Information for LumaxNET board

Table of contents

1 Operating instructions....2
1.1 Function overview....2
1.2 Audio controlled mode....2
1.3 DMX controlled mode....2
1.4 Demo mode....3
1.5 SD card mode....4
1.6 Network mode....4
1.6.1 DHCP mode....4
1.6.2 AutoIP....5
1.6.3 Fixed IP address....5
1.7 Firmware update....6
2 Power supply options....7
2.1 +/-12...18v symmetric power supply (recommended for projector usage)....7
2.2 +9...24v power supply....7
2.3 USB powered....8
2.4 User selectable USB / +9...24v....8
3 Connector assignment....9

1 Operating instructions

1.1 Function overview

- ➔ X/Y scanner outputs with 12 bit resolution (4096 different positions on each axis)
- ➔ Up to 6 color outputs (depending on license) with 8 bit resolution (256 different intensity values per color channel): red, green, blue, intensity, user defined 1, user defined 2
- ➔ DMX512 input and output (non-isolated)
- ➔ 100 Mbit Ethernet port
- ➔ Flexible IP address setting: fixed address, DHCP, or AutoIP
- ➔ microSD card slot for ILDA file playback (ILDA format code 5 RGB)
- ➔ Build-in laser frames for standalone operation
- ➔ Standalone operation via audio control (external microphone required), DMX control, or auto trigger
- ➔ Maximum scan speed ~150.000 points per second (depending on license)
- ➔ Up to 16 devices can be used in parallel for multiprojector laser shows
- ➔ Dimensions 150x60mm

The DIP switches can be used to select the desired operating mode. The mode should be set before switching on the device. Changing the mode while the device is active can lead to undefined and dangerous laser output.

In the standalone operating modes (audio controlled, DMX controlled, demo mode), the ILDA interface displays pre-defined laser frame patterns. If there is no microSD card present, the internal patterns are used. Alternatively, a microSD card with ILDA files can be inserted.
The ILDA files have to use format code 5 (ILDA RGB file format). The file name has to consist of a 3-digit number, followed by the extension .ild
Maximum number of files is 256.
Counting starts from 000.ild, followed by 001.ild, 002.ild... 255.ild
ILDA files are played at a speed of 50 frames per second.
Due to the huge mass of available microSD cards on the market, it cannot be guaranteed that all card are compatible with the ILDA interface. The usage of small <=2GB SD cards instead of high capacity SDHC or XDHC cards is recommended.

1.2 Audio controlled mode

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	0	0	0	0	0	0	0	0	1	0

Use the volume regulator of the projector to adjust audio sensitivity.
Tap the microphone to trigger audio control.
The upper LED flashes whenever an audio signal is detected. When the LED is permanently on, audio sensitivity should be reduced.

1.3 DMX controlled mode

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
Binary DMX channel offset	1	2	4	8	16	32	64	128	256	has to be on (1) for DMX mode

To get laser output, DMX channel 1 needs to have a value greater than 0 (recommended 64...192), and DMX channel 2 also needs to have a value greater than 0.

DMX channel mapping

channel	range	description
1	0...63	Laser intensity from off to full brightness (only if lasers support analog modulation)
	64...192	Laser full brightness
	193...255	Strobe with increasing speed
2	0...255	select the laser frame pattern
3	0...192	Size of the laser projection X axis
	193...255	Automatic size change of X axis with increasing speed
4	0...192	Size of the laser projection Y axis
	193...255	Automatic size change of Y axis with increasing speed
5	0...192	Position of the laser projection X axis
	193...255	Automatic position change of X axis with increasing speed
6	0...192	Position of the laser projection Y axis
	193...255	Automatic position change of Y axis with increasing speed
7	0...192	Rotation of the laser projection
	193...255	Automatic rotation with increasing speed
8	0...192	Blanking: selects how much of the laser pattern shall be blanked
	193...255	Automatic blanking with increasing speed
9	0...192	Blankshift: selects which part of the laser projection shall be blanked (use only in combination with channel 7 - blanking)
	193...255	Automatic blankshift with increasing speed
10	0...15	Show pattern in original colors
	16...31	Pattern completely red
	32...47	Pattern completely green
	48...63	Pattern completely blue
	64...79	Pattern completely yellow
	80...95	Pattern completely magenta
	96...111	Pattern completely cyan
	112...127	Pattern completely white
	128...255	Rainbow effect
11	0...31	Default scan speed (20 points per second)
	32...255	Manual selection of scanspeed (5000...30000 points per second) Attention: make sure not to overload the scanners of the laser projector! If you're unsure about the maximum scanspeed of your laser projector, stay with the default setting.

1.4 Demo mode

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	0	0	0	0	1	0	0	0	1	0

In the demo mode, the laser patterns are triggered automatically, even without music.

1.5 SD card mode

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	0	0	0	0	0	1	0	1	0	0

In the SD card mode, the ILDA interface plays the laser show files stored on a microSD card in an endless loop.
Set DIP switch 4 to on to play the actual ILDA file in an endless loop (single file loop).
Set DIP switch 1 to on and after that to off to go to the next ILDA file on the SD card.
Set DIP switch 2 to on and after that to off to go to the previous ILDA file on the SD card.

1.6 Network mode

Important:
If you want to use a lasershow software, make sure that there is no firewall which blocks network traffic between your computer and the laser projector. The firewall has to be configured to grant network access to the lasershow software.
If the network connection does not work, try to temporarily disable the firewall. If this helps, you can create a matching rule and re-activate the firewall.
Whenever the DIP switch settings for the network mode are changed (for example, change static IP address or switch from DHCP to AutoIP mode), the ILDA interface (resp. the laser projector) has to be restarted (switch power off and on).
The board has to be connected to a 100Mbit or Gigabit Ethernet LAN. 10Mbit Ethernet is not suitable. Also the usage of wireless LAN (WLAN) is not recommended. This will result in decreased output performance and unsafe operation.

1.6.1 DHCP mode

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	0	0	0	0	0	0	0	0	0	0

In this mode, the IP address is provided by a DHCP server. Therefore, a DHCP server has to be available in the network. For example, this could be a cheap 100MBit network router with integrated DHCP server.

1.6.2 AutoIP

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	0	0	0	0	0	1	0	0	0	0

In this mode, the IP address is negotiated automatically without the need for a DHCP server. A Windows computer with enabled AutoIP is necessary to use this feature. In Windows 7, AutoIP is enabled by default. In Windows XP, it has to be enabled manually. In any case, you should check your computers configuration if AutoIP is available.

1.6.3 Fixed IP address

The IP address consists of 4 numbers, seperated by a point. The first two number are always 192.168 and cannot be changed. The last two numbers (*adr1* and *adr2*) can be configured with DIP switches.
The resulting IP address will be something like

192.168.*adr1*.*adr2*

DIP switch setting

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	0000 → *adr2* = 50 1000 → *adr2* = 51 0200 → *adr2* = 52 1100 → *adr2* = 53 0010 → *adr2* = 54 1010 → *adr2* = 55 0110 → *adr2* = 56 1110 → *adr2* = 57 0001 → *adr2* = 58 1001 → *adr2* = 59 0101 → *adr2* = 60 1101 → *adr2* = 61 0011 → *adr2* = 62 1011 → *adr2* = 63 0111 → *adr2* = 64 1111 → *adr2* = 65				00 → *adr1* = 0 10 → *adr1* = 1 01 → *adr1* = 2 11 → *adr1* = 254		1	0	0	0

The Windows computer needs to have an IP address within the same network subnet.

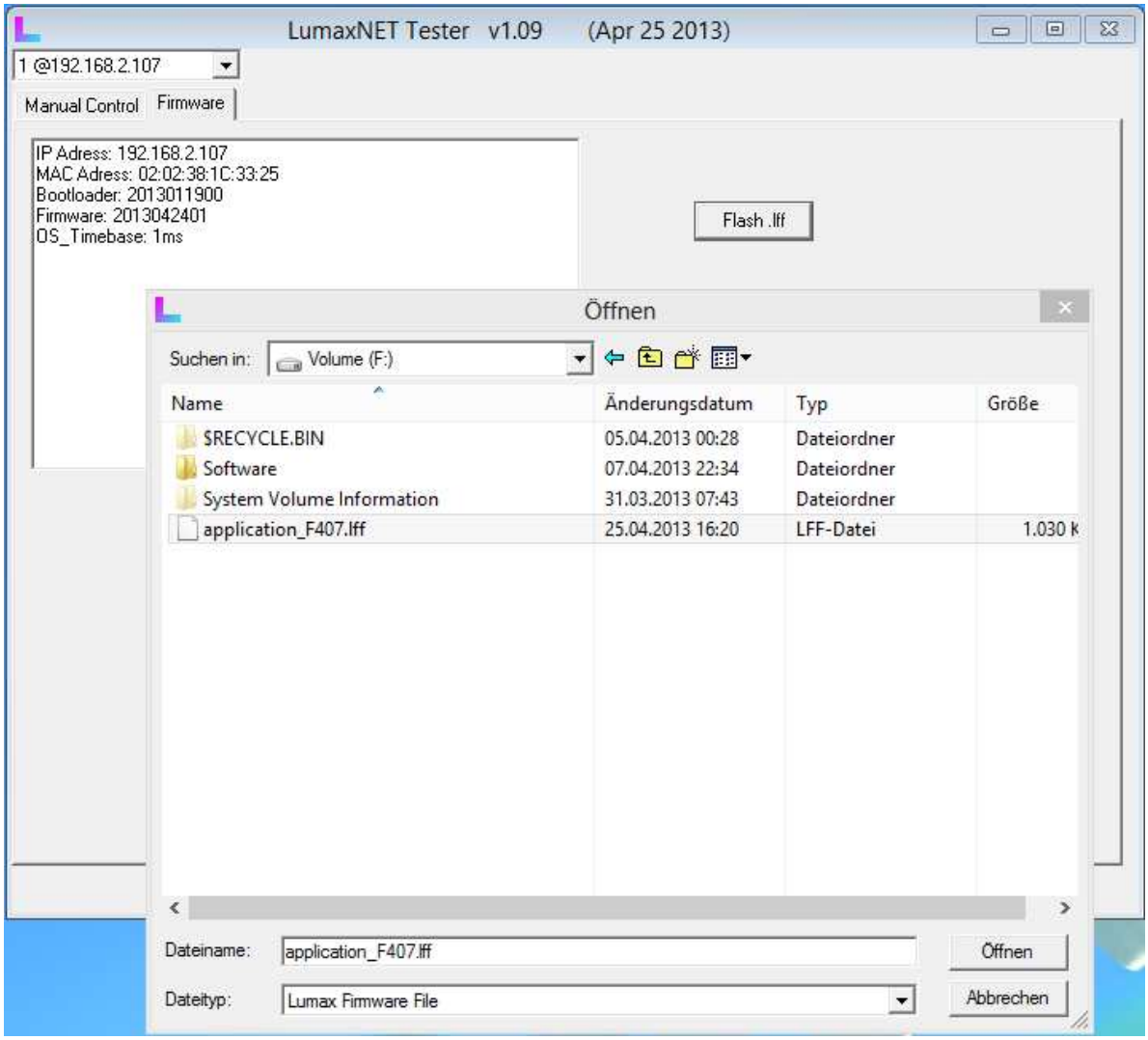
Example:

switch	1	2	3	4	5	6	7	8	9	10
On (1) / Off (0) / don't care (x)	1	1	0	1	0	0	1	0	0	0

This will assign IP address 192.168.0.61 to the ILDA interface.
Assign a different IP address inside the same subnet to the Windows computer, for example 192.168.0.100 (subnet = 255.255.255.0)

1.7 Firmware update

The firmware update is done via network connection. Therefore, set the ILDA interface to network operating mode as desribed in chapter 1.6.
Close all lasershow programs or other software which might access the ILDA interface. After that, start the LumaxNET tool. All connected ILDA interfaces should be detected and listed in the dropdown list in the upper left corner of the tool. If you have several interfaces connected, choose the desired interface.
Go to the 'Firmware' tab and press the button 'Flash .lff'
Select the *.lff firmware file. Now, the firmware update procedure is started.
During the update, do not disconnect power supply or network cable! Wait until the firmware update is finished!
After the update you'll be asked to restart the device.



2 Power supply options

Different options are available for powering the board. They can be selected by different assembly options (soldering bridges or 0R resistors).

Attention: there is no reverse voltage protection on the board. Always check for correct polarity! Wrong polarity will destroy the board! If you're unsure about correct polarity, only use the USB-powered option. Warranty will be lost in case of wrong connection or changing the board assembly options.

Achtung: die Schaltung verfügt über keinen Verpolungsschutz. Die korrekte Polarität muss beachtet werden, da sonst die Schaltung zerstört wird. Im Zweifelsfall nur per USB versorgen, da dies verpolungssicher ist. Gewährleistungsverlust bei flaschem Anschluß oder Modifikation der Bestückungsoptionen!

2.1 +/-12...18v symmetric power supply (recommended for projector usage)

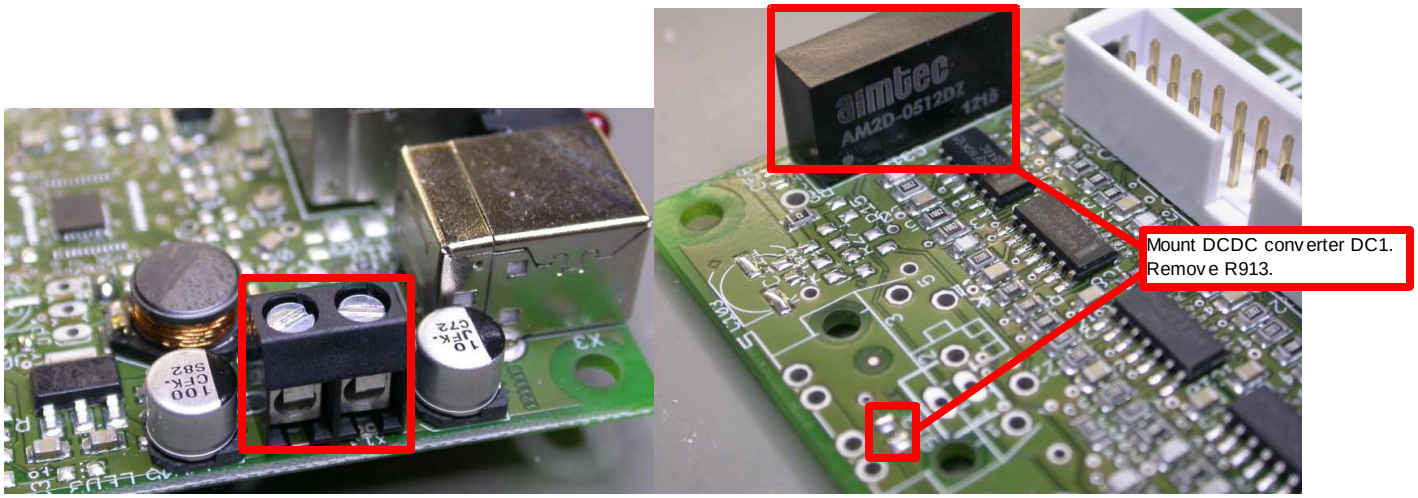
This is the recommended option for laser projectors that have a symmetric power supply with +/-12...18v. In the Laserworld CS series for example, such a +/-15v power supply is used for the laser scanners.
The board itself (without externally connected components) draws approx. ~200mA on each supply lane.
The board offers a stabilized 5 volt power output which can be used to supply other components in the projector with 5 volt. **Important:** maximum output power is 100mA!

2.2 +9...24v power supply

Connector X13 can be mounted to provide an external +9...24v supply voltage.

Parts to be mounted for this option:
DCDC converter DC1 (input: 5v, output: +/-12v, 2 watt)

Parts to be removed for this option:
0R resistor R913



2.3 USB powered

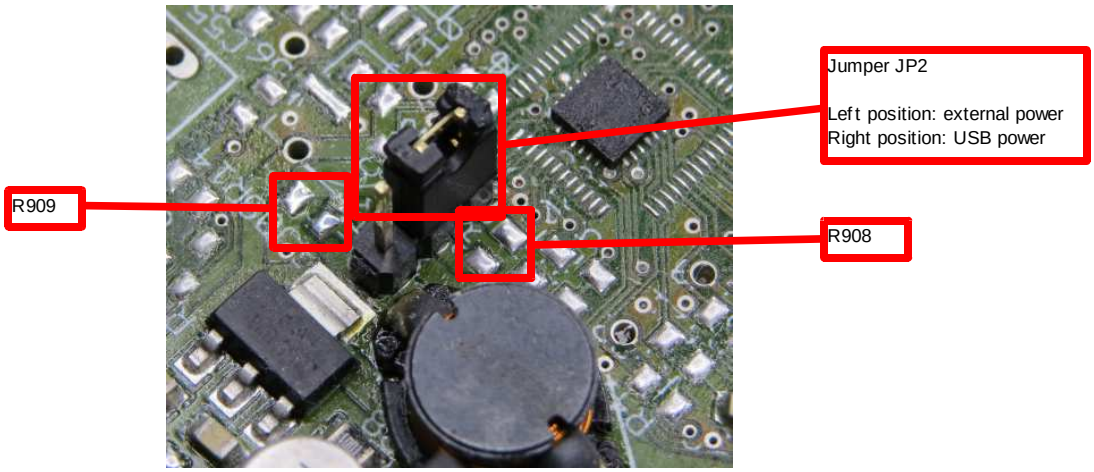
Important: depending on the connected ILDA projector and DMX equipment, the board might draw more than 500mA. Therefore, the board might exceed the maximum allowed power of a computer USB port. It is not recommended to connect the board to a computer's USB port. An external USB power supply with >=800mA should be used instead. High quality USB cables should be used. Avoid long and thin cables, because this will result in a weak power supply and degraded ILDA signal quality.

Parts to be mounted for this option:
DCDC converter DC1 (input: 5v, output: +/-12v, 2 watt)
0R resistor R908

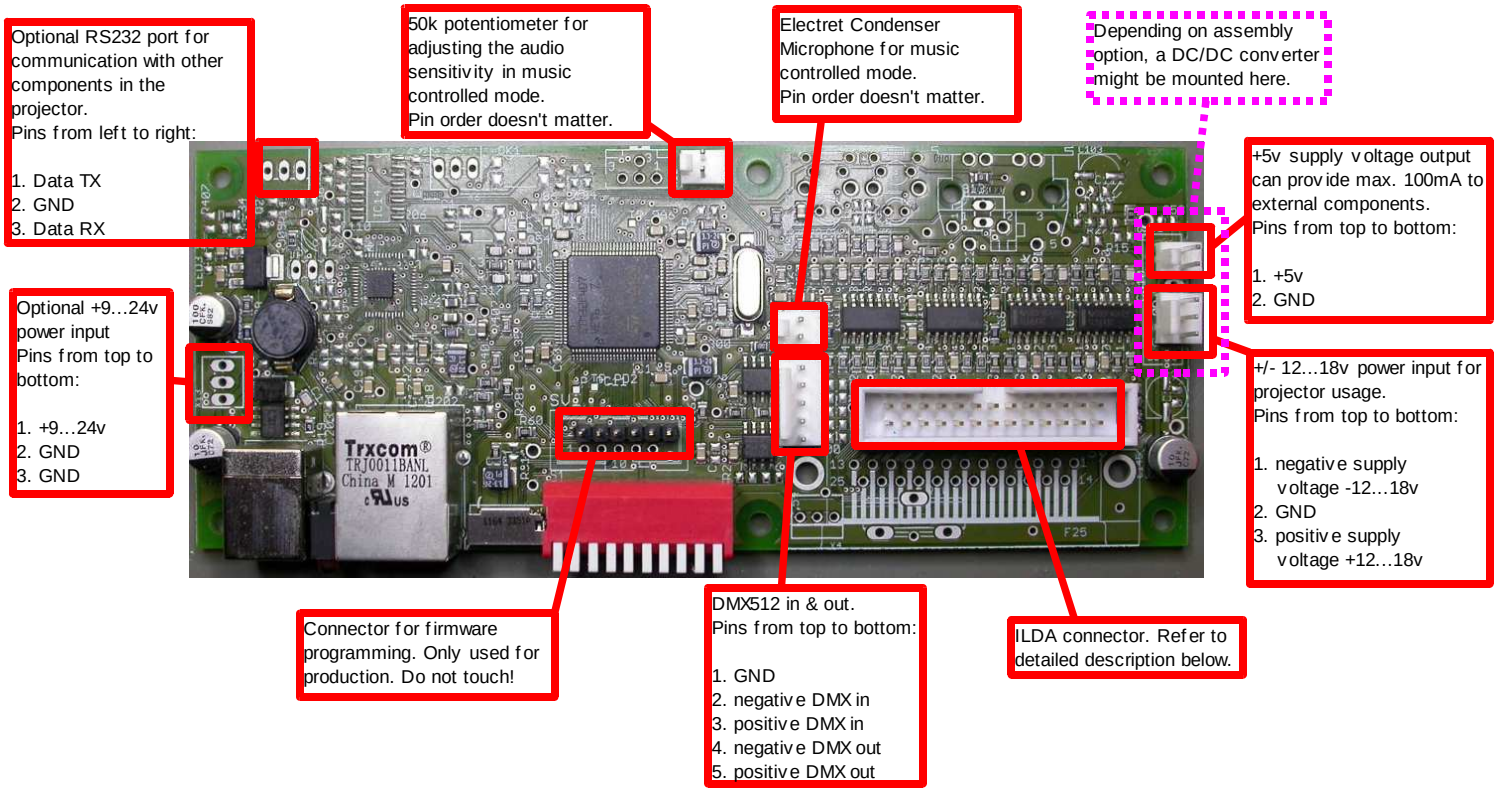
Parts to be removed for this option:
0R resistor R913

2.4 User selectable USB / +9...24v

Instead of R908 and R909, jumper JP2 can be mounted to choose between USB powered and external +9...24v supply.



3 Connector assignment



The ILDA pin header can be used for projector internal wiring. If a SUB-D ILDA connector is needed, it can be soldered onto the board or an adapter cable can be used:

The maximum output power for ILDA signals is 1mA. The laser projector should have high impedance signal inputs in order not to exceed the maximum current.

26pin header	25pin SUB-D	Signal	Details
1	1	X+	positive X scanner output -5...+5v
2	14	X-	negative X scanner output +5...-5v
3	2	Y+	positive Y scanner output -5...+5v
4	15	Y-	negative Y scanner output +5...-5v
5	3	intensity+	intensity color channel positive output 0...+5v
6	16	intensity-	connected to GND
7	4	interlock A	connected to interlock B
8	17	interlock B	connected to interlock A
9	5	red+	red color channel positive output 0...+5v
10	18	red-	connected to GND
11	6	green+	green color channel positive output 0...+5v
12	19	green-	connected to GND
13	7	blue+	blue color channel positive output 0...+5v
14	20	blue-	connected to GND
15	8	user1+	user defined color channel 1 positive output 0...+5v
16	21	user1-	connected to GND
17	9	user2+	user defined color channel 1 positive output 0...+5v
18	22	user2-	connected to GND
19	10	user3+	depends on assembly option: can be unused or connected to intensity+ (default) or to positive DMX512 input
20	23	user3-	depends on assembly option: can be unused or connected to intensity- (default) or to negative DMX512 input
21	11	user4+	depends on assembly option: can be unused (default) or connected to positive DMX512 ouput
22	24	user4-	depends on assembly option: can be unused (default) or connected to negative DMX512 output
23	12	projector return	not connected
24	25	GND	connected to GND
25	13	shutter	depends on assembly option: connected to +5v via 100R (default) or software-controlled shutter signal
26	n/a	n/a	not connected