**Mestra**

Design Decisions

Michel Keijzers, © 2017

# History

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|  |  |
| --- | --- |
| **Date/period** | **Actions** |
| Nov 8, 2017 | Initial version |

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# Introduction

This document describes the design issues. Design alternatives which have been selected are worked out in other documents in more detail.

# Design decisions

## Micro Controller selection

### Alt 1: Arduinos Only

The following Arduinos are good candidates:

* Arduino Micro
* Arduino Uno
* Arduino Mega

Arduino Due’s are out of focus because of the high price.

### Alt 2: STM32 Mixed with Arduinos

Use STM32s, the following STM32 are good candidates:

* STM32F103C8T6
* STM32F407VET6

### Analysis

The controller (including or even excluding MIDI slave) will need much more SRAM than an Arduino can deliver. Therefore, the Arduino’s are not possible for the controller. For other slave types Arduinos can be used.

### Pro/Con list

Table : Micro Controller Selection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Property** | **Alt 1**  **Arduino Uno** | **Alt 1**  **Arduino Mega** | **Alt 2**  **STM32 F103C8T6** | **Alt 2**  **STM32 F406VET6** |
| Price | E 3.50 | E 6.50 | E 1.50 | E 10.50 |
| Memory (SRAM, KB) | 2 | 8 | 20 | 192 |
| Voltage | 5V | 5V | 3.3V | 3.3V |
| UART/USART | 1 | 3 | 6 | 6 |
| CAN | 0 | 0 | 1 | 2 |
| USB (Slave) | 0 | 0 | 1 | 1 |
| Learning curve | +++ | +++ | --- | --- |
| Documentation available | +++ | +++ | --- | --- |
| Help Community | +++ | +++ | --- | --- |
| Space/dimensions | -- | --- | +++ | + |

### Selected Alternative

Use an Arduino whenever possible (regarding specifications), otherwise use STM32.

**Selected: Alternative 1 or 2, depending on situation**

## Controller and Slave Split up

### Alt 1: Combined Controller / MIDI / DMX Slave

Use one device which is both Controller, MIDI slave and DMX slave.

### Alt 2: Separate Controller

Use one device which is Controller, and one device which is both MIDI and DMX slave.

### Alt 3: Separate MIDI and DMX Slaves

Use three devices: a separate Controller, a MIDI slave and a DMX slave.

### Pro/Con list

Table 2: Split up

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Property** | **Alt 1** | **Alt 2** | **Alt 3** | **Remarks** |
| Cost | ++ | ++ | - |  |
| Effort | ++ | ++ | - |  |
| Performance |  |  |  | Analyze |
| SRAM | -- | - | ++ | SRAM divided |
| CPU Power | -- | -- | ++ | CPU power divided |

### Selected Alternative

Although SRAM and CPU power can be divided (no sharing needed), for the first iteration a combined Controller/MIDI/DMX is selected.

**Selected: Alternative 3**

For this alternative, alternative 2 (STM32F407VET6) will be needed.