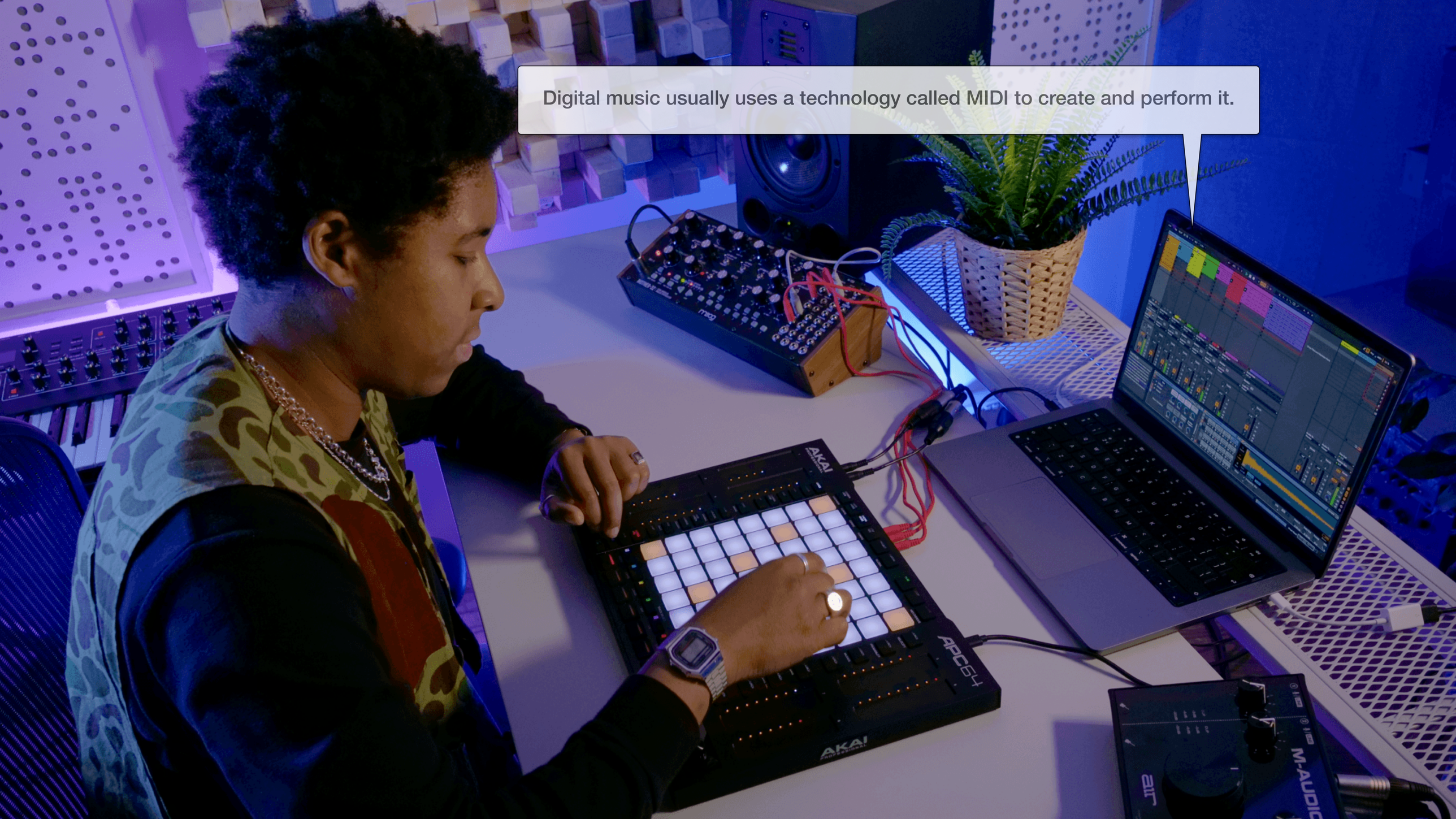
Learning DigiShow

6

Digital Music Applications

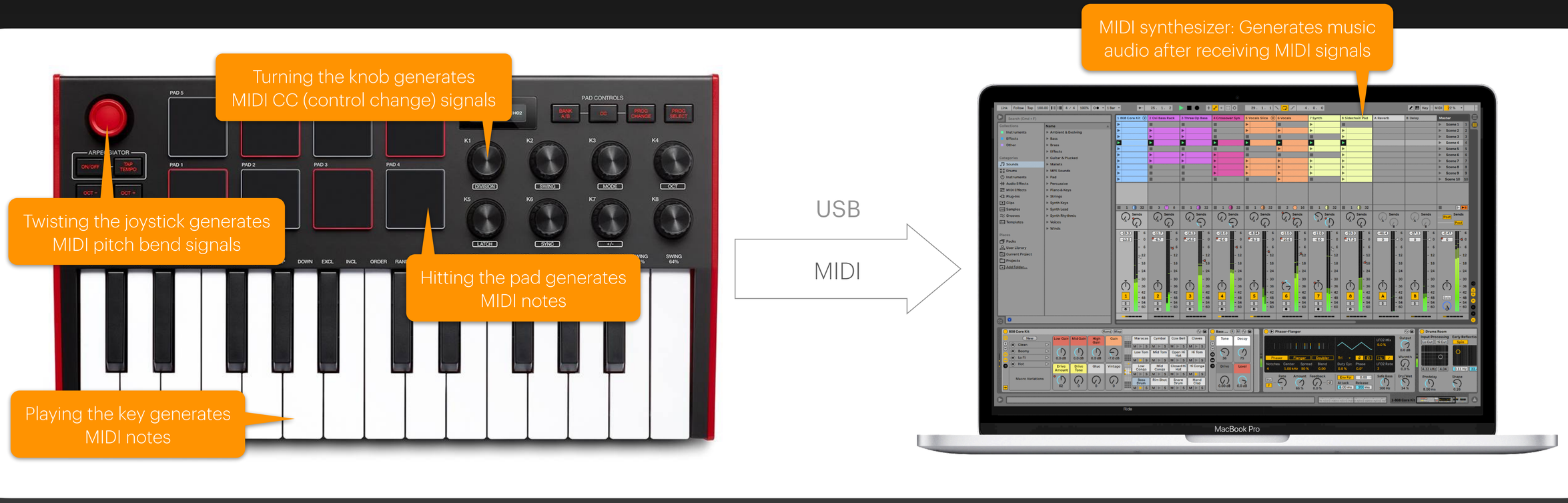
Robin Zhang and Labs 2025


Digital music usually uses a technology called MIDI to create and perform it.
AKAI
APC64
AKAI
M-AUDIO

MIDI Interface

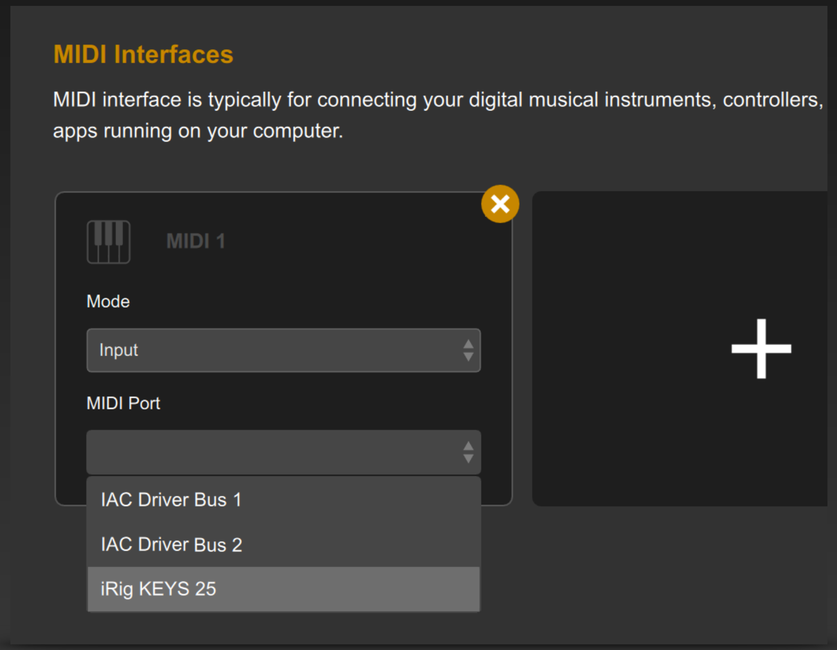
What is MIDI ?

MIDI (Musical Instrument Digital Interface) is a protocol for communication between electronic musical instruments, computers and other related devices, originally developed by the MIDI Association in 1983. MIDI does not transmit the audio signal itself, but transmits data containing performance information, such as the on/off of notes, velocity, timbre changes, etc.



MIDI Interface Configuration

After plugging a MIDI device (such as a keyboard, controller, sequencer, etc.) into the computer USB port, DigiShow can receive MIDI messages from the MIDI device and send MIDI messages to the MIDI device. Users can add MIDI interfaces to the current project in the MIDI section of the Interface Manager.



The MIDI interface provides two interface modes: Input and Output. Select the appropriate mode and select your MIDI device in the MIDI port list.

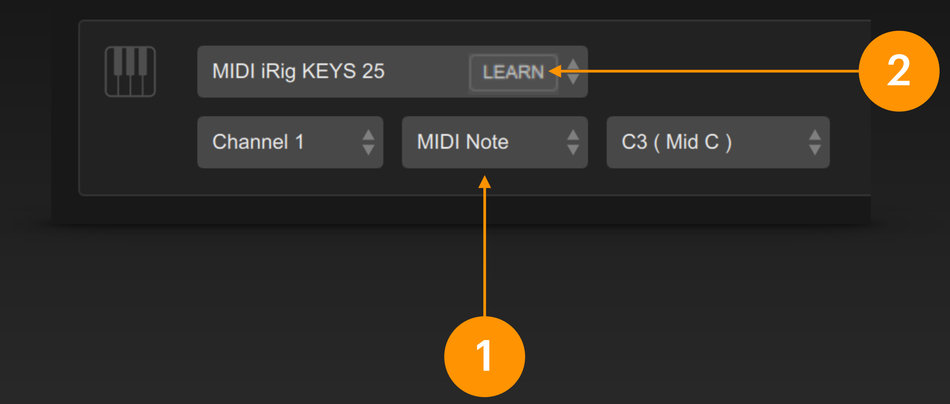
Taking a MIDI keyboard as an example, we usually need to set the mode to Input so that DigiShow can receive the notes and various control signals generated when playing the keyboard.

Sometimes we also need to send MIDI messages to the MIDI device, such as changing the LED status or the position of the electric fader on the MIDI controller. In this case, we need to set the interface mode to Output.

Besides the real MIDI devices connected to the computer, the MIDI port list also lists virtual MIDI ports activated in the operating system environment. After selecting, in Input mode, DigiShow can receive MIDI messages sent by other software, or send MIDI messages to other software in Output mode.

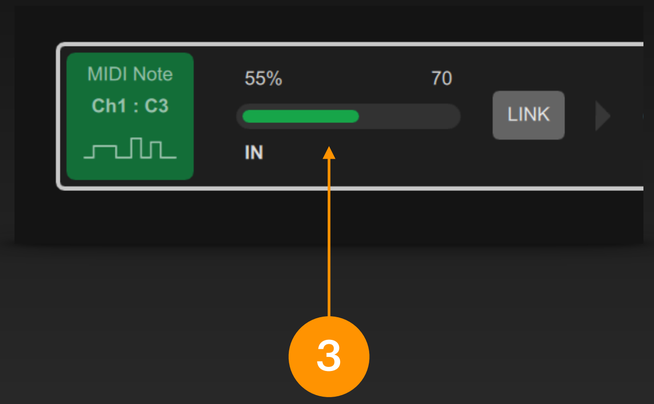
MIDI Signal Input

In the signal link table, set the input end of the signal bar to MIDI, and we can receive specific MIDI messages sent from specific MIDI devices or software in DigiShow.



Select the MIDI interface in the signal bar input, set the MIDI channel number and the MIDI messages you want to receive, which can be MIDI Note, MIDI Control, MIDI Program or MIDI Pitch type. After applying the settings, this input will receive MIDI messages that meet the set requirements.

We can also actively learn MIDI messages sent by external MIDI devices or software. Please start the project first, and the LEARN button will appear. Click this button, and press the keys or move the fader on the MIDI device. The corresponding MIDI messages sent will be automatically recognized by DigiShow and the parameters of the signal bar input will be refreshed.

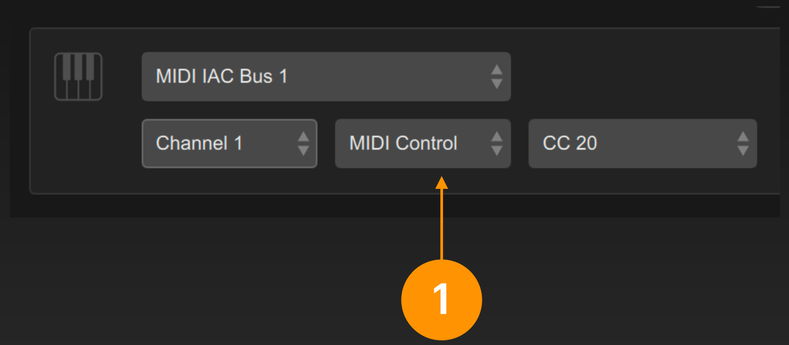


Once the DigiShow project is started, the signal bar input will display the MIDI input signal value in the channel that meets the set requirements. When the input is MIDI Note, its signal value range is 0 ~ 127; when the input is MIDI Control or Program, it is an analog type signal with a value range of 0 ~ 127; when the input is MIDI Pitch, it is also an analog type signal with a value range of 0 ~ 16383.

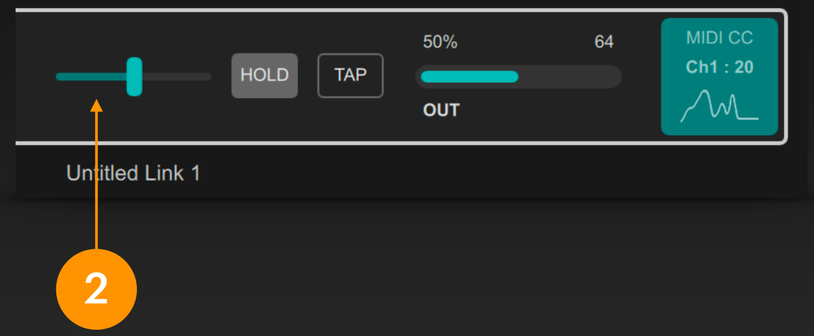
At this time, you can also select an output for the signal bar to achieve the corresponding signal mapping

MIDI Signal Output

In the signal link table, set the output end of the signal bar to MIDI, and we can send specific MIDI messages to specific MIDI devices or software in DigiShow.



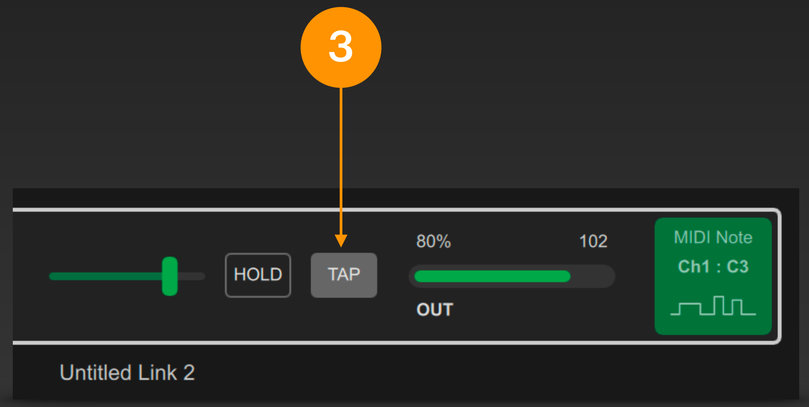
Select the MIDI interface in the signal bar output, set the MIDI channel number and the MIDI message you want to send, which can be of type MIDI Note, MIDI Control, MIDI Program or MIDI Pitch. After applying the settings, this output will be able to send the specified MIDI message.



When the MIDI output signal is set to MIDI Control type, moving the fader in the signal bar can change the output of the MIDI control signal. It is an analog signal with a value range of 0 ~ 127.

At this time, you can also select an input for the signal bar to achieve the corresponding signal mapping.

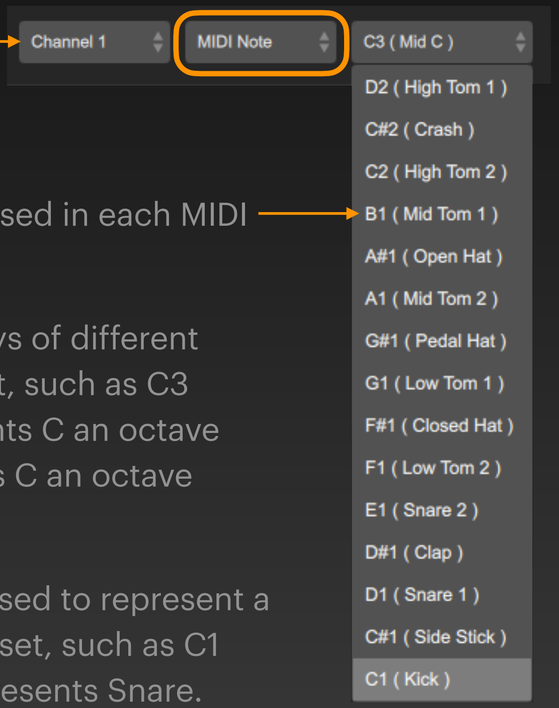
When the MIDI output signal is set to MIDI Note type, clicking the TAP button in the signal bar will send a MIDI note to that MIDI channel. Its velocity value can be set by the fader position, and the value range is 0 ~ 127.



MIDI Signal Types

When we send and receive MIDI messages in DigiShow, the most commonly used MIDI signal types are MIDI Note and MIDI Control Change.

The MIDI interface provides 16 channels for transmitting notes.

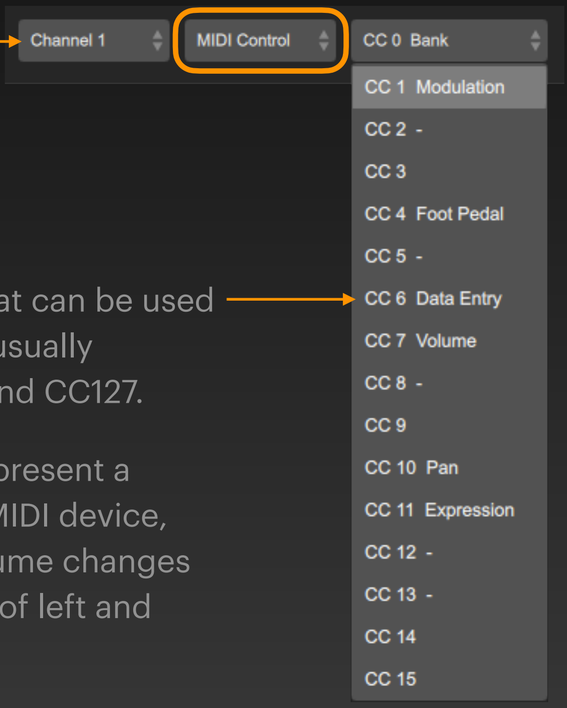


There are 128 notes that can be used in each MIDI channel:

MIDI notes can correspond to keys of different pitches on a keyboard instrument, such as C3 represents middle C, C2 represents C an octave lower than C3, and C4 represents C an octave higher than C3.

Some MIDI notes are also often used to represent a percussion instrument in a drum set, such as C1 often represents Kick and D1 represents Snare.

The MIDI interface provides 16 channels for transmitting control changes.



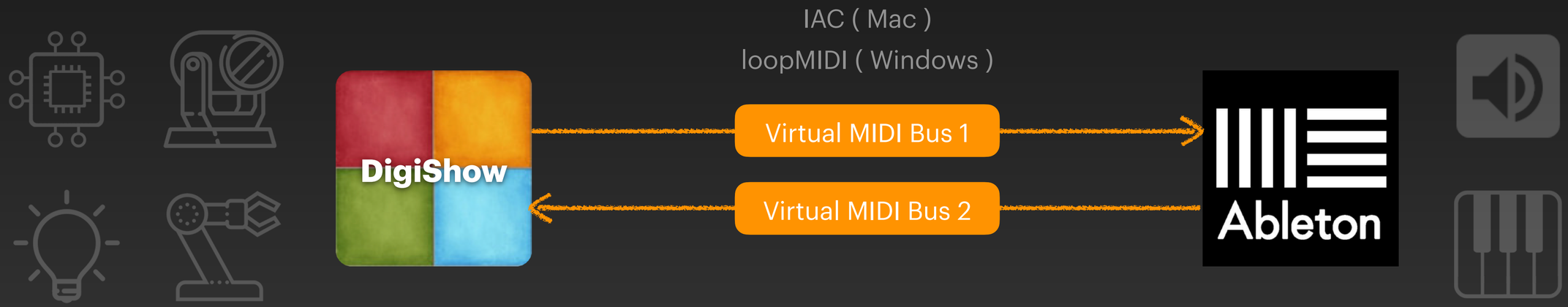
There are 128 control changes that can be used in each MIDI channel, which are usually represented as CC0, CC1, CC2, and CC127.

Each CC (control change) can represent a specific control parameter on a MIDI device, such as using CC7 to control volume changes and CC10 to control the balance of left and right channels.

Virtual MIDI Bus

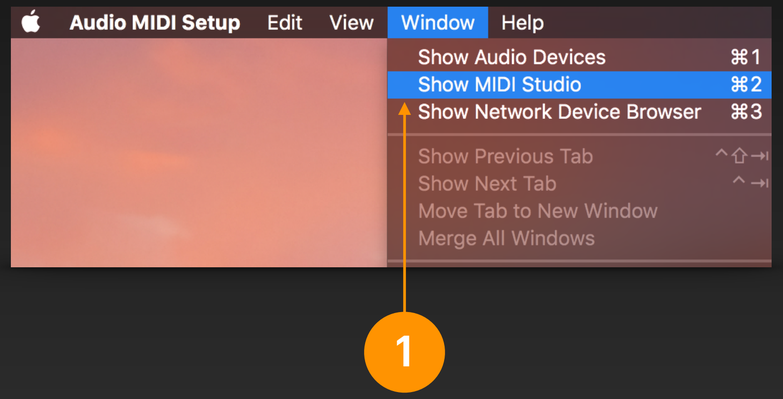
Virtual MIDI Bus

When multiple applications on a computer need to pass MIDI messages to each other, a virtual MIDI bus is set up in the operating system. DigiShow and another music software (such as Ableton Live) open the input and output ports of a virtual MIDI bus respectively to achieve communication and collaboration with each other.

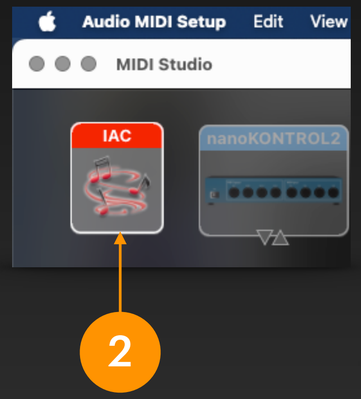


Configuring Virtual MIDI Bus on Mac

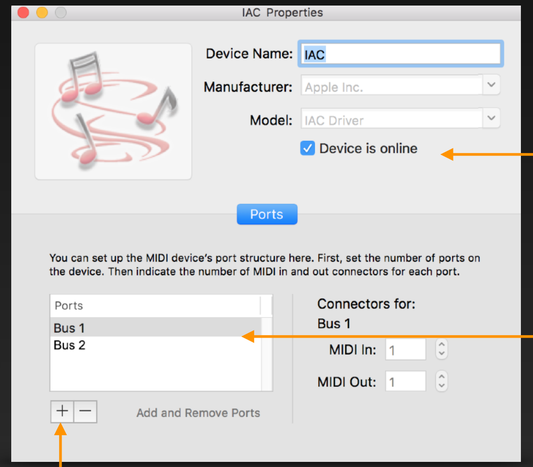
On a Mac, you can use the IAC driver built into the operating system to set up multiple virtual MIDI buses. This driver can be set up and activated in the Audio MIDI Setup utility.



Start the Audio MIDI Setup program in the Applications - Utilities folder and select Show MIDI Studio from the menu.



Double-click the IAC driver icon in the MIDI Studio window



In the IAC properties dialog box, check the Device is online option to activate it.

You can also rename the port if needed (by double-clicking the port name in the list)

You can also add more MIDI ports (buses) by clicking the + button *

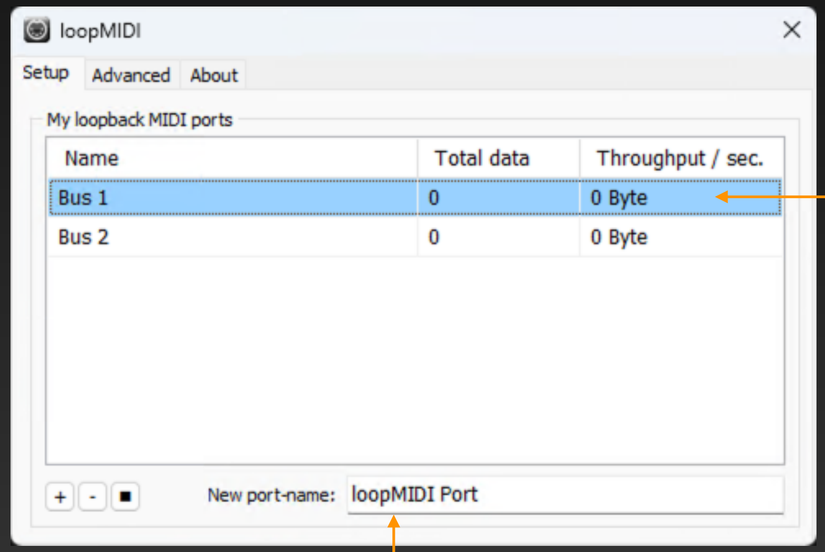
* Usually create multiple MIDI buses for different purposes, such as:
Bus 1 is used for DigiShow to output MIDI signals to other software,
Bus 2 is used for other software to output MIDI signals to DigiShow.

Configuring Virtual MIDI Bus on Windows

On Windows, you need to install the loopMIDI driver to set up multiple virtual MIDI buses. The loopMIDI driver installer is included in the Extra directory of the DigiShow installation package.

1

Launch the loopMIDI application to configure the virtual MIDI buses on your system



3

All virtual MIDI ports (buses) activated in the system are listed here *

* Usually create multiple MIDI buses for different purposes, such as:
Bus 1 is used for DigiShow to output MIDI signals to other software,
Bus 2 is used for other software to output MIDI signals to DigiShow.

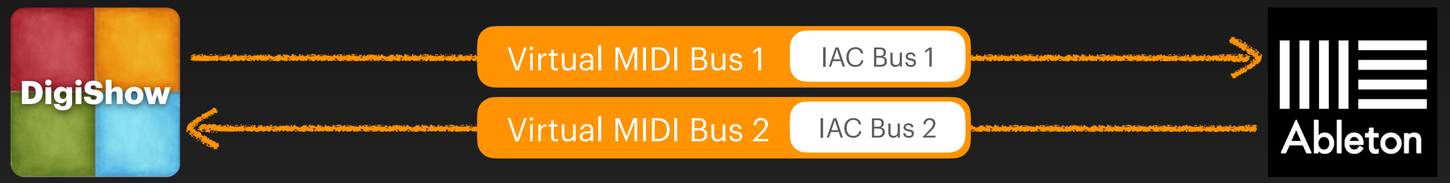
2

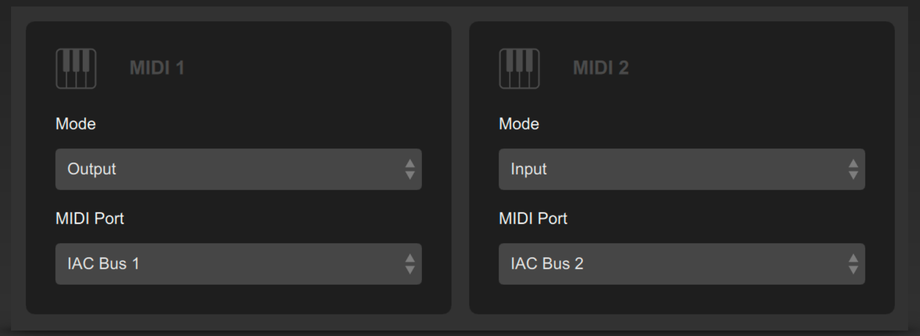
Enter the name of the virtual MIDI port (bus) to be created and click the + button

Configuring Virtual MIDI Bus Interface

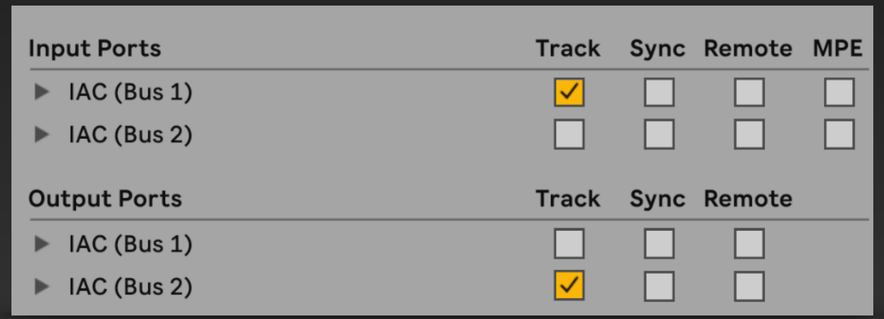
When implementing bidirectional MIDI communication between DigiShow and other software (such as Ableton) via two virtual MIDI buses, some necessary interface configuration is required.

In the system, set up two virtual MIDI buses





1. In DigiShow, in the MIDI section of the Interface Manager, configure Bus 1 as output and Bus 2 as input

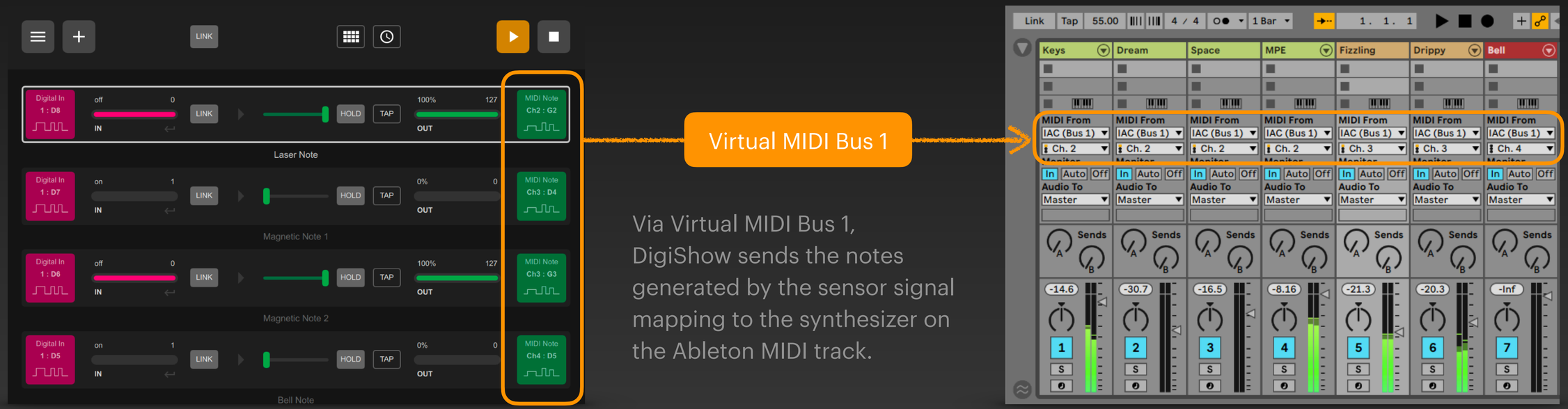


2. In Ableton, in the Link, Tempo & MIDI section of Preferences, configure Bus 1 as input and Bus 2 as output

Virtual MIDI Bus - Trick 1

Trick 1: Experimental Instrument Production (Output from DigiShow to MIDI Bus)

DigiShow obtains sensor trigger signals through Arduino and maps the signals into MIDI notes. The MIDI notes are transmitted to Ableton Live software via the virtual MIDI bus, and musical audio is generated through the synthesizer in Ableton.



DigiShow **Ableton**

Virtual MIDI Bus - Trick 2

Trick 2: Sound and Light Show Production (Input from MIDI bus to DigiShow)

Synchronize the music tracks and light tracks in Ableton, and use MIDI notes and CC curves to produce light scores on MIDI tracks. Transmit MIDI signals to DigiShow via virtual MIDI bus, and map them to DMX light control signals in DigiShow to drive lighting fixtures.

Ableton

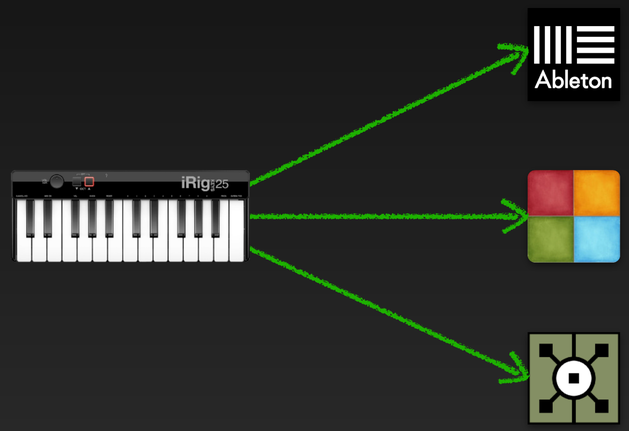
Virtual MIDI Bus 2

Transmit MIDI signals of the light scores created in Ableton to DigiShow via Virtual MIDI Bus 2 and map it to DMX light control signals

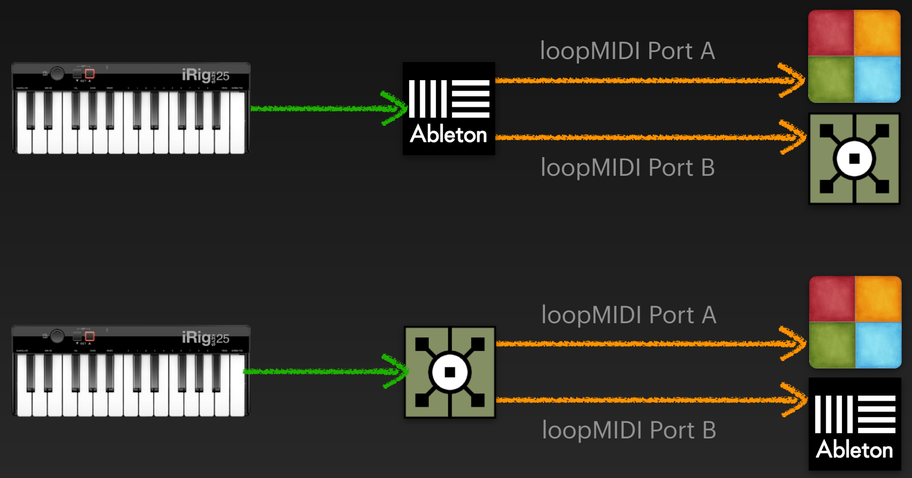
DigiShow

MIDI Port Sharing

We often encounter situations where multiple applications need to use the same MIDI device at the same time. The way to use shared MIDI ports is slightly different in different operating systems:



On Mac, a MIDI port can usually be opened and used by multiple applications at the same time. For example, when you play the keyboard, multiple applications can receive the notes played by it at the same time.



On Windows, a MIDI port can usually only be opened and used by one application at a time. For example, when playing the keyboard, multiple applications cannot receive the notes played by it at the same time.

However, loopMIDI can be used to create multiple virtual MIDI ports, and the MIDI port mapping function in each software can be used to solve the problem of multiple applications needing to share the same MIDI device at the same time.

Summary

- Learn about MIDI, such as MIDI Note and MIDI CC signal types
- Learn to use the MIDI interface in DigiShow for signal input and output with music device and software
- Learn to set up a virtual MIDI bus in the system
- Learn a few tricks to use DigiShow with Ableton