

# ALYSEUM - SELECTOR & HOLD - User's manual (Firmware 1.1)

## 1. Introduction



**SELECTOR** is the most versatile connectivity, control and expansion module in the modular world!

Its front panel, combined with a multitude of control signals, sets it apart from other sequencer switchers.

The heart of the module is a high Voltage and high quality bi-directional addressed Selector  $8 \leftrightarrow 1$ , also called Sequential switcher  $8 \leftrightarrow 1$  or Multiplexer  $8 \rightarrow 1$  or Demultiplexer  $1 \rightarrow 8$ .

Up to 8 SELECTOR modules can be chained to create a bigger Selector up to  $64 \leftrightarrow 1$ .

In every cases, only one Switcher is active at a time!

By using the SELECTOR as a MATRIX II slave module, you can freely expand MATRIX II:

- For each of its 15 inputs, 8 sources.
- For each of its 16 outputs, 8 destinations.

The **HOLD** module is an optional SELECTOR module's companion which adds the features to it:

- 8 digital addressed outputs, selectable between Trigger or Gate.
- 1 CV input to 8 analog addressed outputs, selectable between S&H or T&H.

The 8 digital and 8 analogue outputs are synchronized with the SELECTOR I/O.

Modes, features and chaining of the SELECTOR module are fully preserved when the HOLD module is added!

### These modules can be controlled in 8 different modes of wich 5 exclusive:

1. Standalone by buttons.
2. Slave of the MATRIX II module linked to its preset and bank management.
3. CV Input with its bipolar offset setting.
4. MIDI NOTE or MIDI CC input.
5. Sequential switcher with a MIDI CLK input.
6. Sequential Switcher with a CLK/Trigger input.
7. Sequential Switcher with a CLK/Trigger + RST inputs.
8. CV & CLK/Trigger Inputs, like S&H

### Two unique features increase the power of the different modes and their usabilities:

- An "Arpeggiator-like" function is available for the Modes 5, 6 and 7 and including 4 patterns.
- A "Steps Window" function is available for the Modes 3 until 8 and allows you to freely choose a range of steps in number and location on the fly.

## 2. Hardware

### 2.1. SELECTOR - Package Content

- One SELECTOR module.
- One small pouch containing:
  - o Two M3 screws + nylon washers.
  - o One 10/16 pins power ribbon cable.
  - o Two short MIDI cables : one Jack/Jack and one DIN5 female/Jack (type B)
- Warranty & user manual access card.

### 2.2. HOLD - Package Content

- One SELECTOR module.
- One small pouch containing two M3 screws + nylon washers.
- Warranty & user manual access card.

### 2.3. Specifications

- High voltage and high quality chip type: DG408.
- Front panel width: 8HP for SELECTOR and 6HP for HOLD.
- Modules maximum depth: 26 mm.
- Power requirements for SELECTOR (Full LED On) : +12V= 55 mA / -12V= 2mA.
- Power requirements for SELECTOR + HOLD (Full LED On): +12V= 60 mA / -12V= 6mA.
- Power supply is protected against reverse ribbon cable insertion.
- SELECTOR use a very fast optocoupler (more than 100 times faster than the speed of MIDI) so you can cascade dozens of modules via THRU and without generating any delays. So, you don't need to use a MIDI THRU BOX!

### 2.4. SELECTOR - Installation

#### **Choose the installation location of your unit carefully:**

- Avoid placing it in direct sunlight or close to a source of heat.
- Avoid locations subject to vibrations, excessive dust, heat, cold, moisture or rain.
- Make sure to discharge any built-up static electricity from yourself and your devices before touching or connecting one device to another.

#### **Installation for chaining**

For order to use the chaining feature, install the module #1 on the left first and then the module #2 on the right and so on. Thus you visually respected the LED chaining!

When install both SELECTOR & HOLD in chain, place always per pairs HOLD-SELECTOR + HOLD-SELECTOR + .....

### **Procedure:**

1. Only connect the module to a Eurorack bus board powered by a specified A-100 power supply.
2. Switch OFF and disconnect the Eurorack case from the main power supply by unplugging it from the wall socket!
3. Make absolutely certain that the ribbon cable has the right orientation by connecting the indicated red stripe on the negative 12 Volt side of your Eurorack case bus board.
4. Carefully place the module on an appropriately spaced spot on your Eurorack and fasten it firmly in place with the supplied screws and nylon washers. Replace any covers or blanking plates that you removed to install the module and screw them in firmly.
5. Reconnect the Eurorack case power cable back into the main power supply and switch the case power on.
6. If it doesn't seem to be working as expected (Initialisation LED sequence), immediately disconnect the system from the main power supply again. In this case, double-check the connections, making completely sure that the ribbon cable is the right way round where it connects to the module and the bus.

### **Installation with the MATRIX II:**

- SELECTOR modules must be powered by the same power supply, or generally powered ON/OFF simultaneously with the MATRIX II.
- The MIDI Out of the MATRIX II module must be connected to the MIDI Input of the SELECTOR module.

**NB:** We use a very high speed optocoupler with only 4 $\mu$ S delay. The goal is to be able to cascade a large number of modules without adding a delay on the MIDI. the use of a THRU BOX to avoid any delay is totally useless.

## **2.5. HOLD - Installation**

Power and data is connected to the SELECTOR module by a single 8-contact polarized ribbon cable.

Always install the HOLD module to the left of the SELECTOR module in your Eurocase.

Plug the 8-pins header connector as shown in the photo below.



### **IMPORTANT**

Only SELECTOR modules with a serial number equal or greater than 031-xxx are fitted with this connector.

If you already own a module with a serial number lower than 031-xxx, please order the HOLD module containing the hardware upgrade kit for your SELECTOR module.

This kit is sold at cost and can only be obtained with the purchase of the HOLD module.

## **SELECTOR - How to replace the main card?**

1. Remove the 5 black screw of the front panel with the Allen Key delivered.
2. Using a crosshead screwdriver to remove the 2 screws holding the LED and pushbutton boards in place.
3. Reassemble the LEDs & pushbuttons board with the new main board.
4. Refit the front panel with the 5 black Allen screws.

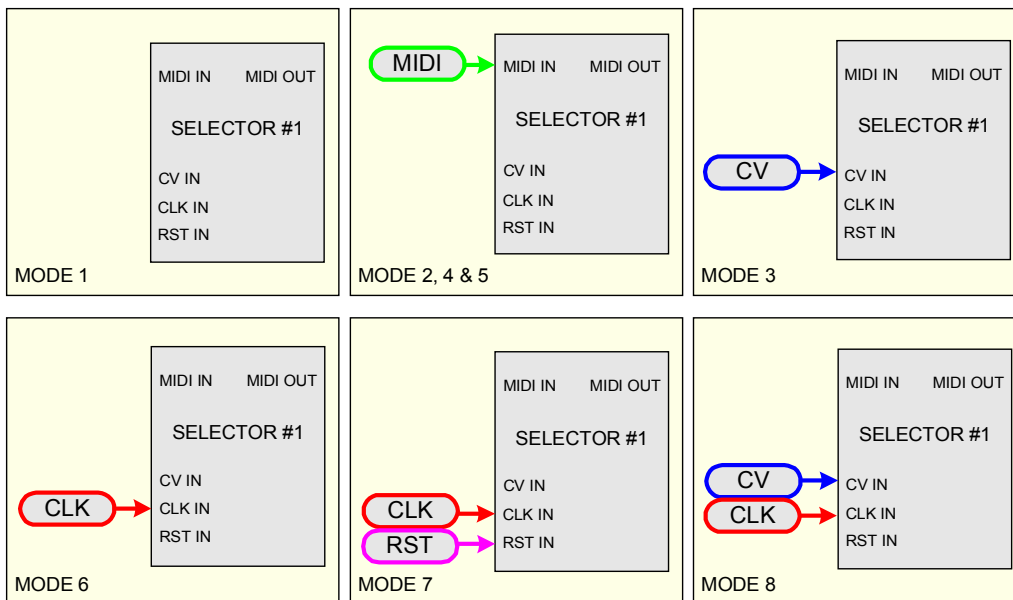
That's it.

## **2.6. SELECTOR - Cabling**

### **External control**

Please, respect the connections according to the Mode used.

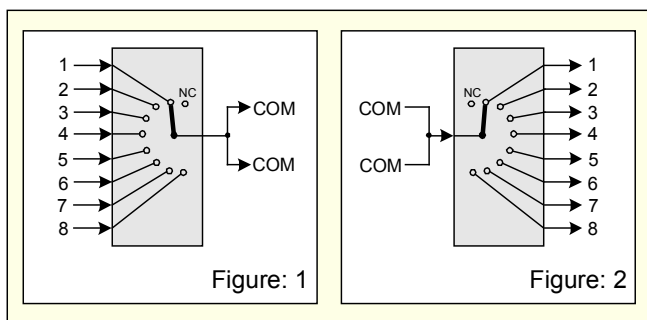
In case of chaining, connect CV, CLK and RST signals only on the module #1 (The Master).



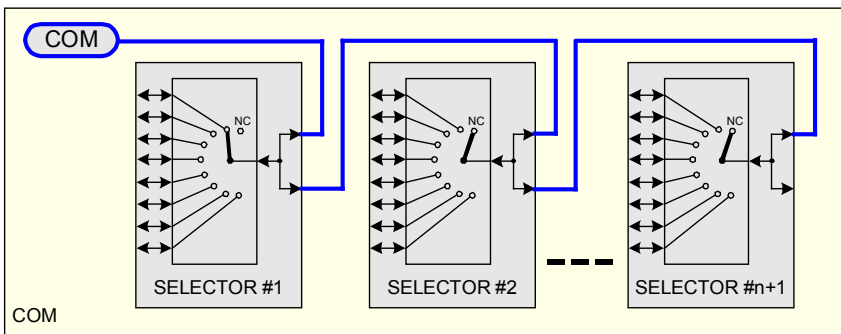
### **I/O & COM**

You have 2 possibilities:

1. Use COMs as an output, if you consider 1 to 8 inputs - see figure 1.
2. Use COM as an input, if you consider 1 to 8 outputs - see figure 2.

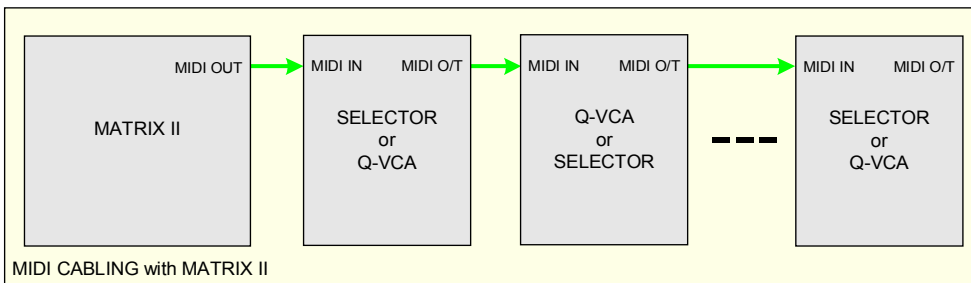


## COM - in case of chaining use



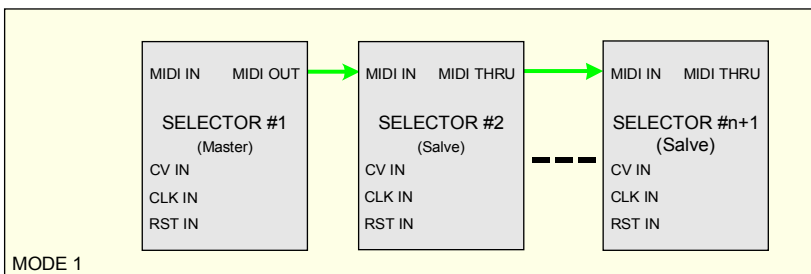
## MIDI - with the MATRIX II

To guarantee the management of the Banks and Presets of the SELECTOR, it is important to wire the MIDI as shown below. The principle is simple, MATRIX II is the master, SELECTOR are slaves.



## MIDI - in case of chaining

This wiring is necessary for proper operation



## 2.7. Good to know

### SELECTOR - SYNC switching timing?

To avoid unwanted sound effects as much as possible, it is important that the two switches that change states (one from ON to OFF and the other from OFF to ON) are synchronized to avoid both being closed at the same time or opened together.

Three possible cases:

1. The change between the two switch is limited to the same/single module. There, the DG408 is by nature: Break-before-make switching action.
2. The change between the two switches which one is in the master module and the other in a slave module.
3. The change between the two switches which are each in a different slave modules.

Software countermeasures are taken to simulate the DG408 in the cases 2 and 3.

### **HOLD - S&H vs T&H?**

The difference between a S&H capture and a T&H capture is the duration of sampling in relation to the duration of the activation period:

- S&H or Sample & Hold = the first 2mS. of the entire period of the activation period.
- T&H or Track & Hold = Throughout the entire activation period.

### **HOLD - Trigger vs Gate?**

The difference between Trigger and Gate during activation of a digital output is:

- Trigger= At the start of the active period, the output remains active for 2 mS
- Gate= The output remains active for the entire activity period.

Finally, Trigger is a very short Gate and Gate is a very long Trigger 😊

### 3. How to use

#### 3.1. Initialization Sequence

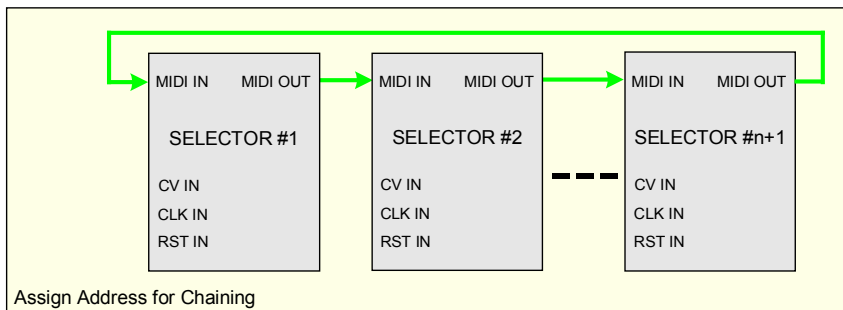
1. Turn the Eurorack case power ON.
2. All LEDs light up one after the other from right to left and finishing by the LED red MODE.
3. Module Address saved in the EEPROM is loaded and the corresponding green LED flashing 1 second.
4. Last mode saved in the EEPROM is loaded:
5. The SELECTOR module is ready!

If you want to use a single module (no chaining), you can go directly to the chapter 3.3.

#### 3.2. Rules in case of use in chaining.

- Use only the buttons and CV Offset of the module #1 (the Master).
- Connect the external CV, CLK and RST signals only on the module #1 (the Master).
- The next modules (the Slaves) buttons, CV OFFSET and Red LED MODE are inoperant!
- All data are save in EEPROM of the module #1 (the Master).
- Except Module #1, all Slaves modules are automatically in MIDI THRU

##### Assign address # in Chaining:



##### The operation is done in a single sequence:

- Turn OFF your system.
- Keep press gently the button RST of the first module (The one you want to give the address #1, and logically installed at the left in your case).
- Turn ON your system and the 8 green LEDs blink 2 times, now release the button RESET.
- Then, the first module will programmed automatically the address #2 of the second module whose the 8 green LEDs blink 2 times to indicate that the module is programmed, and so on until the last of the chain. All modules restart.
- Address module saved in the EEPROM is loaded and the corresponding green LED flashing 1 second.

**NB:** It is important that all modules in the chain are installed, powered and that MIDI is wired in loop!

**NB:** Do not forget to remove the last MIDI cable from the loop after programming the addresses.

### Erase the address:

- Turn OFF your case.
- Keep press the button MODE.
- Turn ON your case and the 8 green LEDs flash twice time, now release the RESET button.
- The module restart, and your SELECTOR is ready to work alone.

### **3.3. Mode selection**

- Press the red button MODE more as 2 seconds, the red LED turn ON.
- Press several times the button MODE to obtain wished mode, the Mode selected turn ON green LED.

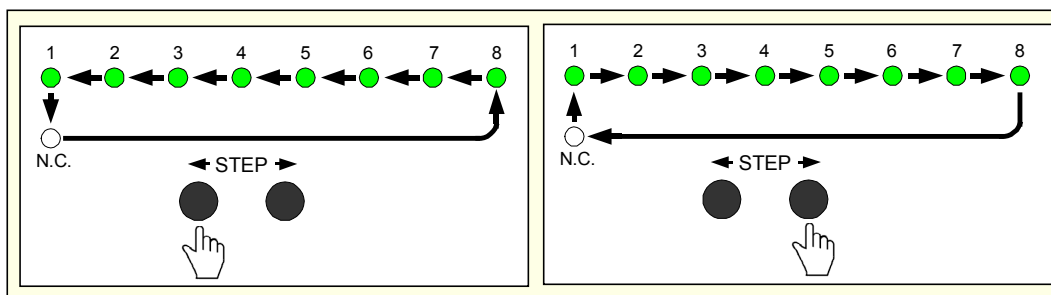
MODE & LED #	MODE	Arpeggiator-like pattern (3.4)	Step window (3.5)
1	Standalone (out of factory)	No	No
2	Use with the MATRIX II		
3	External CV		Yes
4	External MIDI NOTE or MIDI CC command		
5	External MIDI CLK command		
6	External CLK with programmable steps number		
7	External CLK + RST		
8	External CV + CLK - Like S&H or STROBE mode	No	

- Afterwards, press more as 2 seconds the button MODE to confirm your choice, the selected green LEDs flash 2 times to confirm the mode is saved in the EEPROM - OR - To cancel this operation, briefly press the RESET button - OR - Allow 15 seconds to elapse.
- Red LED MODE turn OFF.

### **Mode 1 - Standalone**

Press button STEP ← or STEP → (see figure below), switch is updated.

Keep press button STEP ← or STEP → more as 1 second to engage the auto-repeat, during auto-repeat, switch is not updated.



### In resume:

- With a single module, existing 8 steps and a ninth state when all the LEDs are OFF for No Connection (N.C.)
- With 2 modules in chaining, existing 16 steps and a seventeenth state when all the LEDs are OFF for No Connection (N.C.)
- .....
- With 8 modules in chaining, existing 64 steps and a sixty-fifth state when all the LEDs are OFF for No Connection (N.C.)

**NB:** Keep pressed the button RESET and the SELECTOR is held at No Connection and the last active LED flashes.



## Mode 2 - Controlled by MATRIX II

Same as Mode 1, but with the possibility to save and recall 7 banks of 32 presets via the MATRIX II front panel.

The current Bank & Preset number are saved or loaded and displayed also via the front panel of the MATRIX II, but the values are saved inside the SELECTOR module.

Please, read the user Manual of the MATRIX II to load and save Bank & Preset.

- A LOAD operation, recalls the settings of the SELECTOR + Link to the Bank & Preset number displayed by the MATRIX II.
- A SAVE operation, saves the settings of the SELECTOR + Link to the Bank & Preset number displayed by the MATRIX II.

During SAVE & LOAD operations, green & red LED blink one time.

**NB 1:** The current Preset # is saved or loaded and displayed via the front panel of the MATRIX II, but the values are saved in the EEPROM of the SELECTOR (Master) module.

**NB 2:** Keep pressed the button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

## MIDI SYS-EX.

These commands are generated by the MATRIX II, of course, if you will control the SELECTOR by any software, welcome!

Commands SYS EX	HEX= Header + ID Device + Command # + Data + End
Load a Bank & Preset	F0 00 20 09 00 1F 00 XX YY F7 (XX= Bank= 00 to 06 - YY=PRESE T= 00 to 1F)
Save a Bank & Preset	F0 00 20 09 00 1F 01 XX YY F7 (XX=BANK= 00 to 06 - YY= PRESET=00 to 1F)

## Mode 3 – Controlled by an external CV.

There is the ability to control SELECTOR module by an external CV signal (0 to 5 Volts).

Use the bipolar OFFSET adjust for a compatibility with your source down to -5 Volts.

	Single module	Chaining modules						
Module #	1	2	3	4	5	6	7	8
Steps #	8	16	24	32	40	48	56	64
V/Step	0.7V	0.33V	0.22V	0.16V	0.13V	0.11V	0.09V	0.08V

**NB 1:** The division factor of the input voltage is calculated to the nearest step when the STEPS WINDOW are activated.

**NB 2:** Keep pressed the button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

## Mode 4 - Controlled by an external MIDI NOTE or MIDI CC.

In Mode 4, two categories of MIDI messages can be used, but only one at a time.

1. MIDI NOTE, where each module represents an 8-notes zone
2. MIDI CC, where The 128 values automatically distributed over 1 or multiple modules if chaining.

**NB:** Keep pressed the button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

## Programming MIDI command

Only programmable if the SELECTOR Module is configured in Mode 4.

Connect an external MIDI Keyboard or controller device on the MIDI input.

- Press the button STEP ← more as 2 seconds, the red LED MODE blink.
- Afterwards, the first MIDI Note On or the first MIDI CC detected by the SELECTOR is saved (MIDI Channel sensitive). The 8 green LED flash 2 times to confirm - OR - To cancel this operation, briefly press the RESET button - OR - Allow 15 seconds to elapse
- The red LED MODE stop to blinking.

### **Mode 5 - Controlled by an external MIDI CLK.**

There is the ability to control SELECTOR module by a MIDI sequencer or any software.

Some info about MIDI CLK (System Real-Time Messages) [https://en.wikipedia.org/wiki/MIDI\\_beat\\_clock](https://en.wikipedia.org/wiki/MIDI_beat_clock)

Hex	Condition	Comments
F8	Timing CLK	Sent 6 times per MIDI beat (BPM)
FA	Start	From beginning
FB	Continue	From Stop position
FC	Stop	Stop song's execution
FF	Reset	Return to the first Step

**NB:** Keep pressed the button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

### **Mode 6 - Controlled by a single CLK input.**

Each CLK pulse increments the SELECTOR of one Step, within the programmed number of steps, and repeats indefinitely the cycle.

**NB 1:** Press shortly the RESET button, repeat the sequence from the beginning.

**NB 2:** Keep the RESET button pressed, hold the sequence frozen

### **Mode 7 – Controlled by the CLK + RST Inputs.**

Same as MODE 6, but here we use an external RST.

You can connect directly a sequencer to the SELECTOR module.

Each CLK pulse increment the SELECTOR and a single RST Pulse and the SELECTOR go to the step #1.

**NB 1:** Press shortly the RESET button, repeat the sequence from the beginning.

**NB 2:** Keep the RESET button pressed, hold the sequence frozen

### **Mode 8 – Controlled by the CV & CLK Inputs – like S&H or STROBE mode**

At each CLK pulse, the voltage at the CV input is frozen until the next CLK pulse.

**NB:** Keep pressed the button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

## **3.4. "Arpeggiator-like" patterns**

"Arpeggiator-like" patterns is available and programmable for the Modes 5, 6 & 7.

In chaining, the Master module automatically calculates according to the number of modules in the chain.

The are 4 different styles:

Arpeggiator-like patterns	Pattern #	Resulting Example play	LED
Up (loop)	--	1-2-3-4-1-2-3-4..... (no pattern)	1
Down (reversed loop)	1	4-3-2-1-4-3-2-1.....	2
Up & Down	2	1-2-3-4-4-3-2-1-1-2.....	3
Pendulum	3	1-2-3-4-3-2-1-2.....	4
Random	4	Any-any-any-any.....	5

#### Programming Arpeggiator-like pattern.

- Press the button STEP ←, more than 2 seconds, one of the 5 green LEDs of the arpeggio type turn ON.
- Press the buttons STEP ← or STEP →, to select the Arpeggiator-like pattern you want use.
- Afterwards, press more as 2 seconds the button STEP ← to save your choice - OR - To cancel this operation, briefly press the RESET button - OR - Allow 15 seconds to elapse.
- The green LEDs selected turn off.

### 3.5. Configurable "Steps Window"

"Steps Window" is available and programmable for the Modes 3 until 8.

The "Steps Window" function allows you to freely choose a range of steps in number (minimum 2) and location on the fly!  
In the case of chaining, the master module automatically calculates the number of steps available.

#### Programming the steps window

- Press the button STEP →, more than 2 seconds. Two green LEDs turn ON, these indicate the limit left & the limit right of the steps window.
- Press the button STEP ← or STEP →, to move the starting (left) point.
- Press the button MODE to switch to editing ending point of the steps window.
- Press the button STEP ← or STEP →, to move the ending (right) point.
- Afterwards, press more as 2 seconds the button MODE to save your choice - OR - To cancel this operation, briefly press the RESET button - OR - Allow 15 seconds (timeout) to elapse.
- The two green LEDs selected turn off.

**NB 1:** As soon as two LEDs are contiguous, you can continue to move starting and ending points together.

### 3.6. Firmware upgrade

**SELECTOR** module is pre-programmed with the ability to receive firmware upgrades (for bugfixes, extra features, customizations etc...) via MIDI protocol (SysEx commands).

Please, fill in the page Firmware Upgrade <http://alyseum.com/firmwareupdate> to receive all new firmwares for your product.

In order to flash new firmware, please follow the instructions below (One module at a time):

1. Turn the Eurorack case power OFF.
2. Close all MIDI software on your computer.
3. Connect the computer and the SELECTOR to upgrade with a MIDI cable.
4. Download Sys Ex utility at <http://www.elektron.se/support-and-downloads> (WIN and OSX).
5. Press and hold the BOOT button, while turning the Eurorack case power back ON. The BOOT button is located behind the small hole in SELECTOR front panel, down the CV input and can be pressed using a thin, long object like, for example, a toothpick.
6. The red LED MODE flashes 3 times, release the BOOT button.
7. Open the Elektron C6 Sys Ex utility software, click **Load**, find the new firmware file and click Open.
8. Click **Configure**, select a MIDI Out port corresponding at your MIDI interface, set 400mS for Delay in the textbox, select x1 for Turbo limit field and click OK.
9. Click **Send**.

10. During the firmware update, the red LED MODE blink slowly.
11. During the EEPROM update, the red LED MODE blink fastly.
12. Wait until sending is complete, the red LED Mode flash 3 times, and the module reboots to normal operating mode with new firmware.

**NB 1:** Please note that for the software to be able to send the MIDI commands successfully, no other software or Active Sensing message should be using the MIDI device simultaneously.

**NB 2:** All parameters are reset and all Presets are erased during new firmware flashing.

Thanks to Émilie Gillet from Mutable Instrument for his open Bootloader code: <https://github.com/pichenettes/avr-midi-bootloader>.

## 4. Miscellaneous

### 4.1. Disclaimer

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The information and specifications described in this manual are subject to change without prior notice.

Throughout this manual, trademarked names might be used. We state herein that we are using the name to the benefit of the trademark owner, with no intention of infringement.

### 4.2. Warranty and repair

**ALYSEUM** warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for a period of two years following the date of purchase.

This warranty does not apply to any products which have been repaired or altered by other than **ALYSEUM**, or which have been subject to ESD, moisture, abuse, accident, improper installation or use.

**ALYSEUM** assumes no liability as a consequence of such events under the terms of this Warranty.

Please, consult your dealer for more details or visit our support page on <http://www.alyseum.com/support> before any action.

### 4.3. Special Thanks

Vyronas Dokimakis (the programmer), Philip Thoma, Cyril Colomb and some users for your positive comments or feedback.