



## SELECTOR - User's manual

### 1. INTRODUCTION

The **ALYSEUM** SELECTOR module is a fully bi-directional 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  $64 \leftrightarrow 1$ !

Only one Switcher is active at a time!

SELECTOR module can be controlled in 7 different modes:

- Mode 1: Standalone by push buttons.
- Mode 2: Slave of the MS-MATRIX or MATRIX II module linked to its preset and bank management.
- Mode 3: CV input with offset adjustment.
- Mode 4: MIDI Note or MIDI CC input.
- Mode 5: Sequential switcher with MIDI CLK input.
- Mode 6: Sequential Switcher with CLK input.
- Mode 7: Sequential Switcher with CLK + RST inputs.

Two features increase the power of the different modes and their usability:

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

Applications.

- Switching between various VCO waveforms.
- Step tone sequencing.
- Filter switching.
- VCA routing.
- Usage of several SELECTOR and Q-VCA modules will extend the number of I/O of your MS-MATRIX or MATRIX II, and will create a powerful behemoth of immense functionality for your Eurorack system.
- And many more ....

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## 3. HARDWARE

### 3.1. Package Content

- One SELECTOR module with Eurorack compliant front panel.
- One plastic bag containing:
  - Four M3 screws + nylon washers.
  - One 10/16 pins power ribbon cable.
  - One short MIDI cable (stereo 3.5mm jack – 15cm length)
- Warranty & user manual access card.

### 3.2. Installation



#### 3.2.1. 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.

#### 3.2.2. 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!

#### 3.2.3. 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.

#### 3.2.4. Use with the MS-MATRIX or MATRIX II:

- SELECTOR modules must be powered by the same power supply, or generally powered ON/OFF simultaneously with the MS-MATRIX or MATRIX II.
- For user of the MS-MATRIX, you need to install a free of charge MIDI Out adapter (please, contact **ALYSEUM**).

- The MIDI Out of MS-MATRIX or MATRIX II module must be connected to the MIDI Input of the SELECTOR module.

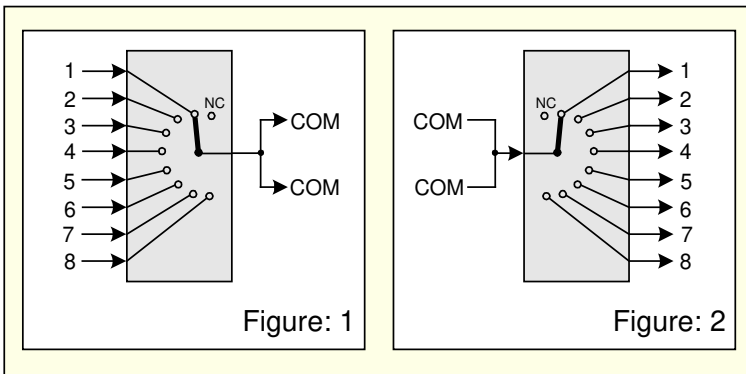
**NB:** We use a very high speed optocoupler with only 4µS delay. The goal is to be able to cascade a large number of modules without adding a delay on the MIDI. the use of a THRU BOX to avoid any delay is totally useless.

### 3.3. Cabling I/O & MIDI

#### 3.3.1. I/O cabling for a single unit

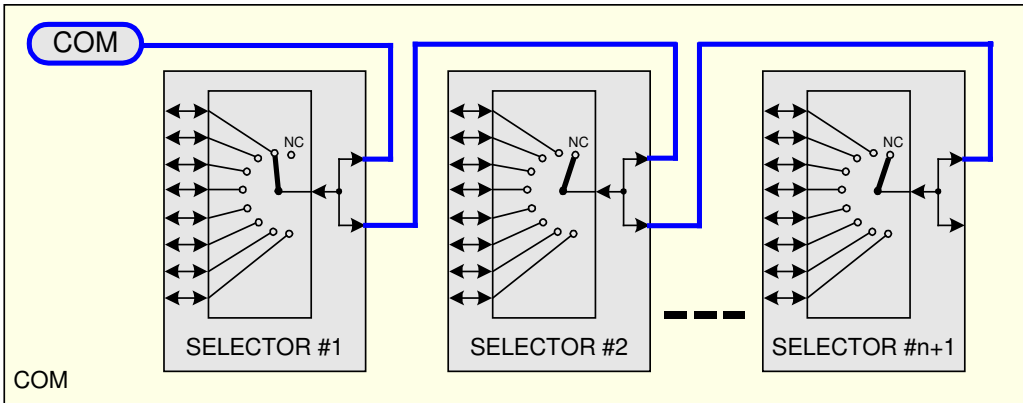
You have 2 possibilities:

1. Use the COM as Output, if you want to take signals from 1 of the 8 Inputs - see figure 1.
2. Use the COM as Input, if you want to route signal to 1 of the 8 outputs - see figure 2.

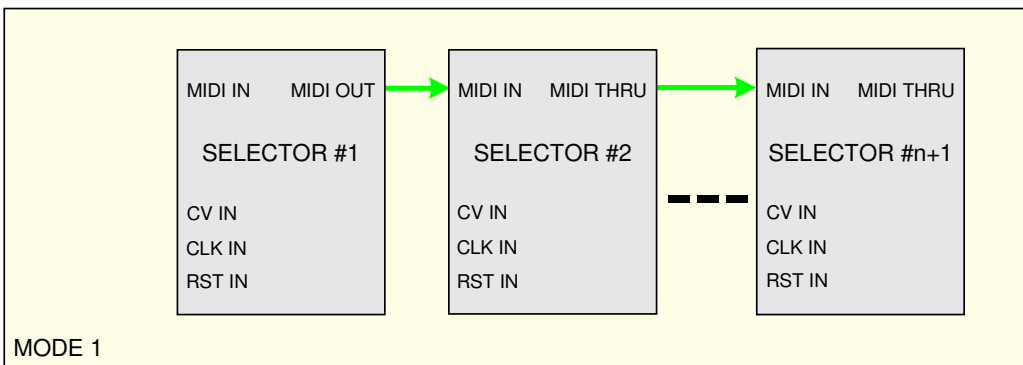


#### 3.3.2. I/O cabling in chaining

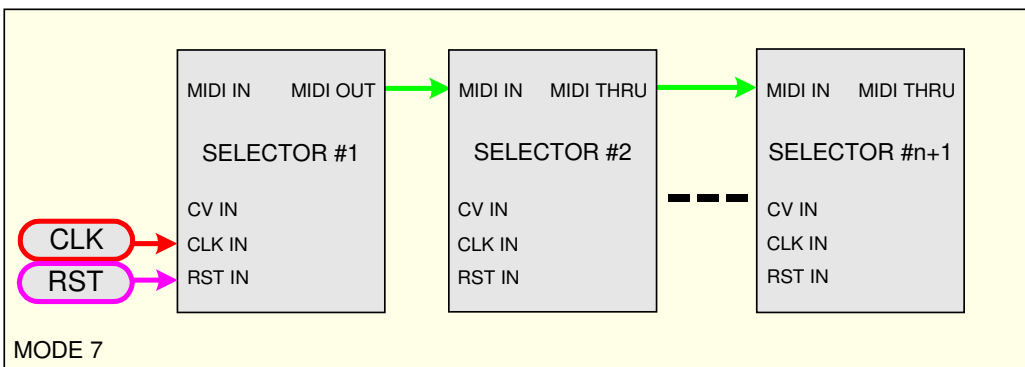
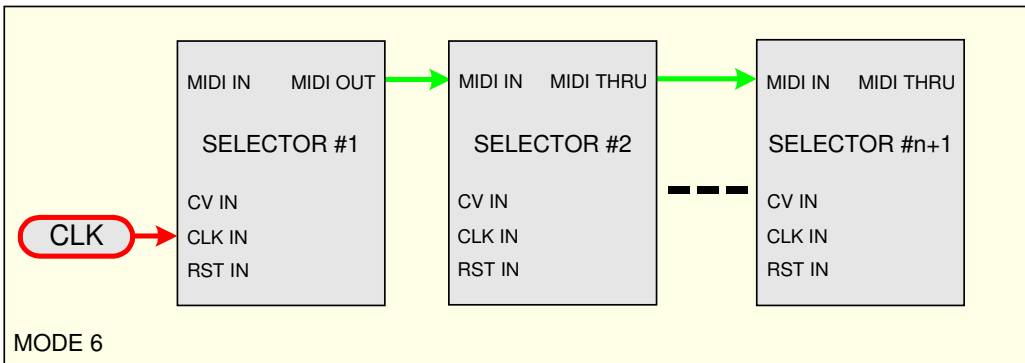
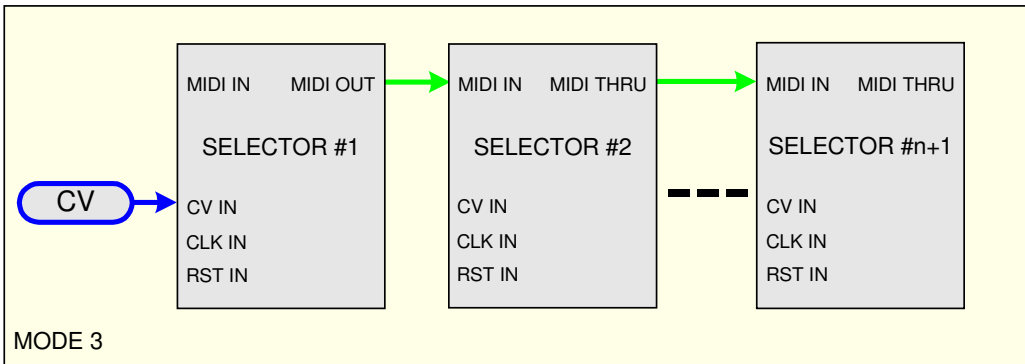
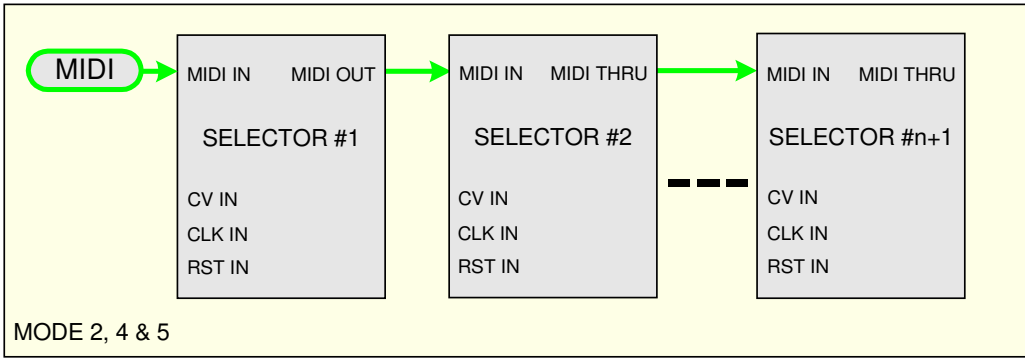
Similar as 3.3.1, but for more inputs or outputs



#### 3.3.3. MIDI cabling in chaining and according to the mode used



MODE 1



### 3.4. Features

- Solid state Switch, type DG408:
  - Wide range: from –10,5 Volts to +10,5 Volts for any digital and analog signals.
  - Low ON-resistance switch: 40Ω
  - High OFF-resistance switch:
  - FULLY bi-directional.
  - DG408 IC on a socket with tulip-gold contacts for easy and reliable replacement.
- All parameters saved in EEPROM.
- Simple firmware upgrades via by the front panel MIDI port.

### 3.5. Specifications

- Front panel width: 40 mm (8HP)
- Module maximum depth: 26 mm
- CV and Digital input maximum level: -10,5 to + 10,5 Volts.
- 4-pins connector located at the back panel for future functionality.
- Power requirements:
  - +12 Volts regulated at 20 mA.
  - -12 Volts regulated at 1 mA.
- Power supply is fully protected against reverse ribbon cable insertion.

### 3.6. SYNC switching in chaining

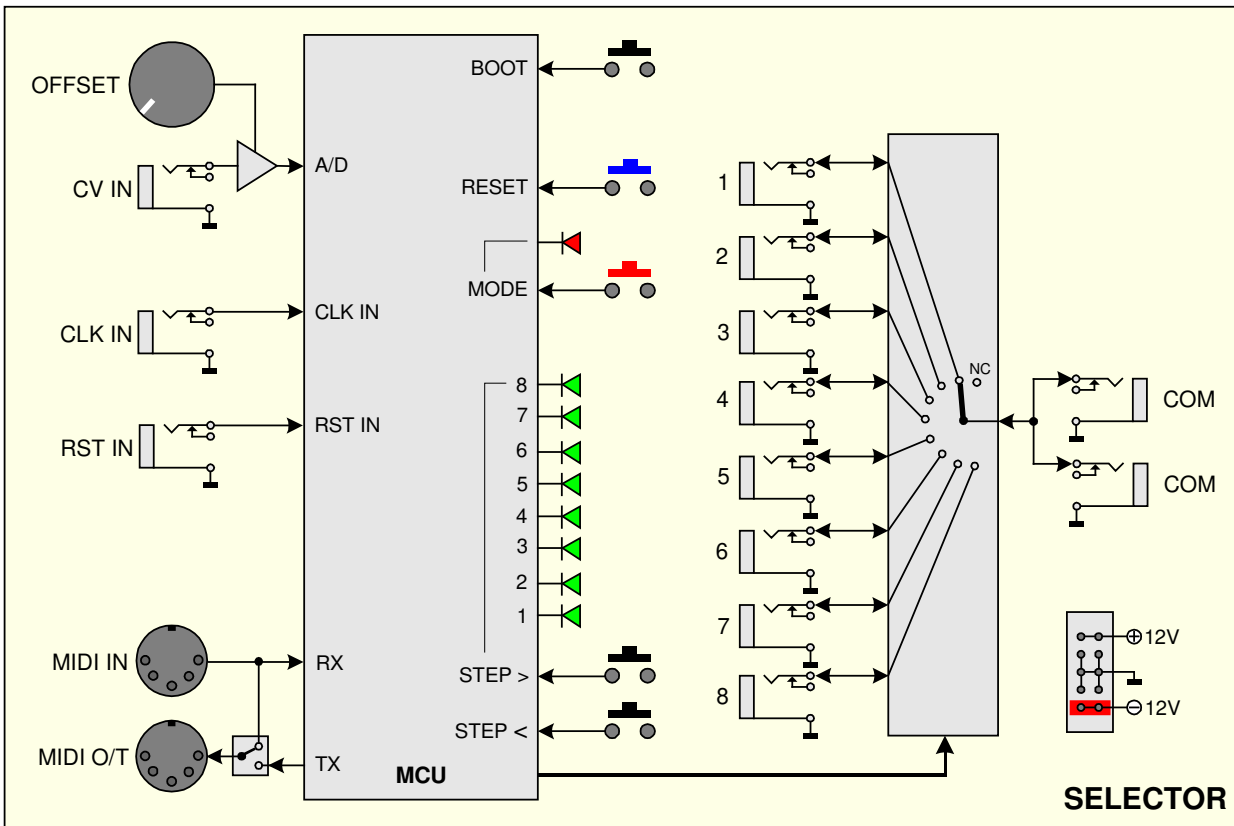
To avoid unwanted sound effects as much as possible, it is important that the two switches that change states (one from ON to OFF and the other from OFF to ON) are synchronized to avoid both being closed at the same time or opened together.

Three possible cases:

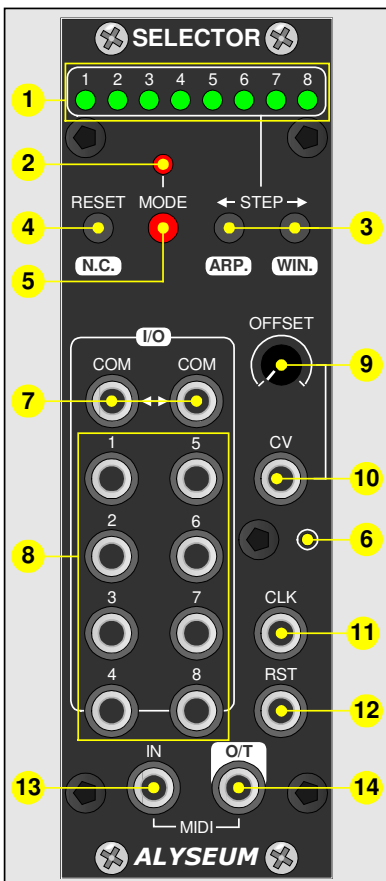
1. The change between the two switch is limited to the same module. There, the DG408 is by nature: Break-before-make switching action.
2. The change between the two switches which one is in the master module and the other in a slave module.
3. The change between the two switches which are each in a different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

In cases 2 and 3, software counter-measures are taken to avoid its disadvantages.

### 3.7. Bloc diagram



### 3.8. Front Panel.



1. 8 Green LEDs: Show active Step.
2. 1 red LED MODE: Show MODE activated.
3. 2 Black push buttons STEP ← → : to select manually a step.
4. 1 Blue push button RESET: To reset a sequence.
5. 1 Red push button MODE: to select a mode.
6. 1 Push button BOOT: Active the Firmware Bootloader.
7. 2 Common Output/Input jacks: To connect the common points.
8. 8 Inputs/Outputs jacks plug: To connect sources or destinations.
9. 1 OFFSET Trim: shifts the CV input voltage with a range of 5Volts.
10. 1 Input CV jack plug: To control the SELECTOR by CV.
11. 1 Input CLK jack plug: To control the SELECTOR By an external CLK.
12. 1 Input RST jack plug: To reset the SELECTOR by an external RST.
13. 1 Input MIDI jack plug: MIDI In.
14. 1 Out/Thru (O/T) MIDI jack Plug: to connect a MIDI Out or MIDI Thru.



## 4. USE

### 4.1. 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. Mode saved in the EEPROM is loaded:
  - o Mode 1: the last position before shutdown is restored.
  - o Mode 2: Slave of the MATRIX II or MS-MATRIX.
  - o Mode 3: Set, regarding the voltage on the CV Input.
  - o Modes 4, 5, 6 and 7: No connection, wait the first event.
5. The SELECTOR module is ready!

#### **IMPORTANT**

- If you want to use one or several independent modules, you can go directly to the chapter 4.3
- If you want to use several modules in a chain, normally continue reading below

### 4.2. Use in chaining

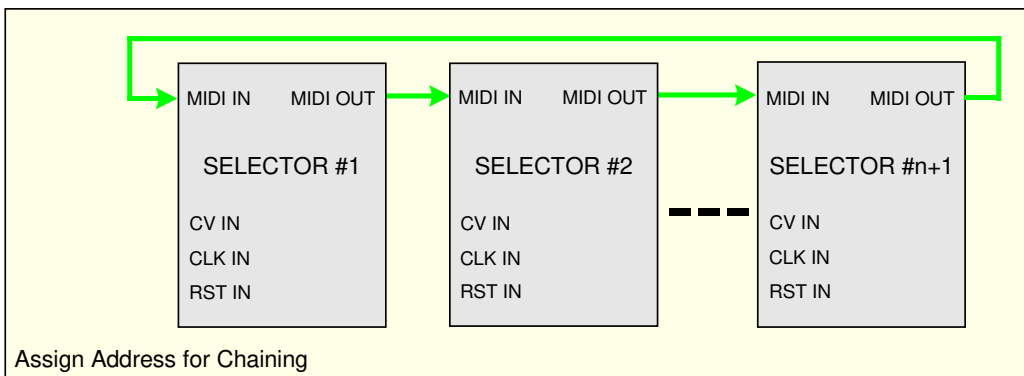
#### 4.2.1. **IMPORTANT - General rules in chaining**

- In chaining, please use the push buttons and CV Offset only of the module #1 (the Master).
- In chaining, please connect the CV, CLK and RST signals only on the module #1 (the Master).
- The next modules (the Slaves) push buttons, CV OFFSET and Red LED MODE are inoppperant!
- All data are save in EEPROM of the module #1 (the Master).
- Except Module #1, all Slaves modules are in MIDI THRU

**NB:** 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 no need to use a MIDI THRU BOX!

#### 4.2.2. **Assign addresses # in Chaining:**

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



The operation is done in a single sequence:

- Turn OFF your system.
- Keep press gently the push 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 to confirm the programming of the address #1, now release the push 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 1S.

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

**4.2.3. Erase the address for use without chaining:**

- Turn OFF your system.
- Keep press gently the push button MODE of the module.
- Turn ON your system and the 8 green LEDs flash twice time to confirm the erasing of the chain address, now release the RESET push button.
- The module restart, and your SELECTOR is ready to work alone.

**4.3. Mode selection**

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

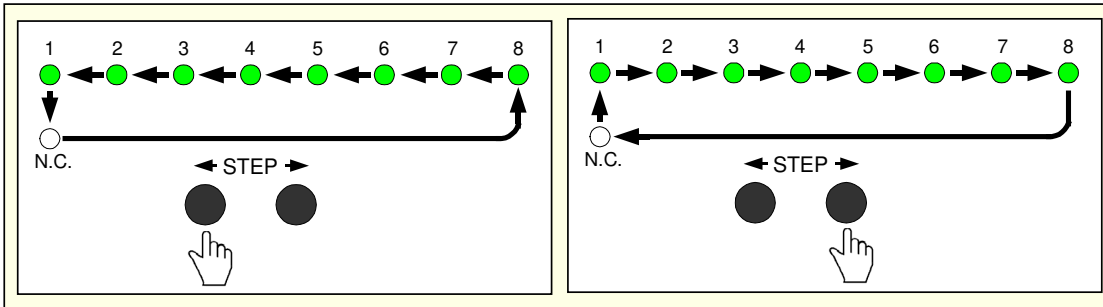
MODE & LED #	MODE	Arpeggiator-like pattern (4.13)	Step window (4.12)
1	Standalone (out of factory)	No	No
2	Use with the MS-MATRIX and MATRIX II		
3	External CV		Yes
4	External MIDI NOTE or MIDI CC command		
5	External MIDI CLK command	No	
6	External CLK with programmable steps number		
7	External CLK + RST	--	--
8	Not available		

- Afterwards:
  - Press more as 2 seconds the push button MODE to confirm your choice, the selected green LEDs flash 2 times to confirm the mode is saved in the EEPROM.
  - OR - Press shortly the push button RST to cancel the current programming.
  - OR - A time out of 15 seconds will cancel the current programming.
- Red LED MODE turn OFF.

#### 4.4. Mode 1 - Standalone

Press the push button STEP ← or STEP →, and the SELECTOR is updated (see figure below).

Keep press the button more as 1 second to engage the auto-repeat (during auto-repeat, switch is not updated).



In resume:

- With 1 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 push button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

#### 4.5. Mode 2 - Controlled by MS-MATRIX or MATRIX II

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

##### 4.5.1. PRESET from the MS-MATRIX:

Please, read the user Manual of the MS-MATRIX to load and save the Preset.

A LOAD operation, recall the settings of the SELECTOR to the Preset number displayed by the MS-MATRIX.

A SAVE operation, save the the settings of the SELECTOR to the Preset number displayed by the MS-MATRIX.

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 MS-MATRIX, but the values are saved in the EEPROM of the SELECTOR (Master) module.

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

##### 4.5.2. BANK & PRESET from the MATRIX II:

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 MS-MATRIX, but the values are saved in the EEPROM of the SELECTOR (Master) module.

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

### 4.5.3. MIDI SYS-EX.

These commands are generated by the MS-MATRIX or MATRIX II.

Of course, if you will control the SELECTOR by any software, welcome!

Commands	SYS EX (HEX)
Load a Bank & Preset	F0 00 20 09 00 1F <b>00 XX YY</b> F7
Save a Bank & Preset	F0 00 20 09 00 1F <b>01 XX YY</b> F7
Factory Reset	F0 00 20 09 00 1F 7F 7F 7F F7

**F0 00 20 09 00**= Header

**1F**= Broadcast MATRIX ID

**XX**= 00 with the MS-MATRIX - OR - 00 until 06 for Banks (7 values) with the MATRIX II

**YY**= 00 until 1F for Preset (32 values)

**F7**= End

## 4.6. Mode 3 – Controlled by the CV Inputs

In Mode 3, there is the ability to control SELECTOR module by an external CV signal (0 to 5 Volts).

Use the 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 push button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

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

In this 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 push button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

### 4.7.1. 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 push 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 - Press shortly the push button RESET to cancel the current programming.
  - OR - A time out of 15 seconds will cancel the current programming.
- The red LED MODE stop to blinking.

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

In MODE 6, there is the ability to control SELECTOR module by a MIDI sequencer.

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 push button RESET and the SELECTOR is held at No Connection and the last active LED flashes.

#### 4.9. 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 the RESET push button for a short time, repeat the sequence from the beginning.

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

#### 4.10. 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 the RESET push button for a short time, repeat the sequence from the beginning.

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

#### 4.11. "Arpeggiator-like" patterns

"Arpeggiator-like" patterns is available only with the modes 5 and 6.

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

#### 4.11.1. **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 push button STEP ← to save your choice
  - OR - Press shortly the push button RESET to cancel the current programming.
  - OR - A time out of 15 seconds will cancel the current programming.
- The green LEDs selected turn off.

**NB:** Modes 5 and 6 each have their pattern saved in EEPROM.

## 4.12. Configurable "Steps Window"

This feature is available and programmable only in MODE 3, 4, 5 & 6.

The "Steps Window" function allows you to freely choose a range of steps in number (minimum 2) and location! (even in chaining).

#### 4.12.1. **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 push button MODE to save your choice
  - OR - Press shortly the push button RESET to cancel the current programming.
  - OR - A time out of 15 seconds will cancel the current programming.
- The two green LEDs selected turn off.

**NB:** Each of the 4 modes has its own dedicated memory in the EEPROM.

## 4.13. 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>.

## 5. MISCELLANEOUS

### 5.1. 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.

### 5.2. Static Electricity, ESD



Electrostatic discharge (ESD) can cause malfunction and/or damage to electronic devices if discharged into the module.

Despite **ALYSEUM** products having built-in protections against ESD, voltages might build up at levels that could harm your equipment.

Some tips and precautions for ESD sensitive environment:

- Make sure to discharge any built-up static electricity from yourself and your devices before touching or connecting one device to another.
- Ground yourself by touching an earth grounded metal surface before handling your module and other equipments.
- For fixed installations, place the module in a grounded metallic rack.
- Ensure air relative humidity is minimum 60%.
- Install ESD specific prevention items, such as grounding mats.
- Reduce movement speed when handling or (dis)connecting devices.
- Avoid carpet or other synthetic flooring.



### 5.3. 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.