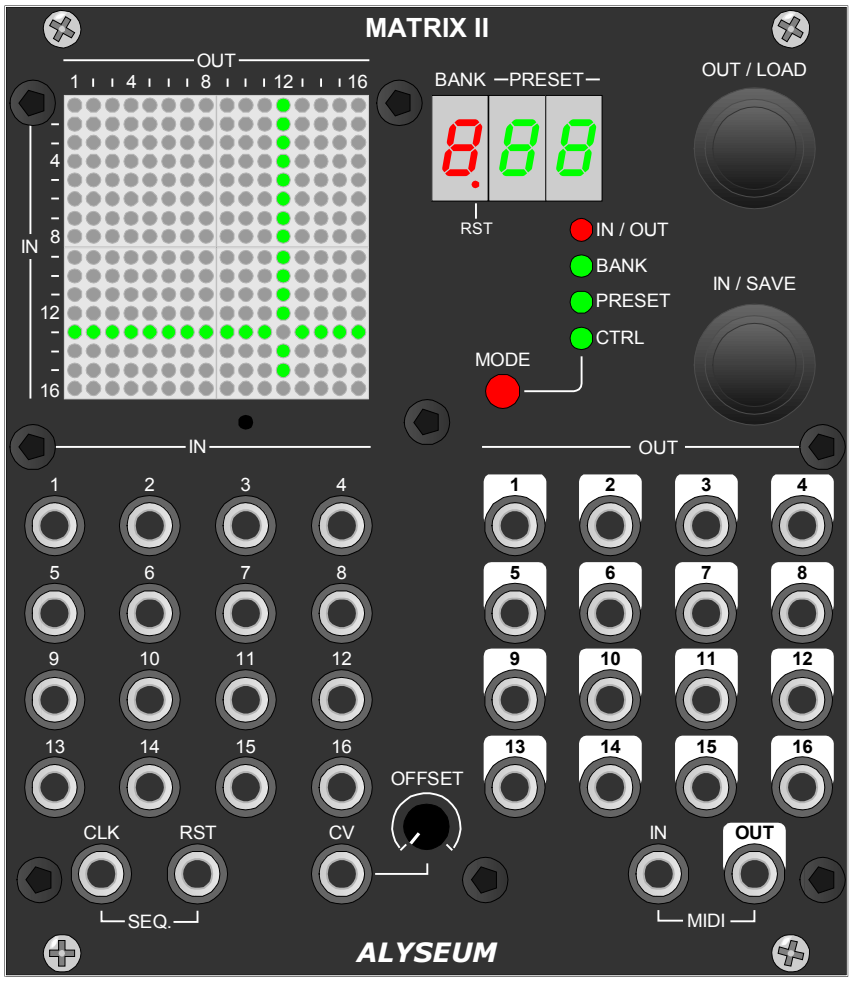
ALYSEUM - MATRIX II - User manual 2.7 - (Firmware 0.3 + 0.4)

1 Introduction



The MATRIX II module consists of a dynamic switching matrix, supporting 15 inputs and 16 outputs.

The 16th input is permanently connected to all non-routed outputs.

The inputs naturally accept a wide variety of signals such as Gates, Clocks, CV, OSC and audio follow a full analogue path to the outputs.

All inputs and outputs are buffered with low offset unity gain op-amps.

A dedicated 256 LEDs display provides a friendly and intuitive graphical user interface, with each LED representing one of the 256 available connection points.

Each of the MATRIX II's inputs and outputs can be expanded using the optional Q-VCA (4-channel mixer) or SELECTOR (1 ↔ 8 multiplexer) modules. These modules are slaves to the MATRIX II and share its memory.

Finally, all your user patches can be saved in 7 banks of 32 Presets or unlimited presets using the freeware editor for WIN or OSX.

<u>The 32 presets in each Bank can be selected by :</u>

- OR – A CLK+RST input for your sequences.
- OR – A CV input with its bipolar Offset setting.
- OR – A MIDI NOTE ON or PGM CH input.
- AND – From the front panel.
- AND – From the free MATRIX II editor (WIN 7-11 & OSX).

Important - *Wichtig - Importanti - belangrijk - Ważne – Σημαντικό*

It is NOT possible to map several inputs to a single output!

MATRIX II does not have a built-in mixing function!

MATRIX II need an active 5 Volts rail to working correctly!

2 Hardware

2.1 Package Content

- One MATRIX II module with Eurorack compliant front panel
- One plastic bag containing four M3 screws + four nylon washers + one 16/16 pins power ribbon cable + one short MIDI cable adapter DIN1.0 female to Jack 3.5mm TRS (type B)
- Warranty & user manual access card

2.2 Specifications

- Front panel width of 111.5 mm (22HP) and maximum depth of 26 mm.
- Power requirements : +12V= 30mA -12V= 30mA +5V= 150mA
- The module is protected against flat cable reversal.

2.3 Features

- 100% Analogue path
- Specialized single Chip from Analog Device (AD75019).
  - Supports wide signal range from –12 Volts to +12 Volts.
  - Isolation between channels: -92dB at 1 KHz.
  - Low distortion: 0,01% .
  - Bandwidth DC over 20KHz.
- 15 inputs & 16 outputs unity and low offset gain buffers.
- 7 Banks of 32 Presets stored in EEPROM.
- Unlimited number of presets via the freeware editor for WIN or OSX.
- Programmable MIDI channel number for NOTE or PGM CH.

2.4 IN16 or GND selection jumper

The unique jumper is available on the rear panel of the module from serial numbers 037-xxx

By default, this jumper is connected to input 16.

If you're not using the 16th input, it's best to set the jumper to GND (0 Volt), as this maximises crosstalk performance on unused outputs.

2.5 Installation

Important: MATRIX II need an active 5 Volts rail to working correctly!

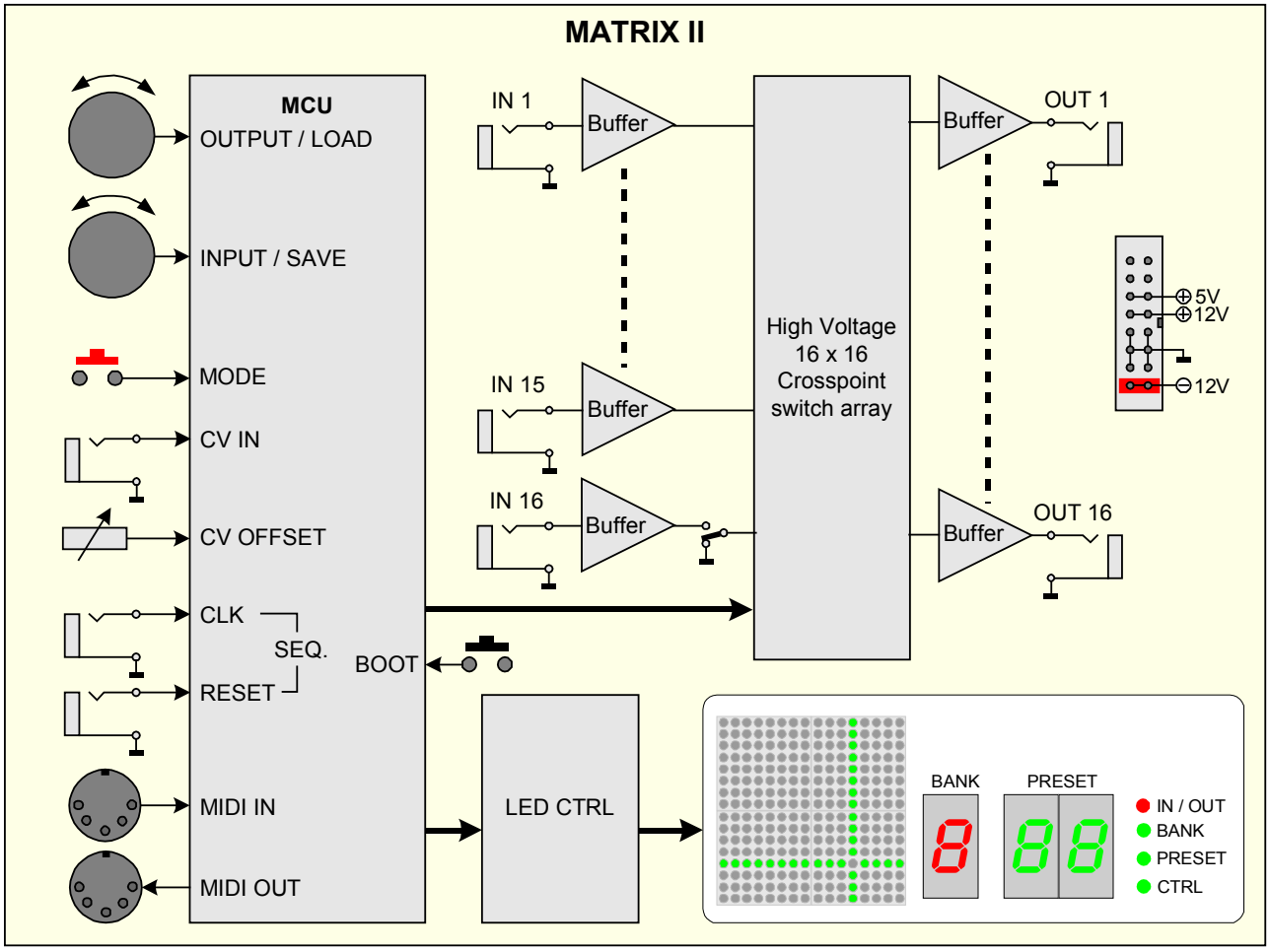
Carefully choose a stable location for your Eurorack, avoiding vibration, dust, heat sources, humidity or rain.

MATRIX II can only be used in a Eurorack synthesizer with an A-100 power supply.

During the entire installation procedure, always switch off your Eurorack – **NO HOT SWAPPING!**

Make sure that the red band on the flat power cable is correctly positioned at -12 Volts.

2.6 Bloc diagram



2.7 Expand to more connections

Each MATRIX II input and output can be expanded via the the optional slaves modules:

- Q-VCA with its 4 VCAs for mixing functions.
- SELECTOR with its selector 8↔1.
- It is also possible to add one or more MATRIX II in your setup - Yes, that exist to few customers with a very big setup. In this case, designate one MATRIX II as the master and daisy-chain the other MATRIX II units as slaves.

All the LOAD and SAVE operations of the presets of all the slave modules will be done in a single operation by the MATRIX II (the master, which you will have determined once and for all).

<u>In short, you can expand each of the 15 inputs with:</u>

- A Q-VCA module to add 4 mixed sources.
- A SELECTOR module to add 8 → 1 switched sources.

<u>And you can expand each of the 16 outputs with:</u>

- A Q-VCA module to add 4 mixed destinations.
- A SELECTOR module to add 1 → 8 switched destinations.

3 How to use

3.1 Initialization Sequence

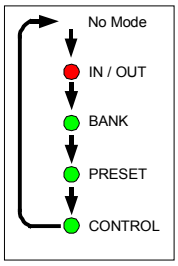
1. Turn the Eurorack case power ON.
2. ***ALYSEUM*** and firmware revision are displayed on the LED array display for less than a second.
3. One by one, the 4 modes LEDs flash for half a second each.
4. The matrix stored in the last used BANK & PRESET are loaded and displayed on the LED digit and corresponding connection on the LED array display 16X16 .
5. A MIDI message is sent to inform the slaves modules (Q-VCA, SELECTOR and/or MATRIX II) of the Bank and Preset to be loaded.

MATRIX II is ready!

3.2 Mode Selection

Press the red Mode button to navigate and select:

- - No Mode (Default - All LED Mode Off)
- ❶ IN / OUT
- ❷ BANK
- ❸ PRESET
- ❹ CTRL



3.3 Mode ❶ - IN / OUT Mode

To select a connection between an input and an output on the matrix, please proceed:

1. The line and column guides appear on the LED array.
2. Turn the IN/SAVE encoder to select a row.
3. Turn the OUT/LOAD encoder to select a column.
4. To activate or deactivate the selected connection press either the IN/SAVE or the OUT/LOAD encoder until the corresponding LED is turned ON. The line and column guides disappear.
5. To change an another connection, repeat step 2 and so on.

NB: Red I/O LED blinking as long as the changes are not saved (Unsaved IN/OUT warning).

Specific algorithm in Rev.03 firmware:

In order to improve performance, we have added a specific algorithm to the embedded software.

All outputs that are not routed to an input are connected to the 16th input by default, regardless of the selected preset.

NB: you will need to use the Rev.03 editor.

Specific algorithm in Rev.04 firmware:

This new algorithm allows access to output 16 in all cases.

NB: you will need to use the Rev.04 editor.

3.4 Mode ❷ - BANK Management

Loading a BANK

1. Turn the OUT/LOAD encoder to select a BANK from 1 to 7.
2. During 10 Seconds, the matrix stored in the selected Bank/Preset location is displayed on the LED matrix display and on the red and green Digits LED (but not loaded yet).
3. Press the OUT/LOAD encoder a second time to confirm your selection.
4. The matrix connections are set according to the selected Bank. A MIDI signal is sent informing slave modules that the particular Preset has been loaded.

Saving a BANK

There is no function to save the BANK location. Each time you save a PRESET, the corresponding BANK number is automatically saved.

3.5 Mode ❸ - PRESET Management.

Load a Preset

Presets can be loaded in several ways: manually or by the dedicated CV Input or by the CLK+RST inputs or by MIDI (either incoming Note On or PGM CH) and finally via the **MATRIX II** Editor.

1. Turn the OUT/LOAD encoder to select a Preset number and press to confirm.
2. The 256 I/Os of the new Preset are loaded and displayed.

Create a new Preset

1. Turn the OUT/LOAD encoder to select a free Preset number and press to confirm.
2. Select I/O mode and create your new patch.
3. Select Preset mode and press the IN/SAVE encoder to confirm your selection. The green double digit will flash three times.

Duplicating a Preset

1. Turn the OUT/LOAD encoder to select a source Preset number and press to confirm.
2. Turn the IN/SAVE encoder to select a free destination Preset number, press, and the green double digit will flash three times to confirm.

Modify a Preset

1. Turn the OUT/LOAD encoder to select the Preset you want to edit and press to confirm.
2. Select I/O mode and update your I/O patch.
3. Select Preset mode and press the IN/SAVE encoder to overwrite the modified preset. The green double digit will flash three times to confirm.

Saving a Preset

1. Turn the OUT/LOAD or IN/SAVE encoder to select a PRESET location.
   PRESETs are indexed in locations between **01** and **32** and displayed on the dual green LED digit during 1 Second (but not overwritten yet).
2. Press the IN/SAVE encoder to confirm your selection and the dual green LED digit flashing 3 times.

3. The current matrix connections are stored to the selected PRESET location. A MIDI signal is sent informing slave modules that the particular PRESET has been saved.

NB: Pushing the IN/SAVE encoder will overwrite the current matrix connections to the specific location and the previously saved matrix will be lost.

Saving a PRESET Automatically

When Auto Save is activated there is no need for any action in order to save a PRESET as any change made is automatically saved. When the Auto Save mode is enable, impossible to save manually!

This means that by activating or deactivating a connection while in IN/OUT Mode you also alter the matrix saved on the specific PRESET location.

To select Auto Save, please follow the procedure:

1. Turn the Eurorack case power off.
2. Press and hold the IN/SAVE encoder while turning the Eurorack case power back on.
3. Release the encoder.
4. Turn the OUT/LOAD encoder to choose between **AUTO SAVE** or **MAN. SAVE**.
5. Press the OUT/LOAD encoder to confirm your selection.
6. The Initialization sequence begins.

3.6 Mode ❹ - CTRL Mode

To select the method of loading a PRESET:

1. Press the red Mode button to select the CONTROL mode.
2. Turn the IN/SAVE encoder to select one of the 35 settings: (*see diagram right).*

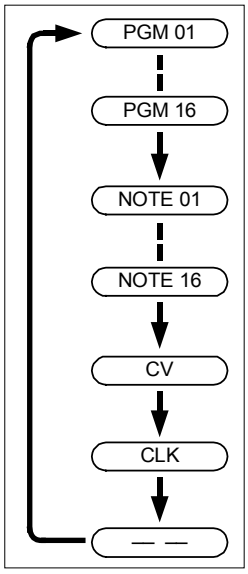
   PGM XX: Preset changing via PGM change (MIDI channel 1 to 16).

   NOTE XX: Preset changing via MIDI notes (MIDI channel 1 to 16).

   CV: Preset changing via CV input (0 to +5 Volts range).

   CLK: Preset changing via CLK+RST inputs, like a Sequential MATRIX I/O Router.

   — — : Preset changing only manually .
3. Press the INPUT/SAVE encoder to confirm your selection.
4. Your selection has been saved as soon as the CONTROL Mode LED is turned Off.



NB 1: Any activity on the MIDI IN or CV input will be indicated by the CTRL LED flashing.

NB 2: All PRESETs changes due to MIDI IN input or CV input or CLK+RESET inputs are ignored while IN/OUT Mode, BANK Mode or PRESET Mode is active.

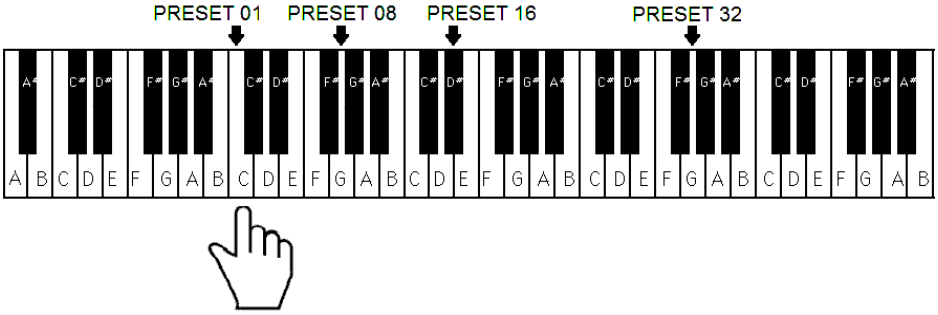
Assigning a MIDI NOTE to Preset 01

By default PRESET 01 corresponds to key C3 (MIDI Note 48). Consecutive chromatic notes correspond to the rest of the Preset locations as shown below.

So, if your keyboard range is too short or you will change the zone, the lowest key which will correspond to PRESET 01 can be reassigned (MIDI Channel sensitive):

1. Make sure you have your MIDI keyboard properly connected to the MIDI IN input of the MATRIX II
2. Turn the Eurorack case power off.
3. Press and hold the red Mode button while turning the Eurorack case power back on.
4. **NEW NOTE** is displayed on the LED display
5. Release the red button
6. Press the desired key on your MIDI keyboard (Note On), hold it for at least 5 seconds or wait for the MIDI/CV LED to flash 4 times and then release the key (Note Off).

7. The MIDI/CV Mode LED flashes 4 times and the new lowest Note is saved.
8. The initialization sequence is begins.



NB : In step 6, if more than one keys are simultaneously pressed for more than 5 seconds, only the one pressed earlier will be used for setting the new lowest key for PRESET 01.

3.7 Factory Reset

ATTENTION! Be aware that a Factory Reset will erase all 7 BANKs of the 32 PRESETs and all Settings stored by the user. Additionally the expander Q-VCA & SELECTOR modules and a other slave MATRIX II will also undergo a Factory Reset - unless you disconnect the MIDI cable.

To perform a Factory Reset:

1. Turn the Eurorack case power OFF.
2. Press and hold both IN/SAVE and OUT/LOAD encoders while turning the Eurorack case power back ON.
3. **RESET** will be displayed on the LED array.
4. Release both encoders.
5. The 7 BANKs of the 32 PRESETs and all CONTROL settings are erased.
6. System reset command (F0 00 20 09 00 1F 7F 7F 7F F7) is sent to slave modules via MIDI, if connected.
7. The initialization sequence begins.

3.8 Examples of practical or creative application

Basic example: Simple routing

Input 1: An LFO (slow modulation signal)

Output 1: Oscillator frequency

Output 2: Filter cutoff → The same LFO modulates both the pitch of a sound and its tonal colour via two connections activated at the same time.

Example of dynamic signal duplication (Multi)

Input 1: A CLK signal

Outputs 1-4: Four different modules (sequencer, delay, synchronised LFO, envelope) → A single CLK signal synchronises several elements of your patch, without loss of quality or latency.

Example of an evolving patch

Inputs 1-4: Four different CV sequences

Outputs 1-16: Several oscillators, filters, effects → You can program the matrix so that every 8 bars, the connections change automatically (e.g. sequence 1 modulates oscillator A, then sequence 2 modulates oscillator B, etc.), creating a composition that evolves on its own.

Controlled feedback example

Input 1: Output of a reverb effect

Output 1: Input of the same reverb effect (via the matrix) → You create an analogue feedback loop, which you can activate/deactivate or modulate in real time via other control signals.

Example of dynamic mixing

Inputs 1-4: Four audio sources (kick, snare, hi-hat, bass)

Outputs 1-4: Four channels of a mixer or effects processor → You can route each source to a different effect, or mix them dynamically according to a rhythmic pattern or envelope.

Example of cross modulation

Input 1: VCA envelope

Output 1: Oscillator modulation CV

Output 2: Filter modulation CV → The envelope modulates both the pitch and colour of the sound, creating an expressive and organic effect.

In summary:

The MATRIX II allows you to transform your modular system into an infinitely reconfigurable network of connections, ideal for improvisation, generative composition, creating unique sound effects, and much more!

3.9 Firmware upgrade.

Always ensure that you have the lastest firmware installed before using the module.

The MATRIX II is pre-programmed with the ability to receive firmware upgrades (for bugfixes, extra features, etc...) via MIDI protocol (SysEx commands).

Please, fill in the page Firmware Upgrade https://alyseum.com/firmware.html to receive a potential new firmwares.

In order to flash new firmware, please follow the instructions below:

1. Turn the Eurorack case power OFF.
2. Close all MIDI software on your computer.
3. Connect the computer and the MATRIX II with a MIDI cable.
4. Download Sys Ex utility at https://alyseum.com/firmware.html (WIN & OSX).
5. Using a thin, long object like a toothpick, press and hold the BOOT button (located behind the small hole just below the LED matrix), while switching your Eurorack back ON.
6. All the LEDs flash 3 times, now 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, set 400mS for Delay in the textbox, select x1 for Turbo limit field and click OK.
9. Click **Send**, the LEDs first flash one after the other during 30 seconds, then all together fast during 20 seconds.
10. Wait until sending is complete. All the LEDs flash 4 times, and the module reboots to normal operating mode with new firmware.

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.

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

3.10 How to control MATRIX II via MIDI SYS-EX

For musicians who wish to load Presets and Banks via their favorite software, we provide the information below. Please note that no support or assistance will be provided!

Commands SYS EX	Header + ID Device + Command # + Data + End
Load Bank & Preset	F0 00 20 09 00 1F 00 BB PP F7
Save Bank & Preset	F0 00 20 09 00 1F 01 BB PP F7

BB= Bank (00H to 07H)

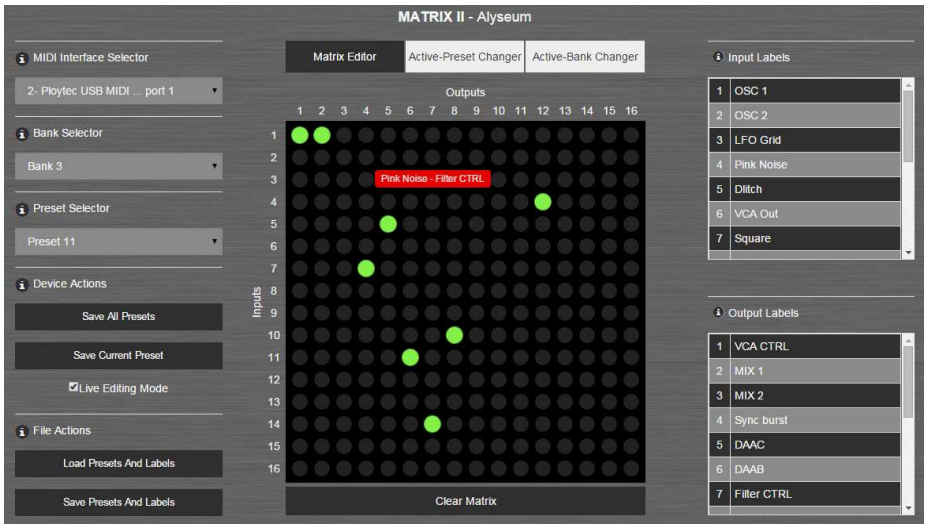
PP= Preset (00H to 15H)

4 Editor

The MATRIX II Editor is an freeware application that provides an easy and fast interface to the MATRIX II functionalities and it works on Windows or OSX, and it's free to download from our website.

The MATRIX II Editor is a standalone/portable executable, so there is no installation process. Once you download it, all you have to do is open it, so you can use it. Depending on your computer's specifications, it could take a few seconds to load, as it has been compressed, in order to save space.

The editor is divided into three vertical sections.



NB: Please note that the MATRIX II Editor can not manage the Bank allocations. You need to SAVE Bank manually on the front panel, one by one.

4.1 Left section

Button - MIDI Interface Selector

All available MIDI Interface connected to your computer will be listed in the dropdown field "MIDI Interface Selector".

Please choose the one connected to your MATRIX II.

NB: In case the "MIDI Interface menu" is empty, although there are MIDI-output devices connected to your computer, please re-open the MATRIX II Editor with Administrator permissions (right click the executable and choose "Run as Administrator").

Button - Bank Selector

The “Bank Selector” is a dropdown list of 7 Banks.

When a Bank is selected, it is loaded onto the matrix, in the center of the screen.

Button - Preset Selector

The “Preset Selector” is a dropdown list of 32 Presets.

When a Preset is selected, it is loaded onto the matrix, in the center of the screen.

Also, the “Save Current Preset” button uses the Preset selected in this list.

Button - Save All Presets

All Presets are saved to the MATRIX II. The active I/O connections are not changed.

Button - Save Current Preset

The selected Preset is saved to the MATRIX II. The active I/O connections are not changed.

Button - Load Presets and Labels

Select a file previously saved by using the “Save Presets and Labels” button (see below - Save Presets and Labels), so that its contents are loaded into the MATRIX II Editor.

In case you have edited Presets or Labels without having saved the changes, you are presented with a verification for overwriting the existing Presets and Labels with the imported ones.

Button - Save Presets and Labels

Download a file containing all Presets and Labels currently in the MATRIX II Editor.

You can afterwards load it (see above – Load Presets and Labels) and continue working where you left off.

Button - In / Out Labels

Output and Input Labels are used to easily identify Outputs and Inputs, respectively, They appear when hovering the mouse over the matrix.

By clicking on a label row, a popup appears, providing the ability to change that label.

4.2 Mid section

Tab – Matrix Editor

This is the default active tab when the application is opened.

It consists of a 16x16 matrix with round buttons, which have a toggle function, as well as a button to reset all I/Os to zero (Clear Matrix).

Tab – Active Preset Changer

The PRESET selector has 32 push buttons representing the 32 presets in the module.

When a preset is selected, it is loaded onto the matrix in the centre of the screen.

In addition, the ‘Save Current Preset’ button uses the preset selected in this list.

Tab – Active Bank Changer

The Bank selector is a drop-down list of 7 banks.

When a bank is selected, it is loaded onto the matrix in the centre of the screen.

4.3 Right section

Editing entry and exit labels

Labels are used to easily identify exits and entries respectively.

Clicking on a label line brings up a pop-up window, allowing you to edit that label.

5 Miscelleanous

5.1 Disclaimer

5.2 Warranty and repair

ALYSEUM warrants to the original purchaser that each of these products is free from defects in materials and workmanship for a period of two years from the date of purchase.

This warranty does not apply to products which have been repaired or modified by anyone other than ***ALYSEUM***, or which have been subjected to electrostatic discharge, moisture, improper installation or use.

ALYSEUM assumes no responsibility for such occurrences under the terms of this warranty.

Before taking any action, please consult your dealer for further details or visit our support page at http://www.alyseum.com/support