audio cubes

Getting Started
Welcome and Thank You!

Years ago we were feeling ourselves increasingly restricted by the existing tools for creating electronic music, because of their user interfaces. We felt ourselves and our creativity being controlled by technology, rather than having control over it. We started designing a new type of electronic musical instrument, a new performance tool ... a new way for musical expression and for exploring ... called the AudioCubes. We hope the cubes help you be creative and that they help you create great live performances. We hope you have a lot of fun with the cubes and share your experiences online at the Percussa website (www.percussa.com). Thanks a lot for buying the AudioCubes!

Software installation

Required Software

If you haven't installed the AudioCubes software yet, please refer to the enclosed printed “Software Installation” sheet included in your AudioCubes package.

If you don't have any internal MIDI ports installed on you system, please read on.
Installing internal (virtual) MIDI Ports for MIDIBridge

MIDIBridge requires 1 or more "Internal MIDI Ports". These internal MIDI ports will enable routing MIDI from MIDIBridge to third-party applications such as Ableton Live, Logic, Cubase, ...

Here's how to create one or more internal MIDI ports:

- **PC (Windows)**

  If you don't already have a MIDI Loopback Cable installed (such as Hubi's MIDI Loopback or Maple MIDI), just install LoopBe1 and follow the instructions. You can find LoopBe1 on the AudioCubes DVD (software\winxp\setuploopbe1.exe). In case you get a warning while installing the LoopBe1 driver, that the driver has not passed testing, you can safely ignore this warning and continue with the driver installation. After installing LoopBe1, a new MIDI port called "LoopBe Internal MIDI" will be available on your system. Use this port in MIDIBridge for internal MIDI routing.

- **Mac (OS X)**

  1) In Finder, choose Menu "Go" and select "Utilities".
  
  ![Finder window with Utilities selected](image)
  
  2) In the folder "Utilities" click on "Audio MIDI Setup.app"

  ![Audio MIDI Setup.app](image)

  3) In Audio MIDI Setup, click "MIDI Devices" on top in the middle.
4) Double-click on the big red icon "IAC Driver". A new window called "IAC Driver Properties" will open.

5) Activate "Device is online" checkbox, if it is not already active.

6) Choose "More Information".

7) In IAC Driver Properties, click on "Ports" in the middle (next to "Properties").

8) Click 4x button "Add Port". 4 IAC MIDI ports called "IAC Bus 1", "IAC Bus 2", "IAC Bus 3", "IAC Bus 4" will appear.

The IAC MIDI ports are now available as virtual MIDI ports on your system which you can use in MIDIBridge and other MIDI applications.
Recommended 3rd Party Software

For this tutorial you will need software that can create sound when it receives MIDI messages. We will show how to use the cubes with Ableton Live and Propellerheads Reason, two different applications for creating and recording music.

- If you received AudioCubes software on a CD or DVD, demo versions of the software is included
- If you downloaded AudioCubes software you can download a Live demo from http://www.ableton.com/ and a Reason demo from http://www.propellerheads.se/

Upgrading from previous software versions

If you downloaded a software update from the web for the AudioCubes, please read the following paragraph carefully.

The AudioCubes electronics inside the cubes need special software to run, called firmware. With each software update, we offer new features in the software on your Mac or PC. To make this software work, your AudioCubes firmware needs to be updated at the same time as updating the software on your Mac or PC.

To do this, please first read the Upgrade Manual before continuing to read this Getting Started manual.

Getting to know the cubes

Each face of the AudioCubes except the bottom and top have a communication port capable of transmitting and receiving digital or analog signals, using infrared light, to and from other cubes nearby. The cubes also have a USB port for sending and receiving data to/from your computer, and for charging the internal battery. Notice that the orientation of the cube can be easily recognized by the location of the USB port.

Charging the cubes can be done by connecting them to a USB port on your computer, or by connecting them to a powered USB hub. When the cubes are connected to a hub or computer which is not connected to mains power, the battery will charge about 5 times slower than normally, and the charging may draw power from your computer's battery in the case of a laptop. We recommend you always charge the cubes from a USB port on a computer or hub which is connected to mains power.

Fully charging the cubes takes about 3 hours, and they keep working without requiring a recharge for 3 to 5 hours depending on how they are used.
The cubes as a MIDI controller

One of the easiest ways to start using the cubes is as a computer interface for existing electronic musical instruments or software. This lets you get a first experience in a familiar environment and quickly understand the potential of the AudioCubes. One of the applications installed on your computer in the AudioCubes folder is called the MIDI Bridge.

It lets the cubes generate two types of information which can be sent to any MIDI (Musical Instrument Digital Interface) compatible software or musical instrument:

- MIDI Note-On messages (used to start sounds)
- MIDI Continuous Controller messages (used to change parameters of sounds)

Start the MIDI Bridge application on your computer. On PC, the application is in Start > Program Files > Percussa > AudioCubes. On Mac, the application is located in Applications > AudioCubes.

The icon in the AudioCubes folder for the MIDI Bridge looks like this:

![MIDI Bridge icon](image)

When the application starts a window will appear that looks like this:

![MIDI Bridge window](image)

Connect a cube to your computer using the supplied USB cable and click on the Cube 1 button.

This is the window you will use to assign a colour to your cubes and to choose how you want to use them in your work.

The central panel of the window shows the connected cube, seen from above, and the status of its 4 faces (the top and bottom face of the cube is not used).

Setting a colour
At the left of the window you can choose a colour for the cube you just connected:

Drag the black circle around over the colours and watch the cube change colour as you move the mouse.

**Setting mode**

Setting a cube mode is done through the panel located right under the colour panel:

You can tell the cube to work in any of three modes:

- **Sender**  
  In this mode the cube sends information about itself wirelessly to other cubes nearby.

- **Receiver**  
  In this mode the cube receives information about other cubes nearby, wirelessly.

- **Sensor**  
  In this mode the cube senses distance to an object nearby, such as another cube or your hands.

The Sender and Receiver modes are used together to generate events when cubes detect each other.

These events are automatically translated into MIDI note-on messages by the MIDI Bridge and sent to music software (e.g. Ableton Live) or MIDI devices, to start playing music or sounds.

Do the following:

- Select the Sender mode for your cube.
- Disconnect it, and connect another cube.
- Choose a colour and set the Receiver mode, and leave this cube connected.
Using the cubes together

Move the Sender cube right next to the Receiver cube which is still connected to your computer and within about 10cm (4 inches). Make the faces of the cubes align.

Notice how the face number changes and how one of the note triggers flashes when the Receiver detects the Sender:

Rotate the Sender cube 90 degrees and notice how the face number changes again, and how a different MIDI note is selected. Each time the cube is rotated it generates a different MIDI note.

Trying one of the demos
Now that the cubes are generating MIDI notes, you can choose to continue this tutorial in Ableton Live or in Propellerheads Reason. You can skip to the chapter below for the demo you prefer.

Using the cubes with Ableton Live

Sending MIDI to Live

When the MIDI Bridge was started, no MIDI output port is selected. If you want to send the events created by the cubes to Ableton Live, you need to use a MIDI Loopback. This is a virtual “pipe” between two MIDI compatible programs running on your computer (e.g. the MIDI Bridge and Ableton Live). To the right side of the MIDIBridge window, you will find a panel to choose a MIDI output port and channel.

![MIDI Output Panel](image)

If you are on Mac, select “IAC Driver (IAC Bus 1)”. If you are on PC, select “LoopBe Internal MIDI”. Make sure to select channel 14 (click and drag the number box to change the channel), used by the examples for Live in this tutorial.

Configuring Live to receive MIDI

Start Ableton Live on your computer and keep the MIDI Bridge open.

- On Mac, go to the Live menu and select Preferences.
- On PC, go to Options > Preferences.

![MIDI Settings](image)

A menu will appear similar to the screenshot above. Select the MIDI tab on the left hand side of the window to display the MIDI options. Next, set the Track and Remote buttons as shown for LoopBe Internal MIDI (PC) or IAC Driver Busses 1 and 2 (Mac).
Loading and playing the example Live set

- On Mac, go to the AudioCubes folder in Applications on your computer, and click on the sounds folder to open it.
- On PC, go to Start > Programs > Percussa > AudioCubes and click on the sounds folder to open it.

Go into the Live demo folder and double click the file to open it in Ableton Live. If this is the first time Live starts, it will need to install its sound library, which might take a few moments. This is normal.

The Live set we created contains 4 audio tracks each with 4 clips in it. Each of the 16 combinations of the faces of the Sender – Receiver cube pair corresponds to one of the audio clips.

Try moving the Sender cube around the Receiver cube and try various combinations of faces. You will notice how the location of the Sender cube and its orientation determine which sound is being played.

If you would like to stop the playback of the sounds, you can press the stop button at the top of the screen, in the middle. Alternatively you can press the SPACE BAR on your keyboard to start/stop the music.

Controlling cube colour from Live

Besides choosing a fixed colour for the cube connected to your PC, you can also control the colours from any MIDI application or controller that can send continuous MIDI controllers.

In Ableton Live, Double click the MIDI clip in the example Live set to display it:

An editing window will open at the bottom of the screen showing the data in the MIDI clip, similar to this:
This represents a change in intensity in time of the red light source inside the connected cube. Notice the controller number on the left side of the editing window (14):

The cubes use three light sources internally. One light is red, one is green and the last one is blue. Mixing those 3 fundamental colours in various intensities creates many combinations (up to 4096). Controller number 14 is used for Red, 15 for Green and 16 for Blue.

When you click the play button on the MIDI clip, you will notice that it starts playing at the same tempo as the audio clips in the Live set.

When we send the data in the MIDI clip to the MIDI Bridge application, the colour of the cube will change.

To do this, first select a virtual MIDI port on the track of the MIDI clip under the “MIDI To” heading:

If the "MIDI To" heading is not displayed, you can make it visible by clicking the IO button on the far right of the screen in Live:
Next, go to the MIDI Bridge, and on the left side of the window, select the same MIDI port as you just selected in Live:

When you now click “Receive from MIDI In”, you will notice that the cube will fade from dark red to bright red, according to the MIDI clip in Ableton Live. Notice how the number displays under the colour picker (CC 14 / 15 / 16) will start changing.

Control effects in Live with sensor cubes

Apart from using the cube connected to your computer to detect other cubes which are wireless, you can also let the cube measure the distance to other objects, such as your hands, or other cubes, and use that to apply effects to the sound.

This is done by setting the cube in sensor mode, using the mode select panel at the left hand side of the MIDI Bridge:
Click on the “Sensor” button to switch the cube into sensor mode. Next, go to the panel in the middle where the cube is shown and the status of its faces. Let's choose one of the faces to change a parameter of a sound effect in Ableton Live. For example, the face on the right (Controller number 12) :

Move your fingers closer and further away of the sensor on the right side of the cube. This is face 3 in the following drawing :

Before using the cube, you will have to calibrate its faces. This is an easy and fast process. To do so, move the cube away from any surrounding objects (including your hands) and press the button "Calibrate" (bottom right).
Now move your finger in front of one of the cube's faces. Notice how MIDIBridge shows the sensor value.

Almost certainly, the sensor value will not reach the top in the display. This means that the sensor range is not yet optimal. To make it better, adjust the gain slider on the top until the range is good.

Next, go back to Ableton Live and click on the Master channel in the Live set we opened earlier.

Notice the effect icon at the bottom-right of the screen indicating that there is an effect through which all the sound passes.

Click on this effect icon to display the effect:
This effect will filter out certain frequencies of the sound while we are playing it back. Let's say we want to change the frequency above which the sound is attenuated (lowered in volume), called the cutoff frequency. In the example Live set, the cutoff frequency has already been assigned to the distance measured by the sensor on the right side of the cube, such that we don't need to do this manually.

Go back to the MIDI Bridge, and activate the enable checkbox (bottom right):

Next, set the MIDI output channel to 2:

Now, go back to Live, and move your fingers in front of the sensor on the right side of the cube.

You should now be able to see the cutoff frequency change and the graph move, as you move your fingers closer and further away of the sensor.

You can of course use one cube pair to generate MIDI triggers (Receiver connected to your computer with USB) and another cube at the same time as a sensor (also connected using USB), to send continuous controllers. Up to 4 cubes can be directly connected via USB to your computer, and edited through the panels Cube 1..4.

Using the cubes with Propellerheads Reason

Installing the Reason Remote Codec

Reason is a well known computer application for making music, and offers a complete suite of effects, instruments, and sequencers.

The AudioCubes are supplied with a Remote Codec for Reason, which makes it easier to map MIDI messages from the AudioCubes to settings in Reason, with minimal configuration work.

We will now go through setting up the codec on your computer, assuming you have already installed Reason 4 (demo or full version).

Setting up the cubes with Reason prior to version 4 is also possible, through setting up a generic control surface in Reason and using MIDI learning. The Remote Codec discussed in this manual does not work in versions of Reason prior to version 4.

- If you are on PC, the Remote codec has already been installed by the installation wizard in C:/Documents and
Settings/All Users/Application Data/Propellerhead Software/Remote

- If you are on Mac, go to the AudioCubes folder in Applications, and into the subfolder codecs. You will find an icon similar to the following:

```
AudioCubes Remote
Codec.mpkg
```

Double-click the icon and the installation wizard will start. Follow the instructions to install the codec on the same volume on your computer on which you installed Reason 4 (in most cases your startup disk). The wizard will install the codec in the following location: /Library/Application Support/Propellerhead Software/Remote

When done, you can start Reason 4.

### Configuring the MIDI Bridge to send to Reason

When the MIDI Bridge was started, no MIDI output port is selected. If you want to send the events created by the cubes to Propellerheads Reason, you need to use a MIDI Loopback. This is a virtual “pipe” between two MIDI compatible programs running on your computer (e.g. the MIDI Bridge and Propellerheads Reason). To the right side of the MIDIBridge window, you will find a panel to choose a MIDI output port and channel. Select the IAC Driver IAC Bus 1 port (Mac) or LoopBe1 Internal MIDI (PC) as output port. Select channel 1.

![MIDI Output](image)

### Configuring Reason to receive from the MIDI Bridge

With Reason 4 running, go to the menu Reason > Preferences. Click on the top drop down menu and select Keyboards and Control Surfaces. Click on the Add button to add a control surface.
Click on the Manufacturer drop down menu and select Percussa. From the Model drop down menu, select CubeControl. Next, go to the In and Out drop down menus at the bottom, and choose the IAC Driver IAC Bus 1 (Mac) or LoopBe1 Internal MIDI (PC) port for the In and Out port. Click the OK button to add the Cube.

After adding the cube, note the message "This is the master keyboard". You can turn this off by clicking the button "Use No Master Keyboard".
If you don't turn this off, the cube triggers will be sent as notes to the Reason devices, which is not what we'd like to do for this tutorial.

**Loading the demo song**

- On PC, go to the AudioCubes folder in Start > Program Files > Percussa > AudioCubes.
- On Mac, go to the AudioCubes folder in Applications.

For both platforms, browse the sounds folder and load the Reason 4 demo song, which uses the codec.
When you first load the song, you will notice there is a Redrum drum machine in the Reason rack. If you can't see it, you can scroll through the rack using the vertical scroll bar.

To play the song and start the pattern sequencers in the Reason rack, press the SPACE BAR on your keyboard. To stop playing, press the SPACE BAR again. When you want to try playing with the cubes and Reason in this demo and want to hear the effect of what you're doing, it is necessary to keep Reason playing.

**Controling the pattern sequencers**

Next to the Reason rack, there is the sequencer window. Go to this window and click on the drums track to focus on the Redrum drum machine in the rack.

Move the sender cube in front of the receiver cube. Each time you turn the sender cube, a different MIDI note will be sent by the MIDI Bridge. The note will be received by the Remote codec and the Redrum drum machine, and will select a different pattern on the Redrum.
One face corresponds to patterns 1-4, another to 5-8 and a third face to banks A-D.

See the diagram below which summarizes this default assignment to select patterns using a cube sender/receiver pair.

If you go back to the sequencer window and select the bass matrix step sequencer, you can repeat the same pattern selection as with the Redrum. The cube is "connected" with the Reason module in the rack for which you selected the track in the Reason sequencer.
Pay attention to the pattern keypad on the matrix sequencer.

Notice how the pattern selection changes when you rotate the sender cube when it is next to the receiver cube.

**Selecting tracks**

Besides selecting patterns on Reason devices, the cubes can be used to select tracks in the Reason sequencer.

In the example song you just loaded, one of the faces of the receiver cube has been pre-assigned to select tracks.

See the diagram below for an overview of how to position the sender and receiver cubes to move the track selection up or down. The receiver cube is always the cube with a connected USB cable, while the sender cube is always wireless.
Controling synthesizers with cube sensors

Apart from using the cube connected to your computer to detect other cubes which are wireless, you can also let the cube measure the distance to other objects, such as your hands, or other cubes, and use that to apply effects to the sound.

This is done by setting the cube in sensor mode, using the mode select panel at the left hand side of the MIDI Bridge:

Click on the “Sensor” button to switch the cube into sensor mode. Next, go to the panel in the middle where the cube is shown and the status of its faces. Let's choose one of the faces to change a parameter of a sound effect in Propellerheads Reason. For example, the face on the right (Controller number 12):
Move your fingers closer and further away of the sensor on the right side of the cube. This is Face 3 in the following drawing:

Before using face 3, you will have to calibrate it. This is an easy and fast process. To do so, move the cube away from any surrounding objects (including your hands) and press the button "Calibrate" (bottom right).

Now move your finger in front of face 3. Notice how MIDIBridge shows the sensor value.
Almost certainly, the sensor value will not reach the top in the display. This means that the sensor range is not yet optimal. To make it better, adjust the gain slider on the top until the range is good.

Next, repeat the sensor calibration procedure (without the need to press "Calibrate" again) above for the face of the cube which has the USB connector. This is face 4 in the diagram below:

When finished, enable the sensors by clicking the enable checkbox for both faces:

Now, go back to Reason, and focus on the Subtractor synthesizer in the Reason rack, by clicking the "bass" track in the Reason sequencer.
Next, touch face 4 with one finger, keep the finger there, and then touch face 3 with another finger, slowly moving this finger closer to the face and further away from the face while you keep your finger on the sensor of face 4.

Notice how the pitch bend wheel of the subtractor synth moves as you move your face 3 finger.

As an exercise, keep your face 3 finger steady, and then release your face 4 finger and notice how the pitch bend wheel stays constant and no longer moves.

This is because face 4 is defined in the Remote codec as the face that "enables" the other faces of the sensor cubes for controlling synthesizer parameters in Reason.

As a final note, you can of course use one cube pair to generate MIDI triggers (Receiver connected to your computer with USB) and another cube at the same time as a sensor (also connected using USB), to send continuous controllers. Up to 4 cubes can be directly connected via USB to your computer, and edited through the panels Cube 1..4.

**Conclusion**

This is the end of the Getting Started manual. We recommend you read through the reference manual to get the most out of your cubes, and to learn more about the advanced features and uses such as:

- Assigning MIDI notes to clips
- Assigning MIDI controllers to sensors
- Using the cubes as a lo-fi sound generator / processor
- Using the cubes with Max/MSP and integrating them in your own patches

The reference manual is of particular importance since it includes safety instructions, and how to take care of your cubes and the built-in rechargeable batteries. It also contains information about the battery autonomy and
instructions for charging the batteries over USB. Please take the time to read this manual in-depth to make sure you do not void the warranty on the AudioCubes.

The Percussa website is a great source for information about the cubes. Be sure to register with your email address to receive the latest updates about the software, free sound packs, tutorials, news about artists using the cubes, and participate in our user's forum.

We hope you have fun with the cubes and that you will explore their creative potential.

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