

MIDI sequencing in Logic (Lecture Outline)

1. Review: What MIDI is

Musical Instrument Digital Interface

Protocol (syntax, language) that allows computers, musical instruments and other hardware to communicate.

Roland founder Ikutaro Kakehashi proposed the idea of a standard instrument language to the other major instrument manufacturers in 1981. Over the next year, representatives from every major manufacturer worked together to create MIDI. An early instance of open-source tech: creators believed MIDI could only succeed if every manufacturer adopted it, so “we had to give it away” (Dave Smith, pres. of Sequential Circuits).

Terminology

A MIDI setup includes

- MIDI hardware like controllers, synthesizers, and computers
- software that interprets, edits, or generates MIDI information
- the interfaces and connectors that link all these things

You will hear people say “a MIDI” to refer to all sorts of things like:

- a Standard MIDI file (.mid)
- a MIDI controller (keyboard, DrumKAT, etc.)
- a MIDI interface

Don't do this. “MIDI” is not a noun unless it refers to the actual MIDI protocol, as in “We use MIDI to control our stage lighting” or “MIDI 2.0 came out in January 2020”. Otherwise say what specific **thing** (DAW, keyboard controller, drum machine, etc.) you're referring to, with “MIDI” as an adjective: a MIDI controller, a MIDI sequence, a MIDI app., etc.

MIDI Messages

MIDI consists of **performance instructions**, not audio!

Channel messages

A channel is usually implemented as a **track** in your DAW

The basic channel message is the **Channel Note** message

When you press a key on a MIDI keyboard controller, a MIDI **note event** is created

- **Note On:** begin playing this note
 - Note number, 0-127. middle C is 60; C# is 61; C5 is 72, etc.
 - Velocity, 0-127: how fast, i.e. how hard, the key was depressed
- **Note Off:** stop playing this note
- Pressure, 0-127: how hard the key is pushed after being depressed (aftertouch)
- Pitch bend (0-127, or -64 to +63)
- Other **controller** messages (sustain, mod wheel, MIDI pan, MIDI volume, etc.)

System messages (go to all channels)

- Time Code, Beat Clock (control synchronization and tempo)

System Exclusive messages (SysEx)

- information specific to a unique device, for ex. to control the waveform parameters of a programmable synth
- works however the receiving device's programmer has set it up: a “private” message with non-standard syntax

2. Sequencers and Software Instruments

- MIDI sequencers record strings (sequences) of MIDI data
 - Standalone sequencers (mostly obsolete)
 - On-board sequencers (limited by screen size and computing capacity)
 - Software sequencers (most common today)
- Software Instruments: Sounds produced by DAW's internal software synths
 - "synth" in broadest sense: includes sample-based instruments
 - Controlled via Software Instrument tracks in Logic; Logic is talking to itself
 - Logic can also control other MIDI devices (External MIDI track)

3. Entering MIDI data

- Screen keyboard (command-K) for Musical Typing on QWERTY keyboard (velocity, other controllers not responsive to keystroke pressure, but can be set)
- Keyboard MIDI controller
- Other controllers: drum, wind, string, etc. See Wikipedia, "[MIDI controller](#)"
- Draw in Piano Roll Editor with Pencil tool

4. Editing MIDI data

- **in Piano Roll Editor**
 - Change pitch, position (note the "snap" settings), velocity
 - Quantize timing, velocity
 - Quantization options: hard, soft, swing, custom
 - Humanize
 - Controller data: pitch bend, modulation, aftertouch, MIDI volume, sustain, etc. via Automation
 - Other interfaces: Score Editor (in Editor panel), Event List (via Window menu)
- **in Region Inspector**
 - applies to entire region (can't select individual events)
 - more quantizing functions
 - slightly different interface parameters
 - Groove Template
 - Smart vs Classic Quantize
- Non-destructive editing: Logic retains original MIDI data (timing, velocity, etc.) but displays and plays back according to quantize settings. To restore original positions etc. in the Editor, select Functions > Dequantize; in the Region Inspector, set Quantize to Off.

5. Global tracks: tempo and meter

- Show/Hide: expansion arrow to the left of the Ruler, or type G for **Global**
- Which global tracks display: Tracks > Global Tracks > Show...
...or control-click in Global Track header
- Tempo, Tempo curve
- Signature
 - Time Signatures
 - Key Signatures (affects loops, chord symbols)

6. Bouncing MIDI to Audio

- Bounce in Place
- To enable operations not possible with MIDI tracks