

HOW TO USE CODE TO CONTROL ABLETON LIVE

1. Write code in Arduino IDE
2. Upload your code to your microcontroller (XIAO nRF52840 Sense)
3. Connect microcontroller to your computer
4. Connect your microcontroller to Ableton Live
5. Add in an Instrument to your workspace in Ableton Live
6. Create a MIDI Mapping for the specific parameters you would like to control

Helpful Hints:

- Ableton Live is a program that you have to pay for, but you can sign up for a free 30 day trial - time this trial correctly so that you have the software for the Final Demo!!!
- In Ableton Live, the bottom left corner is known as "Info View"
 - Whenever you hover your mouse over a feature, information about the feature will pop up on how to use that feature
 - Use this to discover new features on Ableton or find the names of certain features
- Ableton Live also has tutorials built in to the software so you can learn new features or techniques - use this to your advantage!!
- Ableton has sooooo many features, it can get overwhelming. Don't be afraid to look up online resources on the Platform

Helpful links:

Connecting to a MIDI software using Arduino using Adafruit Library

<https://learn.adafruit.com/wireless-untztrument-using-ble-midi/mac-os-x>

Using Audio MIDI Set Up on a Mac

<https://support.apple.com/guide/audio-midi-setup/set-up-midi-devices-ams875bae1e0/mac>

(1) WRITING CODE IN ARDUINO IDE

- Make sure you have the correct libraries installed - you won't be able to call certain commands without the correct libraries. This is especially important for using Bluetooth and MIDI commands
 - Here are the following Libraries we had downloaded:
 - ArduinoBLE by Arduino
 - Madgwick by Arduino
 - Adafruit BluefruitLE nRF51y Adafruit
 - BLE-MIDI by lathoub
 - MIDI Library by Francois Best, lathous
 - NimBLE-Arduino by h2zero
 - Seeed Arduino LSM6DS3 by Seeed-Studio
 - base64 by Densaugeo

- How to install Libraries:



- Click the libraries button:
 - Search the name of the libraries - make sure you're selecting the library with the correct creator
 - Install the latest version of each library
- TROUBLESHOOTING
 - Some commands require built-in libraries (built into your computer, for example, python libraries. Make sure the version of Python you're using in your code is compatible with your operating system - you can check using Terminal (Mac - OS)

(2) UPLOADING CODE TO YOUR MICROCONTROLLER



Check button - Verify

Arrow button - Upload

- Need to connect board to computer using a USB-C cable
- Make sure you have the correct board connected
 - We used "Seeed Xiao nRF52840 Sense"
 - Tools > Boards > Seeed nRF52 Boards > Seeed Xiao nRF52840 Sense
- Ensure your code complies first - Verify using the check button
- Upload code using the the Arrow button
 - Once uploaded to the microcontroller, it should be stored in the memory and you won't need to reupload unless you make edits

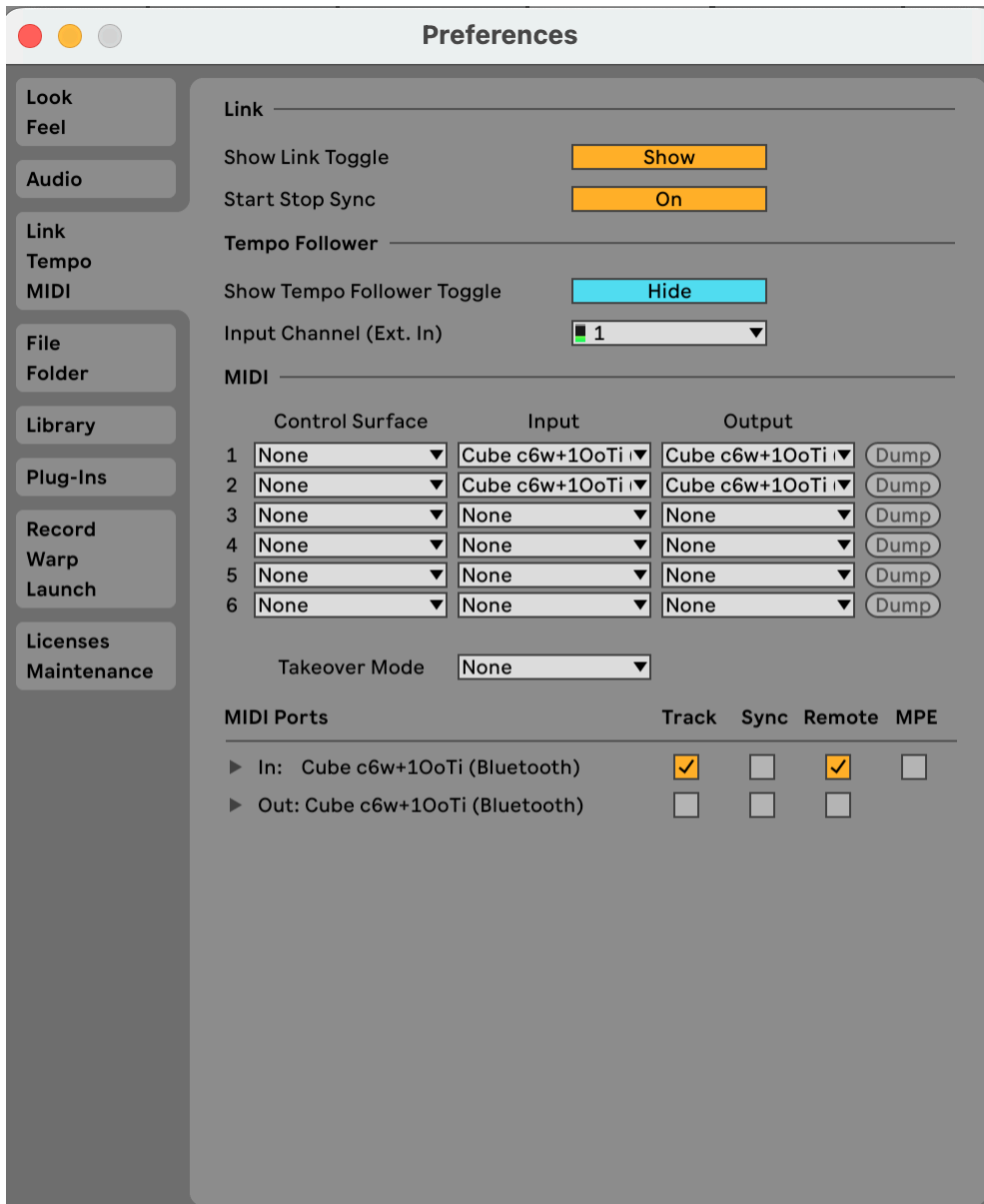
(3) CONNECTING MICROCONTROLLER TO YOUR COMPUTER - MAC OS

- First connect controller to Macbook using Bluetooth settings
- Use Audio MIDI Set up - an application on your Macbook preinstalled
- Use tutorial found at Adafruit for connecting
 - Connecting to a MIDI software using Arduino using Adafruit Library
 - <https://learn.adafruit.com/wireless-untztrument-using-ble-midi/mac-os-x>

(4) CONNECTING MICROCONTROLLER TO ABLETON LIVE

- Upon opening AbletonLive, connect your MIDI controller
 - Preferences (Control + ,) > Link MIDI

- Under MIDI ports, find your controller and allow Track and remote for input
 - Only input is important because your are controller with your music cube and the output will be on AbletonLive



A screenshot of the Preference Window on AbletonLive. Under the tab “Link Tempo MIDI”, your MIDI controller will show up under MIDI ports. Check off Track and Remote for the input.

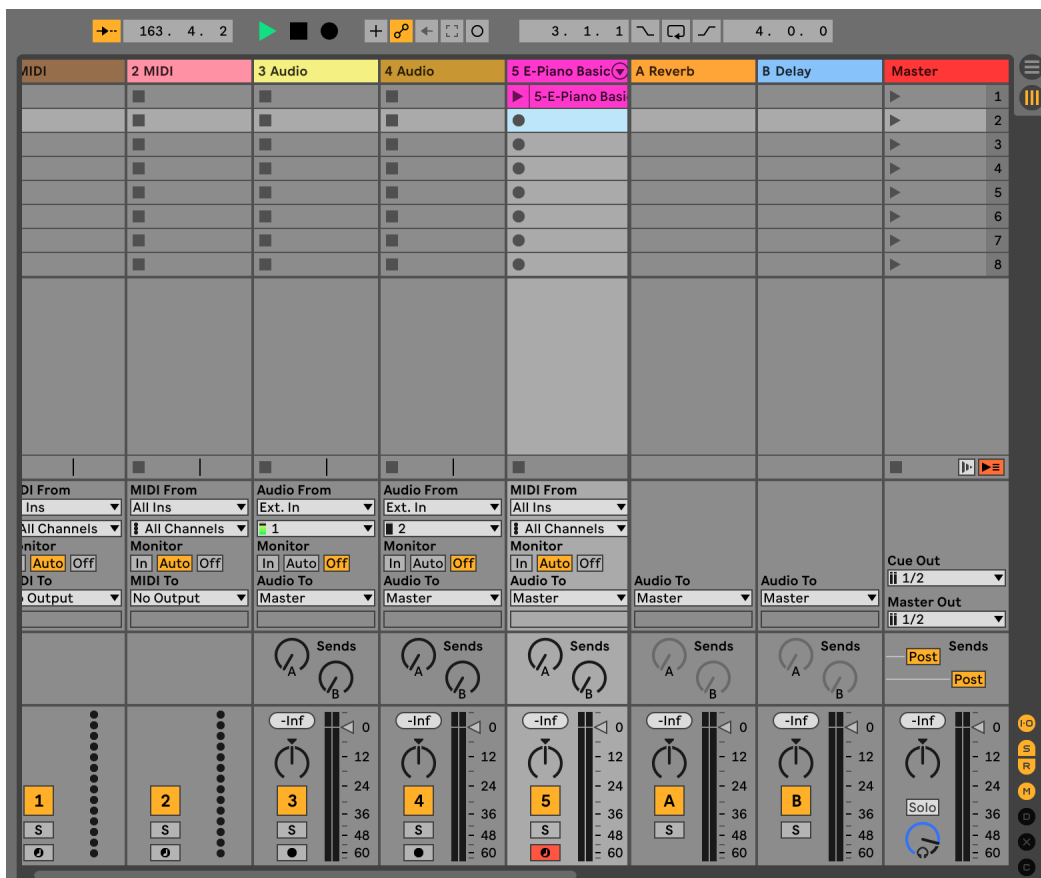
** you can test if your conection to AbletonLive is working by looking in the top right corner. There will be flashing dots if AbletonLive is picking up signals.



The orange square flashes when picking up signals

ADD IN AN INSTRUMENT TO ABLETON LIVE

- Under the browser section, add in an instrument to a clip slot
 - Under Collections, look in the instrument section and select an instrument
 - Drag and drop the instrument into the Clip/Device drop area. It will show up as a new column in the area.
 - Click at least one of the circles in the column so it turns into a clip - this will allow the instrument to play when controlling



This is what the Clip/Device Area should look like after the instrument is added. The fifth column is where the E-Piano Basic instrument is added. You can see there is a clip in the first row. Clicking on the triangle will cause the instrument to be played

ADDING A MIDI MAPPING TO YOUR CONTROLLER IN ABLETON LIVE

** This is where you can really customize your MIDI controller!

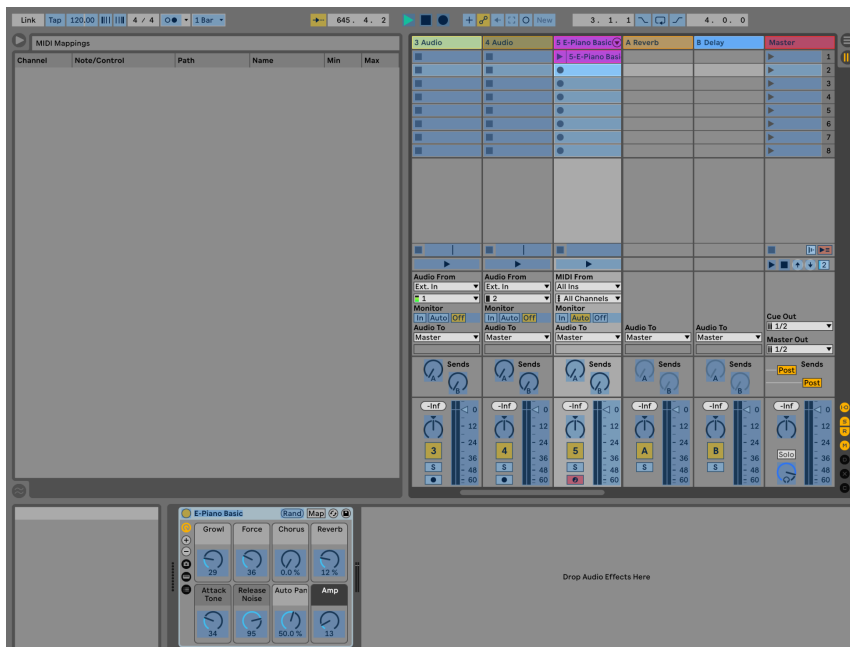
- You can add in different tracks and/or instruments and map your controller to control certain parameters
- There are two different controls which the current code is programmed to do:
 - Specific gyroscopic capabilities - if you turn the cube slowly, you can turn a knob up and down - this could be used for volume, pitch, or any other parameter
 - Rolling a side of the cube - when the microcontroller detects that it is face up for a few seconds, it will recognize which side is facing up. Therefore, you can map this recognition to a specific parameter, causing a certain noise to play or control to trigger when each face lands up
- This is how you can really customize the Music Cube! When our team (C24) left this project off, there are a lot of possible ways you can use the Ableton Live software to customize the controls of the Music Cube MIDI Controller. Ableton Live has so many capabilities, here you can utilize them to add cool features to the music cube!
- Below is an example of how to create a MIDI mapping to your controller

Example: Controlling the Volume with the Music Cube

- In Ableton Live, After you have inserted your Instrument (or anything else you wish to control: tracks, live sets, etc), click the MIDI key in the top right corner



The MIDI Key is highlighted in blue. This will take you to a page where you can control your MIDI mappings



An overview of the screen you see when you click on the MIDI key

- On the right hand side of the screen, you will see the current MIDI mappings in place. (right now there will be none)
- Everything that is highlighted in blue on the page is a parameter which can be controlled by your midi controller
- Double click on a parameter to set it up as a map
 - For example: double click on the track volume slider to set it as a parameter



Volume track slider is highlighted in blue and boxed by the 4 corner tabs

- When you click a button on your MIDI controller, you are establishing a connection to the MIDI controller
 - In this case, rotating the cube is like pushing the button because the code

Using Arduino Code as a MIDI Controller for Ableton Live (ChatGPT)

To connect code running on an Arduino board to Ableton Live as a MIDI controller, you'll need to follow these general steps:

1. Write Arduino Code: You'll need to write code in the Arduino IDE that allows your Arduino board to send MIDI messages. You can use libraries like MIDI.h to simplify this process. Your code will define how different inputs (sensors, buttons, etc.) on the Arduino board will translate into MIDI messages.
2. Upload Code to Arduino: Once you've written your code, upload it to your Arduino board using the Arduino IDE.
3. Connect Arduino to Computer: Connect your Arduino board to your computer using a USB cable.
4. Configure Ableton Live:

Open Ableton Live.

Go to Preferences (Ctrl+, on Windows or Cmd+, on macOS).

In the Preferences window, go to the "Link MIDI" tab.

Under "MIDI Ports," make sure that "Track" and "Remote" are enabled for the appropriate input corresponding to your Arduino board. The name might vary based on your operating system and Arduino board type.

Test MIDI Connection: You can test the MIDI connection by using a MIDI monitor software or directly within Ableton Live. You should see MIDI messages coming from your Arduino board.

5. Map MIDI Controls in Ableton Live: Once Ableton Live recognizes your Arduino board as a MIDI controller, you can map the MIDI messages it sends to various parameters in Ableton Live. This can include things like controlling volume, triggering clips, adjusting effects parameters, etc.
6. Code Arduino Inputs: Modify your Arduino code as necessary to handle different inputs and map them to MIDI messages accordingly.
7. Refine and Test: Refine your code and MIDI mappings as necessary, and test them within Ableton Live to ensure everything works as expected.

Remember, the specifics of your implementation will depend on your hardware setup, the sensors/buttons you're using with the Arduino, and what exactly you want Ableton Live to do in response to those inputs. But these general steps should give you a good starting point.

Connecting from ArduinoIDE to Ableton Live via Bluetooth (ChatGPT)

To bridge communication between a XIAO nRF52840 Sense board and Ableton Live using Bluetooth, you would typically follow these steps:

1. Bluetooth Module: Ensure your XIAO nRF52840 Sense board has a Bluetooth module that supports MIDI over Bluetooth (BLE MIDI). Many Bluetooth modules, such as the nRF52840's built-in module, are capable of BLE MIDI.
2. Bluetooth MIDI Library: Use a Bluetooth MIDI library compatible with your board and its Bluetooth module. Libraries like ArduinoBLE or TinyUSB support BLE MIDI and can be used to establish Bluetooth communication.
3. Upload Bluetooth MIDI Code: Write Arduino code that configures the Bluetooth module for MIDI communication and sends MIDI messages based on your inputs (sensors, buttons, etc.). This code should use the Bluetooth MIDI library to handle the BLE MIDI protocol.
4. Pairing with Computer: Pair your XIAO nRF52840 Sense board with your computer using Bluetooth. On your computer, make sure Bluetooth is enabled and search for available devices. Your XIAO board should appear as a Bluetooth MIDI device.

5. **Configure Ableton Live:** In Ableton Live, go to Preferences > Link MIDI. Ensure that your XIAO board's Bluetooth MIDI connection is enabled for both input and output. Ableton Live should recognize your XIAO board as a MIDI controller.
6. **Map MIDI Controls:** Map MIDI messages sent by your XIAO board to various parameters in Ableton Live. This can include controlling volume, triggering clips, adjusting effects parameters, etc.
7. **Test and Refine:** Test the connection between your XIAO board and Ableton Live. Refine your code and MIDI mappings as necessary to ensure everything works as expected.

By following these steps, you can bridge communication between your XIAO nRF52840 Sense board and Ableton Live using Bluetooth MIDI. This setup allows for wireless control of Ableton Live using your XIAO board.