



seeed studio

3D Printing "Case" Studies

- Wio Terminal
- Seeed Studio XIAO SAMD21
- Seeed Studio XIAO RP2040
- Seeed Studio XIAO nRF52840
- Seeed Studio XIAO ESP32C3
- Seeed Studio XIAO nRF52840 Sense
- Seeed Studio Expansion Board Base for XIAO
- Seeed Studio Round Display for XIAO
- SenseCAP K1100 - The Sensor Prototype Kit with LoRa® and AI
- SenseCAP A1101 - LoRaWAN Vision AI Sensor
- 60GHz mmWave Sensor - Breathing and Heartbeat Module

1. Wearable Device to Help With FoG Issues for Parkinson's

This wearable device, created by [tobychui](#), aims to assist Parkinson's patients experiencing freeze of gait (FoG) issues. FoG is a common symptom of Parkinson's disease that causes temporary immobility or difficulty initiating movement. The device provides sensory cues to alleviate FoG episodes and improve mobility.

To ensure comfort, the wearable device has a lightweight and 3D printed spring-loaded design. It consists of two sections: one for power electronics and the other for control electronics. The spring between the two sections can be replaced with a 3D printed alternative to accommodate different upper arm diameters. The device also features two hooks for attaching it to the patient's upper arm using Velcro.

Seeed's hardwares used in this project:

- [Seeed Studio XIAO RP2040](#)
- [Gear Stepper Motor Driver Pack](#)
- [Battery kit-3.7V 520mAh](#)

Softwares used in this project:



[>> Read the full project on instructables](#)



2. Ring With Mouse Buttons & Wheel

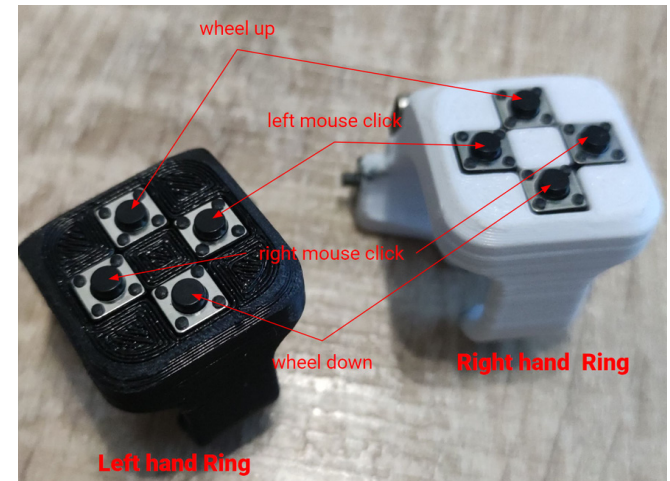
With advancements in virtual reality technology, flight simulation games have gained popularity. However, traditional simulator games have limitations in operation, requiring peripherals like a mouse and keyboard. This reduces realism and user immersion.

To solve this, a new device was developed for DCS World by [rafgaj78](#) to enhance virtual flight immersion. By using the VR hand tracker Leap Motion and The Fingers software, this device eliminates the need for a mouse. Users can now operate buttons using their hands and fingers, providing a more realistic flying experience. To attach Leap Motion to the VR goggles, [rafgaj78](#) created [printable components](#)

Seeed's hardware used in this project:

- [Seeed Studio XIAO nRF52840](#)

Softwares used in this project:



[>> Read the full project on Instructables](#)

3. BLE AI-driven Smartwatch Detecting Potential Sun Damage

This AI-driven Smartwatch built by [Kutluhan Aktar](#) is to forecast sun damage risk levels in the hope of prewarning the user of potential sun damage risk. Kutluhan built an artificial neural network model (ANN) with Edge Impulse to make predictions on sun damage risk levels (classes) based on UV index, temperature, pressure, and altitude measurements.

Taking inspiration from the Ultimatrix in Ben 10, he designed a smartwatch case to create a durable and resilient device capable of functioning flawlessly even in challenging outdoor conditions.

Seeed's hardware used in this project:

- [Seeed Studio XIAO nRF52840 Sense](#)
- [Seeed Studio Expansion Board Base for XIAO](#)
- [Grove - Sunlight Sensor](#)
- [Grove - Temp&Humi&Barometer Sensor \(BME280\)](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

Community Project

XIAO nRF52840 & GSR Sensor

4. Heartbeat Monitor With XIAO nRF52840

[TiagoSantos](#) developed a wearable device utilizing XIAO nRF52840 and a pulse sensor to track heart rate. The pulse sensor captures and analyzes data, which is wirelessly transmitted to a nearby receiver. With the help of an OLED screen on the receiver, the wearer can conveniently monitor their heart rate, providing valuable insights for enhancing health, well-being, and performance.

For the casing, TiagoSantos employed Fusion 360 and Creality Slicer software to design and send it to the printer. The project involves three printed components: the LED case, the main case, and the chest part.

Seeed's hardwares used in this project:

- [Seeed Studio XIAO nRF52840](#)
- [Disposable ECG Electrode \(10 Pcs pack\)](#)
- [Grove - GSR sensor](#)

Softwares used in this project:



[>> Read the full project on Instructables](#)

5. Pet Activity Tracker using XIAO BLE Sense & Edge Impulse

[Mithun Das](#) created an affordable and adaptable fitness tracker for pets, incorporating a XIAO nRF52840 Sense microcontroller and a sturdy case.

The tracker employs Edge Impulse to implement a TinyML model capable of accurately identifying and categorizing pet activities. To complement the tracker, a mobile app was developed, establishing a Bluetooth connection between the two. The tracker's microcontroller transmits prediction data every minute, which is stored locally in the app. This data is then presented through user-friendly graphs, providing valuable insights to pet owners.

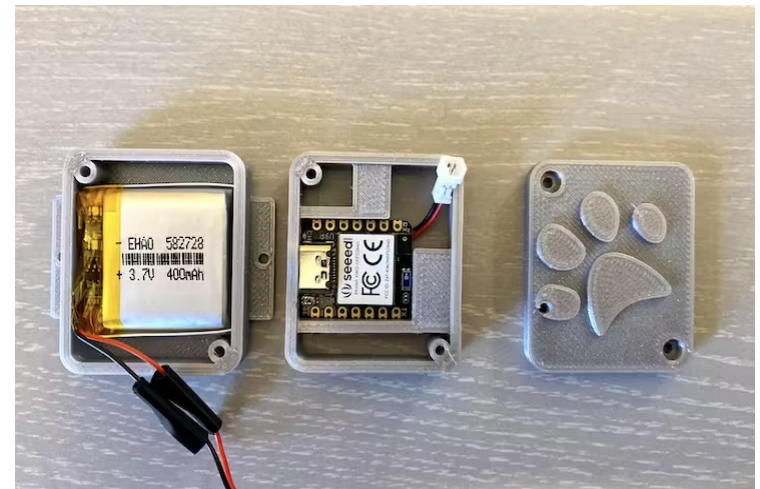
Seeed's hardware used in this project:

- [Seeed Studio XIAO nRF52840 Sense](#)

Softwares used in this project:



EDGE
IMPULSE



[>> Read the full project on Hackster](#)

6. Mouse Fatigue Estimation by GSR and EMG Values w/ TensorFlow

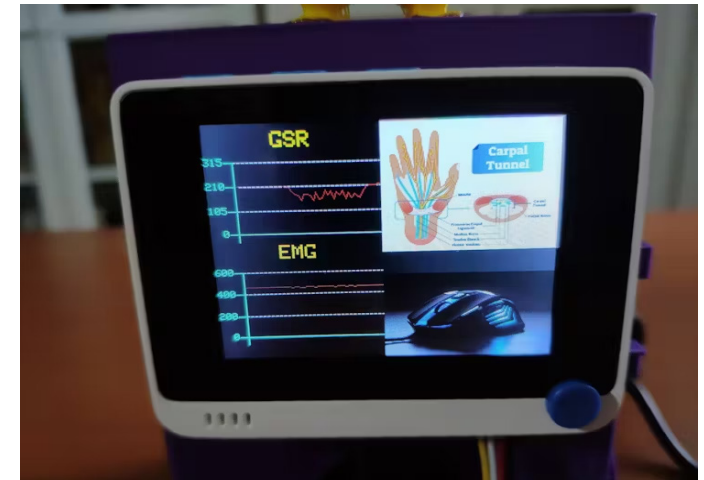
[Kutluhan Aktar](#) developed a system to detect and quantify forearm muscle soreness. This system combines the GSR Sensor for measuring galvanic skin response and the EMG Sensor for measuring electromyography. By collecting GSR and EMG data and utilizing an artificial neural network model trained on established soreness classes, accurate predictions of forearm muscle soreness levels can be made.

To enhance functionality and aesthetics, Kutluhan designed a Pikachu-inspired case, resulting in a compact and robust device that operates flawlessly on his desk.

Seeed's hardware used in this project:

- [Wio Terminal](#)
- [Wio Terminal Chassis - Battery \(650mAh\)](#)
- [Grove - GSR sensor](#)
- [Grove - EMG Detector](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

7. Self-made 3D Printed LED Light

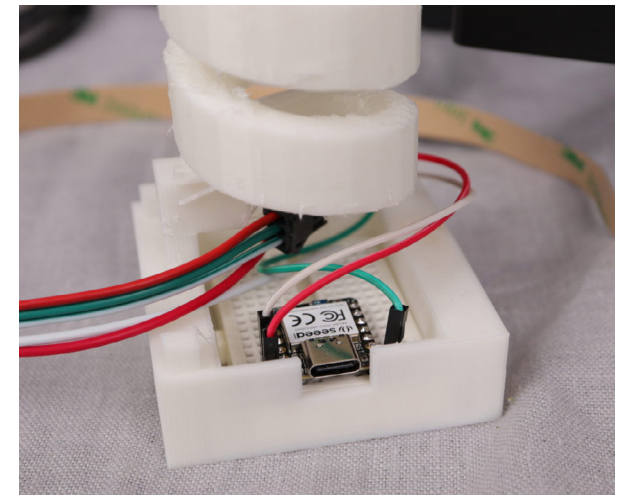
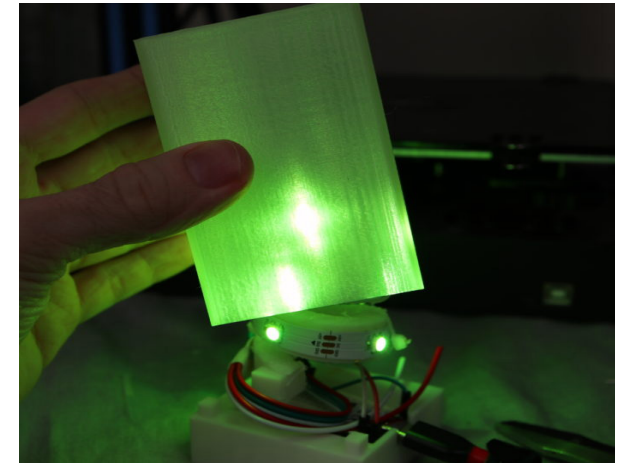
[Michael Schoeffler](#)'s project showcases the utilization of the Seeed Studio XIAO nRF52840 and Bluetooth Low Energy (BLE) technology to manage WS2812B LED strips through the Adafruit Neopixel library.

By leveraging the BLE module, the project establishes a wireless connection between the controller and a mobile app, enabling users to control the LED strip remotely. This endeavor aims to offer an accessible and straightforward solution for wirelessly managing LED strips, catering to various applications like home automation, art installations, and stage lighting. Ultimately, this system fosters creativity and innovation by empowering users to craft personalized lighting effects and displays.

Seeed's hardware used in this project:

- [Seeed Studio XIAO nRF52840](#)
- [WS2812 RGB LED Strip \(5m\) with Remote](#)
- [Mini Bread board 4.5x3.5CM-Green](#)

Softwares used in this project:



[>> Read the full project in this blog](#)

8. DIY Fingerprint Login for Any Computer (xiao + Arduino + Gt521f32)

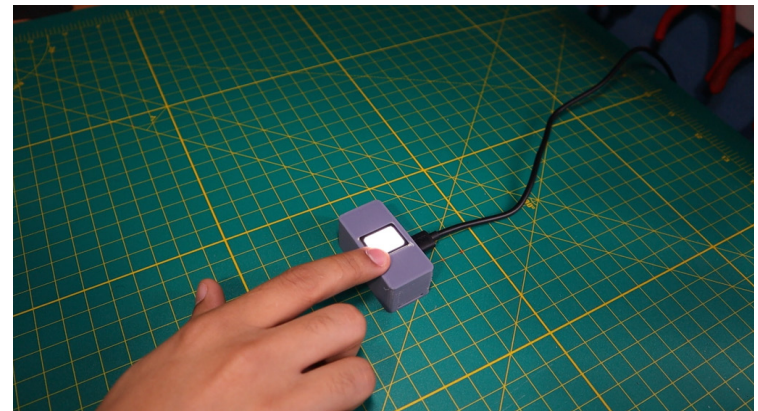
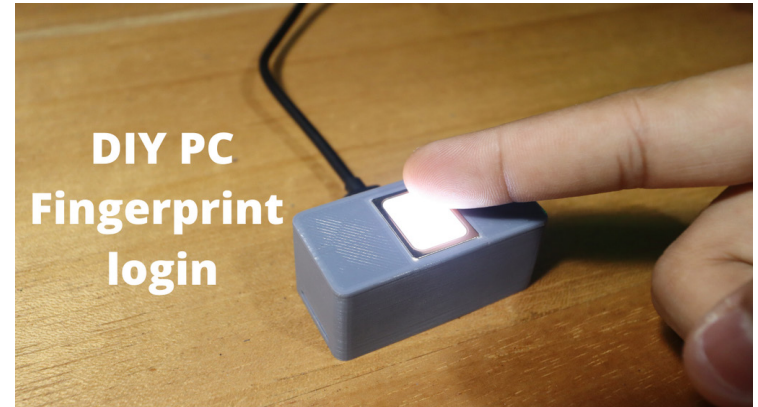
[Justbarran](#)'s project, "PC Fingerprint Login - Universal Authentication (Xiao Arduino)," enables users to securely log in to any computer using their fingerprint instead of passwords. The project utilizes the Seeed Studio XIAO SAMD21 microcontroller, a fingerprint sensor module, and USB connectivity.

Barran used Fusion 360 to design a housing consisting of a base and a cover. The base allows easy insertion of the XIAO, while the cover securely locks in place with an opening for the USB C connector. Standoffs hold the fingerprint sensor, providing space for wire passage.

Seeed's hardware used in this project:

- [Seeed Studio XIAO SAMD21](#)

Softwares used in this project:



[>> Read the full project on Instructables](#)

9. IoT AI-driven Tree Disease Identifier w/ Edge Impulse & MMS

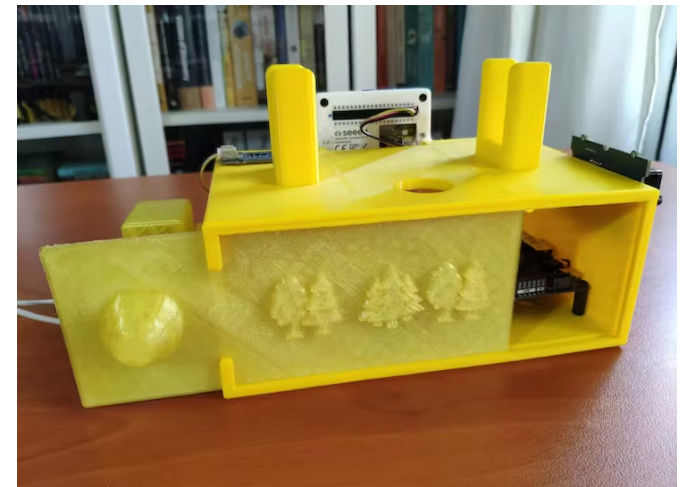
[Kutluhan Aktar](#) created a device that uses Grove-Vision AI to capture images of infected trees and uses Edge Impulse to train a model to ensure early detection of tree diseases. Results are communicated quickly via MMS, safeguarding forests, farms, and agricultural lands.

Kutluhan designed the device with affordability and accessibility in mind. The sturdy case enables easy outdoor placement for capturing tree images. To enhance durability and prevent dust and loose wire issues, a sliding back cover with a handle was incorporated.

Seeed's hardwares used in this project:

- [SenseCAP K1100 – The Sensor Prototype Kit with LoRa® and AI](#)
- [Grove – CO2 & Temperature & Humidity Sensor \(SCD30\)](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

10. AI-assisted Pipeline Diagnostics and Inspection w/mmWave

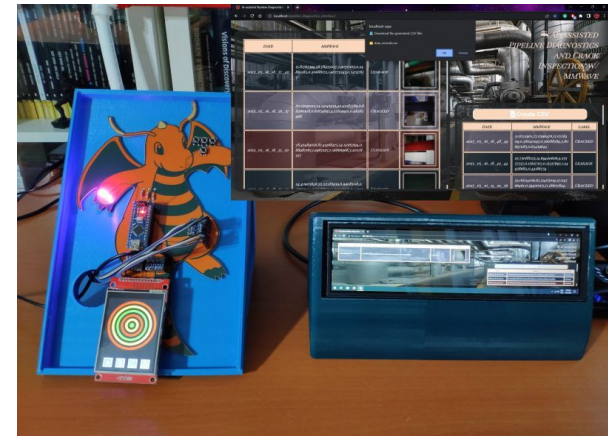
[Kutluhan Aktar](#) created a cost-effective diagnostic system for pipeline maintenance in automated manufacturing. It uses an MR60BHA1 60GHz mmWave radar to collect data, extracts parameters, and trains a neural network model on Edge Impulse for pipeline defect diagnosis. The system also inspects model detection results on a PHP web application using deformed pipe images.

Kutluhan crafted a sturdy and space-saving case with a sliding front cover. The cover is positioned in proportion to the diagonal top surface to ensure protection against dust and maintain secure wire connections.

Seeed's hardware used in this project:

- [60GHz mmWave Sensor - Breathing and Heartbeat Module](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

11. IoT AI-driven Yogurt Processing & Texture Prediction | Blynk

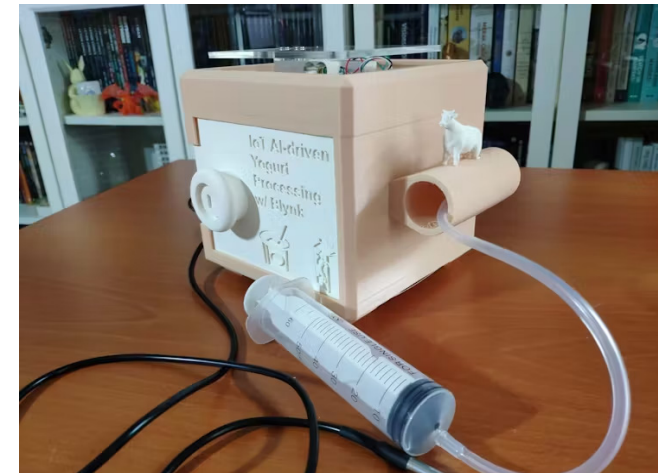
[Kutluhan Aktar](#)'s project measures key data points such as temperature, humidity, and pressure to estimate yogurt consistency. Using XIAO ESP32C3, an artificial neural network model is built and trained to analyze the data and determine optimal fermentation conditions for yogurt.

To ensure user convenience in accessing the SD card for data logging and yogurt culture weighing, Kutluhan designed a durable and strong case. The addition of a sliding front cover with a handle not only prevents dust exposure but also ensures secure wire connections.

Seeed's hardware used in this project:

- [Seeed Studio XIAO ESP32C3](#)
- [Seeed Studio Expansion Board Base for XIAO](#)
- [Grove - Temperature & Humidity Sensor\(SHT40\)](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

12. Button Mouse with XIAO

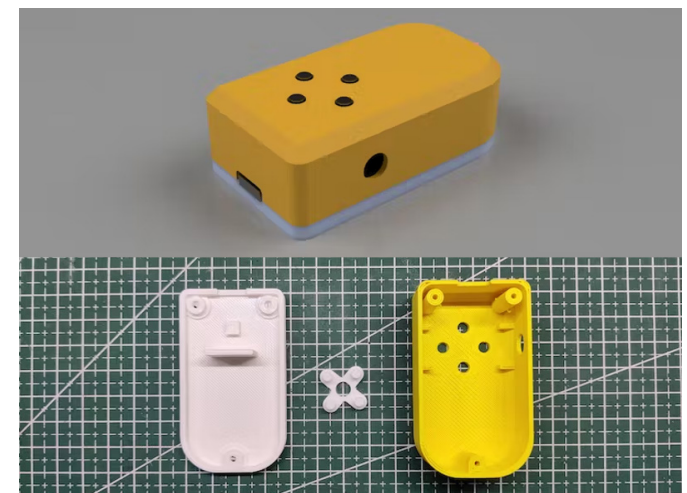
[Arnov Sharma](#)'s project uses the Seeed Studio XIAO SAMD21 to create an emulated HID mouse, providing an alternative to traditional mice. HID devices, including keyboards, mice, game controllers, and touchscreens, enable human-computer interaction.

Arnov employed Fusion 360 to design the CAD file, resulting in a compact mouse resembling a traditional one. The mouse features four buttons on the top side and a right-side trigger. Additionally, Arnov designed a lid that securely encloses the mouse from the bottom.

Seeed's hardware used in this project:

- [Seeed Studio XIAO SAMD21](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

13. AI-driven LoRaWAN Fertilizer Pollution Detector w/ WhatsApp

[Kutluhan Aktar](#) developed an affordable device that utilizes a SenseCAP A1101 LoRaWAN® Vision AI Sensor and Edge Impulse. The device detects chemical fertilizer contamination levels using object recognition technology and relays results via WhatsApp, providing early warnings to farmers and reducing excessive fertilizer use.

Kutluhan created a compact case with a sliding front cover for dust protection, allowing convenient component placement. The case includes a separate remote control section with a diagonal top cover, featuring inscribed logos to highlight the LoRaWAN®-enabled detection.

Seeed's hardware used in this project:

- [SenseCAP A1101 - LoRaWAN Vision AI Sensor](#)
- [SenseCAP M2 Data Only LoRaWAN Indoor Gateway\(SX1302\)](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

14. From Light to Insight: EdgeML powered by Indoor Solar Cells

Indoor solar cells harness light to provide endless energy indoors, eliminating the need for frequent battery replacements. This project utilizes a Seeed Studio XIAO nRF52840 Sense to create an application that runs a machine learning algorithm trained with Edge Impulse. The inference values are sent to a gateway via BLE (Bluetooth Low Energy).

The designer has also developed an enclosure for the project. You can download and print the Evaluation Stand from [here](#). This 3D print allows the Epishine Panel to be oriented towards the light source to improve power harvesting.

Seeed's hardwares used in this project:

- [Seeed Studio XIAO nRF52840 Sense](#)

Softwares used in this project:



[>> Read the full project on Hackster](#)

15. Comovis (Co2 ,Temperature and Humidity Sensor for EspHome)

[Nayel Khouatra](#)'s Comovis is an indoor air monitoring device that detects PM2.5 particles and monitors temperature and humidity. Through a light indicator and the user-friendly Home Assistant platform, Comovis informs users about air quality, indicating safety levels.

The device was 3D printed using ColorFabb AllPHA filament, known for its strength, durability, and eco-friendly properties. For 3D printing the Comovis, you can find the filament [here](#).

Seeed's hardware used in this project:

- [Grove - Air Quality Sensor v1.3](#)
- [Seeed Studio XIAO ESP32C3](#)

Softwares used in this project:



ESPHome



[>> Read the full project on Instructables](#)

16. Phat Stats Now compatible with WIO Terminal and Seeed XIAO Round Display

Rupert Hirst's Phat Stats (TFT) is an Arduino serial display that retrieves hardware statistics from a PC using the HardwareSerialMonitor Windows client. Excitingly, it is now compatible with WIO Terminal and Seeed Studio Round Display for XIAO.

The 3D-printed enclosure boasts a sleek and straightforward design, taking approximately 40 minutes to print in a single stage. Simply insert the XIAO microcontroller into the bottom of the enclosure. To access the Arduino code and STL files for the enclosure, visit the Tallman Labs Github page [here](#).

Seeed's hardware used in this project:

- Wio Terminal

- Seeed Studio Round Display for XIAO

Softwares used in this project:



[-> Read the full project on Hackster](#)

- **Seed Studio XIAO Series**

<https://files.seeedstudio.com/wiki/XIAO/xiao-share.pdf>

- **TinyML Case Studies**

<https://files.seeedstudio.com/wiki/K1100-quick-start/TinyML-Case-Studies.pdf>

- **Seed Fusion PCB Services**

https://www.seeedstudio.com/fusion_pcb.html

- **Co-create and launch your ideas with Seed Studio**

<https://www.seeedstudio.com/co-create.html>

Seed Studio

Seed Studio XIAO Reference Design

CONTACT US



HEADQUARTERS

9F, Building G3, TCL International E City, Zhongshanyuan Road, Nanshan, 518055, Shenzhen, PRC

X.FACTORY

Chaihuo x.factory 622, Design Commune, Vanke Cloud City, Dashi 2nd Road, 518055, Shenzhen, PRC

Japan Office

130 Honjōgai 1F, Shin-Nagoya-Center Bldg. 1-1 Ibukacho Nakamura-ku, Nagoya-shi, Aichi 453-0012 Japan

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