# NLED AllPixMatrix – v.1a

What It Does:

The software uses many media types such as images, animated GIFs, videos(many codecs), Spout/Syphon, external data reception(like Glediator) and software generated content. It converts or maintains the media to low resolution, that will display well on low resolution LED matrices. Small scale LED matrices require low resolution media, as scaling down larger standard sized media results in poor looking images once down scaled. The different types of media content can be mixed together in different ways, and have effects and filters applied to them. The resulting output is transmitted out to a serial port(like a FTDI or USB enabled microcontroller) which converts it to a pixel chipset protocol and sends it to the pixels.

Description:

This program was written for use with my projects and products, but hope it will be useful to others as well. I am frequently asked about how best to create content for low-resolution pixel matrices. There are a few choices out there, but none that are feature rich and open source. This software was kept simple as possible with the ability to easily modify and add to it. Processing has many inbuilt graphics functions that made it a good choice for this type of software.

This software is still be updated and refined. The user must be able to understand and edit the /config/ folders and files in order to get a LED matrix running. Take a look at the example matrix setups in the /config/ folder.

Find videos and updates at https://www.nledshop.com/nledallpixmatrix/
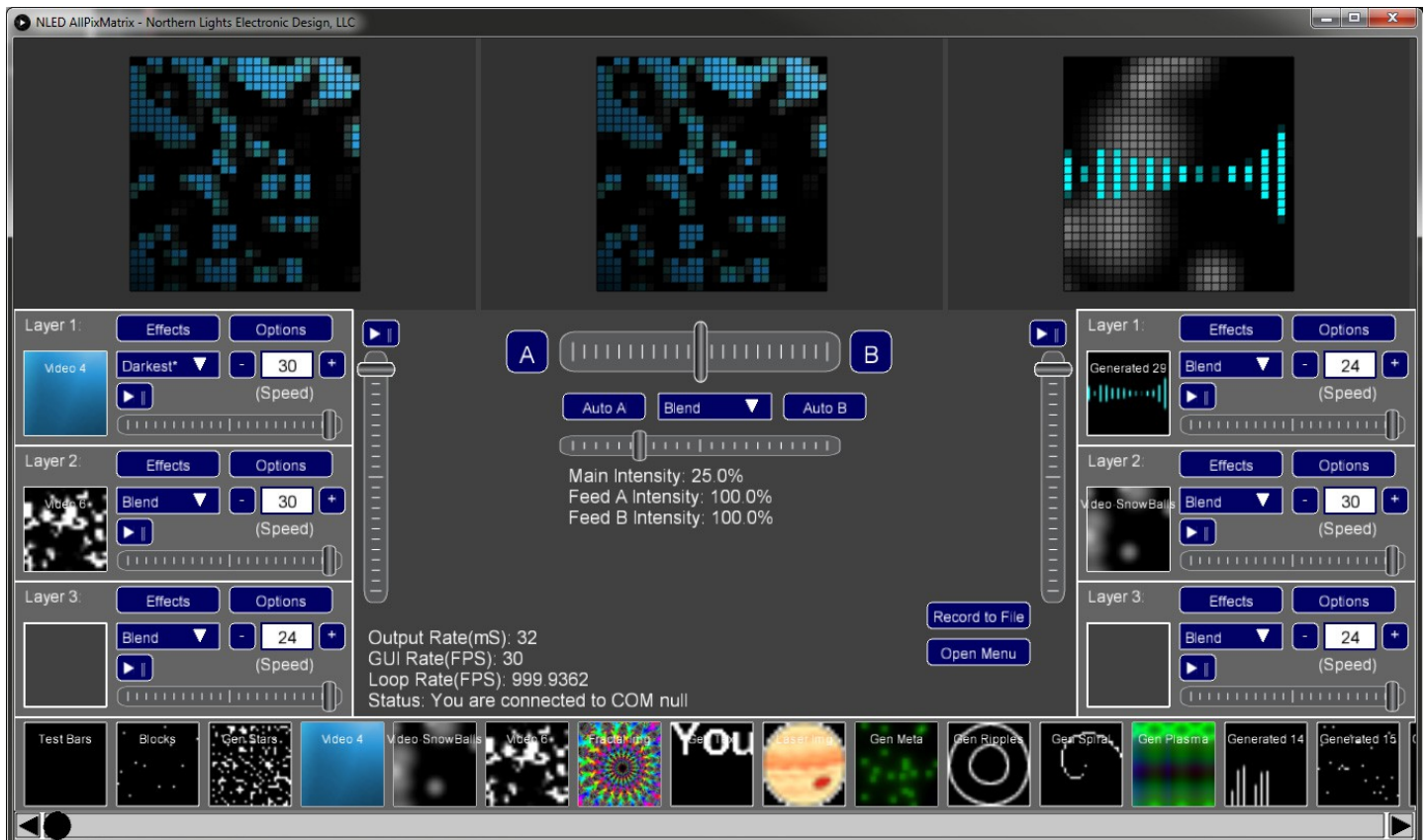
Media Types:

- **Video File:** Is a movie file such as an AVI or MP4. Plays at it's native FPS unless adjusted once placed on a layer. Allows cropping and re-sizing.
- **Animated GIF:** The Java movie library doesn't support GIFs, will need to write support for them. Not yet implmented as of v.1a
- **Image File:** A standard image can be loaded. Images such as JPG, PNG, TIFF, GIF, etc are supported. Allows cropping and re-sizing.
- **Spout/Syphon:** Spout is for Windows, Syphon is for MacOS. Used to receive video streams from other software applications and external video sources. Uses texture sharing on a hardware level to exchange video data. Google for details on the capabilities. Allows cropping and re-sizing.
- **Generated:** Creates motion graphic media in software using functions and algorithms, with inputs from sources like 'Audio-In' for sound reactivity. Always are generated at the native resolution of the LED matrix. More to be added, test them out for details.
- **Data File:** Reads uncompressed text files that contain the color data, similar to an uncompressed video file. All data is expected to be in 24-bit(RGB) color, multiple formats are supported. This is the same format that the "Record To File" function writes. The data file must use the same pixel amount and patching order as the matrix patch that is loaded.
- **External Data:** Meant to be a way to pass in data streams from other software, but currently only supports and works with Glediator. The external software that is transmitting the data stream must be setup and and compatible with the matrix that is loaded in software.

Keyboard Shortcuts and Input:

To fill a layer, click the layer preview icon, it will highlight red, then click one of the media tiles to fill the layer. Right click to cancel the selection.

Clicking the layer preview icon when selected will open the media content tile menu if a content is loaded onto the layer. Same as opening it through the media content tile area.

Right click a layer preview icon to clear the layer.

Mouse Wheel or the scrollbar over media content selection area to the view the available tiles.

Use mouse arrow down/up to select drop down items - click the drop down first
Use mouse arrow left/right to adjust sliders - click the slider first

How to Use:

1. Download source code from GitHub. Extract the "AllPixMatrix" folder.
2. Download Processing 3.4 or newer. www.Processing.org
3. Open "AllPixMatrix.pde" inside extracted folder.
4. Find and look at all the library 'imports' that are done. In the Processing IDE tools dropdown use: Sketch -> Import Library -> Add Library. Download and install all the required libraries.
5. Press the Play/Run button to launch the application. If libraries are missing it will list them in the console.
6. The software application should launch. If not check the console messages for details. If the software successfully launches close it for now, unless your configuration files are ready, then proceed to step 13.
7. Go to the AllPixMatrix folder and open /configs/. This folder holds all of the matrix definitions and configurations.
8. Either edit an existing config folder or copy/paste an existing one and rename it. No spaces.
9. Find or create your patch file, and place it in the config folder. Note that the NLED Patcher software must be used to create compatible patch files, which are saved as a TXT. There are also example files available.
10. Open the "matrix-config.ini" file. Set the NAME to any name or label you want. Set PATCHFILE to the file name of your patch file added in step 9. Rest can stay default.
11. Open the "output-config.ini" file. Edit the values, see previous section on config files for details. Or to use the software without outputting to hardware, just leave default.
12. Edit the "software.ini" folder and direct it to the /config/ folder name that was chosen on step 8.
13. Launch the software application. It will start with the 'Main Menu' open.
14. Click the "Load File" button under the 'Media Content' text. This loads the content file defined in the "matrix-config.ini" file under the CONTENTFILE line.
15. It will take a few seconds to finish loading the media content file. Then close the menu.
16. Or if you want to start with no media tiles loaded, close the 'Main Menu'.
17. The software is now ready to use.
18. To add a new media tile, scroll to the far right of the media tile area, and press the "+" button.
19. To edit a media tile, click on it. Select the type and any settings. Changes are applied in realtime if the media tile is assigned to a layer.
20. To add a media tile to a layer, click the layer tile, which will highlight red, then click a media tile.
21. Add media tiles to layers, use the blend modes, effects, and opacity to mix the layers to the feed.
22. Use the main cross fader and blend modes to mix Feed A and Feed B together to create an output.

Keywords & Glossary:

Media - A source of video, image, or graphic content. Anything for a AVI movie, to a JPG, to a Syphon/Spout feed.

Media Tile - Is a media object that contains additional settings. Such as a image's cropping, stretch/resize. Or a generated media's settings like size, shape, text label, etc.

Layer - Each layer references a media tile and has several options and effects that can be applied on a per layer basis.

Feed - Contains a set of 3 independent layers All 3 layers are combined together to create a buffered image for the feed.

Main Mixed - Feed A and Feed B are combined with blending modes to create the final mixed image buffer.

Main Intensity - Applies an intensity adjustment to the outputted data values. Does not render in software, only affects the data transmitted.

Generated - A media type, creates the graphics in software. With or without user inputted settings or with data sources such as 'Audio In'

Matrix or Matrices - The LED pixel screen/panel/matrix that the software sends data to.

Patch - Also referred to as a 'pixel map', is a set of coordinates that is representation of the actual layout of the physical location of the LEDs. Also considered the order in which the data is transmitted from software to the hardware controller.

Record to File - Writes the mixed output data to a text file, and also will transmit it to hardware if enabled. Multiple file formats available, see the code for details. The text files contain the color data, and can be uploaded to NLED controllers using the 'FilePlay' sequence mode, using NLED Aurora Control or NLED Aurora Matrix.

Config Files:

Each matrix configuration is stored in their own folder in the /config/ folder. These files define the matrix and configure the software to work with the hardware.

All files are separated with TAB space, not spaces, ensure there is only a single TAB separator.

matrix-config.ini
Stores the file paths, matrix defines, and label/name of the matrix, is specific to the phyiscal LED matrix.

output-config.ini
Holds the information related to the hardware aspects of the LED matrix.

Patch File(.txt)
A coordinate file that defines the locations and order of the LED pixels on the project. The pixels can be in any order or position. There are examples in the /config folders. The separate software application NLED Patcher is used to create the patch files using a GUI.
https://www.nledshop.com/nledpatcher/

Content File(.allpix)
This file holds all of the definitions for the media content. These are all the available graphics, videos, images, Spout/Syphon feed settings and parameters. Stores variables like cropping, resizing, file paths, generated settings. While media files like images and movies may be sized for a particular LED matrix, the same content file can be used on all matrix configurations. Regardless if you are controlling an 8x8 or 32x8 screen, it can load and use the same content file.

Other Files:

software.ini
Read by the software at start up. Directs what matrix /config/ folder to load, and GUI options like window size and a few other options.

CONFIGDIR defines what /config/ folder to load. The line should show:
CONFIGDIR-TAB-FOLDERNAME

The CONFIGDIR line can have additional config folders after the first one, that is just to store the strings so they can be easily swapped manually by the user to load a different matrix configuration.