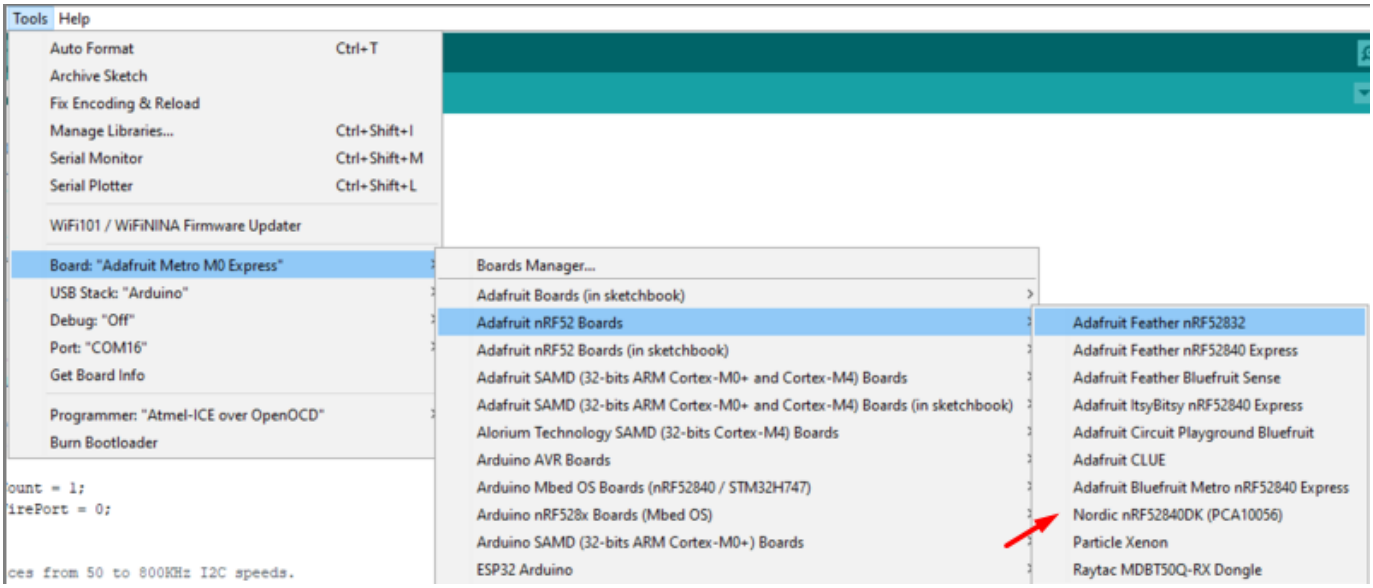
Copy all the folders in the lib directory to "C:\User\<YourName>\Documents\Arduino\libraries"



6. Upload Sketch

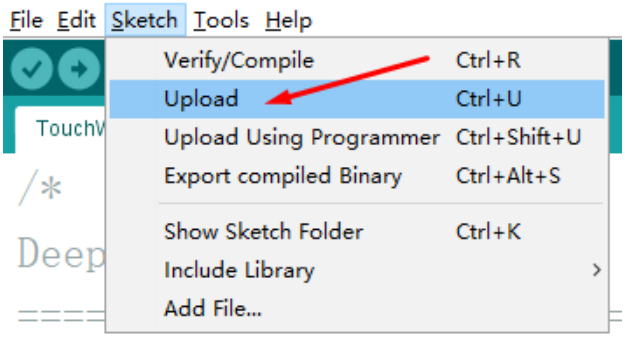
6.1. Select Board

Tools << Board << **Nordic nRF52840(PCA10056)**



6.2. Upload

Sketch << Upload



FCC Caution:

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

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IMPORTANT NOTE:

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 equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM

2.2 List of applicable FCC rules
CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular.

2.3 Specific operational use conditions
This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures
Not applicable

2.5 Trace antenna designs
Not applicable

2.6 RF exposure considerations
To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm from your body.

2.7 Antennas
This radio transmitter FCC ID: 2ASYE-T-ECHO-LITE has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

No.	Antenna Type	Antenna Gain	Impedance	Frequency Range
1	FPC	3.67dBi	50Ω	2.4-2.5GHz
2	Dipole	2.0dBi	50Ω	850-950MHz
3	FPC	-3.71dBi	50Ω	868-923MHz

2.8 Label and compliance information
The final end product must be labeled in a visible area with the following " Contains FCC ID: 2ASYE-T-ECHO-LITE"

2.9 Information on test modes and additional testing requirements
Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B