MIDI Standard

Gabriel Rovesti - 2103389

July 3rd, 2024

Mobile Programming and Multimedia

2023-2024

UNIVERSITÀ DEGLI STUDI DI PADOVA

DIPARTIMENTO MATEMATICA

Overview

- MIDI: definition and representation
- Types of information
- Types of messages and structure
- Channel/system messages
- General MIDI mode
- Devices and connections (with example)
- Conclusions

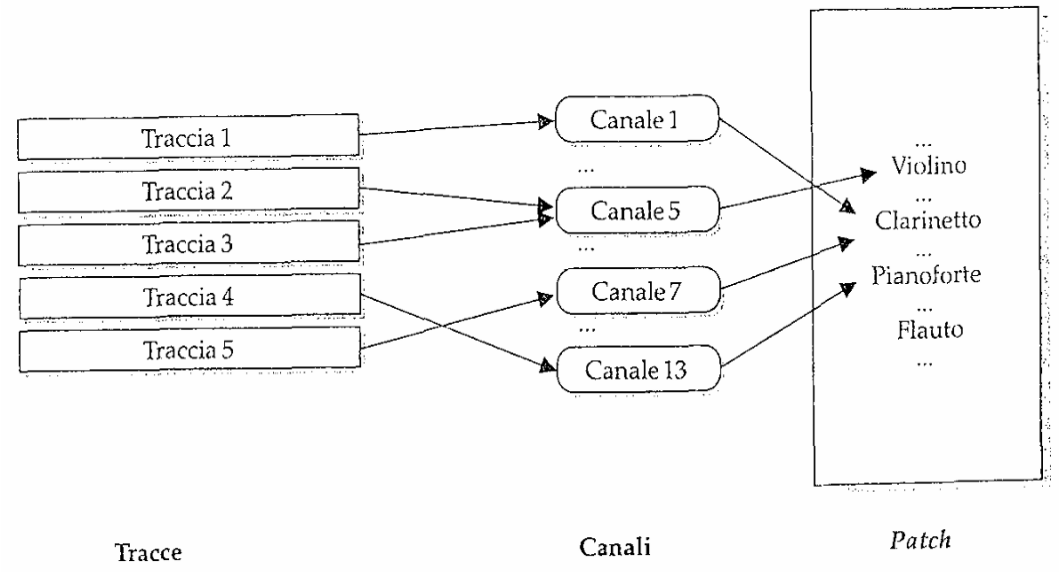
MIDI: what is it?

Source: midi.org

- Communication protocol allowing electronic instruments to connect/exchange real-time data
- Represents musical scores using a specific scripting language
- Efficient compression, ideal for web and background music
- Coding not completely standard and requires specific equipment
- Mainly used for music composition and supports only western music

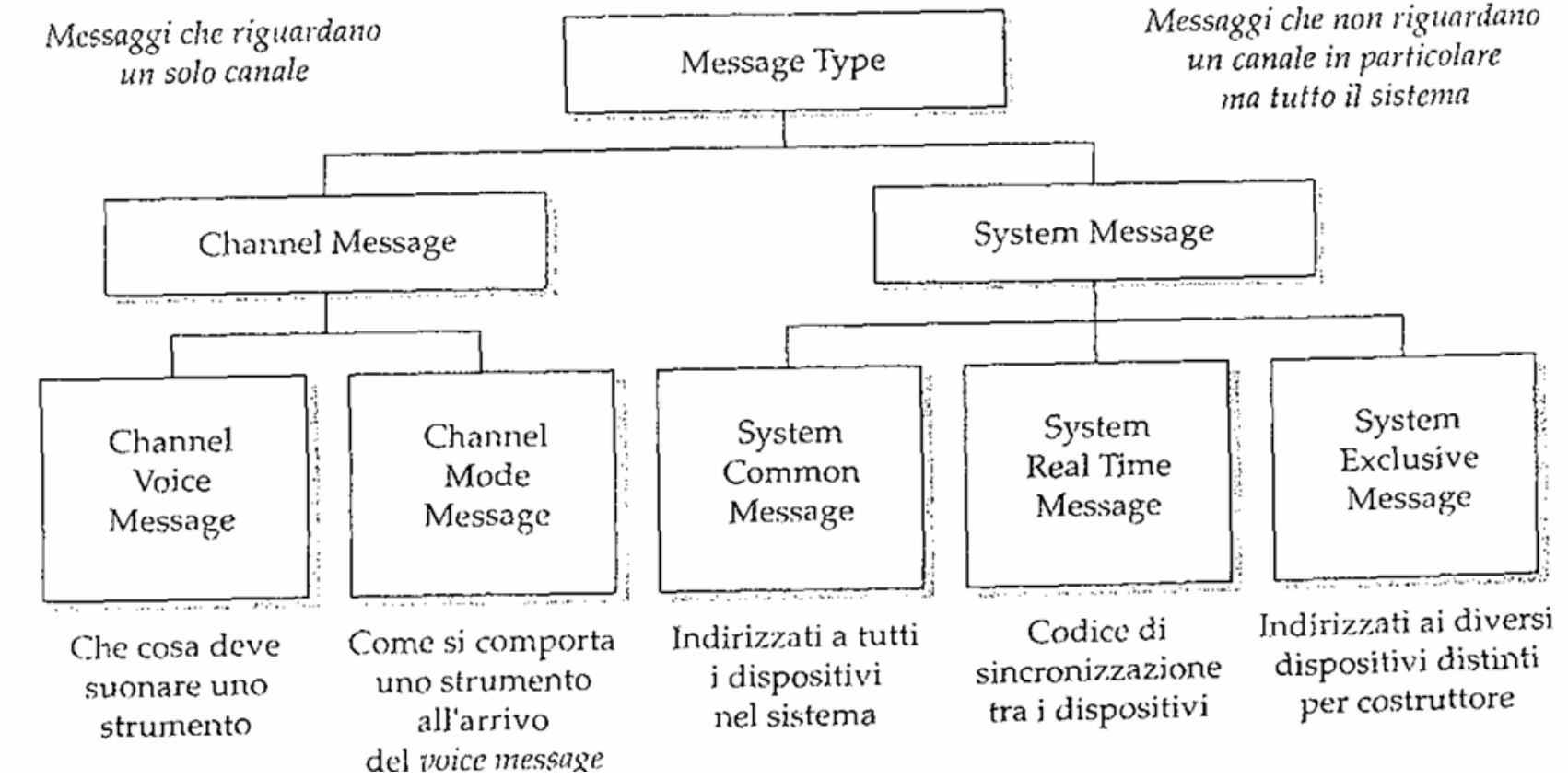
Types of information

- **Channels**
  - *Means* through which send music events
- **Tracks**
  - (Container of) *Sequences* of MIDI messages
  - Each track is associated to one or more channels
- **Patches**
  - *Pitch* produced by a generator
  - Each channel is associated to one patch



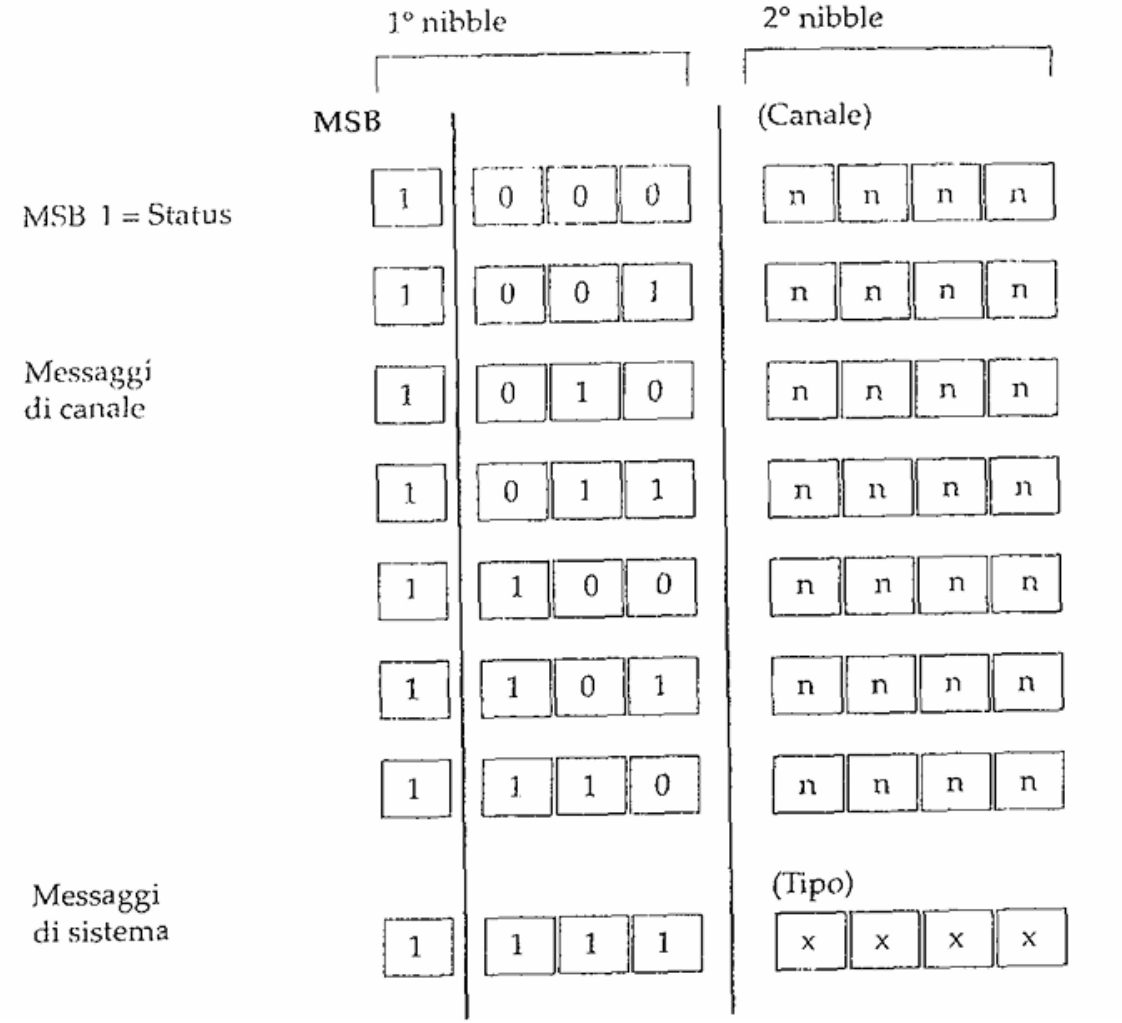
Source: Audio e Multimedia – Valle/Lombardo

Types of messages



Source: Audio e Multimedia – Valle/Lombardo

Structure of messages

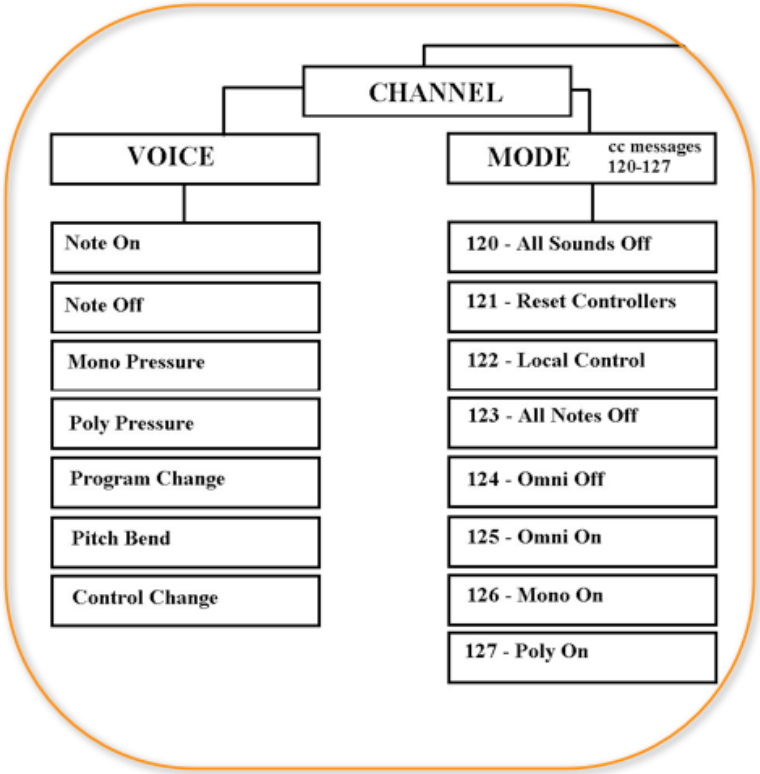


Source: Audio e Multimedia – Valle/Lombardo

Channel messages

- **Voice messages**
  - Musical events to be played by an instrument
  - There are different <u>types</u>
    - *Note On / Note Off*
    - *Channel / Polyphonic Key Pressure*
    - *Pitch Bend / Program / Control Change*

- **Mode messages**
  - How an instrument behaves when voices messages arrive
  - There are different <u>types</u>
    - *Omni On / Omni Off*
    - *Mono / Poly*



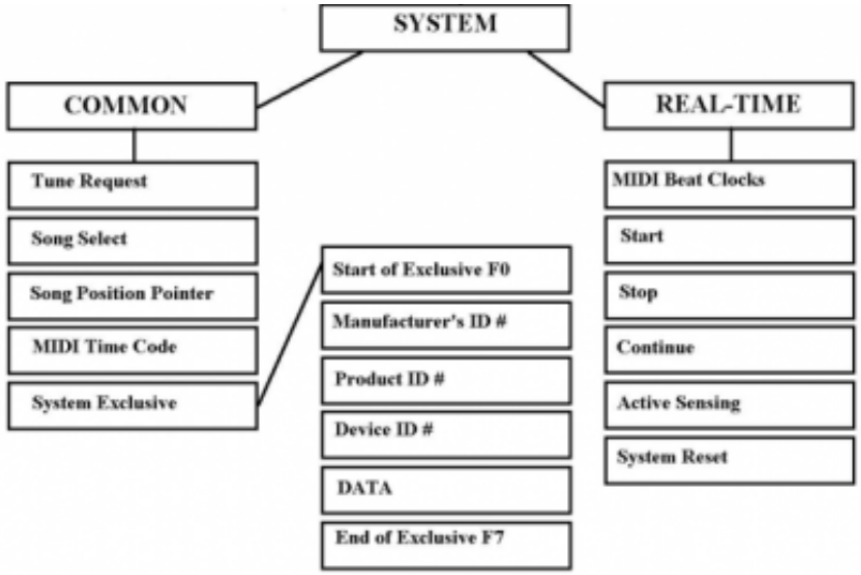
Source: Wikiaudio

System messages

- **Common messages**
  - *General system functions* across the system
  - There are different types
    - *Song Select / Song Position Pointer*
    - *Tune Request*

- **Real-time messages**
  - Synchronization of different system modules
  - There are different types
    - *MIDI Clock*
    - *System Reset*
    - *Start/Continue/Stop*

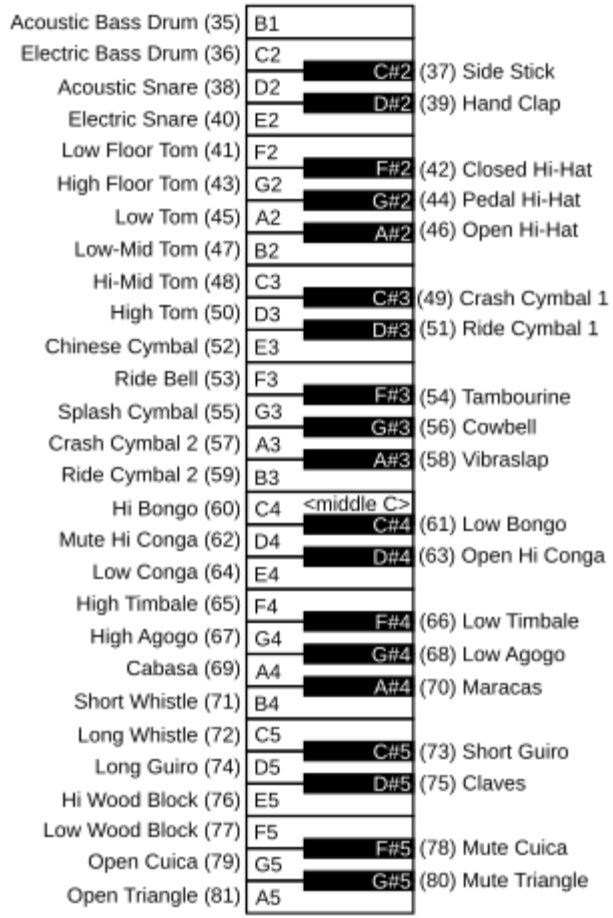
- **Exclusive messages**
  - Non-standard messages for specific manufacturers



Source: Wikiaudio

General MIDI Mode

- Encoding specifying a priori channels/patches/timbres association
- All compliant MIDI instruments meet a certain set of features and presets
- GM attaches specific interpretations to many parameters
- There is no standard way to associate patches to a particular channel
  - E.g., Roland/Yamaha defined their own internal standards



Source: Wikipedia

Devices and connections

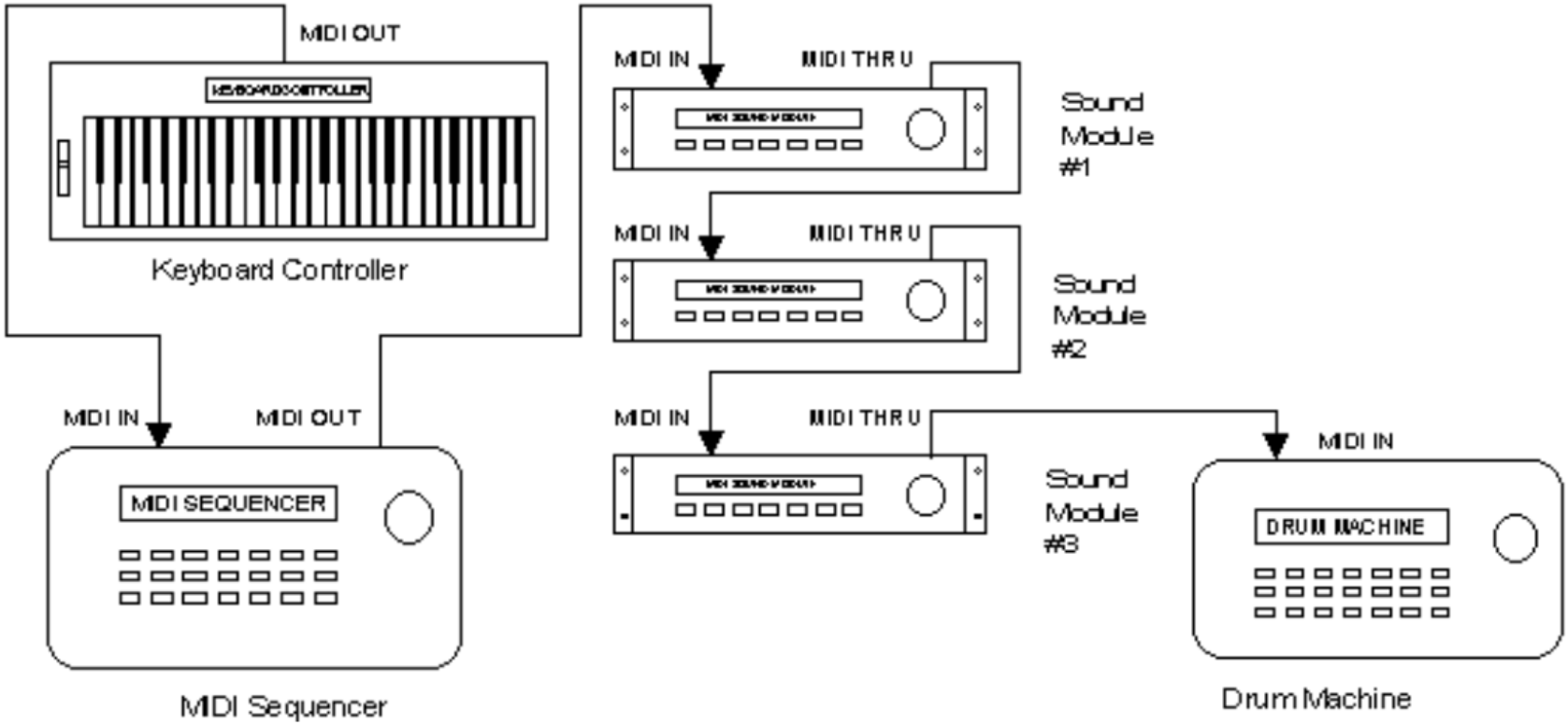
- MIDI also establishes which physical connections should be made (*interfaces*), via DIN connectors

- There are three *types* of ports: In/Out/Thru

- They can easily form a network providing *interconnectivity* between different *devices* (e.g., daisy chaining, Thru Boxes)

Source: MIDI 1.0 Specifications

A MIDI System Example



Source: academictutorials.com

Conclusions

Pros

- Very flexible and editable in instruments configuration
- Files are very small and generally sound good
- It allows for easy editing for both professionals/amateurs
- Can be used both for modern and vintage technology

Cons

- It depends on the quality of chosen playback devices
- Encodes only standard music and uses only 60 channels
- Limited addressing with 16 channels
- Requires specific hardware