

# MIDI usage for modeling and animation in Houdini

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## ABSTRACT

The hands-on workshop for computer graphics professionals introduces the technique and practical implementation of the usage of MIDI devices in Side FX Houdini software as a relatively easy way to supercharge creative workflows. This technique can significantly improve speed and quality of modeling, animation, and creative iteration for Houdini professionals, especially technical artists, and game artists. It can also present the alternative to the random procedural asset generation or work in conjunction with it and improve results from procedural generators. The workshop covers the brief history of MIDI, practical advice on how to choose the appropriate controller for the specific design needs, and overview of built-in Houdini MIDI workflows and presents a customized approach for creating Houdini digital assets for MIDI mapping in Python.

## CCS CONCEPTS

• **Human-centered computing:** • **Interaction techniques;**

## KEYWORDS

MIDI controllers, 3D modeling, Iteration, Animation, Embodied interaction

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## 1 INTRODUCTION

Unlike the popular game engines (Unity, Unreal), Houdini is not supposed to be generally used for real-time manipulation of geometry, triggering, and creating animations. But nevertheless, Houdini 18.5 viewport rendering allows to manipulate 3D assets that are created for games (low to mid-poly count). MIDI-in node in Houdini provides powerful integration for most existing MIDI controllers. However, the interaction paradigm of Houdini as a digital content creation software generally contradicts the idea of real-time asset manipulation just because of the limitations of rendering. The lack of the plugins, workflows and frameworks for effortless MIDI mapping currently prevents creative professionals from using Houdini for real-time workflows. Our MIDI Automapper solution and the workflow aims to change this.

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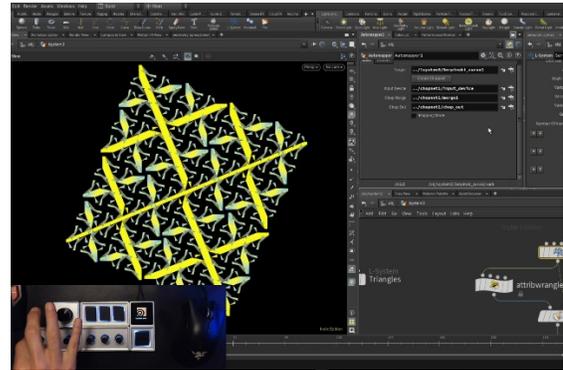


Figure 1: SideFX Houdini interface with the MIDI controller mapped to the parameters of L-System with the superimposed image of the Monogram MIDI controller.

The MIDI In CHOP receives MIDI events from midi devices connected to the serial port, reads MIDI events internal to the workstation (i.e. the built-in software synth), and interprets musical scores in MIDI files [SideFX, 2021]. However, the approach offered in the workshop has nothing to do with music and only uses the ability to read control changes from the connected MIDI controller.

Houdini allows to expose almost every parameter of any object as data, and the data can be mapped to and controlled with MIDI device. MIDI offers the opportunity to control multiple values at the same time which could lead to significant workflow improvements [Wigdor and Wixon, 2011] and open many new creative possibilities due to embodied, synesthetic interaction [Haverkamp, 2013] which uses all ten fingers, like playing music.

Currently there is no built-in way to build a mapping automation tool in Houdini, so in addition to explaining the creative rationale behind the MIDI mapping, the workshop also offers a hands-on guidance on how to build plugins for MIDI in Houdini using Python.

## 2 COURSE LEARNING OBJECTIVES

1. Learn history behind MIDI standard
2. Understand creative rationale behind MIDI mapping for asset creation and manipulation
3. Create simple procedural geometry with L-System with several variables suitable for mapping
4. Understand limitations and considerations for asset creation with real-time MIDI controls
5. Learn an efficient way to design an HDA that automatically creates node networks in MIDI CHOP and implement intuitive 1-click mapping with Python

In the end of the course students will understand new workflow and the directions on how to extend HDA code to accommodate individual design preferences.

## REFERENCES

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