manual

ArtNet node
LL ordercode 10230

Lux Lumen bvba

3/01/2022

Revision V2.0

By Wim Van Themsche

Content:

1 DOCUMENT INFORMATION 4

2 PICTURE 4
2.1 WITHOUT COVER 4
2.2 WITH COVER. 5

3 DIMENSIONS 6

4 SAFETY INFORMATION 7
4.1 SYMBOLS 7
4.2 PROTECTION FROM ELECTRIC SHOCK 8
4.3 PROTECTIONS FROM FIRE AND BURNS 8
4.4 PROTECTION FROM INJURY 9
4.5 DISPOSING OF THIS PRODUCT 9

5 PHYSICAL INSTALLATION 10
5.1 UNPACKING 10
5.2 LOCATION AND ORIENTATION 10
5.3 MOUNTING 10

6 REVISION CHANGE: 11

7 SPI SIGNALS AND ITS VARIANTS : 11

8 ASYMETRICAL VS SYMETRICAL DATA SIGNALS: 12

9 ARTNET, FEATURES AND HINTS: 13

10 ARTNET NODE PHYSICAL LAYOUT. 13

11 CONNECTING THE ARTNET NODE TO A PC 15
11.1 PHYSICAL CONNECTION OF THE ARTNET NODE TO A PC. 15
11.2 THE IP ADRESS OF THE NODE. 16
11.3 WHERE CAN I FIND THE SUBNET IN A IP ADDRESS? 16
11.4 CHANGE SUBNET ON A PC 17
11.5 SET YOUR PC BACK TO THE OLD SETTINGS: 23

12 THE OUTPUTS ON THE ARTNET CARD. 24
12.1 CONNECT FIXTURE TO THE DATA OUTPUT PORTS 24
12.2 UTP CONNECTION PHYSICAL PINLAYOUT 25

13 WEB PAGE 26

14 ARTNET-NODE CONFIGURATOR 27
14.1 INSTALLATION 27
14.2 PATCH BLOCKS 31
14.3 ARTNET SELECT 31
14.4 KEEP 32
14.5 PUSH TO NODE. 32

15 SAVE SETTINGS TO FILE. 33
15.1 SELECT AND SAVE .TXT FILE. 33

16 LOAD SETTINGS FROM FILE 34

17 SPECIFICATIONS 35
17.1 ELECTRICAL 35
17.2 ENVIRONMENTAL 35
17.3 MECHANICAL 35

18 EMC AND SAFETY REQUIREMENTS. 37

19 APPLICATION OF WARRANTY 38

20 RMA PROCEDURE 40

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21 USED LIST OF ABBREVIATIONS.....41

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1

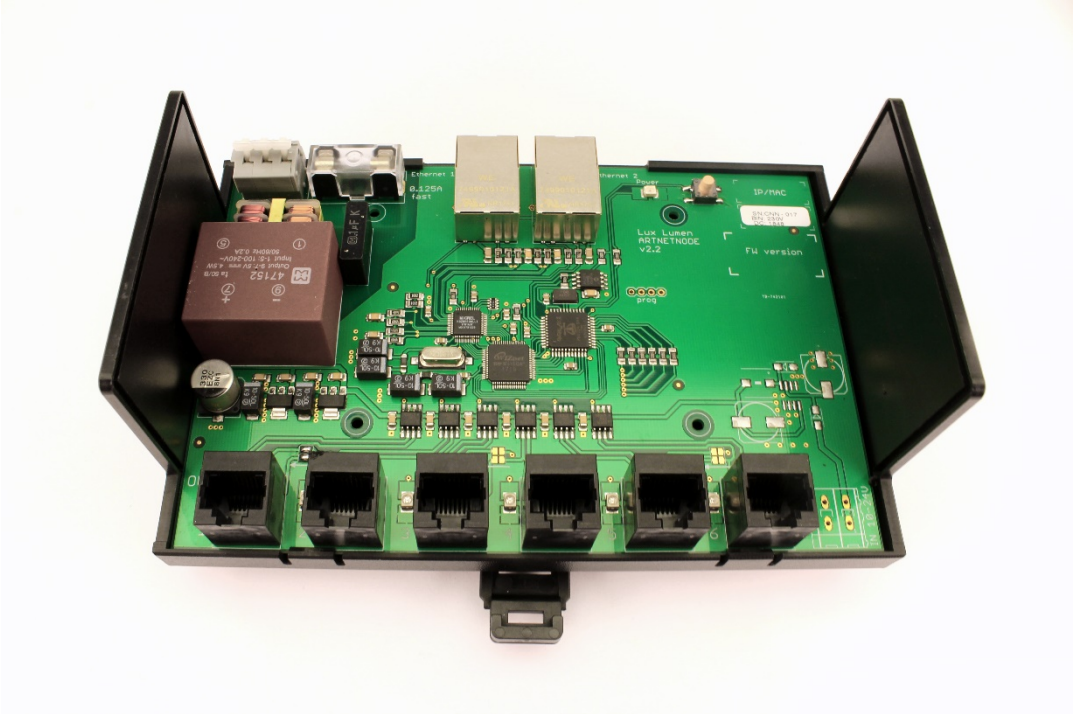
Document information

Project	manual
Item type	ArtNet node
Date	3/01/2022
Revision	V2.0
Owner	Wim Van Themsche

2

Picture

2.1 Without cover



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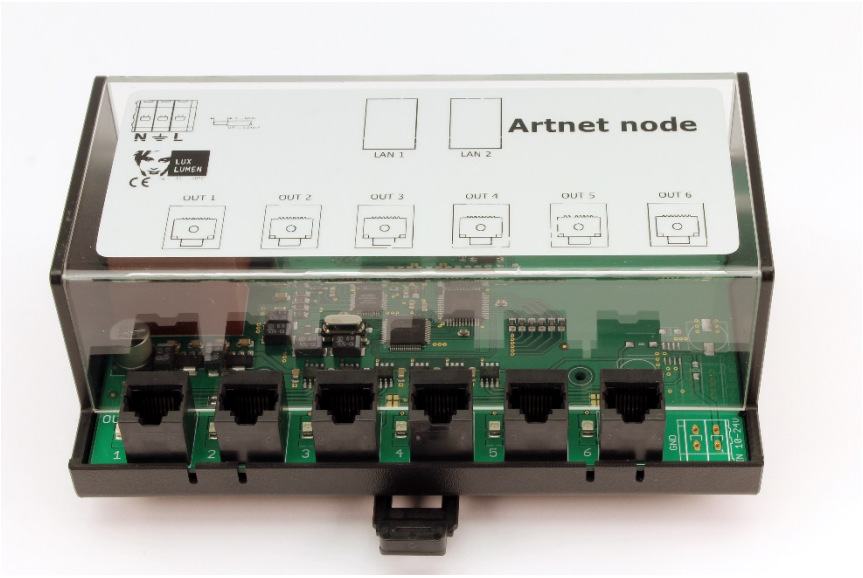
2.2 With cover.



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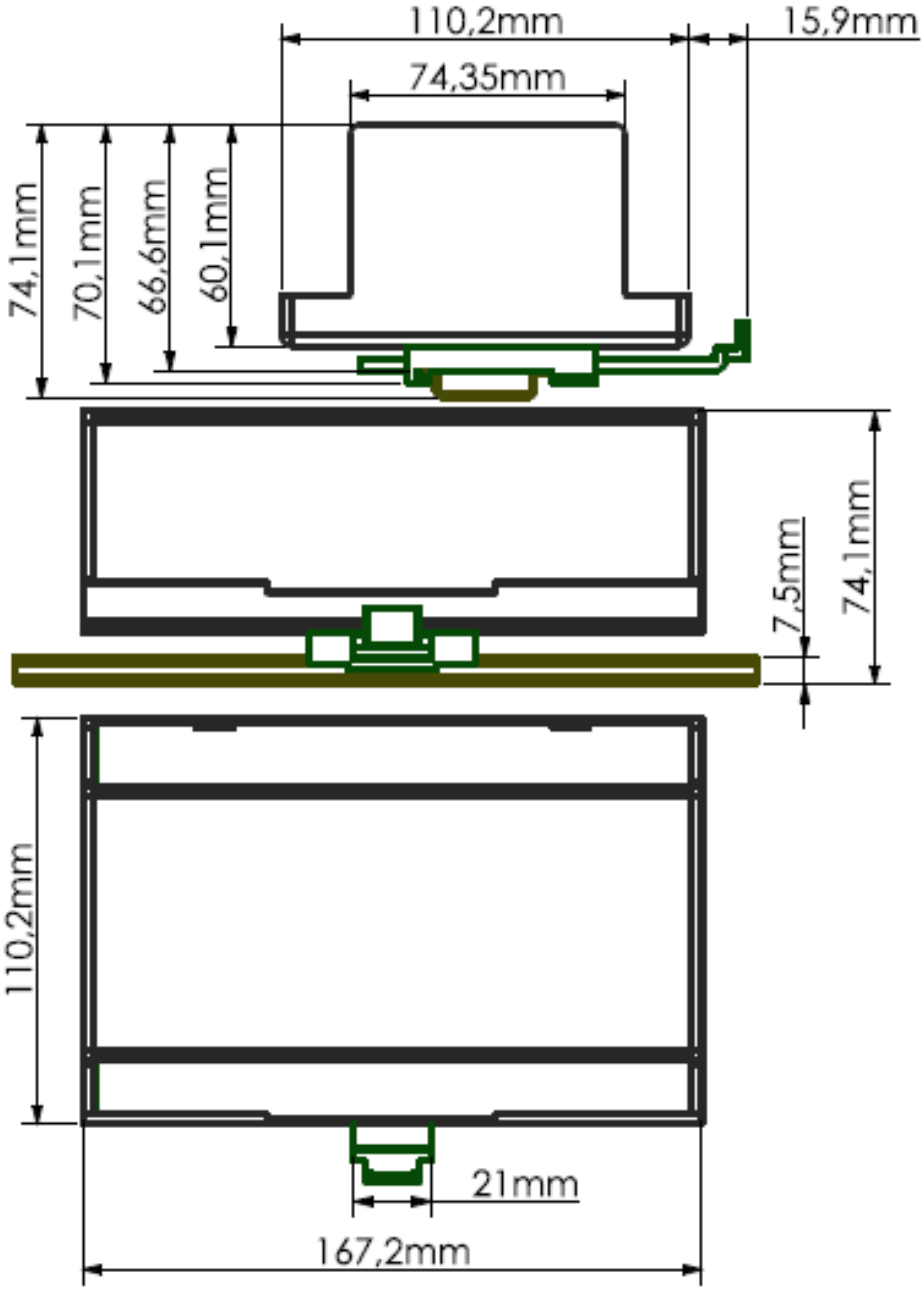
3

Dimensions



Please note, dimensions given are din-rail included.

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4

Safety information

Before installing, powering up, or servicing this ArtNet-node card it his highly recommended that you read this manual and ensure yourself that you completely understand its content. Observe the safety precautions in this manual. Install and operate the ArtNet-node only as described in this manual and in conformity with local regulations. If you have any questions how to operate this product safely please contact your point of sale.

4.1 Symbols

Following symbols are used to identify important safety information on the product and in this manual.

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4.2 Protection from electric shock

This ArtNet-node card is connected with live power so take all precautions to prevent injuries or electrical shocks. Shut down the power of the complete installation before carrying out any installation or maintenance work.

Please note that all metal parts used in the enclosure where this card is used are firmly grounded.

If any cable, seal or housing is damaged, cracked or reformed, disconnect the power of the installation immediately.

The ArtNet-node card is only to be used in a proper housing conform to local regulations.

For any additional servicing, not described in this manual, please contact your point of sale.

4.3 Protections from fire and burns

Do not operate this ArtNet-node card if ambient temperatures, inside its enclosure, is above 45 °C (113 °F). Please ensure yourself that sufficient ventilation around the card is possible.

Do not modify the card in a way not described in this manual.

Never bypass the fuse or change the fuse with another type or value as is rated in this manual.

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4.4 Protection from injury

Ensure yourself that all components, covers are securely fastened. Verify that the card is firmly clicked on a standard din-rail.

4.5 Disposing of this product

This ArtNet-node card is manufactured in compliance with directive of the European community: waste electrical and electronically equipment. Please help to preserve our environment and ensure that this product will be recycled properly at the end of its life.

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5

Physical installation

Thank you for selecting this ArtNet-node card as best solution in your setup.

Warning! Read the safety precautions in this manual before integrating this card into your installation.

Installation must be carried out by qualified professionals only.

Assure yourself that there is sufficient and unrestricted air flow around the ArtNet-node card.

5.1 Unpacking

The following items are included in your package:

- ArtNet-node card
- Carton box package

5.2 Location and orientation

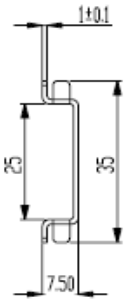
This ArtNet-node card cannot be used without additional protective housing. The housing protects the user against electrical shocks and it is protecting the card against climatologically influences.

Please assure yourself that the cabinet which houses the ArtNet-node card is according to local regulations and laws of the country of installation.

It is advised to install the card in horizontal position on the din-rail.

5.3 Mounting

The ArtNet-node can be mounted on a standard 35mm top hat din-rail. A typical section of this din-rail can be found here:



Note: Use end blocking clamps if necessary in your application.

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6

Revision change:

Brief description of change compared to former revision:

V01: Version without output configurator.
V02:Version with output configurator.

7

SPI signals and its variants :

It is important to understand that there are different versions of the so called 'SPI' signal. Most of them are derivations from the original SPI signal. It would be more correct to use the following terms:

- One wire control bus if there is asymmetrical data, without clock signal.
- Two wire control bus if there is asymmetrical data, with asymmetrical clock signal.

It is important to understand that the standard SPI-variants use an asymmetric signal for the data communication.

It is also important to understand that the data signals of this SPI variants use high clock frequency, which can lead to instability of the signal. We strongly recommend not to use long cable lengths, when the signal is asymmetric.

There are different manufacturers who claim that their chip is SPI compatible, but in reality, this is seldom the case. Timing is very important on an SPI-variant bus, so it might be possible that you will not find a setting on the ArtNet node which is compatible with your ledstrip. (or that it is not stable)

If this is the case, we strongly recommend you send 5 meter of your strip, and your ArtNet node to Lux Lumen, so we can change the timing for that particular used Chip. If we use the term 'SPI' in this manual, we always refer to a variation of the original SPI protocol.

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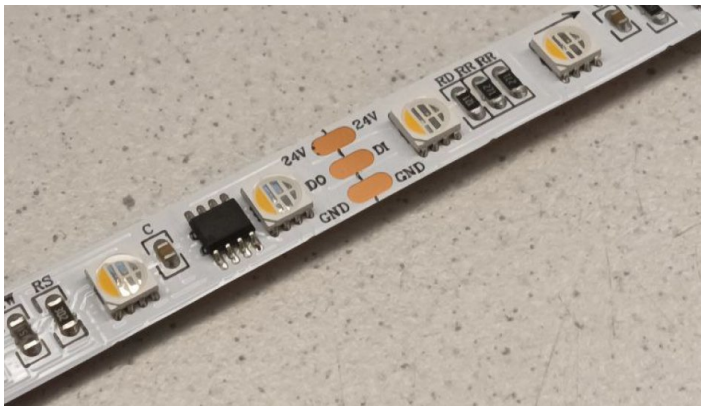
Asymetrical vs Symetrical data signals:

Important to understand, that asymmetrical signals are less stable as symmetrical signals.

The SPI-variants use only 1 wire on the ledstrip, or ledstring.

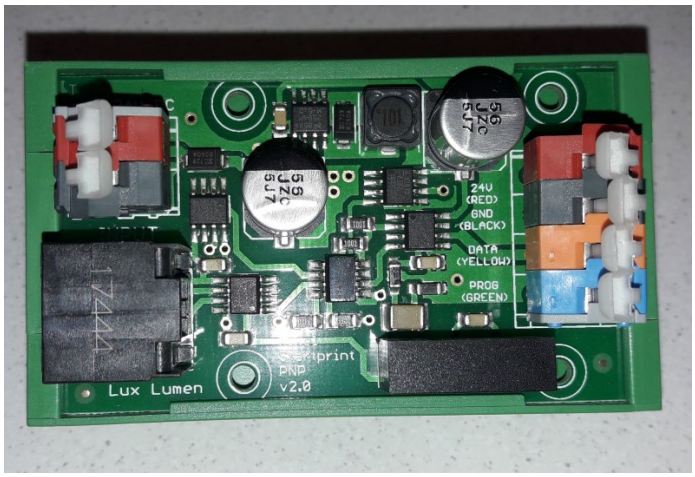
This you can see on the picture below (as an example).



As you can see, all SPI-variants are directive, which means the data can only flow in one direction over the strip.

On the picture above, you can clearly see DO (data output) and DI (data input)

To overcome the problems with longer cable lengths, Lux Lumen made the 6 outputs on the card so, that they output a symmetrical signal. This makes that you can have longer cable lengths as in standard non symmetrical SPI-variants. But this implicates that you can not directly connect a SPI-variant ledstrip to one of the 6 outputs. You need an extra piece of electronics, that converts this symmetrical signal to an asymmetrical signal. We call this a 'pixelstartprint'. A picture of such a PCB, you can find below here:



The LL ordercode is: 10229

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9

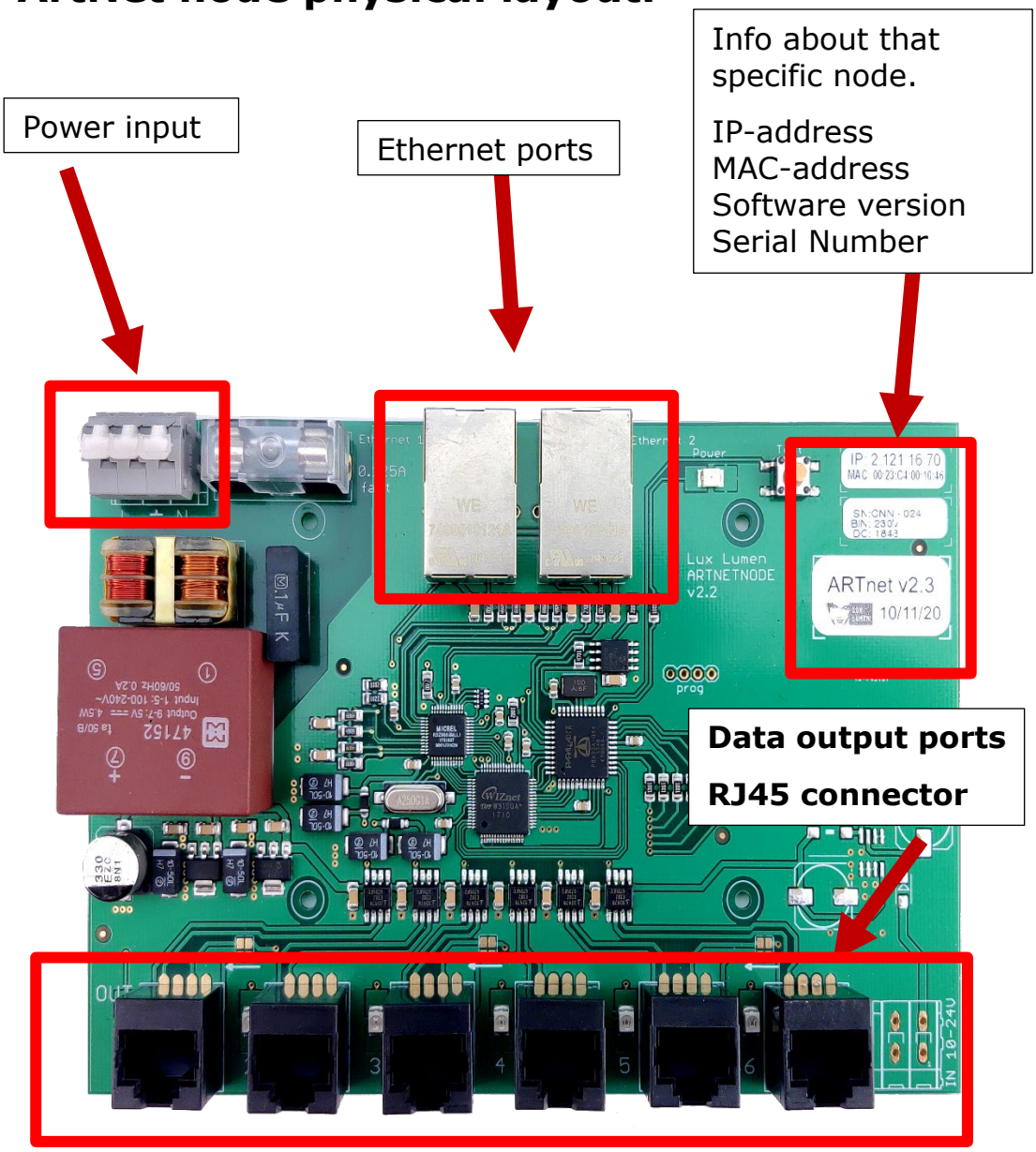
ArtNet, features and hints:

Please always remember that the first universe in ArtNet is number '0' and not '1'. A theoretical limit of 32.768 universes is possible, depending on the network and casting used. For more detailed information on this topic we refer to this link:

https://www.artisticlicence.com/WebSiteMaster/User%20Guides/art-net.pdf

10

ArtNet node physical layout.



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The ArtNet node has a standard power input for 240Vac. If needed customized power inputs, like 12-24 Vdc can be ordered as a special. Please contact info@lux-lumen.com for nonstandard power inputs.

The ArtNet node has 6 six independently programmable data output ports.

The Artnet node has an internal switch on the ethernet ports. This switch can handle up to 300 DMX universes in broadcast. So this means, it can handle up to 300 DMX universes on its artnet 'input', and send 300 DMX universes to the artnet 'output'. But the artnet node can only process signals from maximum 10 different DMX universes. This results in the fact that the maximum channel count of processed channels on the ArtNet node is 5120 channels. Please note, that if you configure the 6 outputs as DMX output, the limit is 6x512 = 3072 channels.

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11

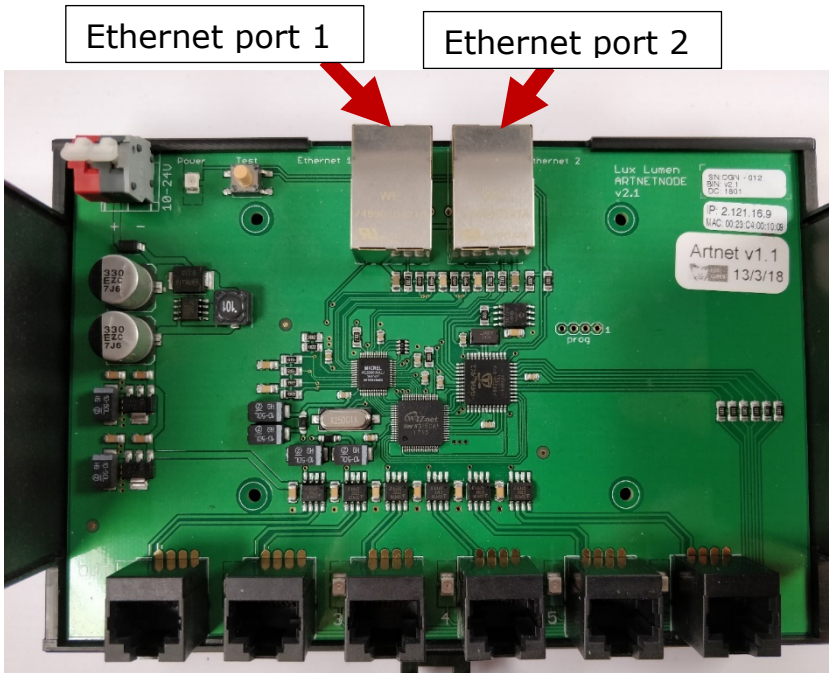
Connecting the ArtNet node to a PC

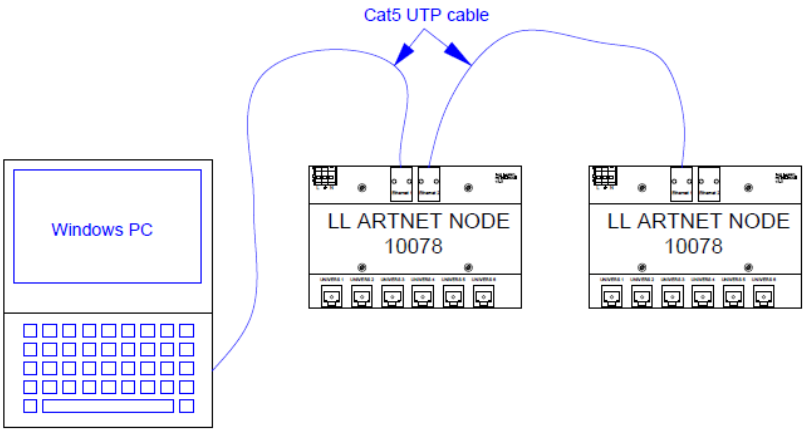
11.1 Physical connection of the ArtNet node to a PC.

If you want to view or change the settings of the ArtNet node you need to connect a windows PC to the ArtNet node.

First connect your PC to the same physical network as the ArtNet node. You can plug the node directly in to your PC with a UTP-cable from the node to the PC or you can connect through a network setup with one or more switches. The internal switch can handle straight UTP cables, as well as crossed UTP cables.

You can link multiple nodes (daisy chain) to the same network. Each node has an ethernet switch build in with 2 ethernet ports.





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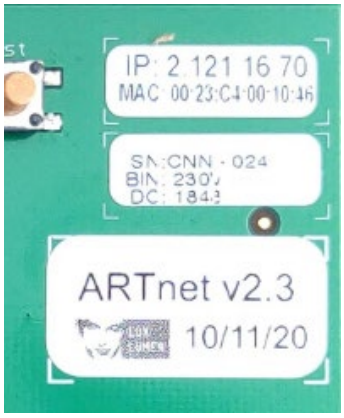
In the layout above, we do a direct connection to the ArtNet node to a PC, and we daisy chain the second card to the first card.

11.2 The IP adress of the node.

The artnet node has a preprogrammed IP address, which you can find on the label which you can find on the right upper corner of the PCB.



In this case, the IP address is 2.121.16.70. This IP address is not end-user-changeable. If for a particular reason, a dedicated IP address is needed, please contact info@lux-lumen.com.

11.3 Where can I find the subnet in a IP address?

You can find the subnet in an IP address as the first number in a series of 4.

For example: 5.11.654.231 is an IP address in subnet number 5.

You have to set the IP address on your PC to the same subnet as the IP address of the ArtNet node. Since the ArtNet standard always uses IP addresses in the subnet '2', the IP address on the PC has to be 2.xxx.xxx.xxx. We even recommend to use a fixed address 2.0.xxx.xxx, to avoid conflicts with other ArtNet devices in the network.

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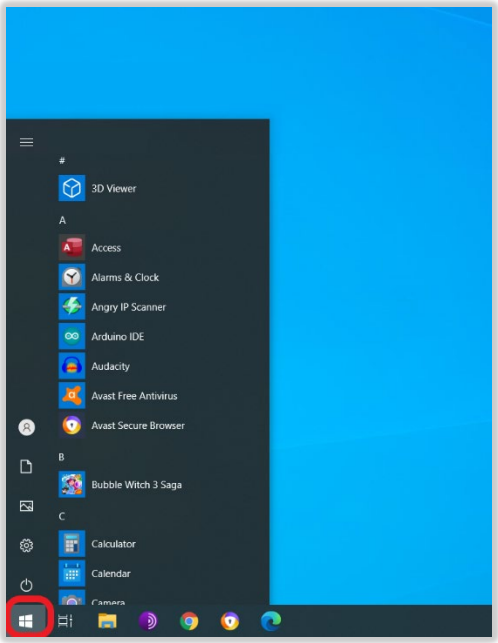
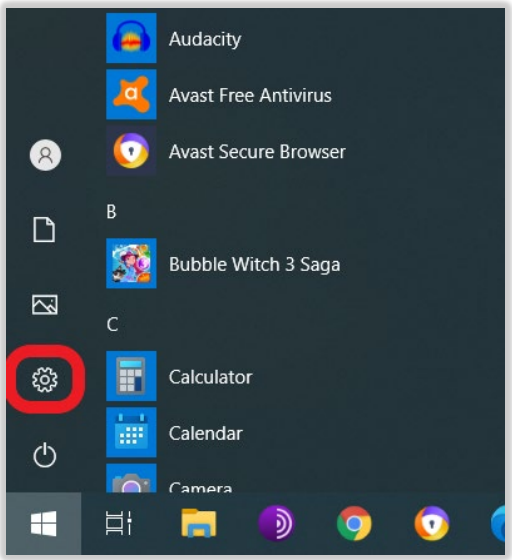
11.4 Change subnet on a PC

To set the PC to the same subnet as the ArtNet node you have to set a fixed IP address on your PC.

- Click on the windows “start” button in the left bottom corner.



- Click on “settings”:



“Windows Settings” opens.

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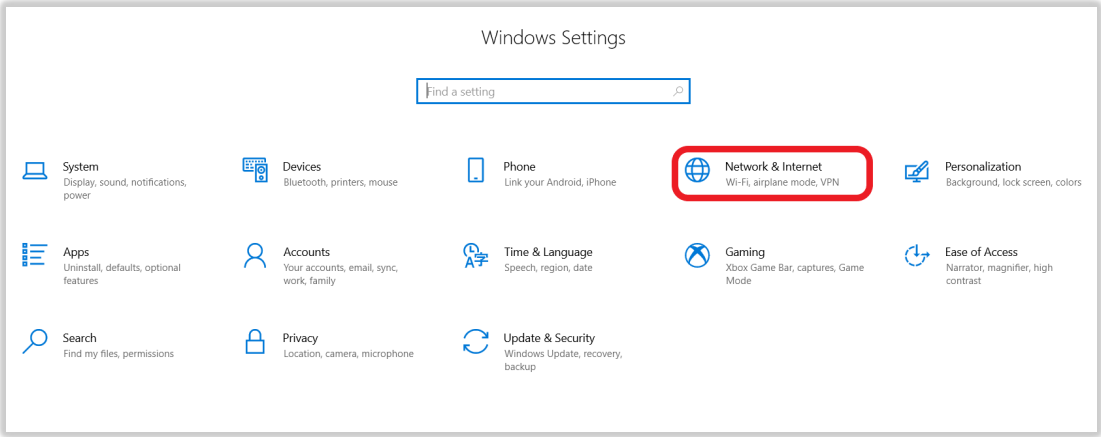
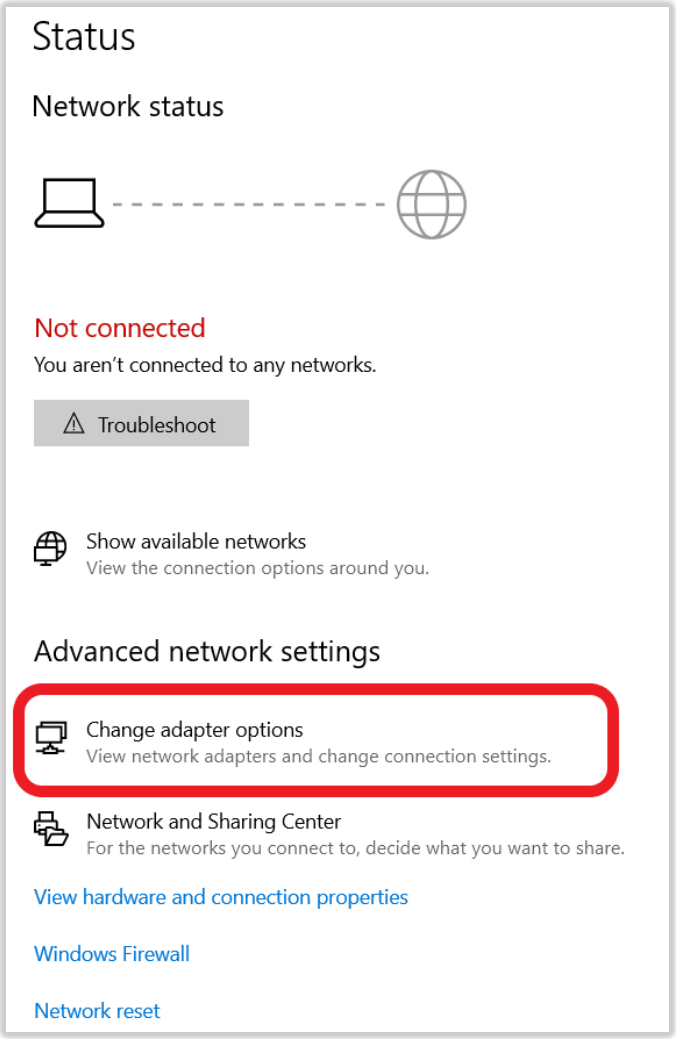
- Click on “Network & Internet”



- Click on “Change adapter options”



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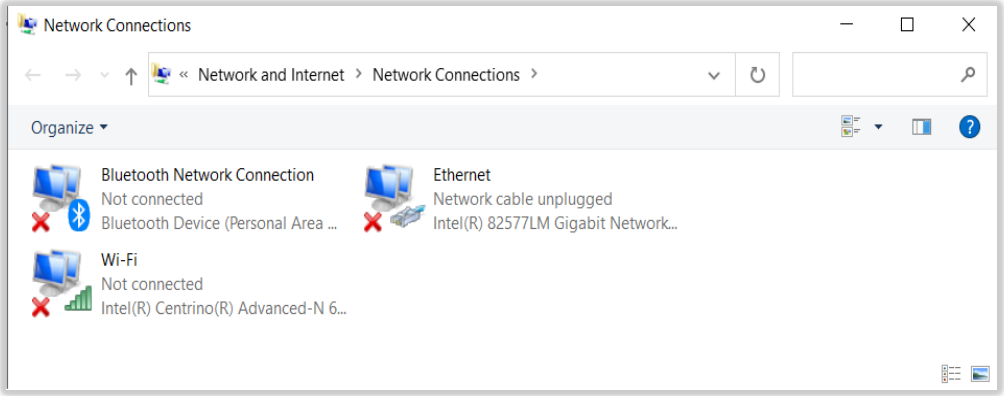
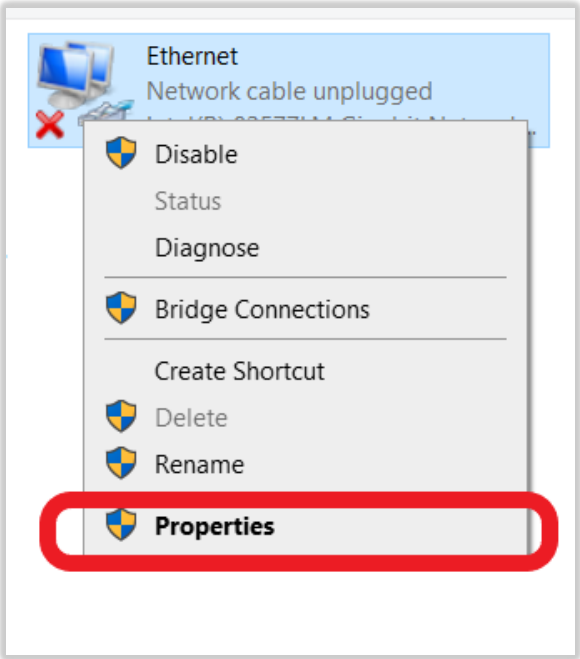
- find the adapter corresponding with the connector you used to connect to the ArtNet node. usually it is the “ethernet” adapter.
- Right click on the adapter.



- Click on “Properties”



Select “Internet Protocol version 4 (TCP/IPv4)

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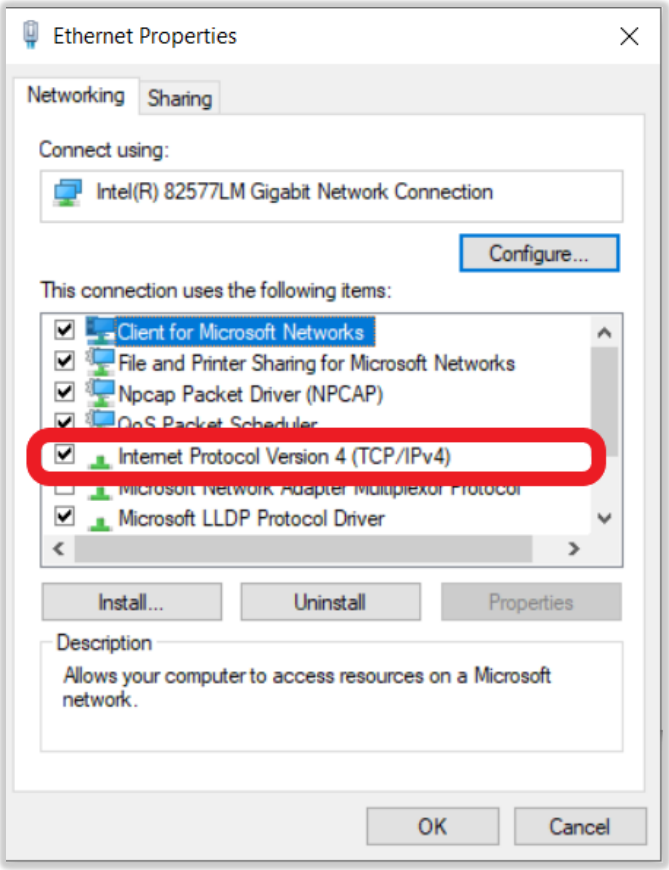
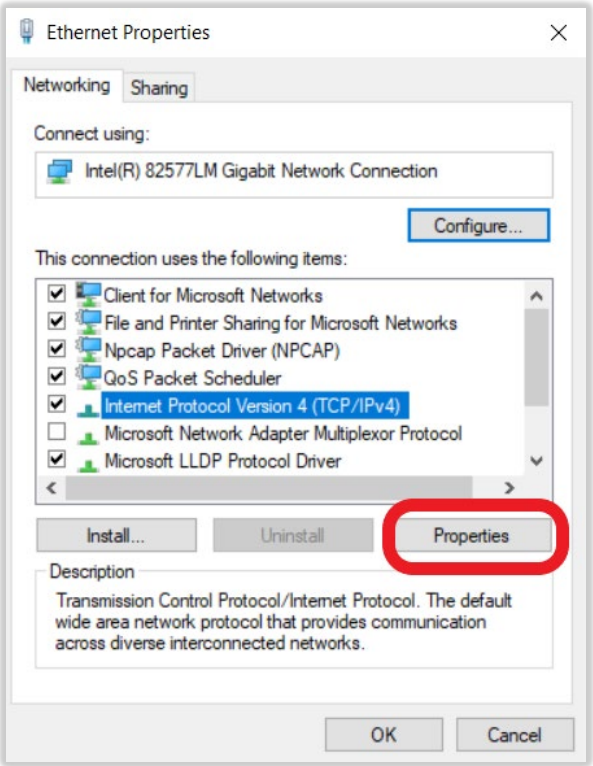


- Once selected click on the button “properties”



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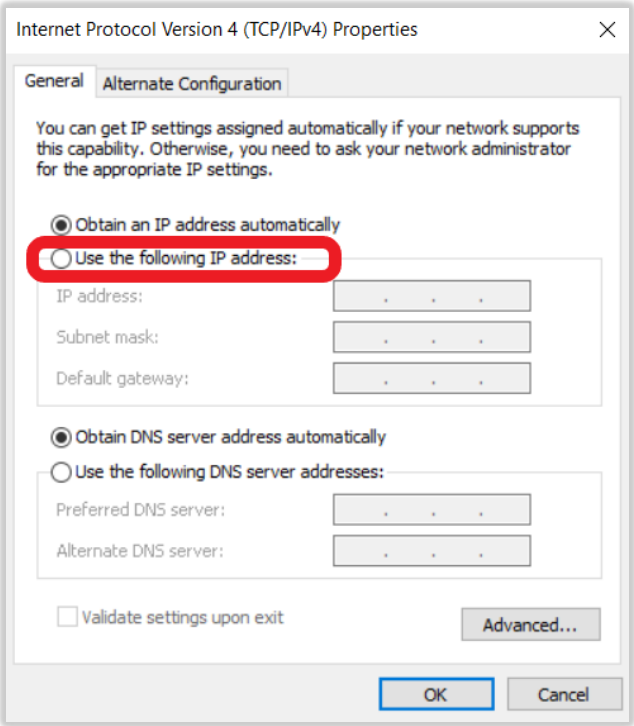
- Select the option “ use the following IP address”



- Fill in the wanted IP address. The first numbers should be ‘2’, the same as the IP address of the ArtNet Node (this is the subnet). The last number must be different to avoid IP conflict. We recommend using the following first two digits: 2.0.xxx.xxx.
- Once you filled in the IP address, the Subnet mask is filled in automatically. If not, just click on it.

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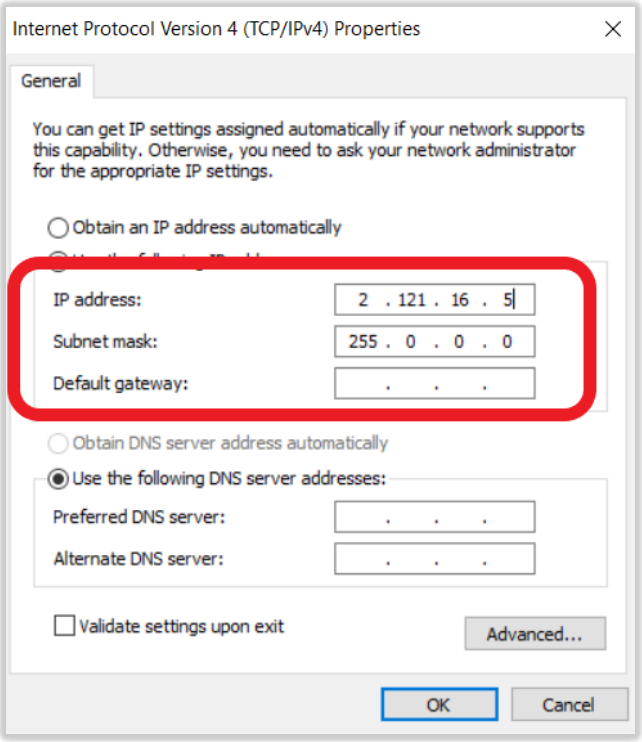
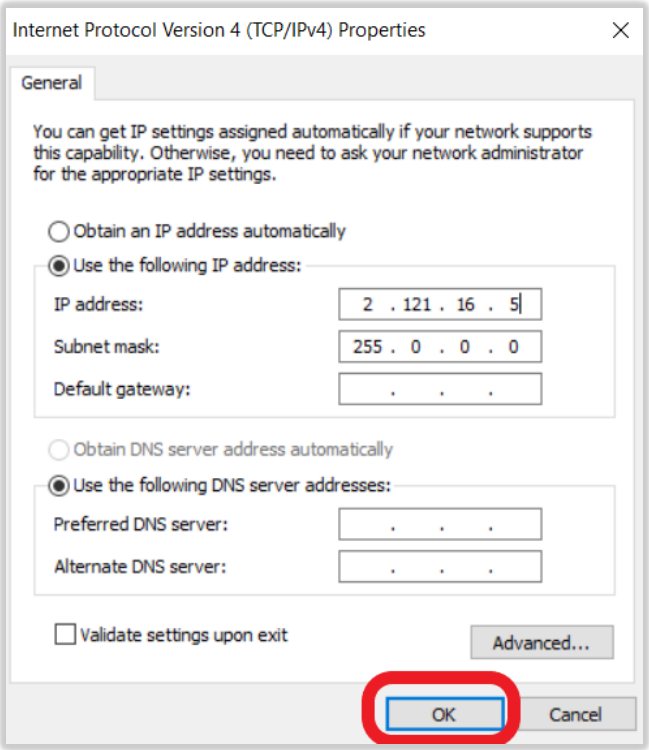


- Click on “OK”



- Click on “close”

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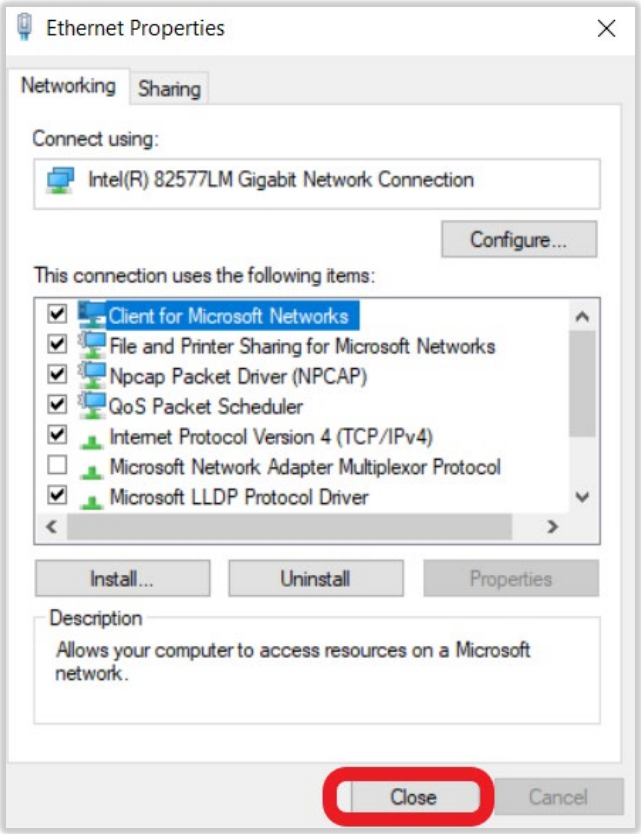
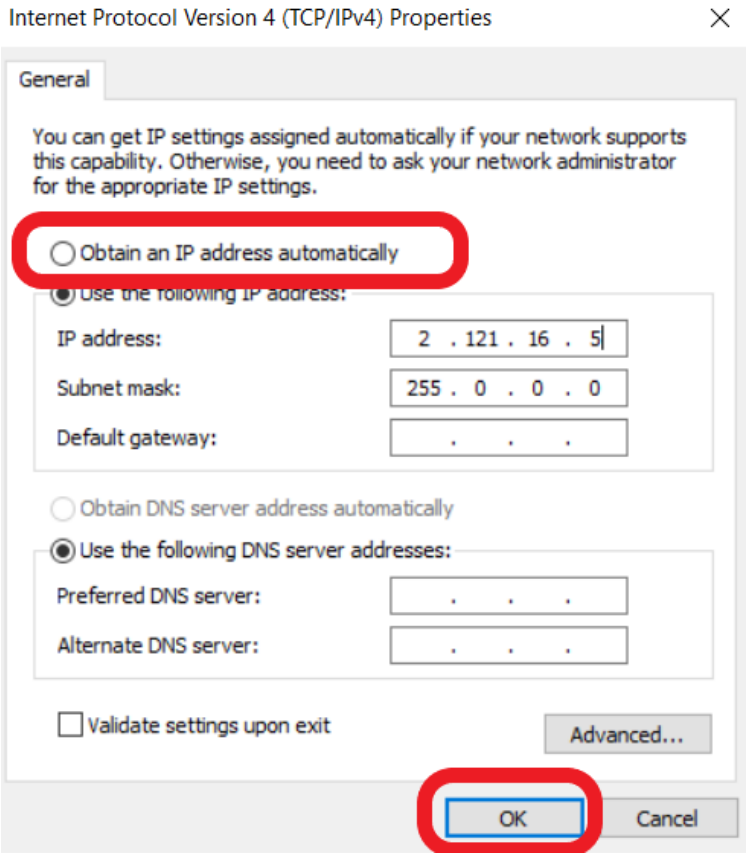


11.5 Set your PC back to the old settings:



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12

The outputs on the ArtNet card.

12.1 Connect fixture to the data output ports

The ArtNet node has 6 symmetrical output ports.
Although they use the same connector type (RJ45) these are not to be confused with the ethernet ports.
It is not possible to connect another node to the network via the output ports.

A data output port on the ArtNet node only sends out the data with the protocol and universe(s) configured for that port.
If nothing configured no data will be send out that port.
See '8 ArtNet configurator' for more info on configuration of the data output ports.

The data output port doesn't give power to the fixture. There needs to be an external power supply unit (PSU) to power the fixture.

Please note, all outputs are using symmetrical data communication, for enhanced stability. Especially when using SPI signals this comes in a handy. See as well chapter 4.

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12.2 UTP connection physical pinlayout.

Pinout of the data output port 1,3 and 5.(RJ45 connector)

Pin number	**Wire color in network cable**	**Pinout**
1	Orange/white	Data +
2	Orange	Data -
7	Brown/white	Ground
8	Brown	Ground
3	Green/white (pin 1 routed from UTP2/4/6)	Clock +/Data+
6	Green (pin 2 routed from UTP2/4/6)	Clock -/Data-

Pinout of the data output port 2,4 and 6.(RJ45 connector)

Pin number	**Wire color in network cable**	**Pinout**
1	Orange/white	Data +
2	Orange	Data -
7	Brown/white	Ground
8	Brown	Ground

An extra explanation for the pin 3+6 on the UTP1,3 and 5 connectors above follows here.

The pins 1 and 2 of UTP connectors 2, 4 and 6 are physically routed to pin 3 and 6 from the UTP connectors 1,3 and 5.

This gives two advantages:

- In case of DMX, You can send 2 DMX universes over 1 physically UTP cable.
- In case of YD pixels of the first generation, which uses SPI + Clock signal, both of them can be combined over one cable.

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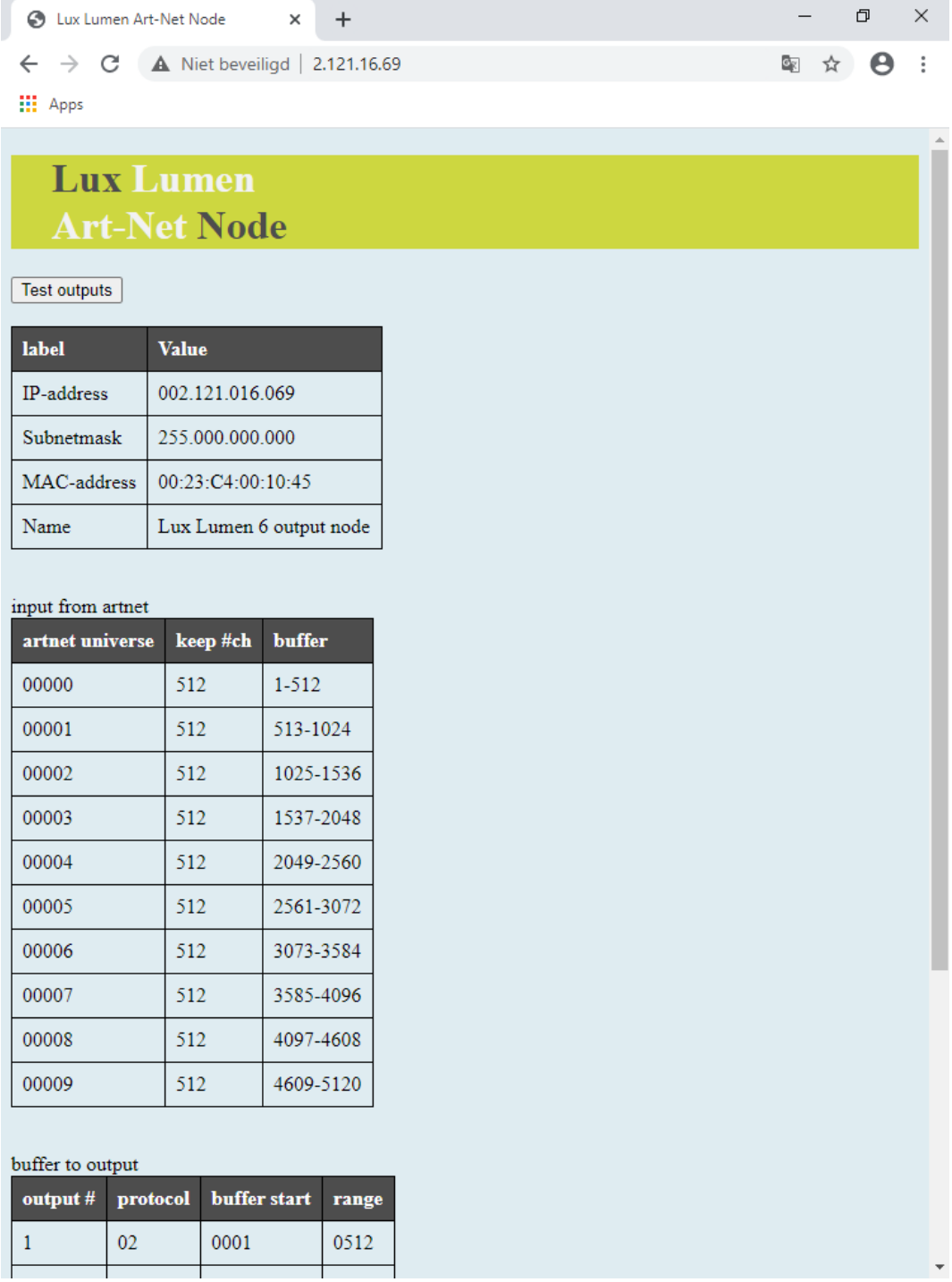
13

Web page

On the webpage you can obtain info about the settings of the ArtNet node. You cannot change the settings via the web page.

With a browser (eg.chrome) surf directly to the IP address of the ArtNet node. In the example below, the IP address of the node is 2.121.16.69.



label	Value
IP-address	002.121.016.069
Subnetmask	255.000.000.000
MAC-address	00:23:C4:00:10:45
Name	Lux Lumen 6 output node

input from artnet

artnet universe	keep #ch	buffer
00000	512	1-512
00001	512	513-1024
00002	512	1025-1536
00003	512	1537-2048
00004	512	2049-2560
00005	512	2561-3072
00006	512	3073-3584
00007	512	3585-4096
00008	512	4097-4608
00009	512	4609-5120

buffer to output

output #	protocol	buffer start	range
1	02	0001	0512

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14

ArtNet-node configurator

14.1 Installation

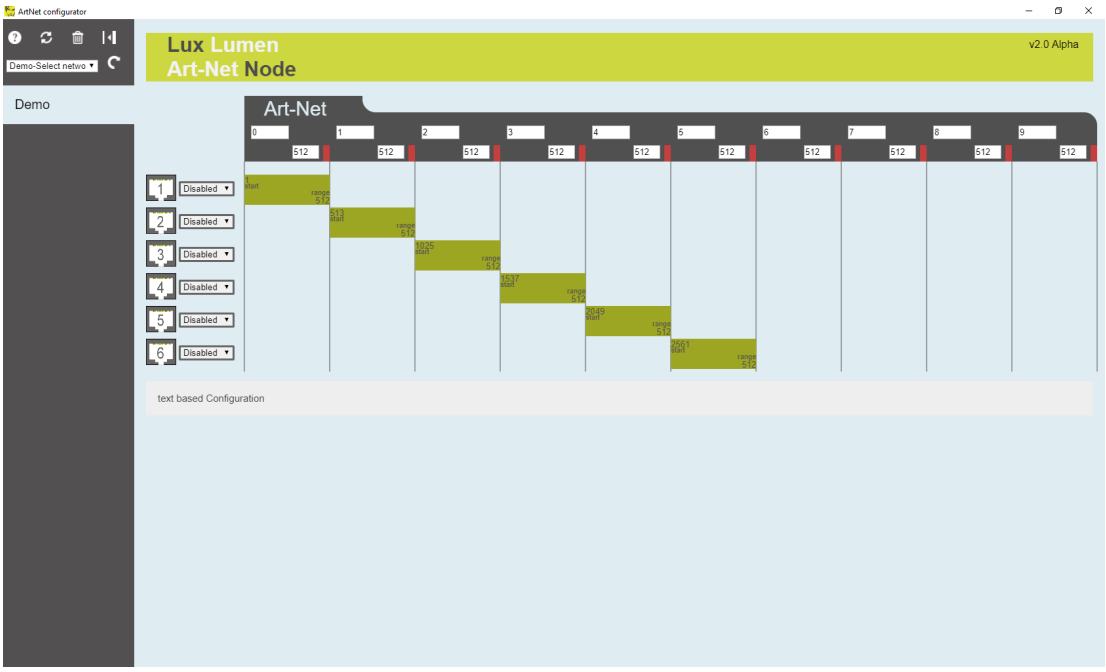
With the ArtNet configurator you can change the settings of the ArtNet node.

The ArtNet configurator is an executable file. There is no installation needed.

You can download this software from following link:

http://www.lux-lumen.com/sites/default/files/2018-08/artnetconfig-v2-0.exe

Once you did run this .exe file, you will see a screen similar to the one below.



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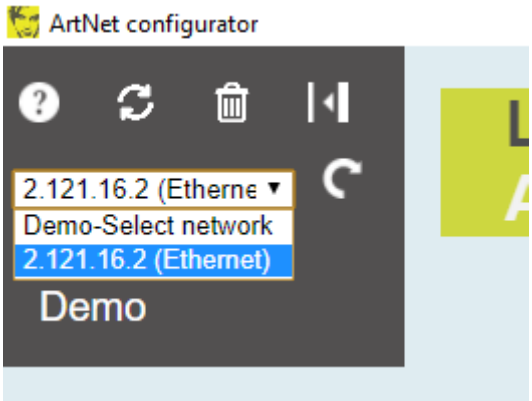
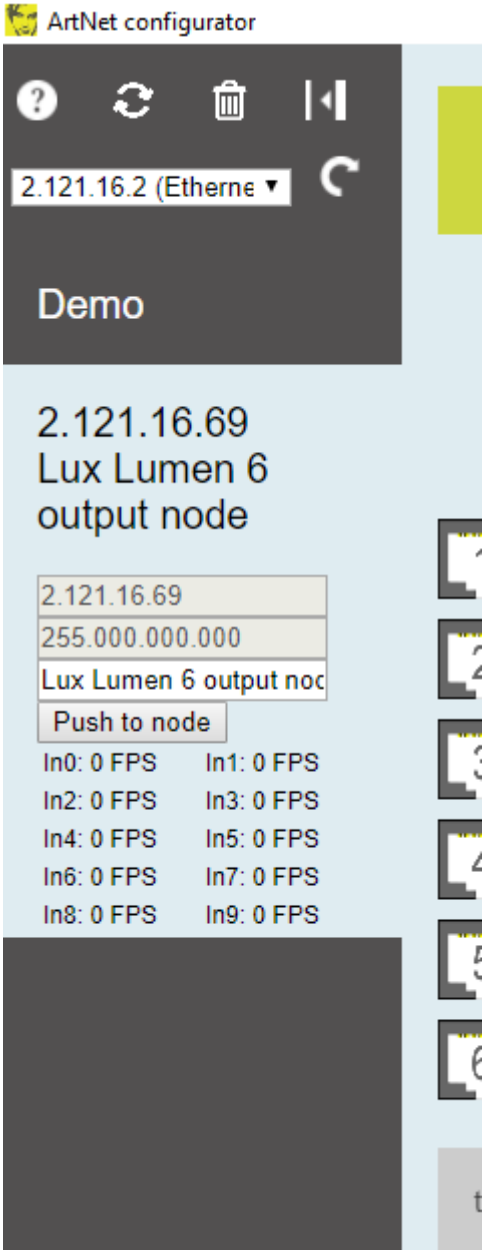
In the top left corner you can choose witch network adapter you want to use to scan for ArtNet nodes.



All detected nodes will appear on the left side. When you click on the node you can change the settings.



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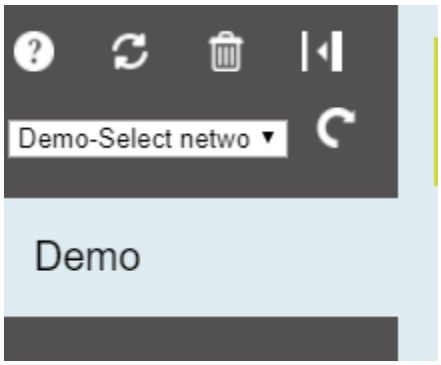
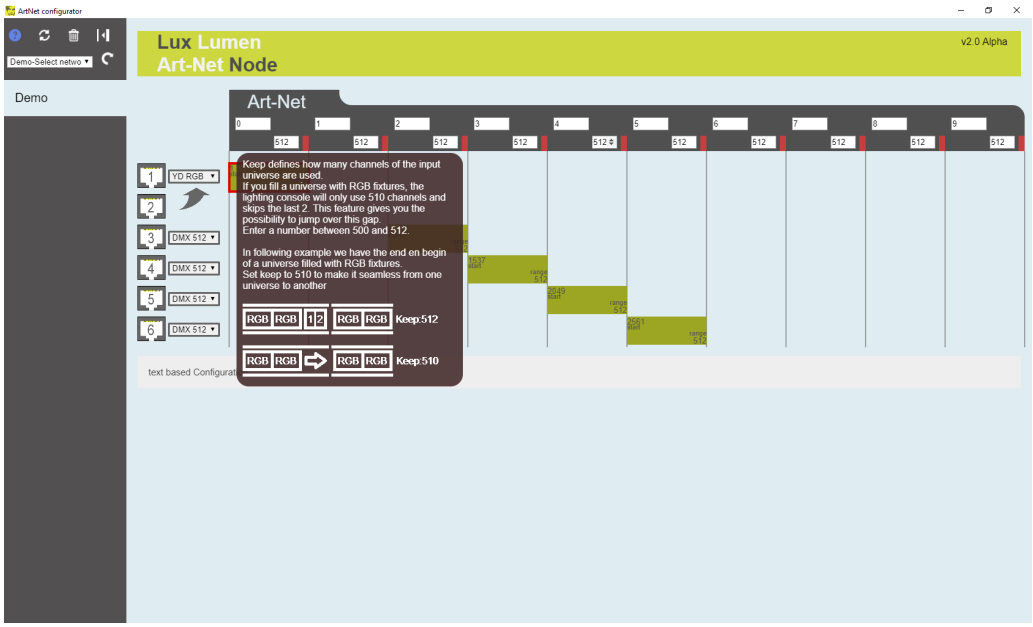
For more info about the ArtNet configurator and all its options, you can click on the question mark in the upper left corner.



When you have this option enabled you get info once you hover over different sections of the ArtNet configurator.

To disable this option click again on the question mark.

As example, you can see what text appears if you hold your cursor on the field '512'.



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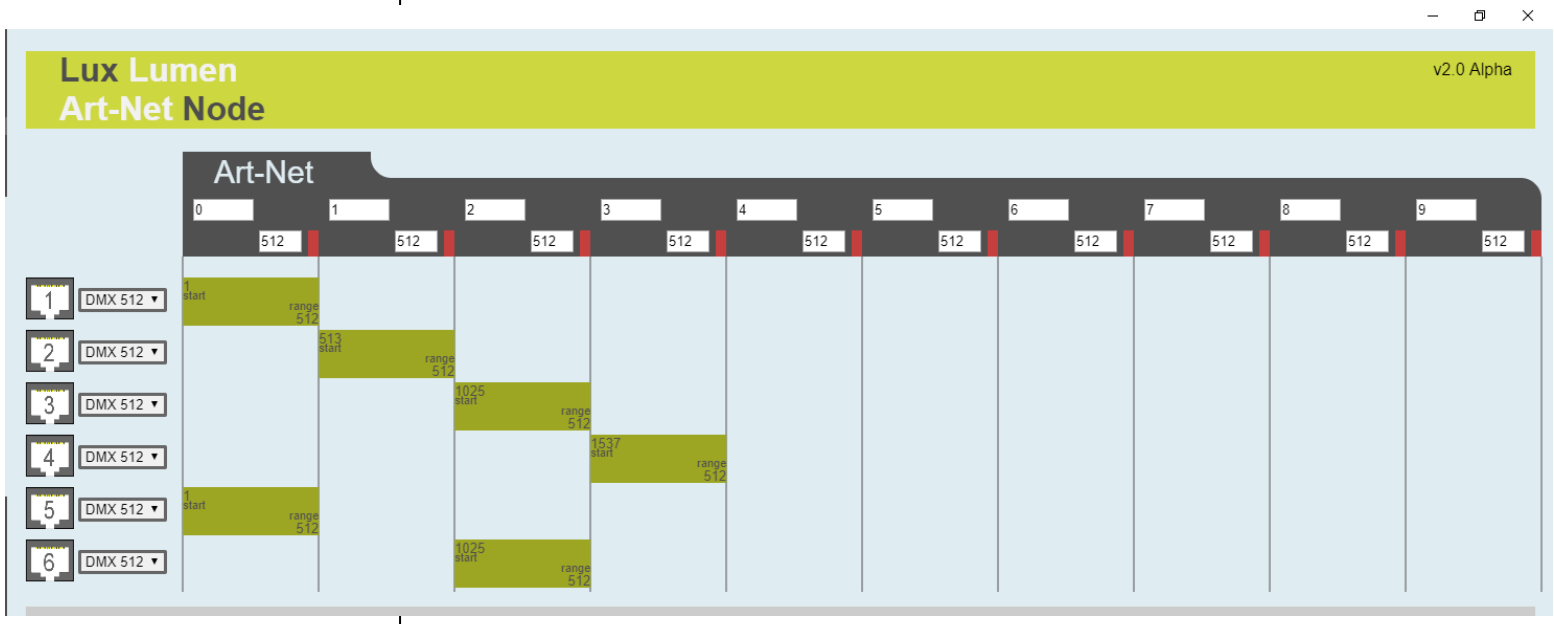
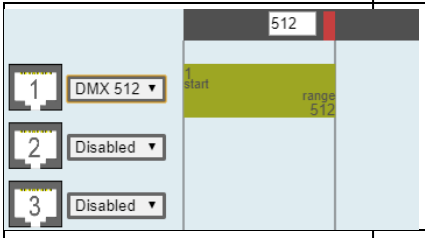
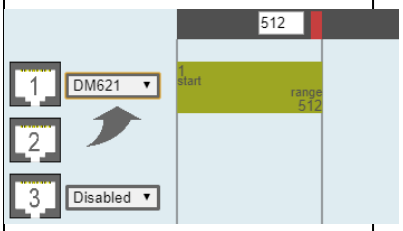
In the center of the screen you can change the output settings of the ArtNet Node.







To activate an output, first select a protocol in the dropdown menu next to the output.

Some protocols needs only 1 line like DMX or WS2811.

Other protocols needs 2 lines: data and clock.
When a 2 line protocol is selected, the next output is used as clock and cannot be used as an independent output.

On the PCB are solder-points to re-direct the clock line to the data line connector. See chapter 8.2 for more info.

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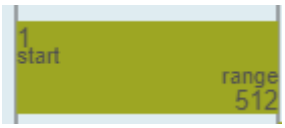
14.2 Patch blocks

With the patch-blocks you can define which portion of the input buffer (Artnet) goes to which output. The start parameter is the channelnumber from buffer where the output starts.

This is a number between 1 and 5119.



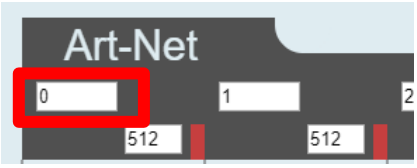
The range is the number of channel for this output.

Depending on the protocol, this is a number between 1 and 512 or 1 and5120.

So it is possible to route all 10 DMX universes to one output, but it is not recommended to do so. The frame rate is inversly with the number of channels outputed.

There are 2 possible ways to input the numbers. By dragging the blocks and text number input. Check the mouse pointer before clocking to see what function is selected.

14.3 Artnet select



Enter the univers number the node needs to capture this buffer.

It is possible to specify 10 completely different universes in any order.

Duplicate universes are not allowed.

Enter a number between 0 and 32767

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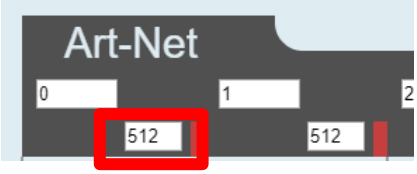
14.4 Keep



Keep defines how many channels of the input universe are used.

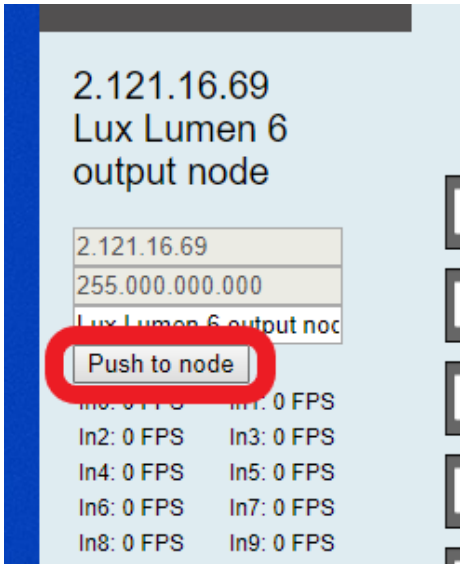
If you fill a universe with RGB fixtures, the lighting console will only use 510 channels and skips the last 2. This feature gives you the possibility to jump over this gap.

Enter a number between 500 and 512. In following example we have the end and begin of a universe filed with RGB fixtures.

Set keep to 510 to make it seamless from one universe to another.

14.5 Push to node.

To confirm the changes click on 'push to node' on the left side.



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15

Save settings to file.

15.1 Select and save .txt file.

On the bottom screen, you will see a field labelled 'text based configuration'. If you click on this field, a text file will pop up.

We strongly recommend to select this txt, and paste it in a .txt file, and save this in a safe environment. Please name this file with the IP address of the ArtNet node, so you can easily retrieve it.

Example of this .txt file:

uni0: 00000 keep0: 512

uni1: 00001 keep1: 512

uni2: 00002 keep2: 512

uni3: 00003 keep3: 512

uni4: 00004 keep4: 512

uni5: 00005 keep5: 512

uni6: 00006 keep6: 512

uni7: 00007 keep7: 512

uni8: 00008 keep8: 512

uni9: 00009 keep9: 512

type0: 03 start0: 0001 range0: 0512

type1: 00 start1: 0513 range1: 0512

type2: 02 start2: 1025 range2: 0512

type3: 03 start3: 1537 range3: 0512

type4: 02 start4: 2049 range4: 0512

type5: 02 start5: 2561 range5: 0512

This .txt file is stored under a name + IP address, for example

Node stageright IP 2.121.56.23

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16

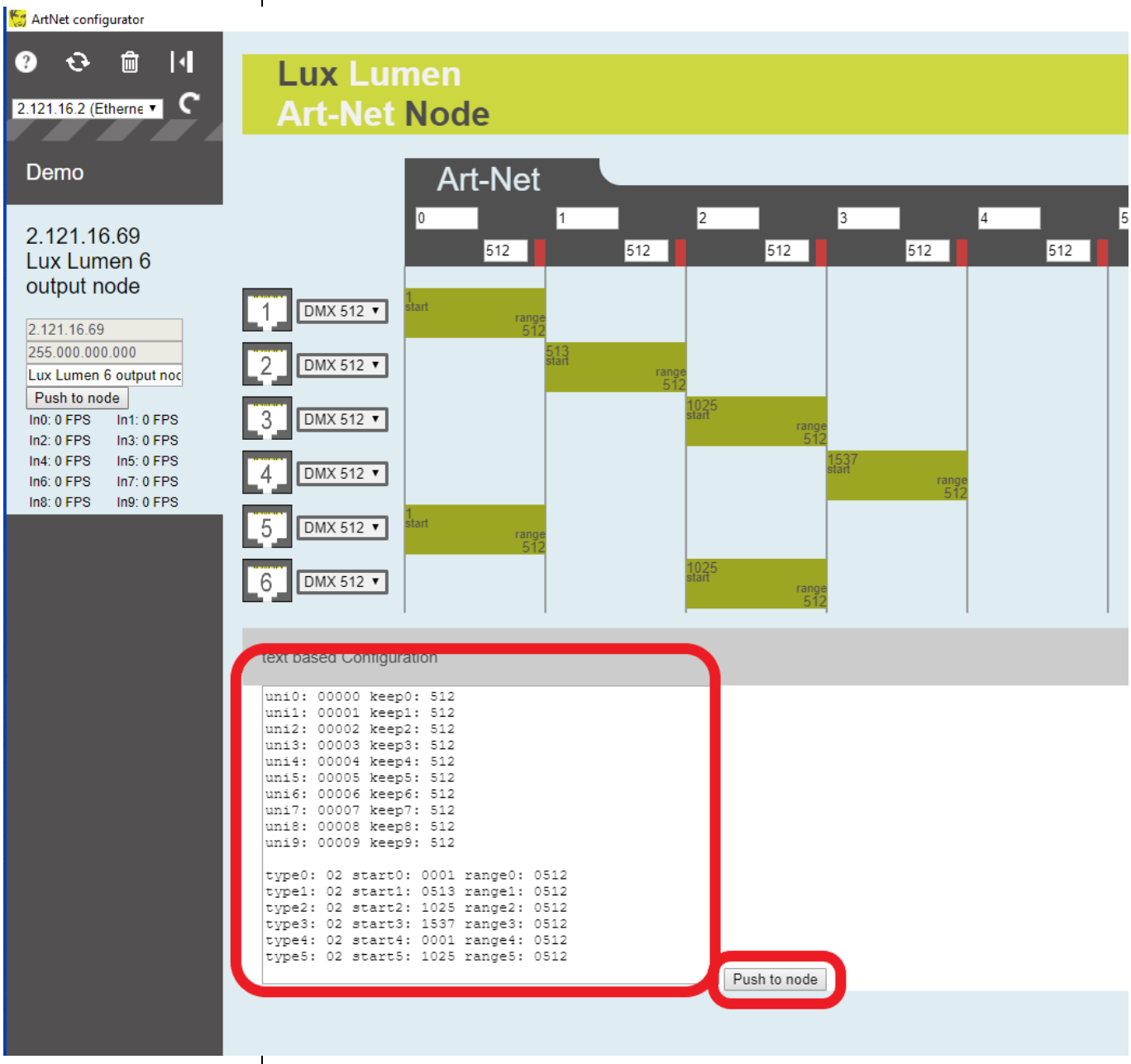
Load settings from file

In the ArtNet configurator you can load settings from a text file.

When you replace an ArtNet node find the file named with the IP address from the old ArtNet node and open it.

Copy the text from the file and paste it in the text field in the ArtNet configurator.

Confirm by clicking on 'Push to node' next to the text field.



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17

Specifications

17.1 Electrical

Inputs

- 220-240 volt AC
- Power input on Cage clamp®
- 2 ethernet inputs on RJ-45 connectors
- Status led

Outputs

- 6 programmable outputs on RJ-45 connector

17.2 Environmental

- IP rating: IP 20
- Humidity: 30% to 95%
- Ta (max) : +45 °C (104 °F)
- Ta (min): -15 °C (+5 °F)
- Tc (max): +55 °C (131 °)

17.3 Mechanical

Physical dimensions of the card below:

Dimensions ArtNet-node	167x 110 x 70	mm
Dimensions packaging	230 x 230 x 130	mm
Weight ArtNet-node	500	gr
Weight packaging	700	gr

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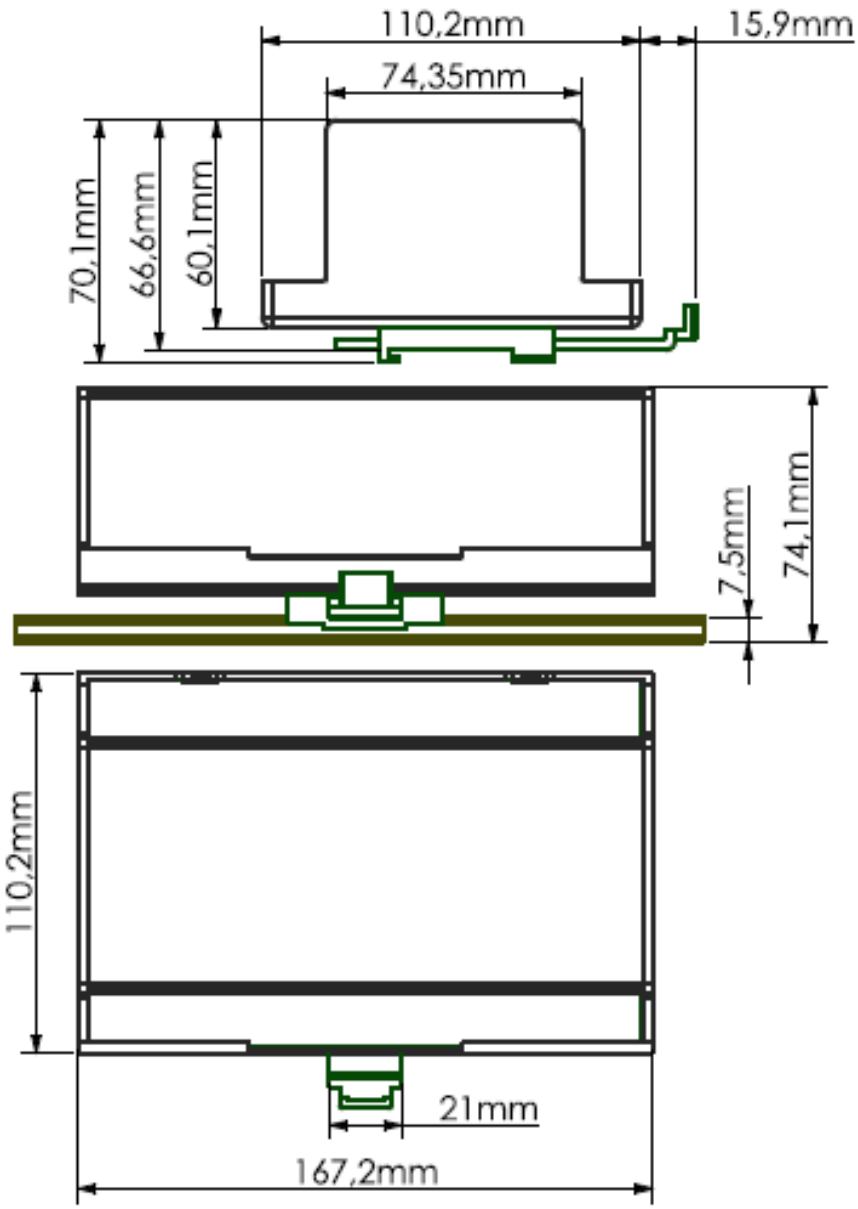

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EMC and safety requirements.

The ArtNet-node card is fully compliant to the LVD and EMC directive of the European council, if used in a properly designed setup.

EMC requirements of the power supply:

The ArtNet-node card is only intended to be used in lighting applications, and as such, the complete assembly of led unit and power supply needs to be fully compliant with the harmonized standards.

Immunity according to:

- EN 61547:2009 (General EMC immunity requirements lighting eq.)
- EN 61000-4-1:2006 (General immunity testing techniques)
- EN 61000-4-2:2008 (ESD immunity test)
- EN 61000-4-3:2006 + A1:2007 (Radiated immunity test)
- EN 61000-4-4:2004 (Fast transients and burst immunity)
- EN 61000-4-5:2005 (Surge immunity test)
- EN 61000-4-6:2008 (Conducted immunity test)
- EN 61000-4-8:1993 (Magnetic field immunity test)
- EN 61000-4-11:2004 (Voltage variations immunity test)
- EN 61000-6-1:2005 (Generic standards for immunity)

Emission according to:

- EN 61000-3-2:2005+A1:2008+A2:2009 (Harmonics emission test<16A)
- EN 61000-3-3:2008 (Flicker+ voltage changes limits< 16A)
- EN 55015:2006+A2:2009 (Conducted + radiated emission lighting equipment)

To achieve this compliance, a proper power supply must be supplied. In case of doubts, contact your point of sale.

LVD requirements of the power supply:

The ArtNet-node card is only intended to be used in lighting applications, and as such, the complete assembly of led unit and power supply needs to be fully compliant with following harmonized standards:

- EN 60598: general requirements of lighting equipment.

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19

Application of warranty

Warranty period

Warranty service is valid for one year from the date of purchase by the consumer, as evidenced by invoice date given out by your point of sale.

Warranty service

Service under warranty can only be done by Lux Lumen.

Coördinaties:

Lux Lumen

Kernenergiestraat 53 A

2610 Wilrijk

Belgium

Any cost of secure transportation of the product to and from Lux Lumen service department, will be borne by the customer.

Limitations

Lux Lumen will not warrant the following:

Periodic check-ups, maintenance and repair or replacement of parts due to normal wear and tear.

Consumables

Any software

Defects caused by modifications carried out without Lux Lumen's approval.

Damage resulting from the fact that a product is not conforming to country specific standards or specifications in another country that the country of purchase.

Costs incurred by Lux Lumen's service center in making any adoptions or modifications of a product necessary for country specific technical or safety standards or specifications, or any other cost to adjust the product as a result of any specifications which have changed since the delivery of the product.

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Warranty service is excluded if damage or defects have been caused by:

Improper use, extensive use, handling or operation of the product as referred to in the user manual or operator manual and/or relevant user documents, including without limitation, incorrect storage, dropping, excessive shocks, corrosions, dirt, water, or sand damage, if the product is not rated to be used in severe conditions, indicated by its IP and IK degree, mentioned in the product specifications in this manual.

Repairs, modifications or cleaning carried out by a non Lux Lumen service centre.

Use of spare parts, software or consumables, which are not compatible with the product.

Connecting the product to equipment not intended to be used with this product.

Defects caused by improper condition of the power supply network.

Inadequate packaging of the product when returning it under the RMA procedure.

Accidents or disasters or any cause beyond the control of Lux Lumen, including but not limited to lightning, water, fire, public disturbances, improper ventilation, and acts of god.

Others

It is the responsibility of the customer to backup and save any software files and programs before repair and to restore the same after such repair.

This warranty does not affect the consumer's statutory rights under applicable national legislation in force, nor the consumer's rights against the retailer arising from the sales/purchase contract. In the absence of applicable national legislation, this warranty will be the consumer's sole and exclusive remedy, and Lux Lumen cannot be liable for any incidental or consequential damages for breach of any express or implied warranty of this product.

For full details of the warranty offered on this product, please contact Lux Lumen's service center.

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20

RMA procedure

To send material back to Lux Lumen, you need a RMA (Return Material Authorization) document that you will receive from Lux Lumen.

Without the RMA document, we cannot accept the material.

The procedure to obtain a RMA:

Step1:

Customer contacts Lux Lumen about warranty, defects if material has to be returned.

Step2:

Lux Lumen sends the customer a filled out RMA document (using a unique RMA number)

Step3:

Customer sends material (include a copy of the RMA document with the material)

Step 4:

Lux Lumen evaluates the problem, and informs the client if repair is done under warranty, or makes an offer to the client for repair.

Step 5:

The procedure related to lux lumen quality procedures, is started up.

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21

Used list of abbreviations

- DMX: digital multiplexed data signal to according to USITT
- SPI: Serial Peripheral Interface
- PCB: printed circuit board
- CAT 5: category 5 cable
- CAT 6: category 6 cable
- UTP: Unshielded Twisted Pair
- LAN: Local Area Network
- AC: Alternating current
- DC: Direct current
- °F: Temperature in degrees Fahrenheit
- °C: Temperature in degrees Celsius
- din-rail: rail used in electrical installation according to 'Deutsche Industry Norm' specifications

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