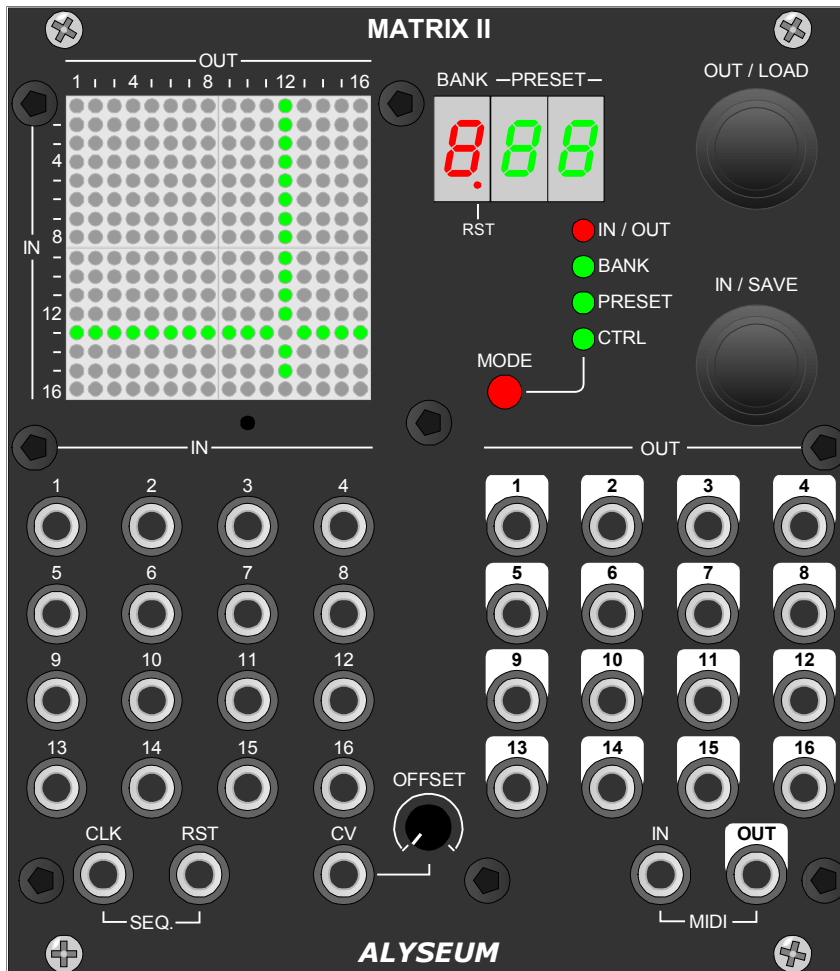# ALYSEUM - MATRIX II - User manual 2.5 - (Firmware 0.3)

1   Introduction

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

The 16th input is a special one, it is low impedance (3KΩ) and is permanently connected to all no routed outputs.

The inputs accepts by nature a variety of signals such as Gates, Clocks, CV and OSC and follow a full analog path to the outputs.

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

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

Each inputs and outputs can be multiplied by 4 with the optional Q-VCA mixer module or optional SELECTOR multiplex 1 ↔ 8 module.

And finally, all your user patches can be saved in 7 Banks of 32 Presets or unlimited presets via the freeware editor for WIN or OSX.

These 32 Presets can then be recalled by:

1. OR a CLK+RST inputs to obtain a Sequential MATRIX I/O router
2. OR a CV Input with its bipolar offset setting.
3. OR a MIDI NOTE ON or PGM CH
4. AND the front panel
5. AND the freeware MATRIX II editor (WIN & 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!

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2   Hardware

2.1   Package Content

- One MATRIX II module with Eurorack compliant front panel
- One plastic bag containing:
    - o   Four M3 screws + nylon washers
    - o   One 16/16 pins power ribbon cable
    - o   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: 111.5 mm (22HP).
- Module maximum depth: 26 mm.
- Power requirements (30% LED ON): +12V= 30mA / -12V= 30mA / +5V= 150mA

2.3   Features

- Full analog path
- Specialized single Chip from Analog Device (AD75019).
    - o   Wide signal range: from –11 Volts to +11 Volts.
    - o   Isolation between channels: -92dB at 1 KHz.
    - o   Low distortion: 0,01% .
    - o   High bandwidth DC up to 20KHz.
- 16 inputs & 16 outputs unity and low offset gain buffers.
- 7 Banks of 32 Presets saved in EEPROM and loadable by MIDI PGM CH, MIDI NOTE, CV or CLK+RST.
- Unlimited presets via the freeware editor for WIN or OSX.
- Programmable MIDI channel number for NOTE or PGM CH.

2.4   Installation

ATTENTION: MATRIX II need an active 5 Volt rail to working properly!

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.

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.

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.

2.5   Bloc diagram
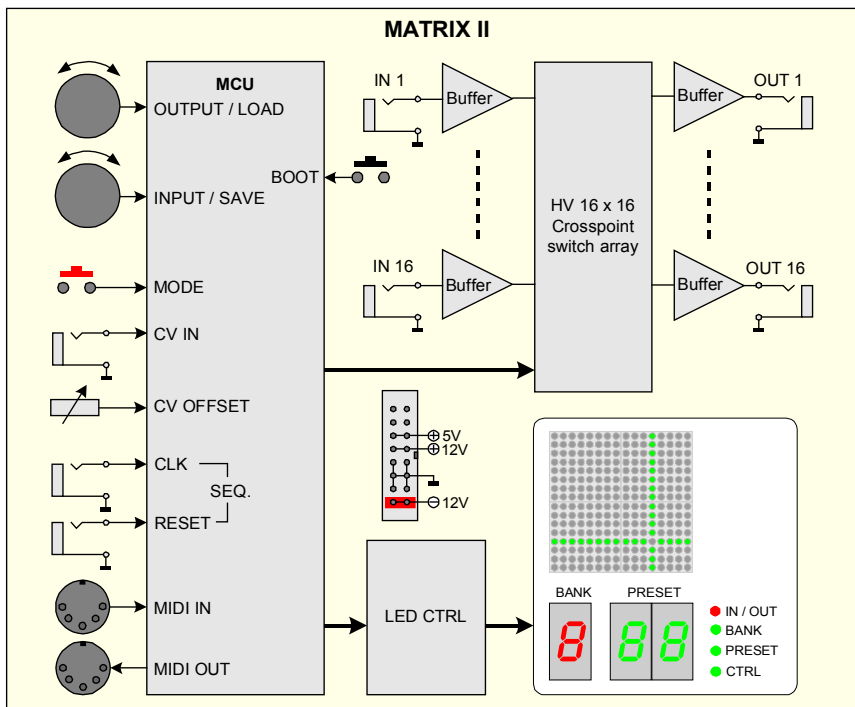
2.6   Expand to more connections

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

- 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 very few customers).

All the LOAD and SAVE operations of the memories 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).

In resume, you can expand each inputs by:

- One Q-VCA module, add mix 4 sources per MATRIX II input
- One SELECTOR module, add Switcher 8 → 1 sources per MATRIX II input

And you can expand each outputs by:

- One Q-VCA module, add 4 destinations mixed per MATRIX II output
- One SELECTOR module, add switcher 1 → 8 destinations per MATRIX II output

# 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.

After about 30 seconds, MATRIX II is stabilized and ready for use!

3.2   Mode Selection

Press the red Mode button to navigate and select:

●   No Mode (Default - All LED Mode Off)
●   IN / OUT
●   BANK
●   PRESET
●   CTRL
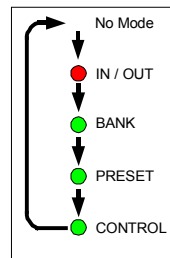
3.3   IN / OUT Mode

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

1.   Press the red Mode button to select IN/OUT Mode.
2.   The line and column guides appear on the LED array.
3.   Turn the IN/SAVE encoder to select a row.
     The selected row number corresponds to the input jack of the same number.
4.   Turn the OUT/LOAD encoder to select a column.
5.   The selected column number corresponds to the output jack of the same number.

To activate 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.

To deactivate the selected connection press either the IN/SAVE or OUT/LOAD encoder until the corresponding LED is turned OFF. The line and column guides disappear

To move on to another connection, turn the IN/SAVE or the OUT/LOAD encoder and then go to step 3 .

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

Specific algorithm in the firmware :

To increase the performance, we have added a specific algorithm in the firmware: All outputs not routed to an input, are by default connected to the 16th (or GND by default), so as to improve the performances between analog audio channels.

Please, do not use input 16 unless all other inputs (1-15) are already connected to an output.

3.4   BANK Management

Loading a BANK

Bank # can be loaded manually and via the **MATRIX II** Editor.

1. Press the MODE button to select BANK Mode.

2. Turn the OUT/LOAD encoder to select a BANK location (1 to 7)

3. 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).

4. Press the OUT/LOAD encoder a second time to confirm your selection.

5. 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

Don't exist a saving bank location function. Each time you save a PRESET, the BANK number is automatically saved.

3.5   PRESET Management.

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.

Loading a PRESET.

1. Press the MODE button to select PRESET Mode.

2. 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 10 Seconds (but not loaded yet).

3. Press the OUT/LOAD encoder to confirm your selection.

4. The matrix connections are set according to the selected PRESET. A MIDI signal is sent informing slave modules that the particular PRESET has been loaded.

TIP: In CV mode and if you don't use the CV input, you can select a PRESET very fastly via the OFFSET trim.

Saving a PRESET

1. Press the MODE button to select PRESET mode.

2. 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).

3. Press the IN/SAVE encoder to confirm your selection and the dual green LED digit flashing 3 times.

4. 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.

3.6   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: (s*ee diagram right).*

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

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

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

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

    E. ─ ─ : 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: When one of the five CONTROL Mode settings has been selected any incoming activity, either from the MIDI IN input or the CV input, will be indicated by the flashing CONTROL Mode LED.

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.
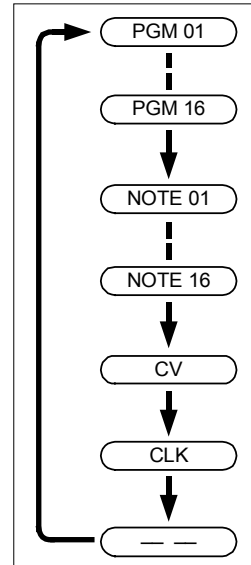

3.7   SETTING.

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.
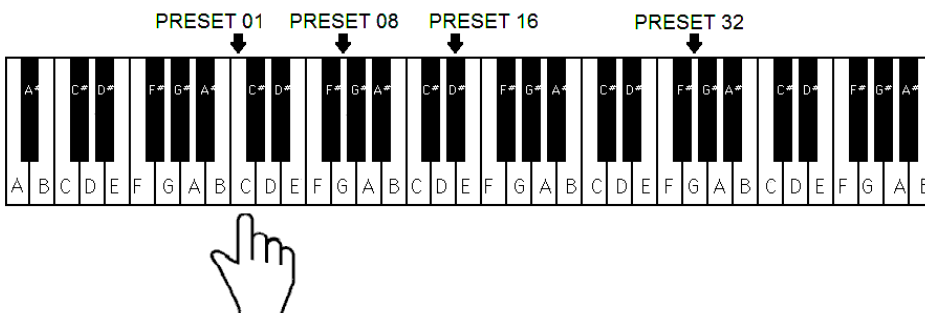
NB 1: There is no need to repeat this operation every time you turn the module ON, since the lowest Note under a MIDI Channel are stored in the non-volatile memory of the module.

NB 2: 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.

Auto Save or Manual Save

To change the method Presets are saved:

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** and **MAN. SAVE** as indicated on the LED display.

5. Press the OUT/LOAD encoder to confirm your selection.

6. The Initialization sequence begins.

3.8   Factory Reset

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.

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 Q-VCA and/or SELECTOR modules via MIDI connected.

7. The initialization sequence begins.

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 http://alyseum.com/firmwareupdate to receive new firmware for your product.

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 http://www.elektron.se/support-and-downloads (WIN & 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 MATRIX II front panel – left from the mode LED, and can be pressed using a thin, long object like a toothpick.

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, then all together fast.

10. Wait more as 1 minute 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.

All parameters (lowest note, last used Preset and Bank, last used midi channel or cv input or CLK+RST, preset save mode) 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.

3.10   How to control MATRIX II via MIDI (SYS-EX) ?

For musicians who wish to control the MATRIX II via their favorite software, we provide the information below, please note that no support or assistance will be provided!

You can communicates with the MATRIX II with the following SYS-EX protocol

Send Preset to device:
F0, 00, 20, 09, 00, 1F, 7E, 01, BANK_INDEX, PRESET_INDEX, PRESET_VALUES, F7

If the BANK_INDEX and PRESET_INDEX in this message are the same as the respective active bank index and active preset index of the MATRIX II at that time, this preset will also directly appear on the matrix (live mode)

Change active Bank:
F0, 00, 20, 09, 00, 1F, 7E, 02, 01, BANK_INDEX, F7

Change active Preset:
F0, 00, 20, 09, 00, 1F, 7E, 02, 01, PRESET_INDEX, F7

Live editing mode:
Send preset to device, making sure that the BANK_INDEX and PRESET_INDEX in this message are the same as the respective active bank index and active preset index of the MATRIX II at that time (otherwise, this will be considered a "Send preset to device" message).

Notes:
- BANK_INDEX = 00 to 07
- PRESET_INDEX = 00 to 15
- PRESET_VALUES = 16 separate values (00-15), 1 for each matrix row

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 and Mac OSX, and it's free to download from the Alyseum 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.
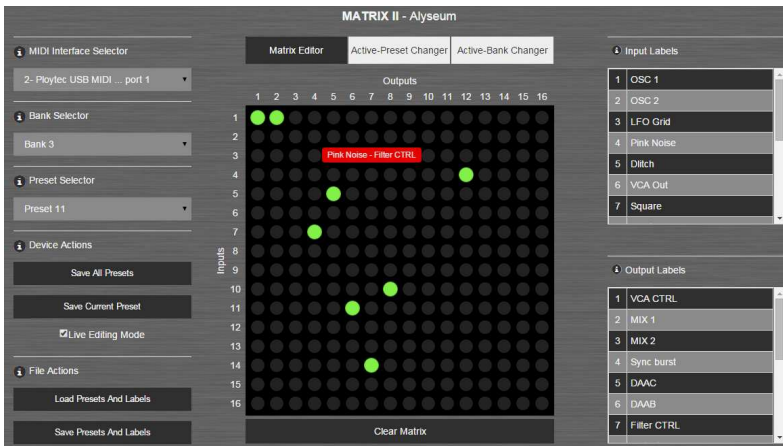
NB: Please note that the MATRIX II Editor can not manage the Bank allocations. You need to SAVE Bank manually on the front panel, one by one.

4.1   Matrix Editor Tab

This is the default active tab when opening the application.   It consists of a 16x16 matrix with round buttons, that have a toggling functionality, as well as a "Clear Matrix" button, for easy matrix clearing.

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").

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.

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.

MATRIX II Actions

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

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

File Actions

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.

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.

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, as seen in the image on the right.
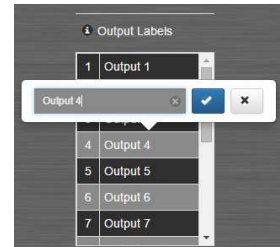
4.2   Active-Preset Changer Tab

The Active-Preset Changer Tab can be used to load fastly a Preset from the MATRIX IIs EEPROM memory to the active switch matrix.

After selecting the correct channel – the one that the MATRIX II is configured to receive PGM Change Messages on.

You just press the button corresponding to the Preset you want to load and the matrix connections are set according to the selected Preset.

4.3   Active-Bank Changer Tab

The Active-Bank Changer Tab can be used to load fastly a Bank from the MATRIX IIs EEPROM memory to the active switch matrix.

After selecting the correct channel – the one that the MATRIX II is configured to receive PGM Change Messages on

You just press the button corresponding to the Preset you want to load and the matrix connections are set according to the selected Bank.

5   Miscelleanous

5.1   Disclaimer

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   Warranty and repair

5.3   Special Thanks

Vyronas Dokimakis (the programmer), Vangelis, Philip Thoma, Cyril Colomb, Alex, and all the users for their positive comments and feedback.