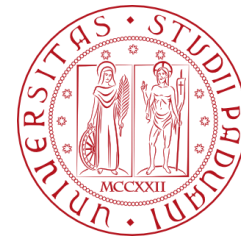


MIDI Standard

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

MIDI: what is it?



MIDI

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**

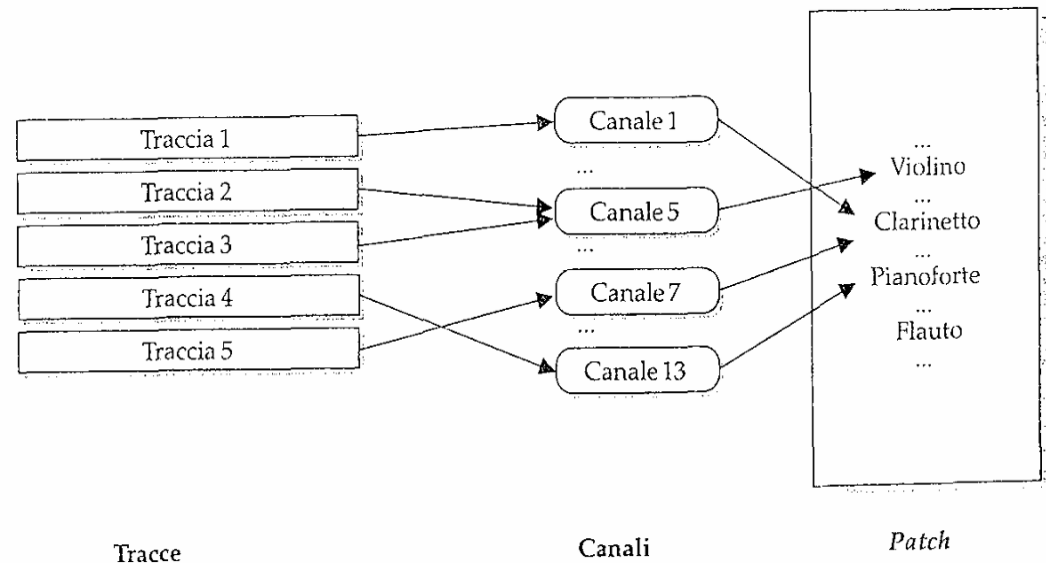
- *Means* through which send music events

- **Tracks**

- (Container of) *Sequences* of MIDI messages
- Each track is associated to one or more channels

- **Patches**

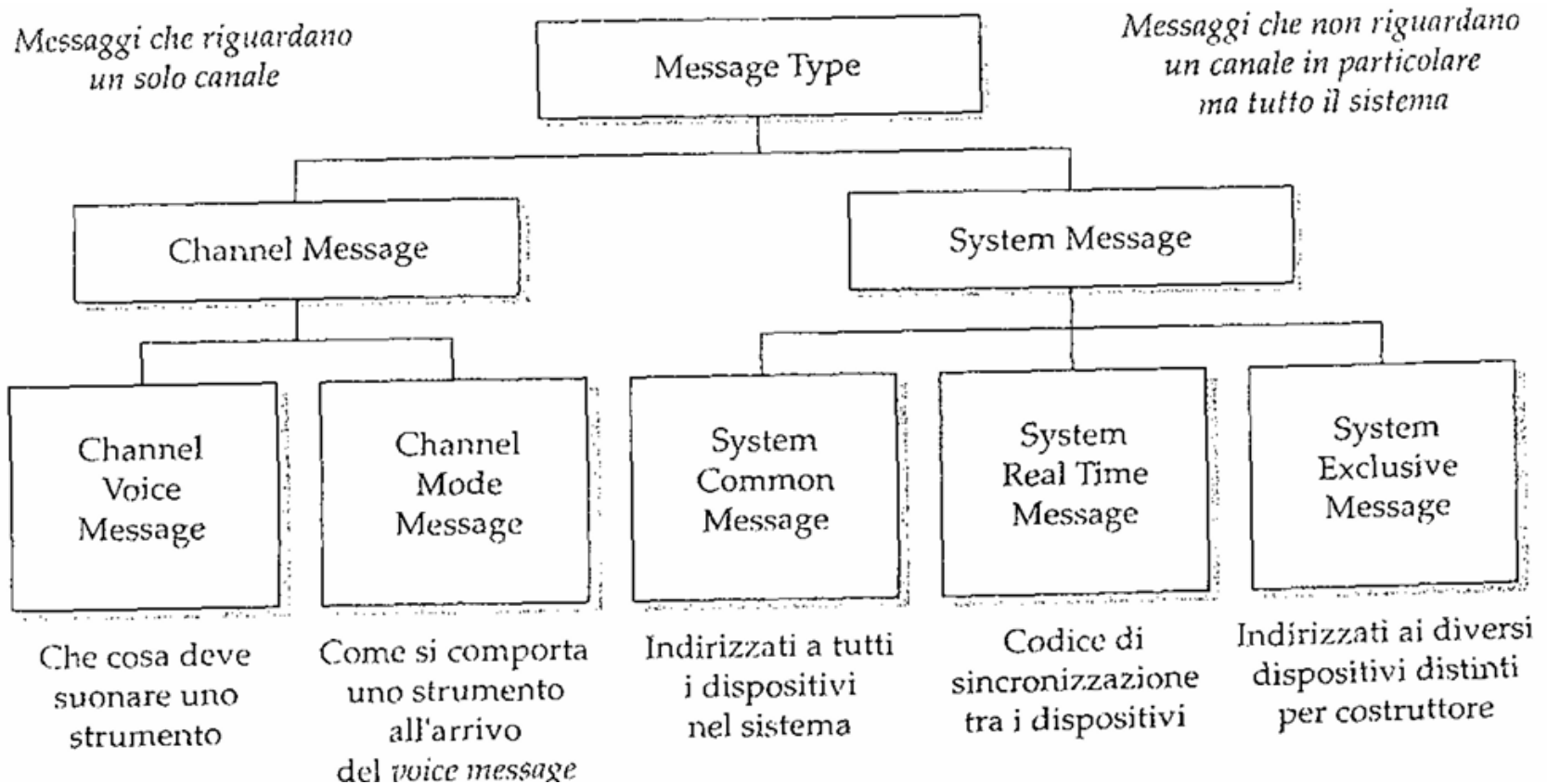
- *Pitch* produced by a generator
- Each channel is associated to one patch



Source: Audio e Multimedia – Valle/Lombardo

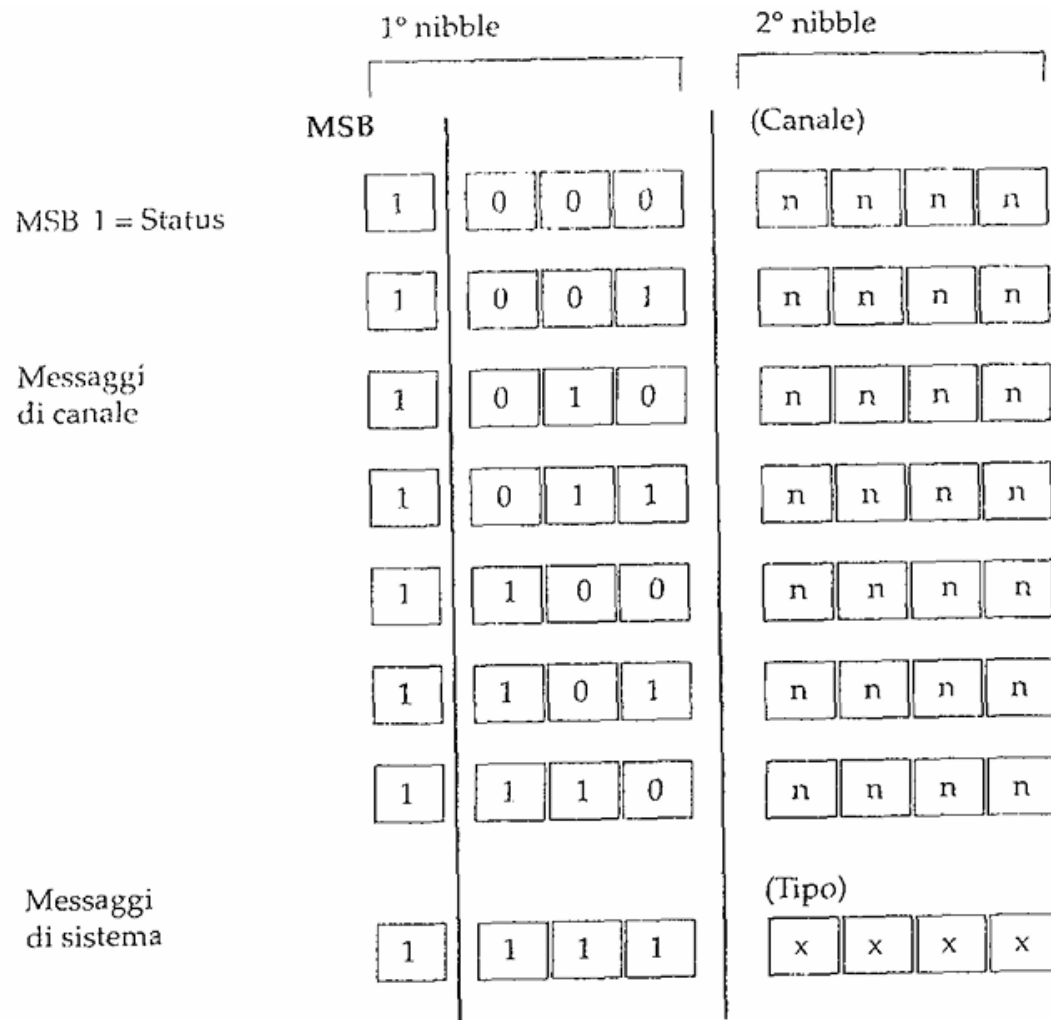


Types of messages



Source: Audio e Multimedia – Valle/Lombardo

Structure of messages



Source: Audio e Multimedia – Valle/Lombardo



Channel messages

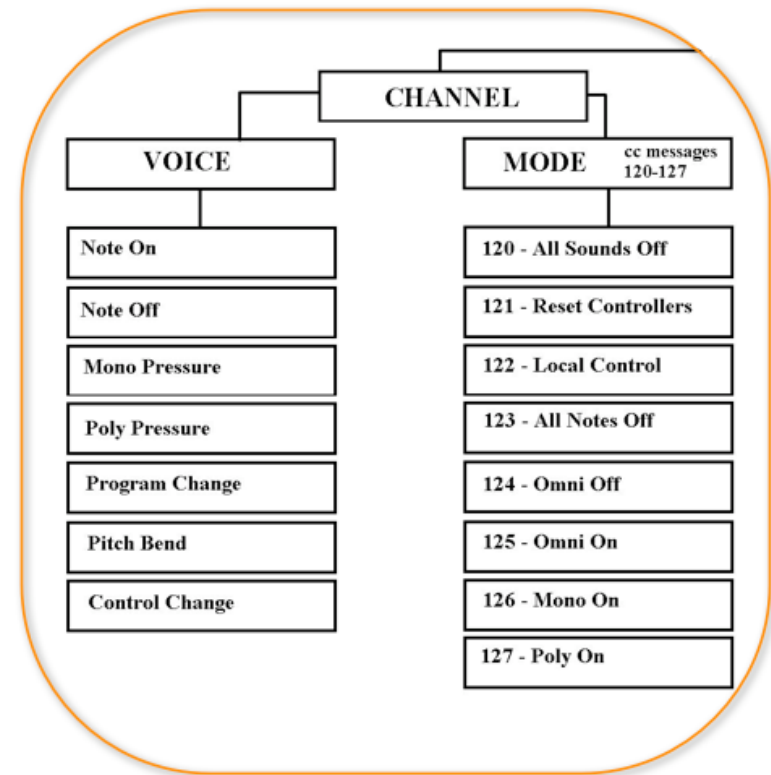


- **Voice messages**

- Musical events to be played by an instrument
- There are different types
 - *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 types
 - *Omni On / Omni Off*
 - *Mono / Poly*



Source: Wikiaudio



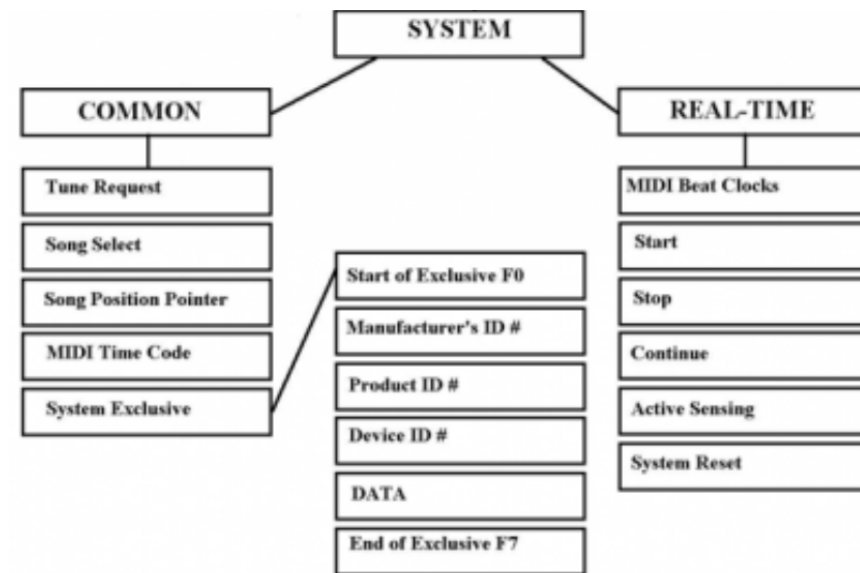
System messages

- 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*



Source: Wikiaudio

- Exclusive messages

- Non-standard messages for specific manufacturers



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

Acoustic Bass Drum (35)	B1	
Electric Bass Drum (36)	C2	
Acoustic Snare (38)	D2	C#2 (37) Side Stick
Electric Snare (40)	E2	D#2 (39) Hand Clap
Low Floor Tom (41)	F2	
High Floor Tom (43)	G2	F#2 (42) Closed Hi-Hat
Low Tom (45)	A2	G#2 (44) Pedal Hi-Hat
Low-Mid Tom (47)	B2	A#2 (46) Open Hi-Hat
Hi-Mid Tom (48)	C3	
High Tom (50)	D3	C#3 (49) Crash Cymbal 1
Chinese Cymbal (52)	E3	D#3 (51) Ride Cymbal 1
Ride Bell (53)	F3	
Splash Cymbal (55)	G3	F#3 (54) Tambourine
Crash Cymbal 2 (57)	A3	G#3 (56) Cowbell
Ride Cymbal 2 (59)	B3	A#3 (58) Vibraslap
Hi Bongo (60)	C4	<middle C>
Mute Hi Conga (62)	D4	C#4 (61) Low Bongo
Low Conga (64)	E4	D#4 (63) Open Hi Conga
High Timbale (65)	F4	
High Agogo (67)	G4	F#4 (66) Low Timbale
Cabasa (69)	A4	G#4 (68) Low Agogo
Short Whistle (71)	B4	A#4 (70) Maracas
Long Whistle (72)	C5	
Long Guiro (74)	D5	C#5 (73) Short Guiro
Hi Wood Block (76)	E5	D#5 (75) Claves
Low Wood Block (77)	F5	
Open Cuica (79)	G5	F#5 (78) Mute Cuica
Open Triangle (81)	A5	G#5 (80) Mute Triangle

Source: Wikipedia



Devices and connections



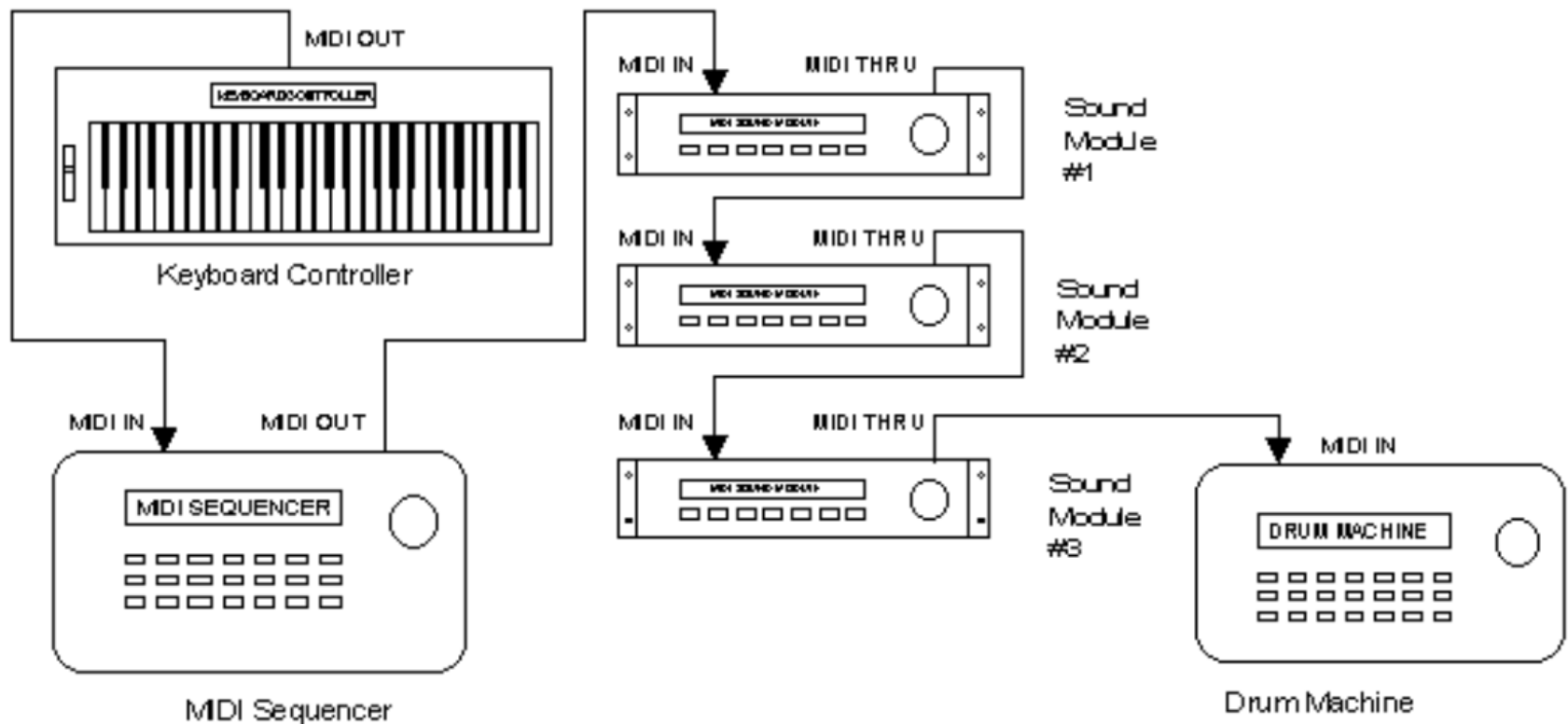
- MIDI also establishes which physical connections should be made (*interfaces*), via DIN connectors
- There are three *types* of ports: In/Out/Thru
- They can easily form a network providing *interconnectivity* between different *devices* (e.g., daisy chaining, Thru Boxes)



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



Thanks for your attention!



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Questions?

References and bibliography:

- Audio e Multimedia – Valle e Lombardo
- MIDI Standard – Wikipedia (italian/english versions)
- midi.org
- The MIDI Protocol - Musical Instrument Digital Interface (slides)
- MIDI File Format – Multimedia Applications (CS403) – Aligarh Institute of Technology
- Complete MIDI 1.0 Specification



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