



1. Introduction

Moncha.NET 2 is 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 2 is distributed as OEM board, which can be integrated into your laser system or as a box version.

Moncha.NET works in four modes:

- **Ethernet mode** – Moncha.NET 2 is completely controlled by Moncha software.
- **DMX mode** – Moncha.NET 2 is able to play preprogrammed effects and complete laser shows and you can use DMX to trigger them.
- **ArtNet mode** – you can control one or more Moncha.NET 2 devices using ArtNet protocol (generally ArtNet is DMX over Ethernet).
- **Stand-alone mode** – you can let Moncha.NET 2 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.box 2 Device

2.1 Front view

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



Moncha.box 2 device front view

Here you can find the control description.

Control	Description
DIP switch	Can be used to set IP and DMX address. When set to 0, device IP and DMX address is set by web configuration. DIP switch also sets the default animation to play after the device is turned on.
Integrated Ethernet switch	Allows you to daisy chain several devices using Ethernet. We don't recommend to use depth of Ethernet more than 4 (although even more than 10 will work for 30kpps lasers).
Status	Status diodes.
Buttons	In auto play mode you can use them to change animation to be played. Holding the up button for 5 seconds when starting the device will cause to

	reset the device to factory settings.
Micro SD card	Micro SD card, you can use FAT32 cards up to 32 GB size.
DMX In/Out	DMX512 connectors.
DMX Thru	In case this diode is ON, the DMX is generated by the software/device. If it's OFF, the DMX is in thru mode (same as for other DMX devices). The device is typically in Thru mode when using it in DMX mode (DMX in signal is connected).

There are 3 d **status diodes** on the device:

Red	Flashes when there is some image being projected on laser output.
Yellow	Flashes when device is receiving DMX or ArtNet signal.
Green	Device is ON. Flashes when software is connected over Ethernet.

2.2 Rear view



There is an ILDA output for laser and powerCON in and out on the rear side of the device. Again, you can use powerCON in and out to daisy chain several Moncha.box 2 devices. The ILDA output diodes can help you see the outgoing signal status on ILDA port (for axes, color channels, ...).

2.3 1U rack device



There is a nice feature available especially for clients, who need to use many laser projectors. You can connect 3 of the Moncha.box 2 devices and you'll get one device, which fits inside 1U rack.

3. Control modes

Moncha works in 4 modes:

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

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.

ArtNet and DMX mode (DMX channels)

If there's no software connected to the device over Ethernet, Moncha.NET 2 works in DMX or ArtNet mode. The mode is switched automatically once the ArtNet or DMX signal is connected to the device. DMX address can be set by DIP switch – it uses switches 1 to 9 (0 to 512 value range).

When Moncha.NET 2 is in ArtNet or 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 (B1)	0 – default, 1 (0%) – 255 (100%)
14	Dark Blue (B2)	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
18	Zoom	Size X and Y together
19	Color preset (*)	Quickly change the color of the scene
20	Rotation speed	Automatic rotation of axis Z. It's like gobo rotation when using moving heads. When this value is 128, image will rotate once per second.

The default behavior of the **Red**, **Green**, **Blue** and **Dark Blue** channel is to change the color of the image. In this mode when set to 0, the image uses its original color.

But you can also use it as maximal brightness for given color channel. The desired behavior can be set in web configuration.

(*) There are 16 colors used in **Color preset**:

No.	Color Name	DMX range	R, G, B1, B2 Value
1	Default	0-15	R = 0, G = 0, B1 = 0, B2 = 0,
2	Red	16-31	R = 255, G = 0, B1 = 0, B2 = 0
3	Orange	32-47	R = 255, G = 128, B1 = 0, B2 = 0
4	Yellow	48-63	R = 255, G = 255, B1 = 0, B2 = 0
5	Green/Red	64-79	R = 128, G = 255, B1 = 0, B2 = 0
6	Green	80-95	R = 0, G = 255, B1 = 0, B2 = 0
7	Green/Blue	96-111	R = 0, G = 255, B1 = 128, B2 = 0
8	Cyan	112-127	R = 0, G = 255, B1 = 255, B2 = 0
9	Blue/Green	128-143	R = 0, G = 128, B1 = 255, B2 = 0
10	Blue	144-159	R = 0, G = 0, B1 = 255, B2 = 0
11	Blue/Red	160-175	R = 128, G = 0, B1 = 255, B2 = 0
12	Magenta	176-191	R = 255, G = 0, B1 = 255, B2 = 0
13	Red/Blue	192-207	R = 255, G = 0, B1 = 128, B2 = 0
14	Dark Gray	208-223	R = 85, G = 85, B1 = 85, B2 = 0
15	Light Gray	224-239	R = 170, G = 170, B1 = 170, B2 = 0
16	White	240-255	R = 255, G = 255, B1 = 255, B2 = 0

Stand-alone mode

Stand-alone mode is the lowest priority mode. In Stand-alone mode you can play any show stored on SD-card. For Moncha.box 2 you can switch between the files stored on SD card using up/down buttons.

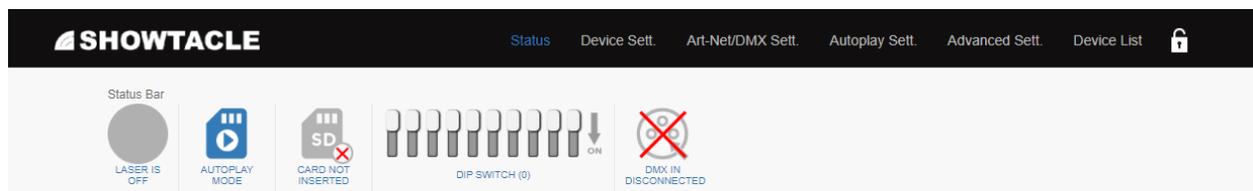
Stand-alone mode and DIP switch

With DIP switch you set which show to play (switches 1 – 8). It is possible to set size, position and all the remaining drawing settings using web configuration.

4. Web configuration

You can use even your mobile phone with web browser to configure Moncha.NET 2 device. It's very practical, since you don't need to install any application to your phone or computer. You can use Internet Explorer / Edge, Chrome, Safari or any other web browser to access web configuration.

To access web configuration, you must type your device IP address into any favorite web browser. E.g. if your device IP address is set to 192.168.1.147, just type "192.168.1.147" into your web browser address. The last byte of the IP address (147 in our example) can be set in web configuration. But if you set some value using DIP switch, the last byte is set by DIP switch. It's because have the ability to quickly change the IP addresses without the need of changing the web configuration.



Moncha 2

Status

Main settings

Device name:	Moncha2	i
Firmware version:	3.6	
Device type:	BOX 2	i
Communication protocol:	Moncha2/FiestaMAC	i
Serial number:	201	
Activated for FiestaMac:	NO	i
Last used FiestaMac:	Never	i
MAC addr:	90-4e-91-c0-05-f8	i
Control mode:	Autoplay	i
SD-Card inserted:	NO	i
Current IP:	192.168.1.203	i
Current mask:	255.255.255.0	i
Default IP:	192.168.1.203	i

Moncha.NET 2 web configuration

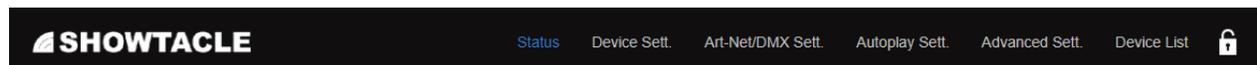
Note: Make sure your computer IP address (or your IP router DHCP) is in 192.168.1. address range to be able to access the web configuration.

Status bar

There are several status settings visible all the time in the web configuration.

Laser is On/Off	Indicates whether there is some image being draw on laser output.
Mode	Current control mode (Ethernet, Art-Net, DMX, Autoplay).
Card status	Indicates whether the card is inserted.
DIP switch	Current DIP switch status.
DMX In status	Indicates whether the device receives DMX in signal.

Main menu



- Status – display status of the device
- Device Sett. – you can set drawing size, position or even color settings of the device here.
- Art-Net/DMX Sett. – settings for DMX and ArtNet
- Autoplay Sett. – auto play settings
- Advanced Sett. – additional and experimental settings
- Device List – displays all Moncha.NET 2 devices connected to Ethernet network

Status

You can see basic device settings here.

Main settings

Main settings

Device name:	Moncha2	i
Firmware version:	3.6	
Device type:	BOX 2	i
Communication protocol:	Moncha2/FiestaMAC	i
Serial number:	201	
Activated for FiestaMac:	NO	i
Last used FiestaMac:	Never	i
MAC addr:	90-4e-91-c0-05-f8	i
Control mode:	Autoplay	i
SD-Card inserted:	NO	i
Current IP:	192.168.1.203	i
Current mask:	255.255.255.0	i
Default IP:	192.168.1.203	i

Device name	Current device name. Can be changed in Device Sett.
Firmware version	Current firmware version in the device
Device type:	Type of the device – can be BOX 2, Lite 2, Upgrade, ...
Communication protocol (*)	Selected communication protocol.
Serial number	Device serial number
Activated for FiestaMac	In case the device is activated for Fiesta for Mac, you can see YES here.
Last used FiestaMac	Last date when Fiesta for Mac was used.
MAC addr	Device MAC address.
Control mode	Current control mode (Ethernet, DMX, ...)
SD-Card inserted	Is SD card inserted?
Current IP	Current IP address.
Current mask	Current IP mask.
Default IP	Default IP address set in web configuration.

(*) Communication protocol – Moncha.NET 2 can be used with older Fiesta.NET software for Windows or new Fiesta for Mac. You can select, which one you would like to use in the web configuration.

Hardware settings

Hardware settings

Max size:	X: 65535	Y: 65535	i
Center pos.:	X: 0	Y: 0	i
Device invert:	X: Normal	Y: Normal	i
Device rotate Z:	0.0		i
Enable brightness maps:	Disabled		i
Apply Color Optimizations:	Disabled		i
Max color:	R: 255, G: 255, B1: 255, B2: 255		i

Color balance [i](#)

	R	G	B1	B2
R	255	0	0	0
Y	255	255	0	0
G	0	255	0	0
C	0	255	255	255
B	0	0	255	255
M	255	0	255	255
W	255	255	255	255

Max size	Maximal drawing size.
Center pos.	Current center position.
Device invert	You can see Invert X and Y here.
Device rotate Z	Z-axis rotation (horizon).
Enable brightness maps	Is using brightness maps?
Apply Color Optimizations	Are color optimizations enabled or disabled?
Max color	Maximal brightness for every color channel.
Color balance	You can see the current color balance for every of the 7 basic colors here.
Color fades graphs	Current color channel fade curves.

Autoplay

You can see all important settings for Autoplay here.

Autoplay

Default file:	0	i
Current file:	0	i
Brightness:	255	i
Autoplay autostart:	Enabled	i
Play all after start:	Disabled	i
Is play all:	Stopped	i
Speed:	128	i
Repeat:	Enabled	i
Recolor:	R: 255, G: 255, B1: 255, B2: 255	i

Default file	This file will start playing after the device is started. Practical especially for advertisement purposes.
Current file	Currently played file.
Brightness	Current maximal brightness.
Autoplay autostart	Enabled or disabled autoplay file after the device is started.
Play all after start	Play all will play all files from SD card. This shows if this feature is enabled or disabled.
Is play all	Is currently playing all files from SD card?
Speed	Speed – current speed of animation.
Repeat	Repeat enabled or disabled.
Recolor	You can force the color to be used when playing files from SD cards.

Art-Net/DMX

Default Art-Net/DMX addr: 1 

Current Art-Net/DMX addr: 1 

DMX OUT mode: Through 

Color channels usage: Color channel intensity 

DMX only

DMX IN status: Disconnected 

Art-Net only

Art-Net net addr: 1 

Art-Net universe: 1 

Default Art-Net/DMX addr	Default DMX/Art-Net address. This setting is saved inside the device and can be overridden using DIP switch.
Current Art-Net/DMX addr	Current DMX/Art-Net address set by either web configuration or overridden by DIP switch.
DMX OUT mode	Current DMX out mode. In case you use software, the DMX out is generated from the software. But if you use the device in DMX mode, the DMX is in through.
Color channels usage	There are two options here: Color channel intensity - The DMX channels are used to set the maximal brightness of every color channel. Change color - The DMX channels are used to set the color of the image (old Moncha way). In case the DMX channels are set to 0, original image color is used.
DMX IN status	Indicates whether the DMX in is connected.
Art-Net net addr	Shows Art-Net Network number.
Art-Net universe	Here you can see, what Art-Net universe is used. DMX address within Universe is set by Default Art-Net/DMX addr or DIP switch .

Device Settings

Allows you to set the basic device settings.

Hardware settings

You can set all the basic drawing settings of the device here. Generally, it replaces the rear laser control panel (with even more options). These settings are used for ***ALL*** modes (including Ethernet/software). Generally, these settings emulate the default laser projector rear panel settings, where you can set maximal brightness, size or position.

Device name (max 256 chars)	Device name. This is practical for easy orientation in case you use several laser devices.
Communication protocol	Current communication protocol. You can use Fiesta.NET (original Fiesta software for Windows) or Moncha2/FiestaMAC (for new Fiesta for Mac software or latest Moncha 5).
Max sizeX (0 - 65535)	Maximal size X in range from 0 to 65535 (two bytes precision).
Max sizeY (0 - 65535)	Maximal size Y in range from 0 to 65535 (two bytes precision).
Center posX (-32767 - 32767)	Center position X in range from -32767 to 32768 (two bytes precision).
Center posY (-32767 - 32767)	Center position Y in range from -32767 to 32768 (two bytes precision).
Device rotZ (0 - 360)	Device rotation Z. Generally used to rotate horizon of your laser output.
InvertX/InvertY	Axis invert.
Apply Color Optimizations	Enable or disable color optimizations – including color balance, fade curves and maximal color channel brightness.
Max red/green/blue1/blue2	Maximal brightness for every of the 4 color channels.
Color balance	Allows you to set color balance for all basic colors. Typically, is used to e.g. lower the brightness of green color channel in white color.
Save HW Sett.	Press this button always to save the settings. All the settings will be saved to internal memory of the device, so it's preserved after the device restart.

Network settings

Default IP	You can define IP address of the device here. The first 3 bytes of the IP address are always used. Last byte is used only in case the DIP switch is set to 0. In case you set some value on DIP switch, the last byte of the IP address is set by DIP switch.
Mask	Network mask. In case you use Art-Net, you'll have to probably change to 255.0.0.0.
Save net. Sett.	Press this button to save the settings.

Testing output

Allows you to display several test patterns on device output. Probably the most important are the Brightness and Colors, since they allow you to set the device color fades.

Account Settings

You can set the device admin access codes. By default, the device password is not set for easy access to web configuration. The default name/password is admin/admin.

Art-Net/DMX settings

Default Art-Net/DMX address (1-512)	Default ArtNet/DMX address of the device. This value is used only in case the DIP switch is set to 0.
Ant-Net net (1-128)	Art-Net's net setting.
Ant-Net universe (1-256)	Art-Net's universe setting.
Color channels usage	There are two options. Color channel intensity -The DMX channels are used to set the maximal brightness of every color channel. Change color - The DMX channels are used to set the color of the image (old Moncha way). In case the DMX channels are set to 0, original image color is used.
Save Art-Net/DMX Sett.	Click this to save the settings.

Autoplay settings

Player

Allows you to play any file from SD card. Using **Previous** and **Next** buttons you can switch to previous/next file on SD card (empty positions are skipped). **Play All** allows you to play all files from SD card. Use **Stop** to stop playing any file.

This feature is perfect to view your SD card files. And also allows you to use your mobile to play any file from SD card.

Player settings

Player brightness (0 - 255)	Maximal brightness of file played using autoplay or player.
Player speed (0 - 255)	Speed of playing (same function as DMX speed channel).
Player repeat	Should the file repeat when playing using autoplay or Player after it's finished?
Repaint red/green/blue1/blue2 (0 - 255)	Maximal brightness of every color channel. Works the same way as in DMX mode.
Player autoplay autostart	In case it's ON, player will start automatically after the device is started. It's practical for advertisement purposes. Also use this setting to disable automatic file play when software, DMX or Art-Net is disconnected.
Player default file (0-255)	What file will be used to play after the device is started? In case you set DIP switch to value different than 0, player will play file set by DIP switch.
Play all after start	In case it's ON, player will play all the files from SD card after the device is started.

Save Autoplay Sett.

Save the settings to internal memory.

Advanced settings

Activate device – in case you want to use Moncha.NET 2 device with Fiesta for Mac software, you have to purchase software license. Here you insert the activation file.

Reset - Turn off and turn on your device.

Factory reset - Reset your device settings to default factory settings.

Device list

It's very practical feature, since you can see all the connected Moncha.NET 2 devices here. And you can switch to their web configuration just by clicking the device's IP address.

List of Moncha/The Upgrade devices

IP:	Serial num.:	Device type:	FW version:
This device (192.168.1.203)	201	Moncha.NET 2 - BOX	3.6
192.168.1.201	210	Moncha.NET 2 - BOX	3.6

Reload list

Example of two connected Moncha.NET devices

Use **Reload list** to refresh the list – will search for all the connected devices. Use this in case you connect additional device to your network.

5. 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 **fares.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. It's easier to generate first 3 files using Moncha.NET software.

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.

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.

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:

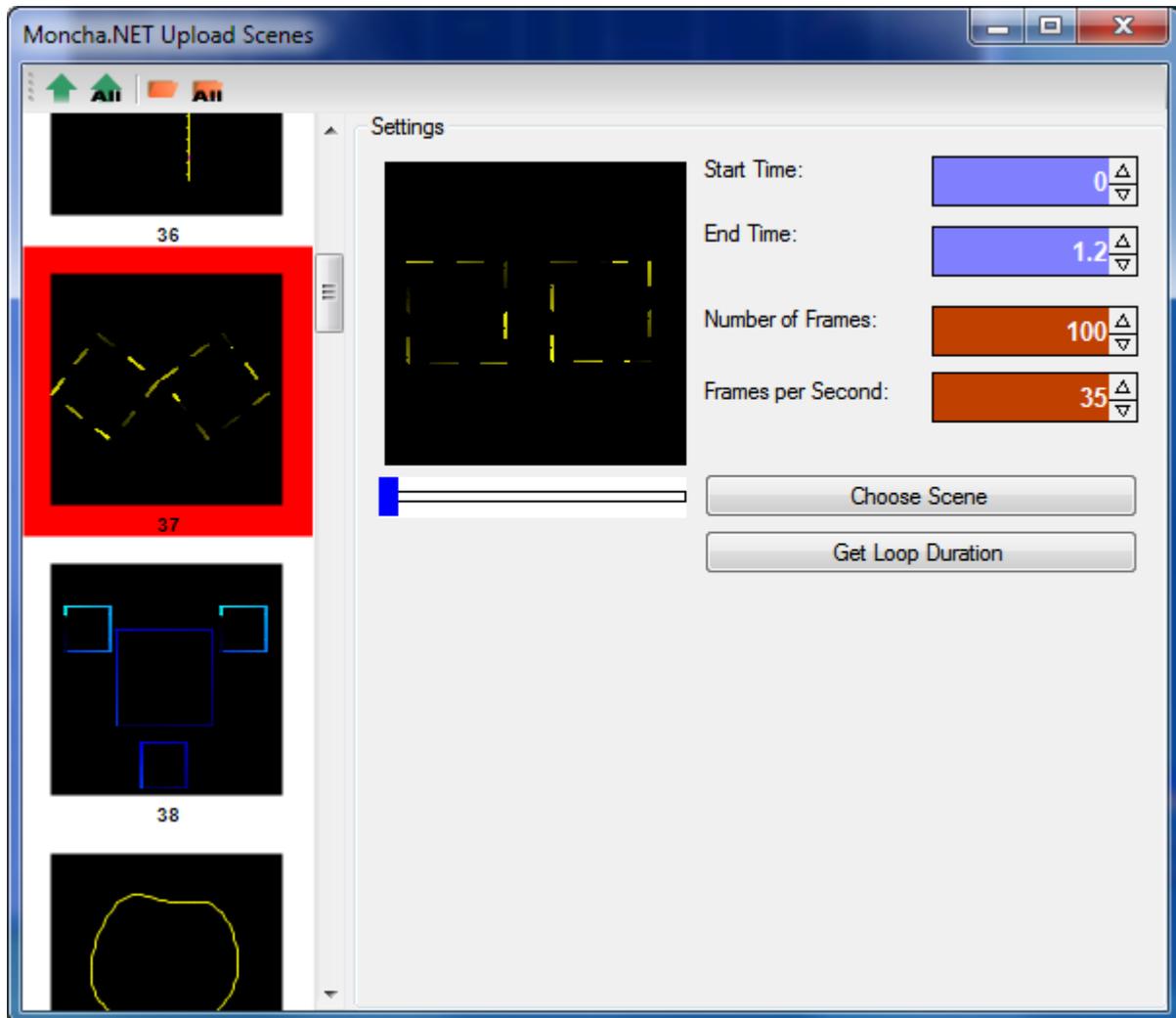
```
[Red]
Point=0,0
Point=1,76
Point=250, 153
Point=255, 255
```

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

6. 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.

7. Technical details

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

You can see the status of each ILDA function thanks to ILDA control diodes below the ILDA connector.

DMX connector

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

Here is the DMX pin description for OEM versions (DIP switch or display):

Pin	Function
1	GND In
2	DMX In -
3	DMX In +
4	GND Out 1
5	DMX Out 1 -
6	DMX Out 1 +
7	GND Out 2
8	GND Out 2
9	DMX Out 2 -
10	DMX Out 2 +

DMX Out works in 2 ways – as THRU connector, when Moncha.NET is controlled over DMX in. And its real OUT connector for Moncha.NET software, when used over Ethernet.

DIP Switch (for DIP switch version)

DIP switch is used in different context:

1. Sets IP address with switches 1-8.
2. Sets DMX address with switches 1-9.
3. Sets the default player file using 1-8.

8. 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 “m2box.bin” or “mnt2.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 60 seconds.