

LE WEB À L'HEURE DU



Benoit Viguier
@b_viguier

LyonJS 31/05/2017



RÉGION MIDI-PYRÉNÉES



Pas ce Midi là



**« Le MIDI c'est pas le truc avec
des sons pourris ? »**

-Guillaume B.

Fichier MIDI

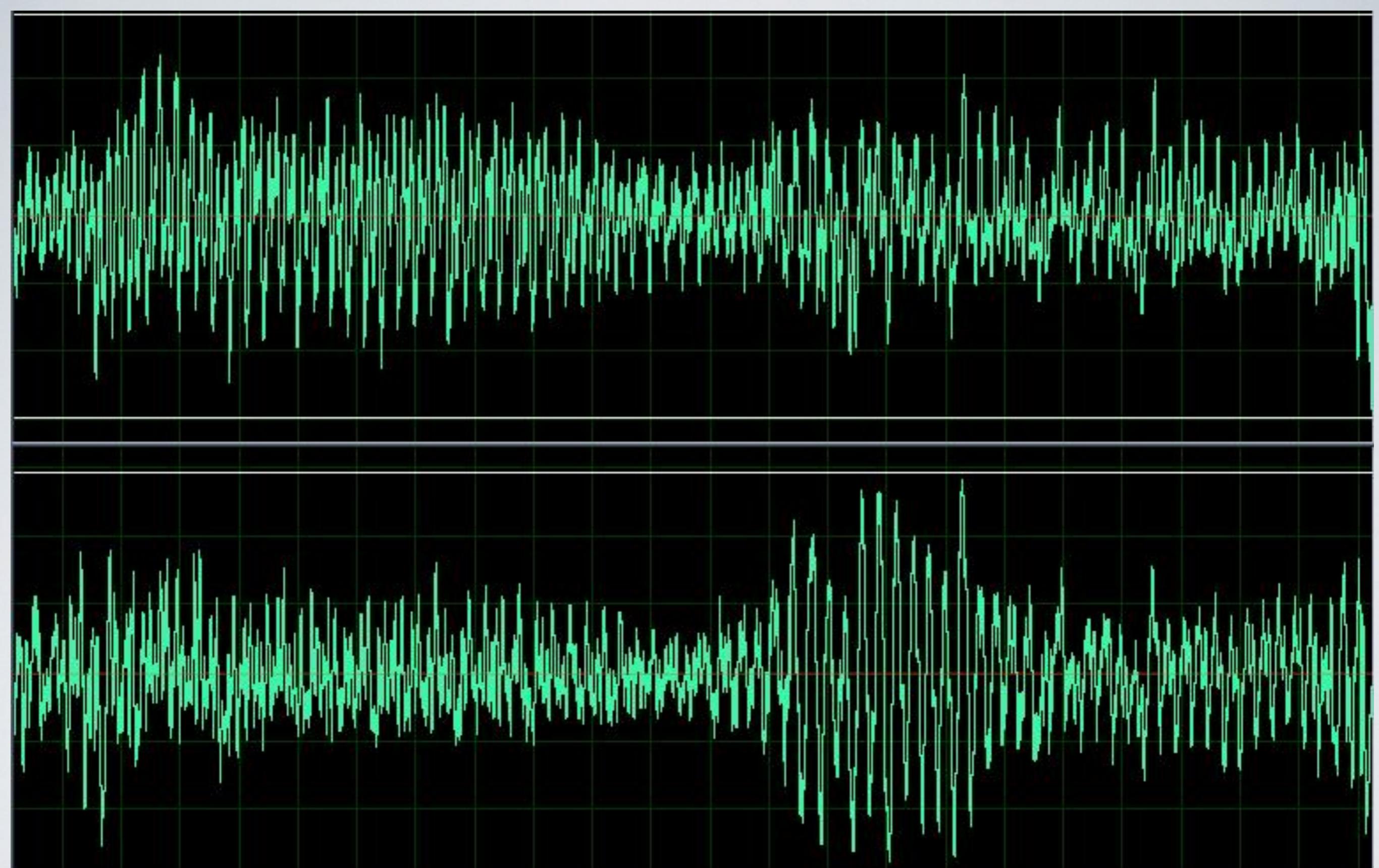
***.mid * .midi * .smf**

FAFNER (to Fasolt)

Glaub' mir, mehr als Frei - a frommt das gleis - sende Gold:
Trust me, more than Frei - a boots the glit - tering gold:

(Fasolt's demeanor shows
 auch ew' - ge Ju - gend er- jagt, wer durch Goldes Zau - ber sie zwingt.
e - ter - nal youth would be won if the golden charm were our own.

MIDI = évènements



Son (*.mp3, *.wav ...)

À propos...

Benoit Viguier
@b_viguier

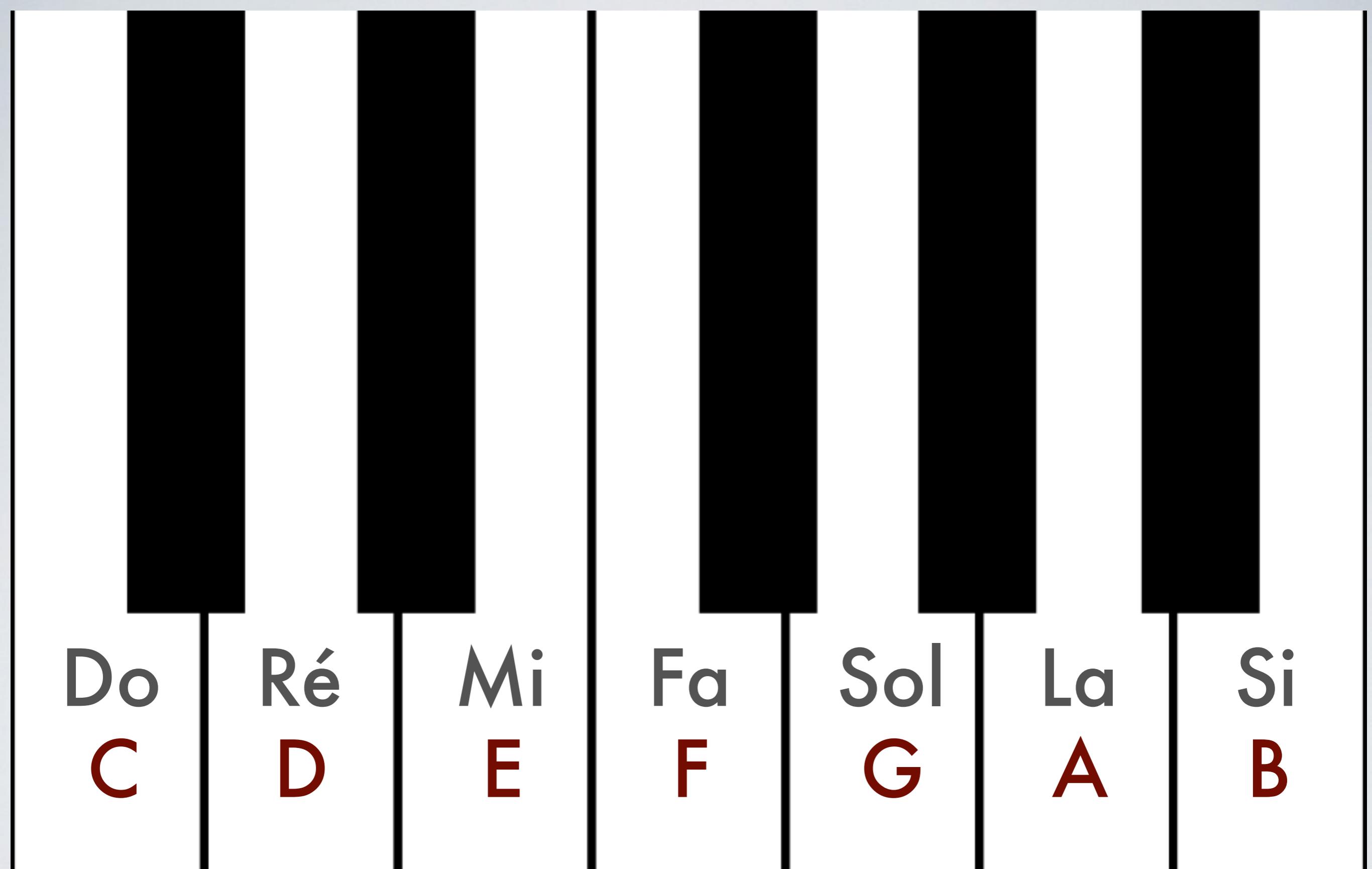
Lead Développeur Backend
Élao / M6Web

♥ Musique ♪



Do you speak « Music »?

**2015: 18% des Français jouent d'un
instrument de Musique**



Do
C

Ré
D

Mi
E

Fa
F

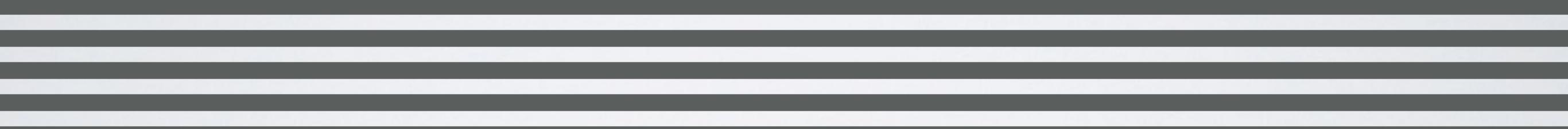
Sol
G

La
A

Si
B

Notation musicale

La Musique électronique



Un peu d'histoire

<1960

1960

1970

1980

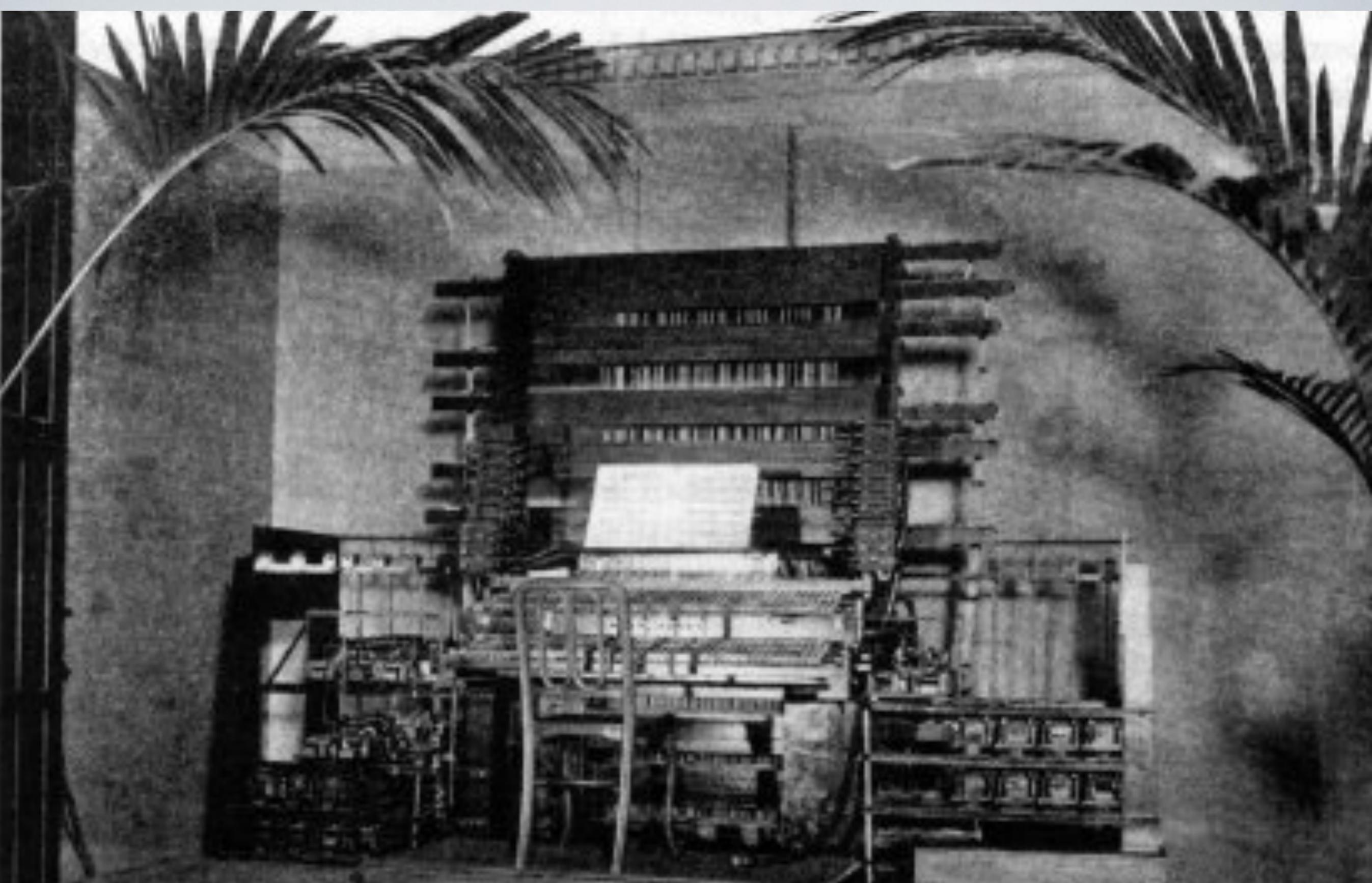
Préhistoire Électronique limitée

1990

2000

2010

> 2010



Telharmonium (1897)

<1960

1960

1970

1980

Antiquité

Premiers instruments

1990

2000

2010

> 2010



Moog (1964)

<1960

1960

1970

1980

Age d'or

Transition numérique

1990

2000

2010

> 2010



Musical Instrument Digital Interface

<1960

1960

1970

1980

Temps Modernes

Démocratisation de l'ordinateur

1990

2000

2010

> 2010



Windows 95

<1960

1960

1970

1980

L'Ère Informatique

Ordinateur tout puissant

1990

2000

2010

> 2010

**Le MIDI
est toujours là !**

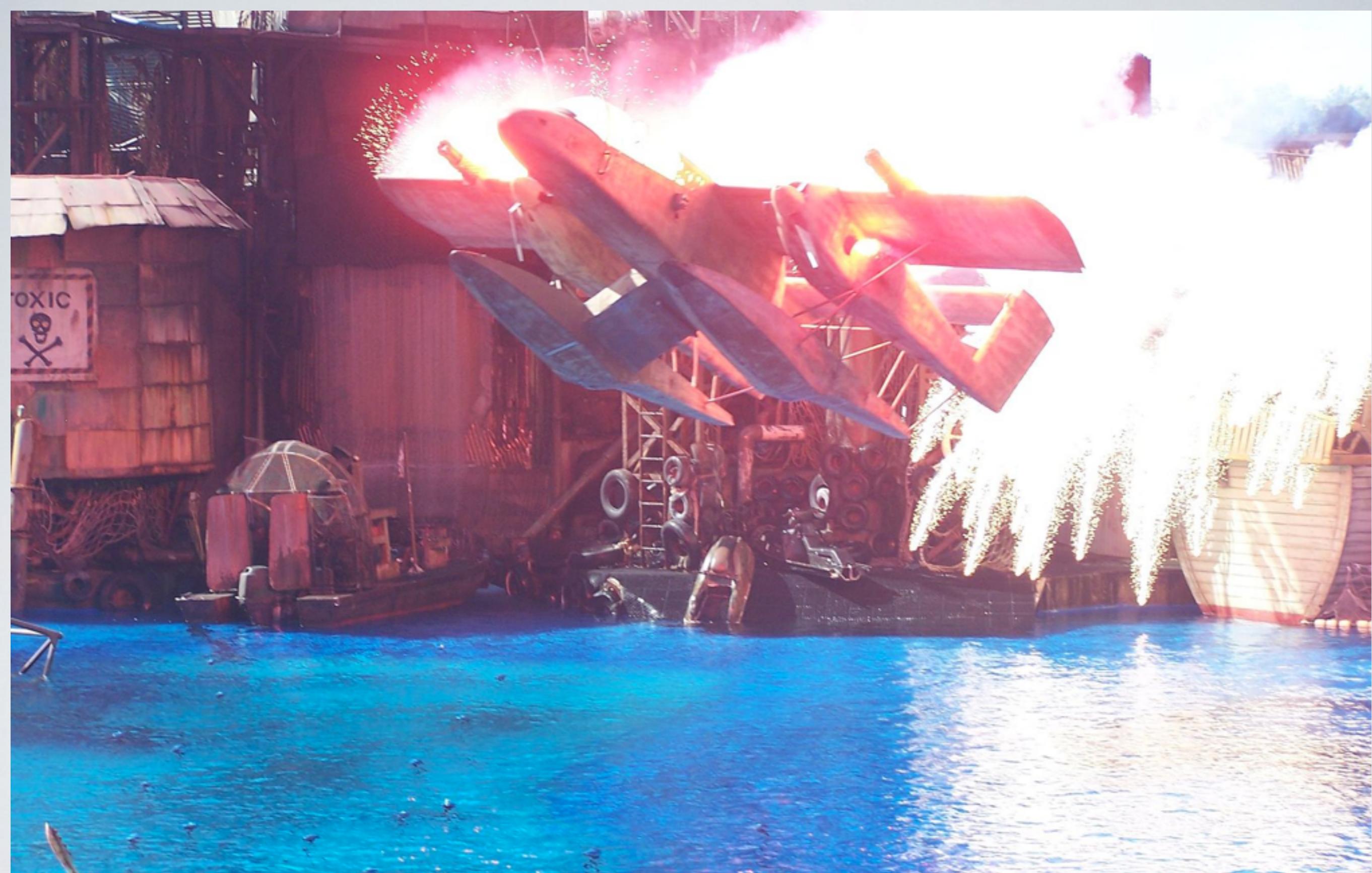
Depuis 34 ans...

Utilisations actuelles

Scène, Composition, sonneries mobiles, apprentissage...

**Pas seulement
pour la musique**

Des shows, des jeux...



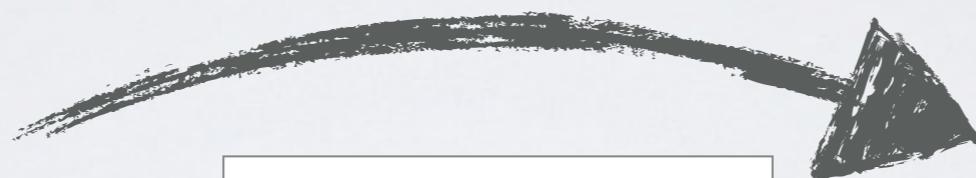
MIDI Show Control

Le MIDI

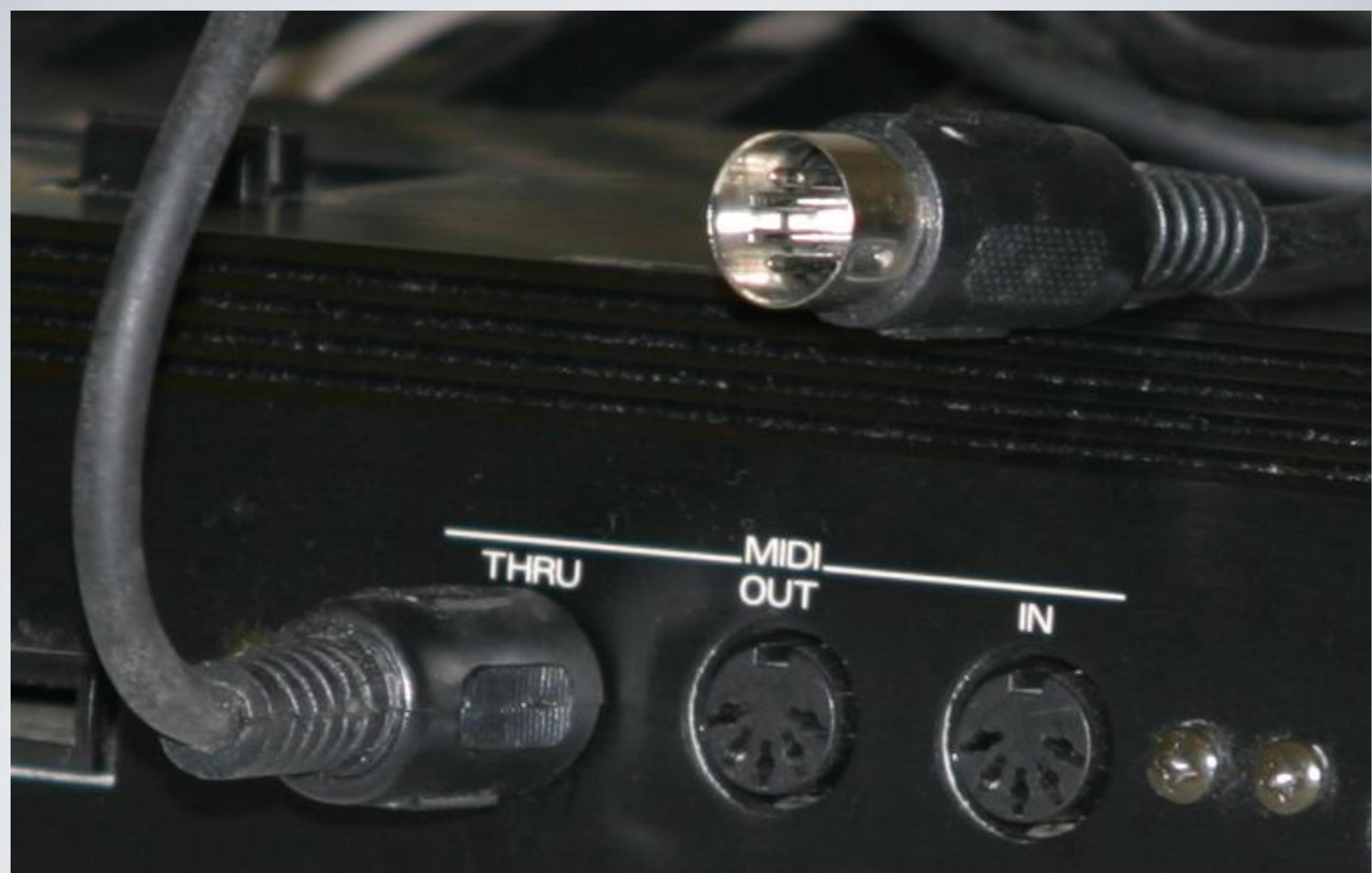


Vu de l'extérieur

Contrôleur



Module de son



Connectique

Out In

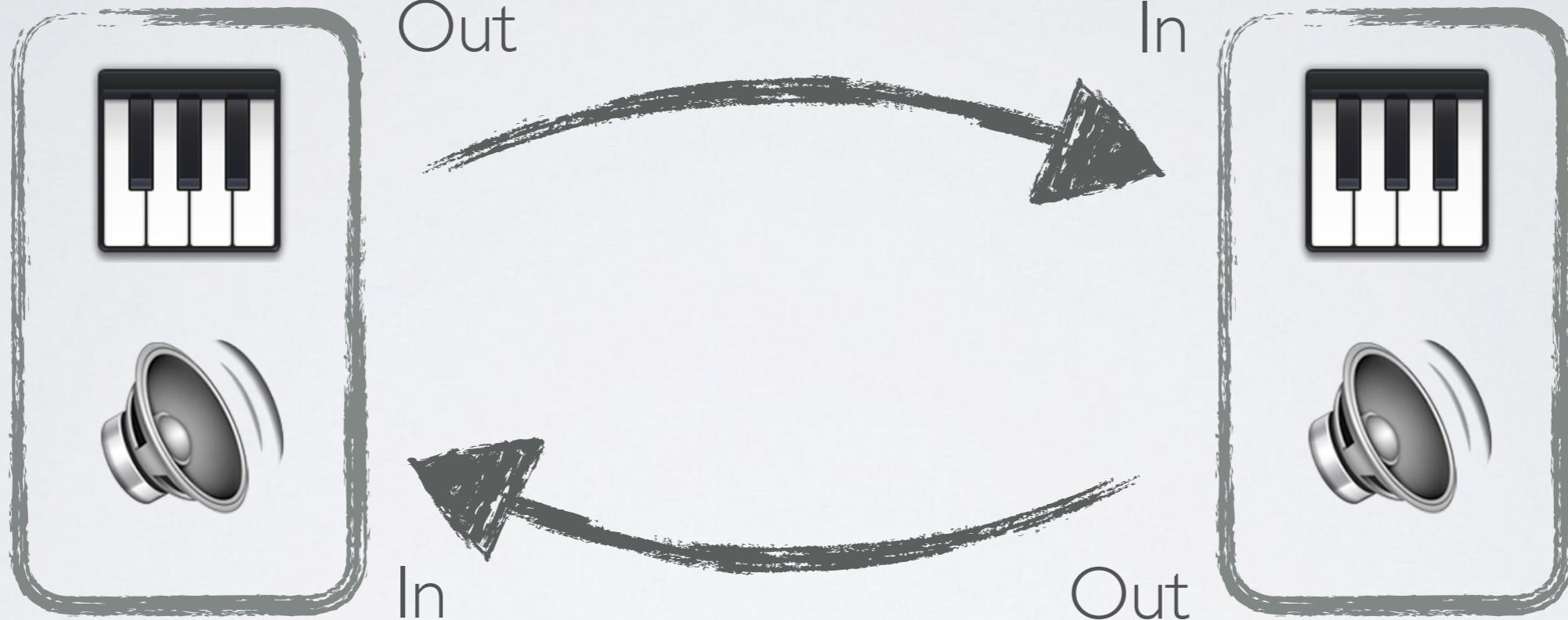


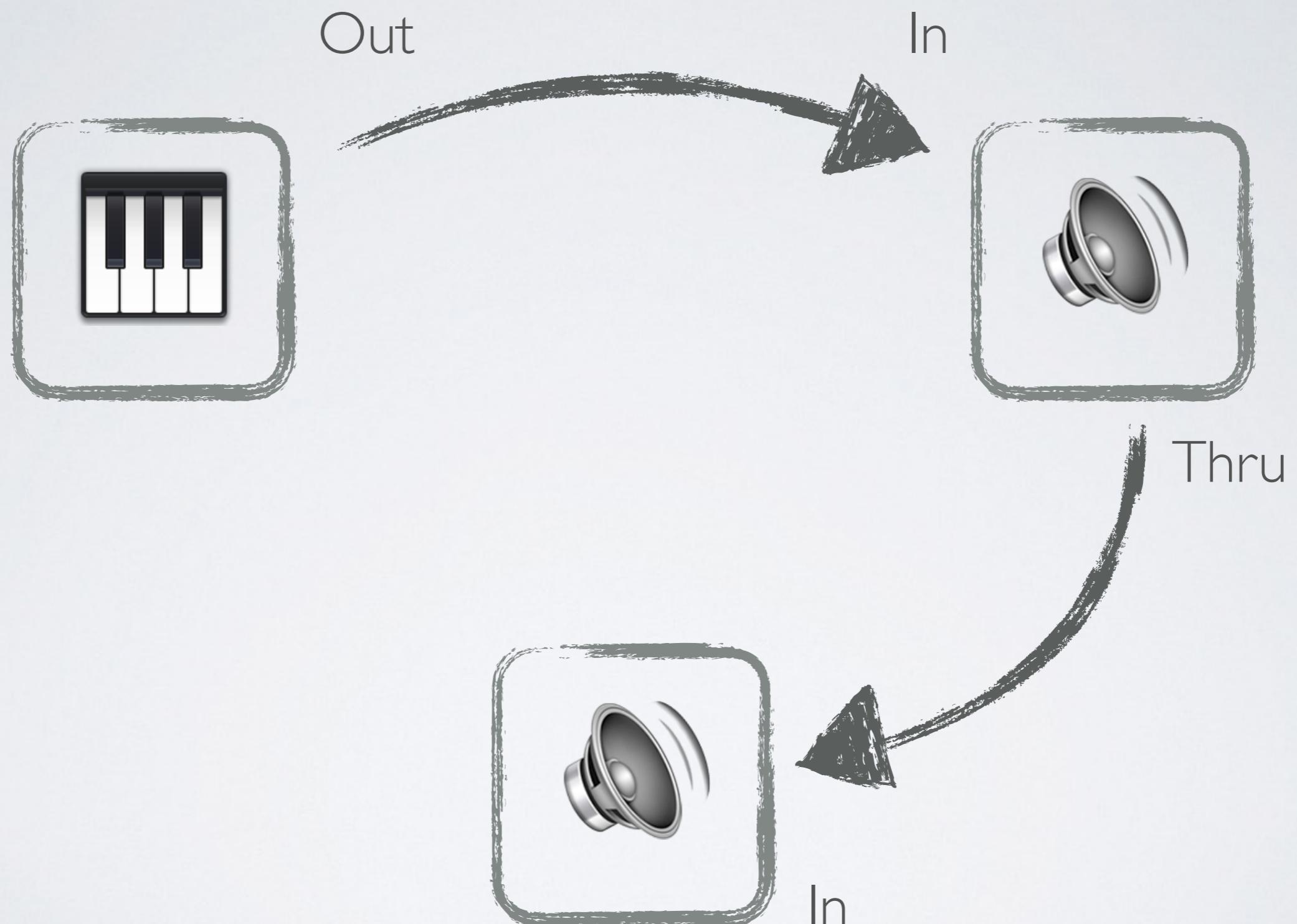


Out



In





Contrôleurs

Exemples



Akai LPK25



AX-Synth



TD-50KV



OCTAPAD SPD-30



RockBand Drum Controller

novation

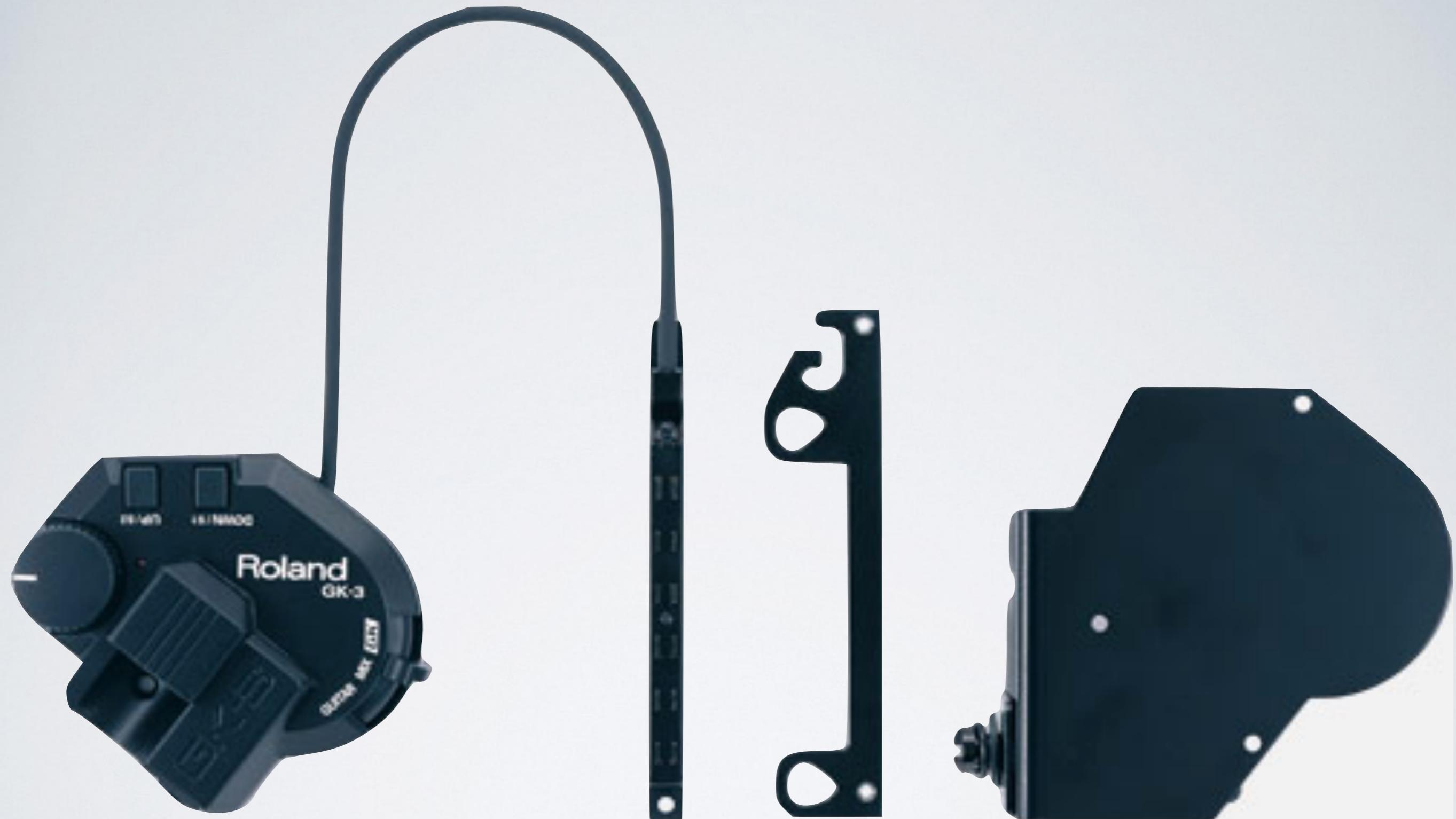
CIRCUIT



Novation Circuit



DJ 2 Go



Roland GK-3

Roland GR-55 GUITAR SYNTHESIZER



Roland GR-55



Aerophone AE-10



EWI 5000

Module de son

Exemples



Roland FA-06

Roland

JP-08



JP-08



Roland Jupiter-8



Rack



Et l'ordinateur ?



M-Audio Uno

M-AUDIO
MIDISPORT 4x4



MIDI In

D

C

B

A

MIDI Out

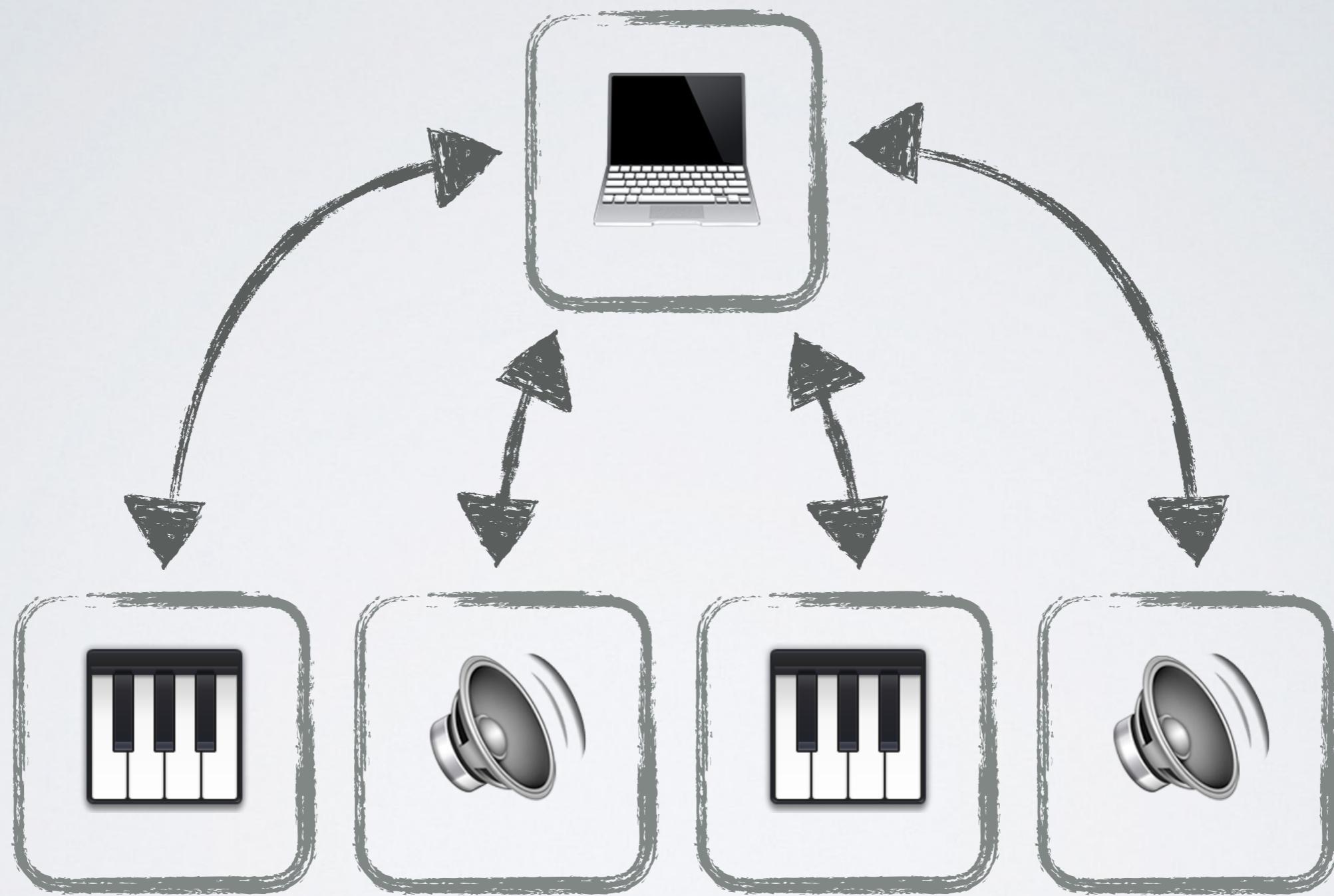
D

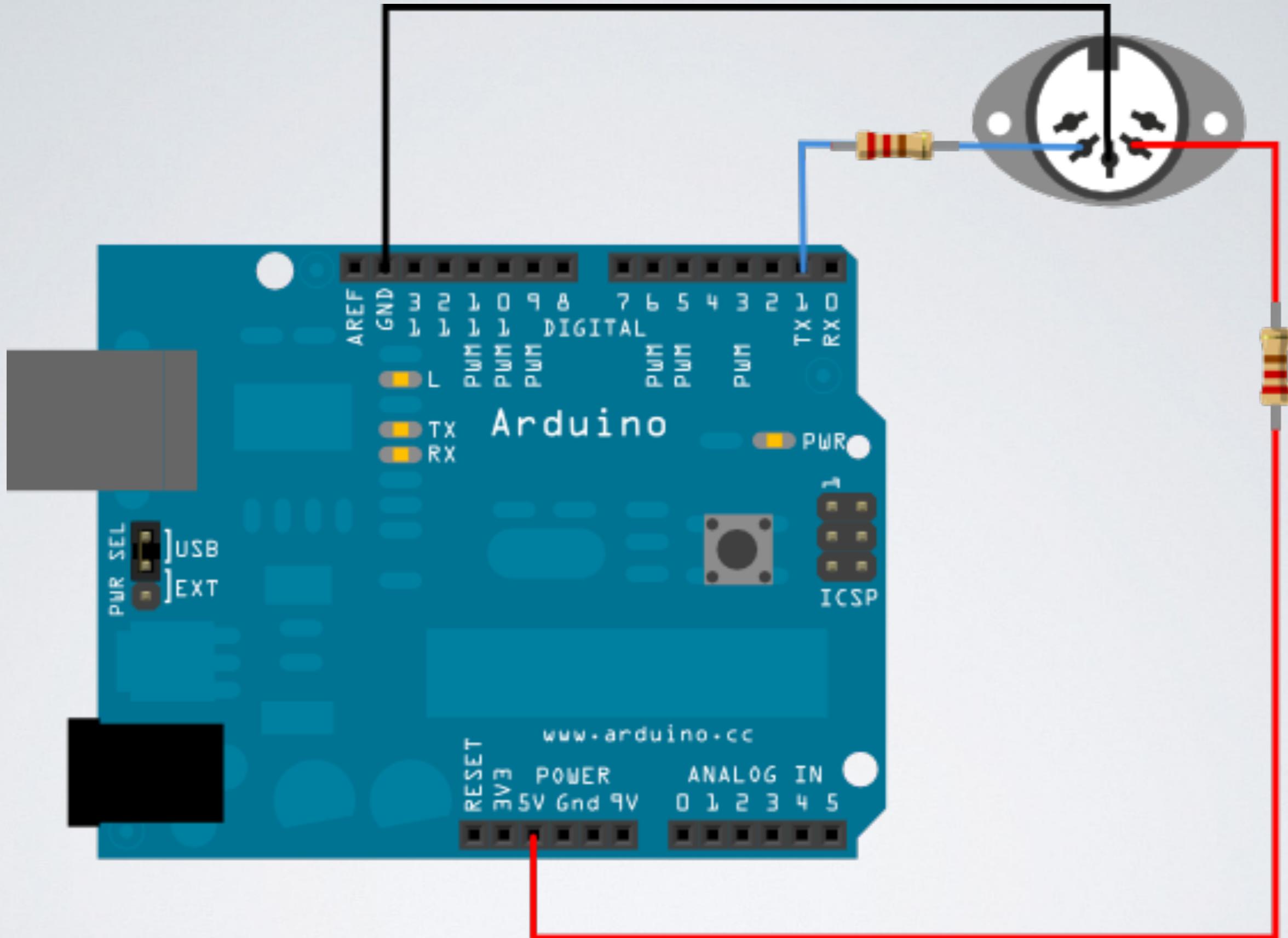
C

B

A

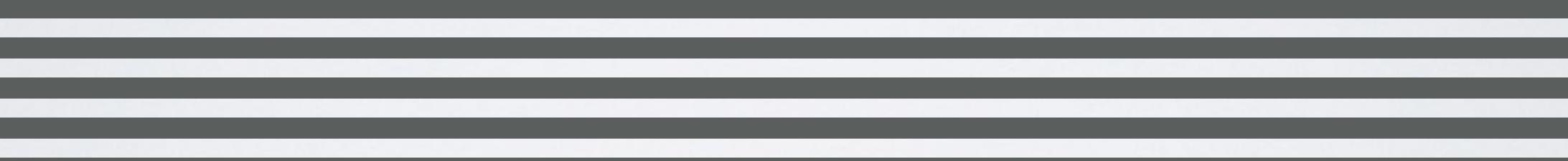
M-Audio MidiSport





Arduino

Le MIDI



Vu de l'intérieur...

RTFM !

midi.org/specifications

16 canaux

≈16 instruments

Message Binaire



Status

Data (optionnel)

Data (optionnel)

Voice messages
On, Off, Pitch Bend, Sustain...

Note On

1001nnnn

0kkkkkkk

0vvvvvvv

Canal

Note

Vélocité

Note Off

1000nnnn

0kkkkkkk

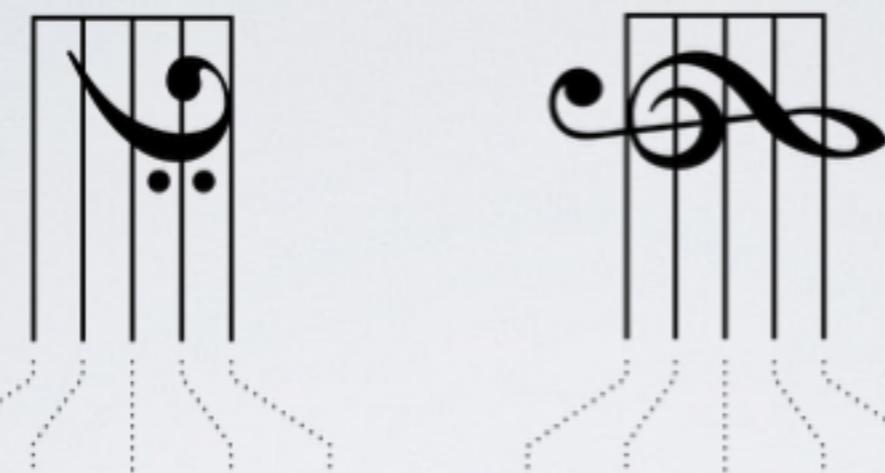
0vvvvvvv

Canal

Note

Vélocité

Fre- quency	MIDI note	Inter- national German
41265	108	C8
		C''''
2093	96	C7
		C'''
1046.5	84	C6
		C''''
83	83	
86	87	
85	86	
93	94	
93	95	
92	92	
91	91	
90	90	
89	89	
88	88	
87	87	
86	86	
85	85	
103	103	
102	102	
101	101	
100	100	
99	99	
98	98	
97	97	
105	105	
104	104	
103	103	
102	102	
101	101	
100	100	
99	99	
98	98	
97	97	
106	106	
107	107	
108	108	
41265	108	C8
		C''''
2093	96	C7
		C'''
1046.5	84	C6
		C''''
83	83	
86	87	
85	86	
93	94	
93	95	
92	92	
91	91	
90	90	
89	89	
88	88	
87	87	
86	86	
85	85	
103	103	
102	102	
101	101	
100	100	
99	99	
98	98	
97	97	
105	105	
104	104	
103	103	
102	102	
101	101	
100	100	
99	99	
98	98	
97	97	
106	106	
107	107	
108	108	



128 Notes

Program change



Canal

Programme

Void

Normes d'instruments

GM1, GM2, GS, XG

Canal 10 = Drums

Control Changes

Plein de possibilités...

Control Change

1011nnnn

0ccccccc

0vvvvvvv

Canal

Control Change

Valeur

Channel Mode

Messages

Polyphonie, reset...

All Notes Off

1011nnnn

01111011

00000000

Canal

All Notes Off

0

System Real Time

Clock, Active sensing...

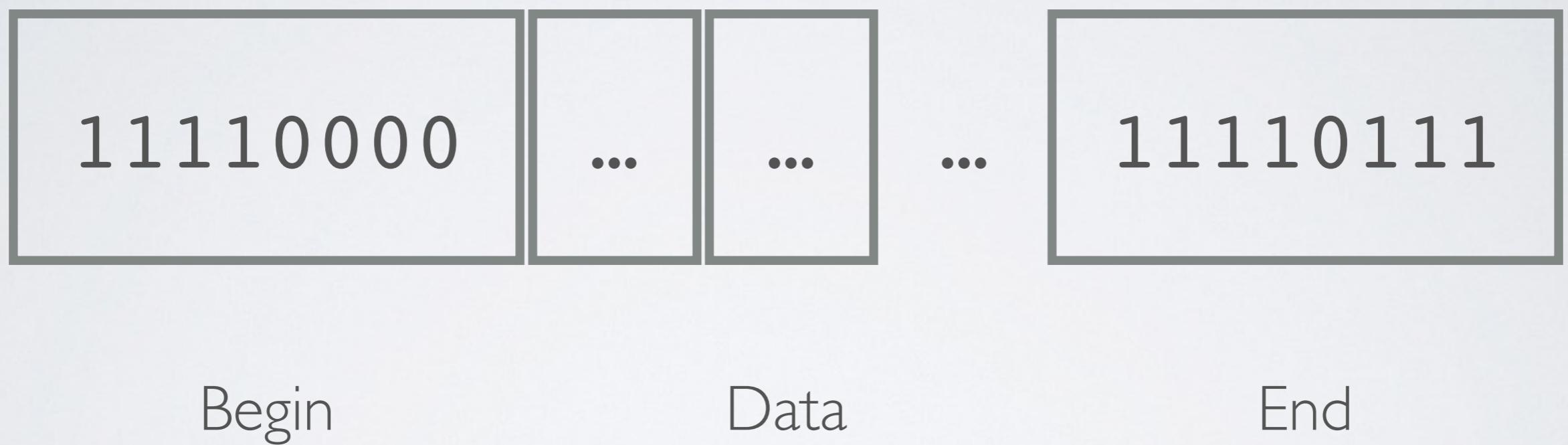
System Common Messages

Song position, Tune...

System Exclusive

Le standard dans le standard

SysEx



Web MIDI API



Javascript

« The Web-MIDI API is
the most significant
advancement
of MIDI since... MIDI itself! »

midi.org

**Pourquoi dans le
navigateur?**

À part la *Hype*

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser	Chrome for Android
			49						
			56			9.3		4.4	
	14	52	57	10		10.2		4.4.4	
11	15	53	58	10.1	44	10.3	all	56	57
		54	59	TP	45				
		55	60		46				
		56	61						

Compatibilité

Jazz-Plugin

<http://jazz-soft.net/>

Documentation

<https://webaudio.github.io/web-midi-api/>

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDISuccess( midiAccess ) {
    console.log( "MIDI ready!" );
    var input = midiAccess.inputs.values().next().value;
    if (input)
        input.onmidimessage = echoMIDIMessage;
    output = midiAccess.outputs.values().next().value;
    if (!input || !output)
        console.log("Uh oh! Couldn't get i/o ports.");
    else
        console.log(input.name, output.name);
}

function onMIDIFailure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDISuccess, onMIDIFailure );
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
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function onMIDI Success( midiAccess ) {
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    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDI Success, onMIDI Failure );
```

```
partial interface Navigator {
```

```
Promise<MIDIAccess> requestMIDIAccess(  
    optional MIDIOptions options
```

```
) ;
```

```
} ;
```

```
dictionary MIDIOptions {  
  
    boolean sysex;  
    boolean software;  
  
}; ;
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDI Success( midiAccess ) {
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        console.log(input.name, output.name);
}

function onMIDI Failure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDI Success, onMIDI Failure );
```

```
interface MIDIAccess: EventTarget {  
    MIDIInputMap inputs;  
    MIDIOutputMap outputs;  
    EventHandler onstatechange;  
    boolean syssexEnabled;  
};
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDISuccess( midiAccess ) {
    console.log( "MIDI ready!" );
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    else
        console.log(input.name, output.name);
}

function onMIDIFailure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDISuccess, onMIDIFailure );
```

```
interface MIDIInputMap {  
    readonly  
    maplike<DOMString, MIDIInput>;  
};
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDISuccess( midiAccess ) {
    console.log( "MIDI ready!" );
    var input = midiAccess.inputs.values().next().value;
    if (input)
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    if (!input || !output)
        console.log("Uh oh! Couldn't get i/o ports.");
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        console.log(input.name, output.name);
}

function onMIDIFailure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDISuccess, onMIDIFailure );
```

```
interface MIDIInput : MIDIPort {  
    EventHandler onmidimessage;  
};
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDI Success( midiAccess ) {
    console.log( "MIDI ready!" );
    var input = midiAccess.inputs.values().next().value;
    if (input)
        input.onmidimessage = echoMIDIMessage;
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        console.log(input.name, output.name);
}

function onMIDI Failure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDI Success, onMIDI Failure );
```

```
interface MIDIMessageEvent: Event {  
    Uint8Array data;  
};
```

High Resolution Time

window.performance.now()

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDI Success( midiAccess ) {
    console.log( "MIDI ready!" );
    var input = midiAccess.inputs.values().next().value;
    if (input)
        input.onmidimessage = echoMIDIMessage;
    output = midiAccess.outputs.values().next().value;
    if (!input || !output)
        console.log("Uh oh! Couldn't get i/o ports.");
    else
        console.log(input.name, output.name);
}

function onMIDI Failure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDI Success, onMIDI Failure );
```

```
interface MIDIOutput : MIDIPort {  
  
    void send(  
        sequence<octet> data,  
        DOMHighResTimeStamp timestamp = 0  
    );  
  
    void clear();  
  
};
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
}

function onMIDISuccess( midiAccess ) {
    console.log( "MIDI ready!" );
    var input = midiAccess.inputs.values().next().value;
    if (input)
        input.onmidimessage = echoMIDIMessage;
    output = midiAccess.outputs.values().next().value;
    if (!input || !output)
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    else
        console.log( input.name, output.name );
}

function onMIDIFailure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDISuccess, onMIDIFailure );
```

```
interface MIDIPort : EventTarget {  
    DOMString           id;  
    DOMString?         manufacturer;  
    DOMString?         name;  
    MIDIPortType       type;  
    DOMString?         version;  
    MIDIPortDeviceState state;  
    MIDIPortConnectionState connection;  
  
    EventHandler onstatechange;  
  
    Promise<MIDIPort> open();  
    Promise<MIDIPort> close();  
};
```

```
var output = null;

function echoMIDIMessage( event ) {
    if (output) {
        output.send( event.data, event.timeStamp );
    }
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function onMIDI Success( midiAccess ) {
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function onMIDI Failure(msg) {
    console.log( "Failed to get MIDI access - " + msg );
}

navigator.requestMIDIAccess().then( onMIDI Success, onMIDI Failure );
```

API bas niveau

Envoyer/Recevoir des messages



API « Moyen » Niveau

Sécurité & Vie Privée

Détournements possibles

Interface virtuelle

La feature manquante

Démonstrations



Show Time !

Hardware / Software

Présentation



Akai LPK25

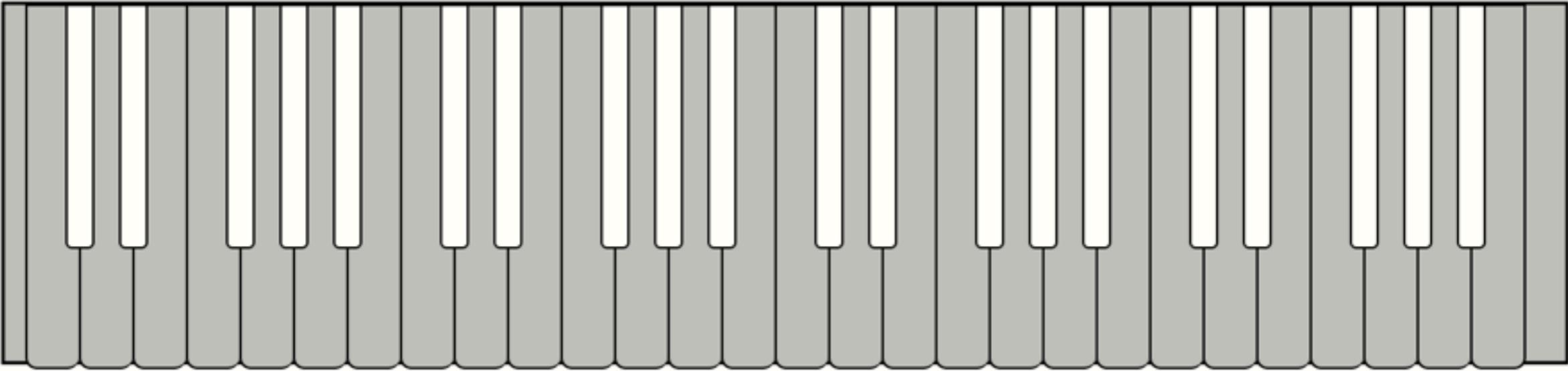
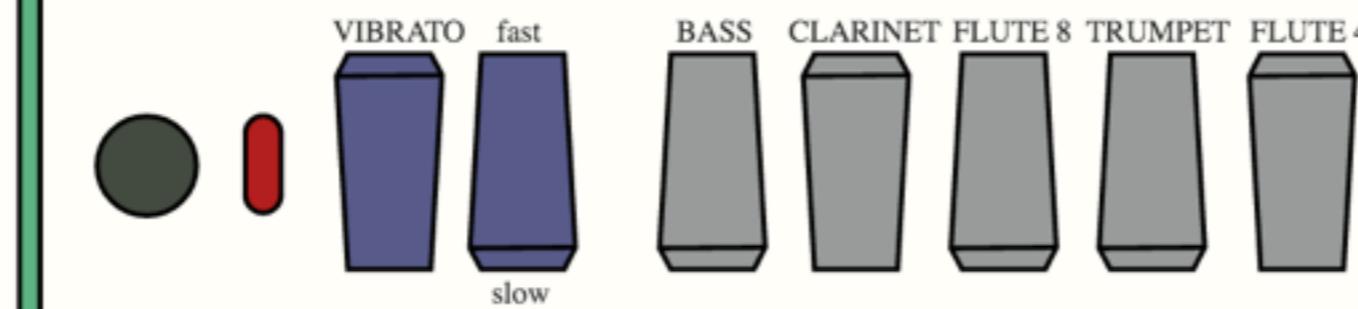
SimpleSynth

Un synthétiseur *light*

This example uses Web MIDI input (from all available ports and channels) to drive a Web Audio monophonic synthesizer. There is no UI. [Source available on github.](#)

<https://webaudiodemos.appspot.com/monosynth/>

F





<https://webaudiodemos.appspot.com/midi-synth/>

Demo Everywhere!

<https://webaudiodemos.appspot.com/>

Midi Browser

Sequencer Midi



Pour finir



Quoi retenir ?

Merci

@b_viguier