Moncha.NET (Box version)

1. Introduction

Moncha.NET is latest Ethernet laser show controller from Showtacle. It is a perfect solution for laser show hobbyists, but also for professional users, who don't require high scan rate for professional graphics. Moncha.NET is distributed as OEM board with display integrated into your laser system or as a box version.

Moncha.NET works in three modes:

- **Ethernet mode** –Moncha.NET is completely controlled by Moncha.NET software.
- **DMX mode** – Moncha.NET is able to play preprogrammed effects and complete laser shows and you can use DMX to trigger them.
- **Stand-alone mode** – you can let Moncha.NET play any show or effect or animation stored on SD-card even without any computer or DMX controller. It's perfect for advertisement purposes.

2. Moncha.NET Device

2.1 Front view

There are several connectors and LED diodes on the front side:

Moncha.NET device front view

DMX IN is used for DMX signal input, Ethernet for LAN cable. SD-Card supports FAT and also FAT32 file system with maximal capacity up to 32GB.
There are control LEDs located on this side as well:

Red	There is some image at laser output
Blue	Device is in Ethernet mode
Yellow	Device is in DMX mode
Green	Device is ON

2.2 Rear view

There is ILDA output for laser and DMX output on the rear side of the Moncha.NET device.

2.3 ILDA OUT connector

Is used to control your laser scanners and laser color. Here is the pin description:

PIN	Function
1	AXIS X +
2	AXIS X -
3	AXIS Y +
4	AXIS Y -
5	Blank
6, 10, 12, 14, 16, 18, 20, 24, 26	GND ILDA
7	Connect to pin 7
8	Connect to pin 8
9	Red
11	Green
13	Blue
15	Dark Blue
17	Yellow
19	Cyan
21, 22, 23	Not connected
25	Shutter

2.2 DMX

There is one DMX input and one DMX output on the Moncha.NET device. Using DMX input you can control your Moncha.NET using any DMX-controller, or you can use Moncha.NET software to control simple DMX devices (and synchronize them with laser show).

3. Control modes

Moncha works in 3 modes:

1. **Ethernet mode**
2. **DMX mode**
3. **Stand-alone mode**

3.1 Ethernet mode

Ethernet mode is active when the Moncha.NET software is connected. It is highest priority mode. The DMX or Stand-alone mode is turned off when Moncha.NET software connects to Moncha.NET over Ethernet cable.

Moncha.NET uses IP address 192.168.1.X, where X is set in main menu (please check Main menu section below). IP address can be changed only when Moncha.NET software is *not* connected to Moncha.NET device.

3.2 DMX mode

If there's no Ethernet connected and DMX cable is connected, Moncha.NET works in DMX mode. DMX address is set by DIP switch – it uses switches 1 to 9 (0 to 512 value range).

When Moncha.NET is in DMX mode, it receives DMX channels and plays all the shows from SD-card. Following DMX channels are used:

1	Position X	128 - middle
2	Position Y	128 - middle
3	Rotation	0 (0 degree) – 255 (360 degree)
4	Size X	0 (0%) – 255 (100%)
5	Size Y	0 (0%) – 255 (100%)
6	Brightness	0 (0%) – 255 (100%)
7	Scan rate	0 (default), 1 (slowest) – 255 (fastest)
8	Animation	0 (none), 1 – 255 (animation from SD-card)
9	Animation Speed	0 (0% - stop) – 128 (100%) – 255 (300%)
10	Animation Direction	0 – 127 (normal direction), 128 – 255 (opposite) – this is working only for files up to 255 frames
11	Red	0 – default, 1 (0%) – 255 (100%)
12	Green	0 – default, 1 (0%) – 255 (100%)
13	Blue	0 – default, 1 (0%) – 255 (100%)
14	Dark Blue	0 – default, 1 (0%) – 255 (100%)
15	Position X Fine	Fine position for X
16	Position Y Fine	Fine position for Y
17	Rotation Fine	Fine rotation

3.3 Stand-alone mode

Stand-alone mode is the lowest priority mode. In Stand-alone mode you can play any show stored on SD-card. You can also adjust device drawing settings using practical menu on display.

3.3.1 Main stand-alone screen

Basic screen contains following information:
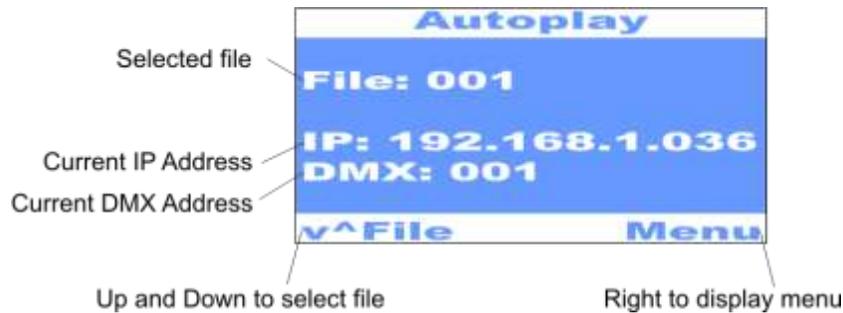
You can use up and down arrows to select file to play from SD-card. With right button you can display **Main menu**.

3.3.2 Main menu

There are following options in Main menu:

Draw settings	Allows you to display draw settings for Stand-alone mode (Size, Position, …)
Default file	Sets default file, which will start to play after Moncha.NET is turned on.
IP Address	Set IP address of the device
DMX Address	Set DMX address of the device
Display test	Displays single white beam at the laser output
Load settings	Loads Stand-alone mode settings from internal memory
Save settings	Store stand-alone mode settings into device internal memory
Reset settings	Reset settings to default state
About …	Display basic information about Moncha.NET device (Version, Run hours, Serial number, …)

You can select specific settings using right button.

Moncha.NET has internal memory, where it can store all Draw settings, Default file, IP and DMX address. You can Load/Save/Reset these settings using menu commands.

3.3.3 Draw settings

You can adjust drawing settings of the laser output for stand-alone mode using this **Draw menu**. It's good to select some file to play and adjust these settings while playing. There are following properties to set in draw menu:

Size X	Set horizontal size
Size Y	Set vertical size
Position X	Horizontal position
Position Y	Vertical position
Rotation	Rotate picture around depth axis (Z), it's practical when laser is placed on uneven surface
Scan-rate	Set scan-rate for the images: 0-default scan-rate 1-1% of required scan-rate 255-100% of required scan-rate
Animation speed	Speed of played animation: 0-Stop 128 – 100% speed 255 – 300% speed
Color	Allows you to recolor whole image using one color
Repeat	If checked, played animation or show is repeated when it ends
Invert X,Y	Not used for box version. Invert X or Y axis only for OEM boards with display

4. Configuration

Moncha.NET allows you to configure following settings:

1. Brightness maps using **map.txt** file.
2. Color balance using **balance.txt** file.
3. Color fade curves using **fades.txt** file.

All the files must be stored in card's root directory! You can use ';' to make notes in the files – all the text behind ';' is ignored.

4.1 Configure Brightness Maps

Moncha.NET allows you to define up to 8 independent rectangular brightness areas. They are defined in **map.txt** file:

```
[Area]
Left = -100
Right = 100
Bottom = -100
Top = 0
BrightnessLeft = 0
BrightnessRight = 100
BrightnessTop = 100
BrightnessBottom = 0
;Brightness = 100
```

There can be more [Area] sections in the file. Left, Right, Bottom and Top defines area size and position. All 4 values are from -100 to 100.

Brightness of the area can be defined in two ways:

- Using Brightness setting – all the area will use same brightness from 0 to 100
- Using Brightness Left, Right, Top or Bottom – defines intensity of the image on left, right, top or bottom area edge. E.g. when BrightnessBottom is 0 and BrightnessTop is 100, Moncha.NET will fluently fade image from top to bottom.

4.3 Configure Color Balance

Use **balance.txt** file to define color balance of the colors. There are 7 colors used: White, Red, Green, Blue, Magenta, Cyan and Yellow and you can define color channel levels for every one of these colors. So e.g. if you use RGV laser (the one with red, green and ultra-violet 405nm lasers), it is good to add a little green color to the blue (it will look more like blue).

```
[White]
Red = 255
Green = 255
Blue1 = 255
Blue2 = 255

[Red]
Red = 255
Green = 0
Blue1 = 0
Blue2 = 0

[Green]
Red = 0
Green = 255
Blue1 = 0
Blue2 = 0

[Blue]
Red = 0
Green = 0
Blue1 = 255
Blue2 = 255

[Magenta]
Red = 255
Green = 0
Blue1 = 255
Blue2 = 255

[Cyan]
Red = 0
Green = 255
Blue1 = 255
Blue2 = 255
```

```
[Yellow]
Red = 255
Green = 255
Blue1 = 0
Blue2 = 0
```

The color balance works the same as in Fiesta(.NET) software.

4.4 Configure Color Fades

Sometimes your laser turns on at e.g. 30% of the fade range and is at maximal brightness at e.g. 60% of the fade range. Then it's good to use color fade curves to enhance color fade. You can use **fades.txt** file to solve this problem:

```
[Red]
Point=0,0
Point=255, 255

[Green]
Point=0,0
Point=255, 255

[Blue1]
Point=0,0
Point=255, 255

[Blue2]
Point=0,0
Point=255, 255
```

So to solve your 30%-60% example for e.g. red color, you would need to write:

```
[Red]
Point=0,0
Point=1,76
Point=250, 153
Point=255, 255
```

(76 s approximately 30% of 0-255 range, 153 is 60% od 0-255 range).

5. Uploading animations to Moncha.NET

You can create and upload frames to Moncha.NET SD-Card using Moncha.NET software. It is even possible to upload to more devices at once, which is very practical by DMX-controlled laser shows. Thanks to brightness maps it is even possible to make the DMX laser show safe.

You can find upload scenes dialog in **Tools->Upload scenes** in Moncha.NET software menu. Following window will be displayed:
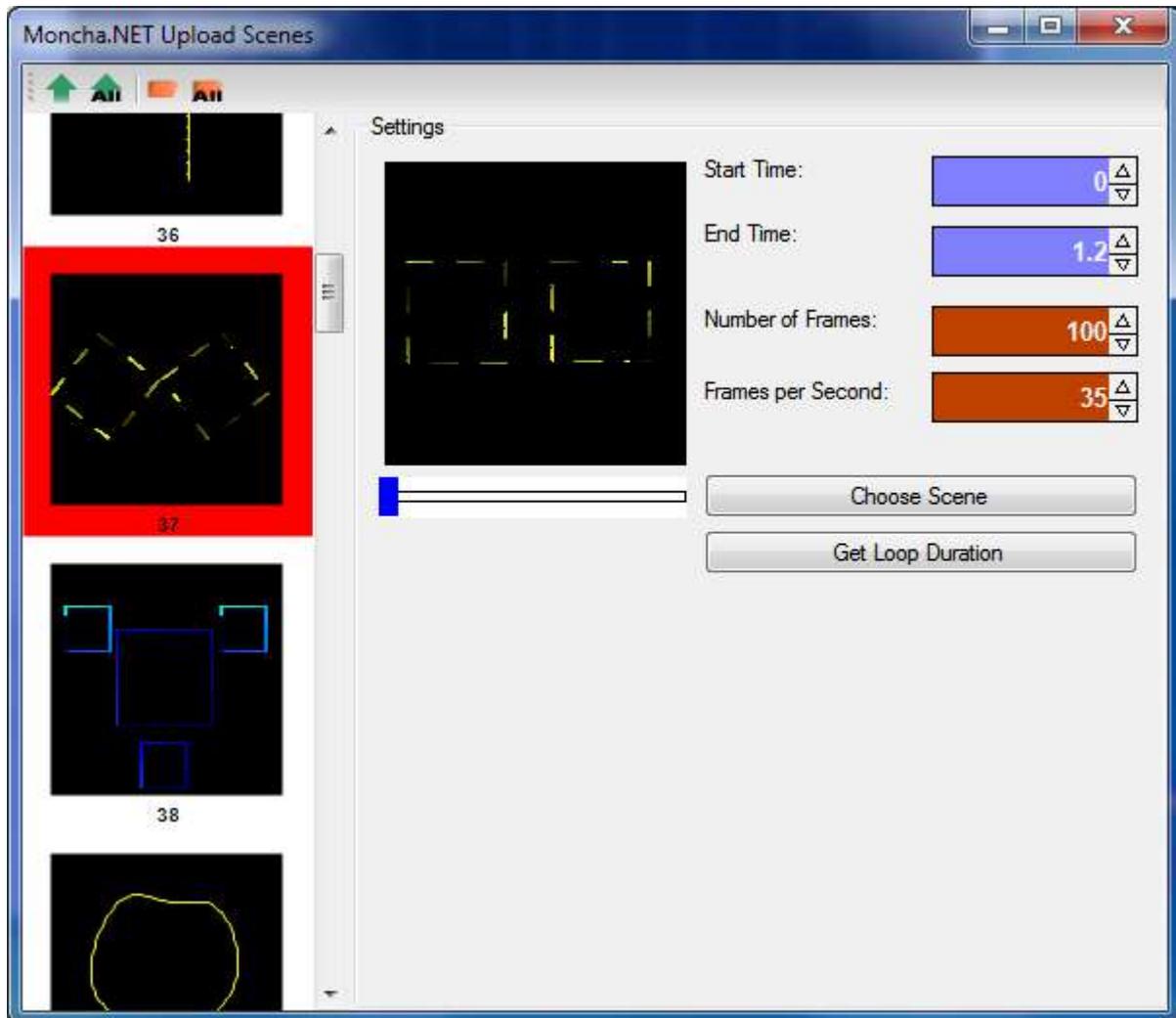
Upload scenes dialog

On the left side you can see animations, which will be exported to SD-Card. You can change animation to any scene from your workspace. Just select **Choose Scene** and you'll be able to pick any scene from workspace.

The remaining settings can be used to prepare your animation suitable for DMX control. **Start Time** sets start time of the animation, **End Time** end of the animation. Using these settings you can make your animation loop-able.

Number of frames determines number of frames of the exported animation. It is recommended to use less than 256 frames – like this you'll be able to control direction of the animation (using channel 10).

Frames per seconds determine speed of playing of the frames. We recommend keeping it at 35, like this the animation is smooth.

When you set all your desired animations, you can export your scenes to SD-Card or to Moncha.NET devices directly. You can also export all animations or only one.

6. Upgrading Moncha.NET firmware

Moncha.NET firmware can be upgraded using standard SD card with FAT32 (!) file system. To upgrade follow these steps:

1. Turn off your Moncha.NET device.
2. Copy the file "mnet.bin" and bootldr.cfg to your FAT32 formatted card.
3. Insert the card into Moncha.NET.
4. Turn on Moncha.NET device.

Upgrade will take less than 30 seconds.