

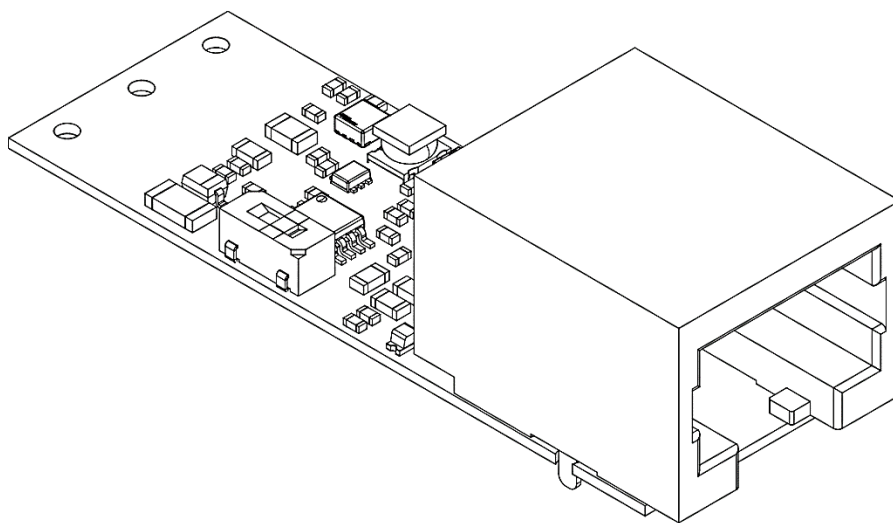


PUSHING CONTROL BOUNDARIES

PXLNET TRANSCEIVER 2 RJ45 Bus (RJ)

Art.#2035301

USER MANUAL



THANK YOU FOR CHOOSING DIGIDOT!

DiGidot offers powerful products and solutions to control LED pixels. The DiGidot Controller is the heart of our control system and offers great flexibility. In order to benefit from all our system advantages and to keep your infrastructure easy, we offer some innovative accessories like our PxLNet range extending equipment.

These products allow you to send high speed SPI protocols over large distances. This that you can install the DiGidot Controller in a central place and drastically decreases the amount of hardware.

Have fun creating mesmerizing lighting installations!

Your DiGidot team

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INTRODUCTION

SPI protocols are sensitive to data distortion and often only work reliably for up to 3 meters (9.8 ft) of cable distance between the controller and first SPI IC/LED. The DiGidot PxLNet Transceiver is a small sized module that can be used as receiver or transmitter to extend the range of an SPI signal. The PxLNet Transceiver converts PxLNet, which is send from a DiGidot PxLNet Transmitter or a Transceiver in transmit mode, based on the original SPI protocol that is send from an SPI controller.

A DiGidot PxLNet Transmitter or Transceiver converts sensitive SPI protocols to PxLNet which can cover huge distances, up to 300 meters (984 ft). Any SPI protocol can be received or be transmitted by this module. Connect the same number of universes as to the connected SPI controller can send per port.

Installation is easy thanks to the well laid out solder pads. The output side can be soldered directly to most industry standard SPI controlled LED strips. When this module is connected to the end of an LED strip or pixel-controlled product, it can be used as a transmitter when the Tx/Rx switch is flipped.

A PxLNet Transceiver in Transmit mode can also be connected to a DiGidot Controller output port to convert the SPI signal to PxLNet. The PxLNet Transceiver can also be used to convert a DMX signal from a DiGidot Controller or a PxLNet Transmitter to DMX TTL.

CONTENTS

1 x DiGidot PxLNet Transceiver module

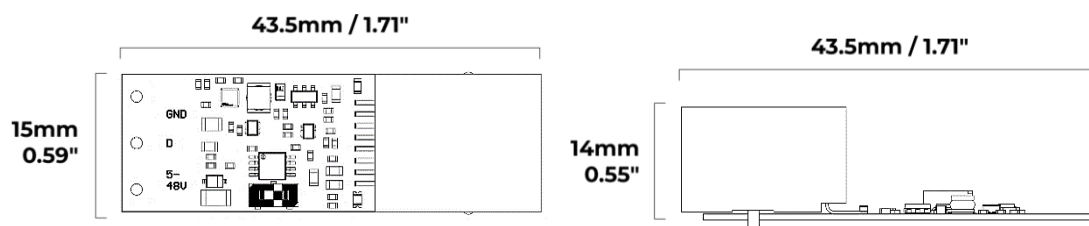
NOTE

We put great care in our products and have a high-quality control standard. Nonetheless we advise to double check for missing or damaged items. In case of any missing or damaged items, please contact your supplier immediately. Never use damaged products!

FEATURE LIST PXLNET TRANSCEIVER 2

- Flexible operating voltage from 5 to 48 Vdc
- RJ45 bus for PxLNet in/out
- Solder pads for input/output signals
- Status LED indicators for power and incoming data
- Auxiliary network cable break-out solder pads
- Selectable operating mode (Receiver/Transmitter) by an onboard switch
- Over voltage protection
- Reverse polarity protection
- Data, Vcc and GND input and output connections on both sides

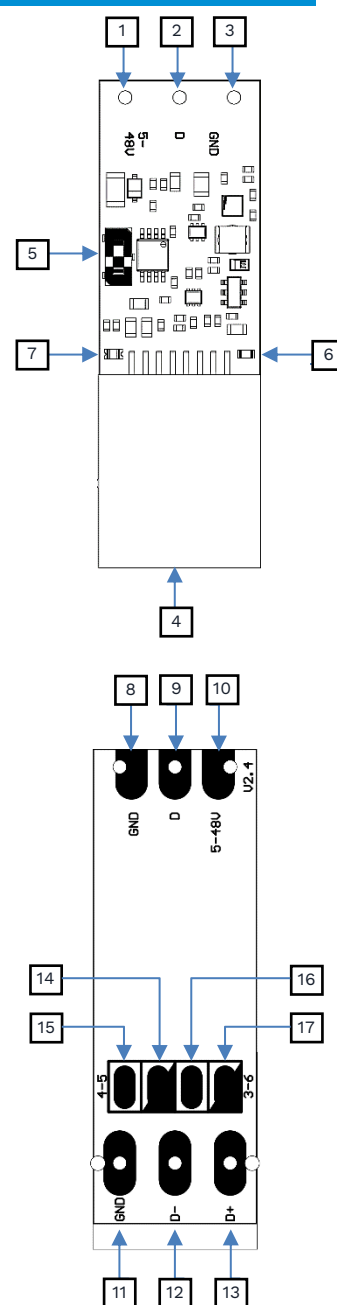
TECHNICAL DRAWINGS



PRODUCT DESCRIPTION

Top side	Type	Description
1	Power	Vcc / DC+ / 5-48V (same as 10)
2	BUS I/O	Data out/in (same as 9)
3	Power	GND/DC- (same as 8)
4	RJ45 Bus	Data input
Pin 1 (orange/white)	BUS I/O	PxLNet Data + in
Pin 2 (orange)	BUS I/O	PxLNet Data - in
Pin 7 (brown/white)	BUS I/O	PxLNet GND
Pin 8 (brown)	BUS I/O	PxLNet GND
5	Switch	Rx/Tx selector
6	White LED	Power indicator
7	Blue LED	Data signal indicator

Under side	Type	Description
8	Power	GND/DC- (same as 3)
9	BUS I/O	Data out/in (same as 2)
10	Power	Vcc / DC+ / 5-48V (same as 1)
11	BUS GND	PxLNet GND
12	BUS I/O	PxLNet Data in/out -
13	BUS I/O	PxLNet Data in/out +
14	AUX	Pin 6 (green)
15	AUX	Pin 3 (green/white)
16	AUX	Pin 4 (blue)
17	AUX	Pin 5 (blue/white)
Wire colors according to T-568B standard		



TECHNICAL SPECIFICATIONS

Electrical

Input Voltage:	5-48 VDC
Max. power consumption:	1 W
Inrush current:	Max. 200 mA @ Ta 20°C
RMS current Rx mode:	5 VDC: 11.5 mA
	12 VDC: 5.1 mA
	24 VDC: 2.7 mA
	48 VDC: 1.8 mA
RMS current Tx mode:	5 VDC: 81 mA
	12 VDC: 31.5 mA
	24 VDC: 16.6 mA
	48 VDC: 9.1 mA

Mechanical

Dimensions:	43,5 x 15,0 x 14,0 mm 1.71 x 0.59 x 0.55" (L x W x H)
Net weight:	6gr 0.11oz

Environmental

Ambient Temp. (Ta) in operation:	-20°C - 45°C -4°F - 113°F
Storage temperature:	-20°C to 50°C -4°F to 122°F
Max. operating relative humidity:	90% (indoor use only)

Protection

IP rating:	IP00 (unprotected, indoor use only)
Voltage input:	Overvoltage protection (max. 48 VDC)

Connectivity

Solder pad wiring:	0,3-0,5 mm ² 20-24 AWG
Terminal wiring power:	Max. 2,5 mm ² 14 AWG
Terminal wiring data:	Recommended: 0,3-0,5 mm ² 20-24 AWG

Quality & compliances

Warranty:	1 year carry in factory warranty
Compliances:	CE, RoHS, all components are UL pending
Certification:	ETL certification pending
Applied standards:	EN60950-1:2006 +A11:2009 + A1:2010 + A12:2011 + A2:2013, IEC60950-1 / EN60950-1, EN61006-6-3, EN55032
HS Code:	85176990

BEFORE INSTALLATION

Before installing DiGidot products it is important to take notice of following safety and installation instructions.

Safety instructions

- ▶ Before installation and using the product, read this manual carefully.
- ▶ Make sure that these instructions are handed over to the end-user and to those responsible for installation and usage.
- ▶ Local electrical and safety rules and guidelines always overrule this manual.
- ▶ DiGidot Technologies B.V. cannot be held liable for improper handling, product installation, usage or storage.
- ▶ Installation should only be carried out by a professional and certified installer who is qualified to work on the electric installation.
- ▶ Do not conduct any repairs of the device (there are no user serviceable parts). Any unapproved repairs and/or product modifications will void product warranty. DiGidot Technologies B.V. cannot be held liable for any consequences.
- ▶ Repairs of this product may only be carried out by the manufacturer DiGidot Technologies B.V.
- ▶ Repairs and maintenance on the installation may only be carried out by qualified technicians.
- ▶ Always disconnect the mains power when working on a high voltage electric installation, not doing so may result in product damage and/or personal injuries.
- ▶ Do not connect or modify this product other than described in this manual.
- ▶ Never use a product that is defective or does not work correctly or when the product is visibly damaged or when the product starts to smoke, or when a crackling/sizzling noise is audible. If this is the case in any way, disconnect power and please contact your supplier immediately.
- ▶ This is a low voltage device. Working voltage is 5-48 Vdc only.
- ▶ The only way to power off this product is to disconnect it from the power source.
- ▶ The product is designed for indoor use (dry locations) only. Exposure to rain or moisture may cause fatal damage.

WARNING

Deleted settings cannot be restored, please make a backup, before resetting the device. This product is ESD sensitive. It is required to work in an ESD safe environment and undertake all necessary ESD protective precautions before installing and soldering this product, to minimise the risk of ESD inflicted product damage.



MOUNTING OPTIONS

We recommend to place this product in a protected enclosure such as an electrical junction box. Double sided (foam)tape or acid free, non-conductive and non-corrosive glue/adhesives can be used on the underside of this product, to hold it in place. Please be careful when applying pressure, small components can come off when applying excessive force.

Be sure that none of the conductive parts, including the header pins on the underside, make any contact with conducting surfaces or materials, to prevent malfunctioning and damage.

When using heat shrink, please cover the entire module and be careful when applying heat, especially with heat guns. When overheating this product, components and soldering may come loose, resulting in fatal damage.

TIP

It's safe to use and cover this product with appropriate electronic protection resin to improve IP rating. Another option to improve IP rating is to use a conformal coating spray for electronics after all wires have been connected/soldered.

WARNING!

- This product should not be subjected to higher temperatures than their specified range (risk of fatal damage)!
- Keep these products away from direct sunlight, rain or other moisture (short circuit risk).
- Do not use this product outdoors or in humid environments (short circuit risk).

INSTALLATION & WIRING

There are several ways to connect and integrate the PxLNet Transceiver module. Use the RJ45 bus on the PxLNet input/output side or solder your PxLNet signal wires to the underside of the product. Please refer to the wiring schemes in this manual.

PxLNet Data in/out

There are two ways to connect the PxLNet data:

1. Use the RJ45 bus to connect a Cat-5E network cable or better.
2. Solder a DMX cable (110Ω impedance STP) or Cat-5E (or better) to the D+, D- and GND solder pads [11][12][13] on the underside of the PCB.

Data in/out & power in

There are two ways to connect the SPI data:

1. Solder this module directly to the solder pads of a pixel controlled LED strip that has a matching solder pad layout. Most industry standard SPI (Data only) controlled LED strips will match the solder pads of the PxLNet Transceiver.
2. Solder wires with a wire gauge of 0,3-0,5 mm² | 20-24 AWG, to solder pads [1][2][3] on the upper side or to [10][11][12] on the underside of the PCB.

In case you've ordered an additional screw terminal for the PxLNet Transmitter, you can solder the 3-way terminal to the output by placing the terminal on the top side of the PCB. Insert the 3 pins in the solder pad holes and make sure that the wire openings are facing outwards. Solder the pins on the underside.

The screw terminal allows to insert wires of your lighting product with wire gauges up to max. 2,5 mm² | 14 AWG.

NOTE

Keep wires between output and LED product within 2 meters (6.5 ft) in length.
Ground output wire from PxLNet Transceiver must be equal in length as the Data wire.
Don't use wire gauges bigger than 0,5 mm² | 24 AWG for the data signal.

Solder instructions

Soldering this product should be carried out carefully by a trained and certified electronics professional.

- ▶ Please pre solder all wires.
- ▶ Max. Soldering temperature: 400°C (752°F) for max. 3 seconds.
- ▶ Use RoHS compliant lead free solder wire.

WARNING! TAKE ESD SAFETY PRECAUTIONS!

This product is ESD sensitive. It is required to work in an ESD safe environment and undertake all necessary ESD protective precautions before installing and soldering this product, to minimise the risk of ESD inflicted product damage.



Power supply

To power this product, the DC+ and DC- must be connected to a SELV rated power supply that provides appropriate power at the required supply voltage.

Before applying power, make sure that the outputs are wired and soldered correctly to avoid short circuits.

WARNING

Applying, AC power and/or higher voltages can cause fatal damage to this product.

IMPORTANT

Make sure to equalize the ground potentials.

Always connect grounds (DC-) of DiGidot controller and every power supply, connected to every product that is controlled by a single DiGidot controller to each other.

The ground connection between a DiGidot PxLNet Transmitter and a PxLNet Transceiver or multiple Transceivers are automatically established when using the RJ45 bus with network cable in between.

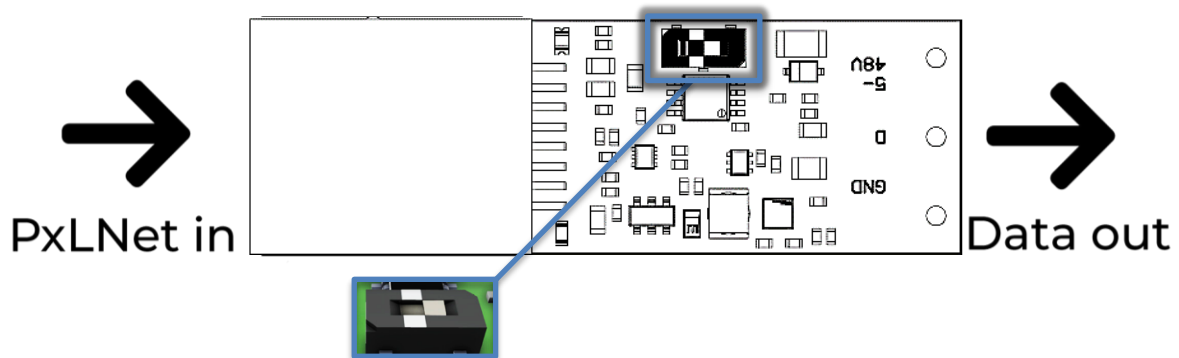
OPERATING MODES (Rx/Tx)

Receiver mode (Rx)

The default operating mode of the PxLNet Transceiver is Receive mode (Rx).

You can identify that it's in this mode by looking at the switch position: from this top view, its put to the right side. The 2 white squares don't line up with the switch itself.

In this mode, the PxLNet data is received, converted back to the original protocol, and output on the Data-out side.



Transmit mode (Tx)

In order to use the PxLNet Transceiver as a single channel transmitter, switch the position to the left, from a top view. It aligns with the 2 squares that are present on the switch itself. In this mode, regular SPI data (or DMX-TTL) is received on the Data-IN and converted to PxLNet signal on the output on the left side.



Connect a network cable to the RJ45 bus and connect it to the next PxLNet Transceiver in receiving mode (Rx).

Instead of connecting a network cable to the RJ45 bus, a cable can also be soldered to solder pads [11][12][13] on the underside (as indicated on page 5).

The distance between two PxLNet Transceivers is max. 300 meters (984 ft).

Wiring schemes

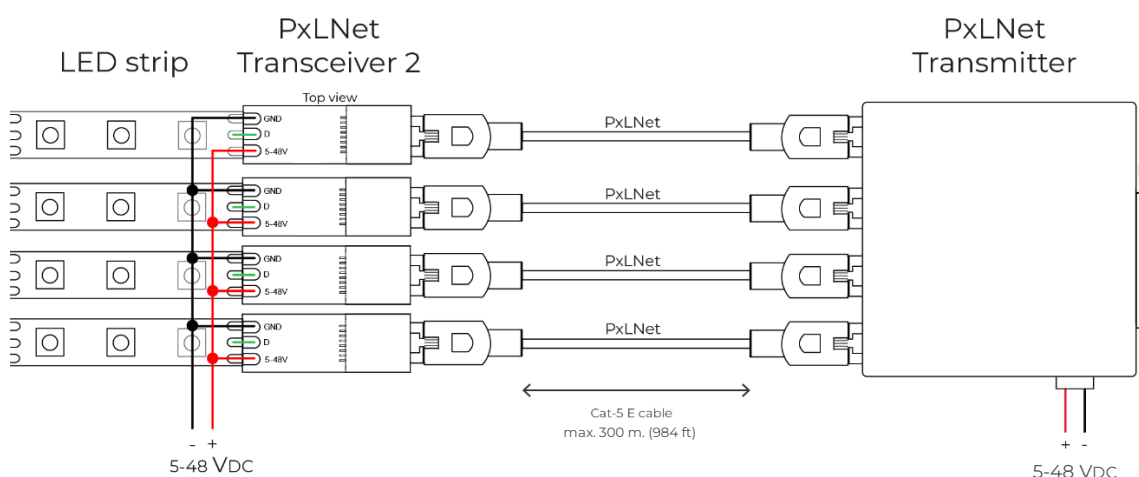
Following wiring schemes show various options to connect this product. There are many more connection options and combinations possible which may not be listed in this manual. As long as following wiring principals are followed, a wide range installation options can be created.

- ▶ PxLNet Transceivers must be powered properly as indicated.
- ▶ If LED products need to be powered at other voltages than 5-48 Vdc, separate powering is required. In this case all grounds must be connected at any time.
- ▶ Use proper network cables or DMX cables as indicated on page 8. Thicker wires and higher cable impedance may result in unstable or corrupted data.

Wiring scheme 1

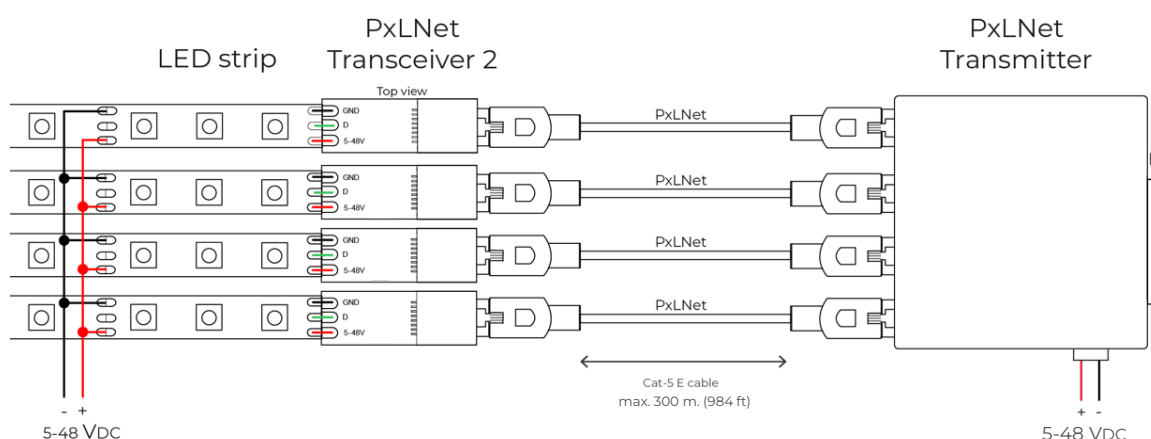
Convert PxLNet to SPI Data

DiGidot Controller with PxLNet Transmitter connected by Cat-5E network cables to PxLNet Transceivers which are connected directly to a pixel controlled LED strip. Please double check if the solder pads of the LED strip align correctly and are in the correct order of the PxLNet Transceiver solder pads. If not please follow wiring scheme 2.



Wiring scheme 1 option 2

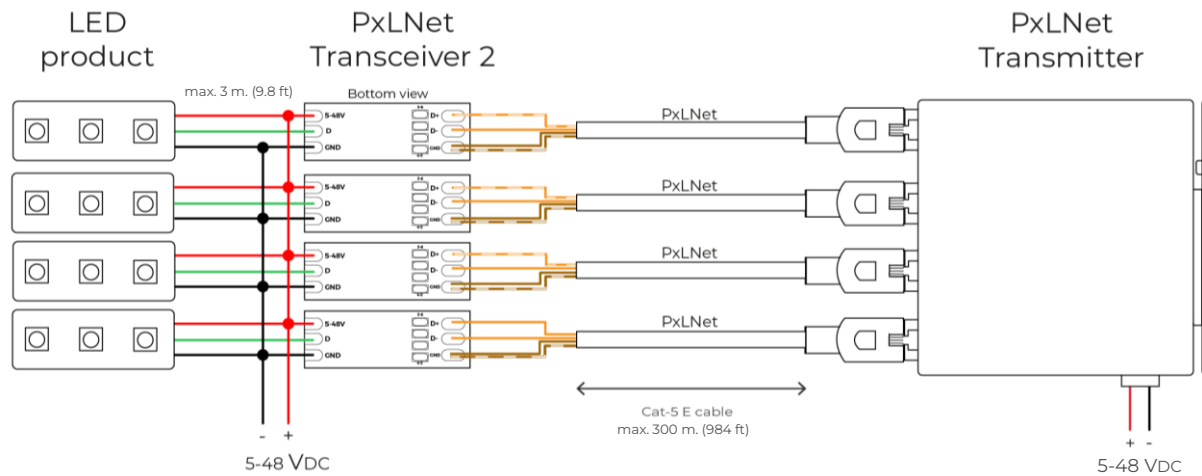
Supply power at alternative location



Wiring scheme 2

Convert to SPI and wired luminaire connection

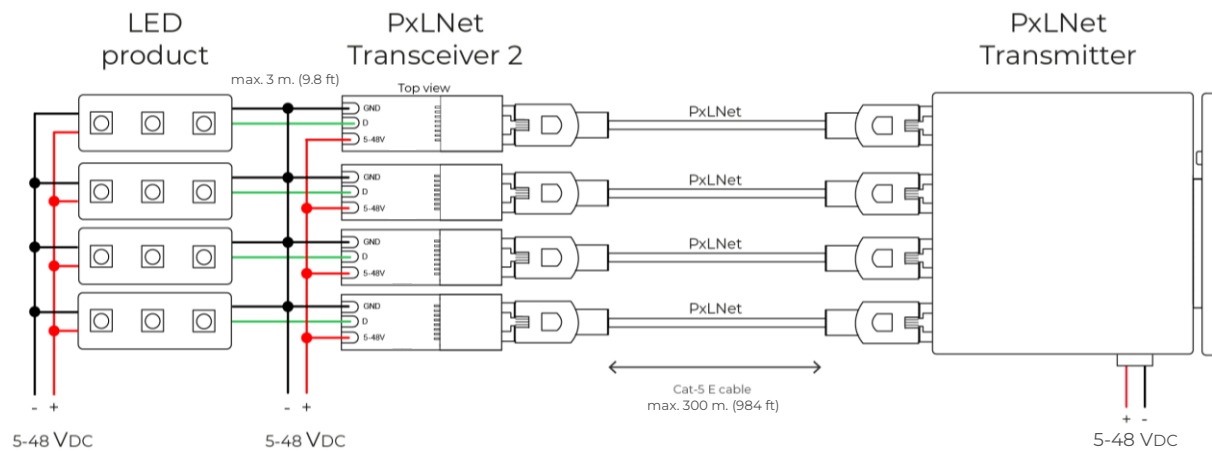
DiGidot Controller with PxLNet Transmitter connected by Cat-5E network cables which are soldered to PxLNet Transceivers which have wires soldered that go to a pixel controlled LED product.



Wiring scheme 3

Different operating voltages

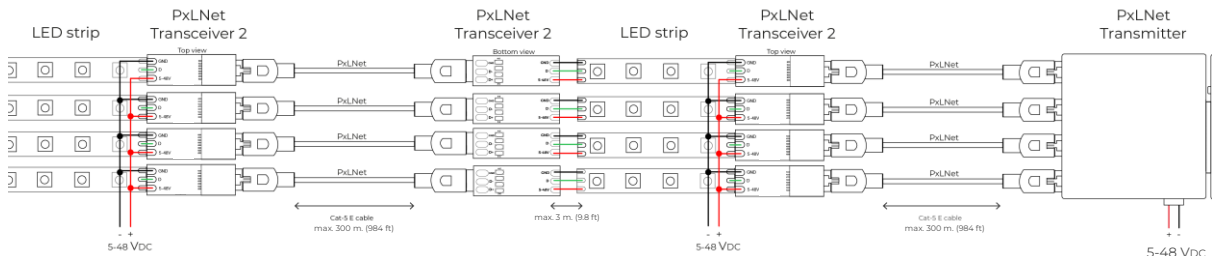
DiGidot Controller with PxLNet Transmitter connected by Cat-5E network cables which are connected to PxLNet Transceivers, which are wired to pixel controlled LED products, that run on another power supply and/or voltage.



Wiring scheme 4

Transceiver in transmit mode

DiGidot Controller with PxLNet Transmitter connected by Cat-5E network cables to PxLNet Transceivers which are soldered directly to a pixel controlled LED strip. At the end of every LED strip another PxLNet Transceiver is placed in transmit mode, to send the remaining signal to the next LED strip.

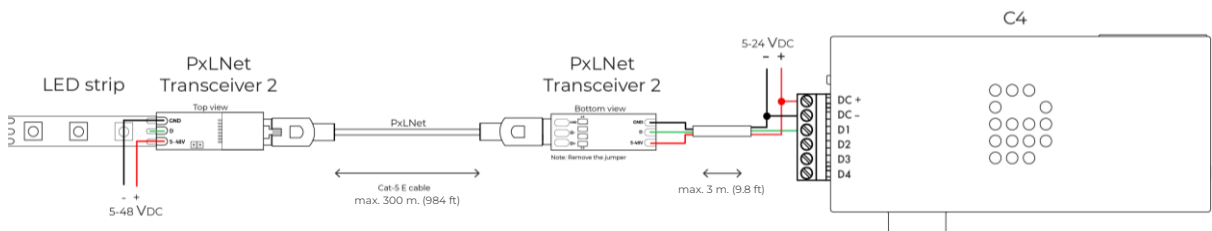


Please note that the operating mode switch is in Tx mode for the center Transceivers (white squares makes 1 line).

Wiring scheme 5

Single port SPI range extension

DiGidot Controller Data port connected directly to a PxLNet Transceiver in transmit mode, to send the PxLNet signal up to 300 meters away to the next PxLNet Transceiver.

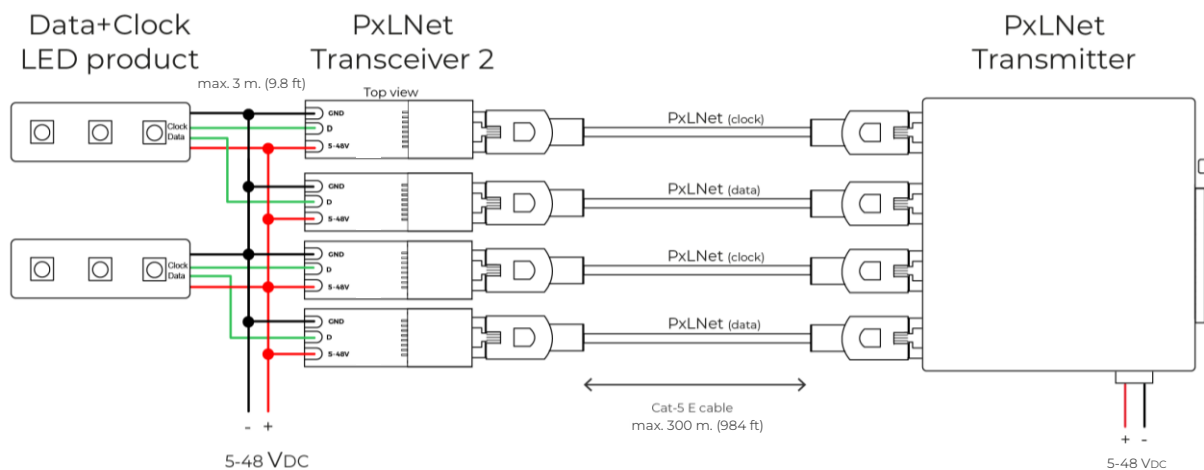


Please note that the operating mode switch is in Tx mode (white squares makes 1 line).

Wiring scheme 6

Convert PxLNet to SPI Data + Clock

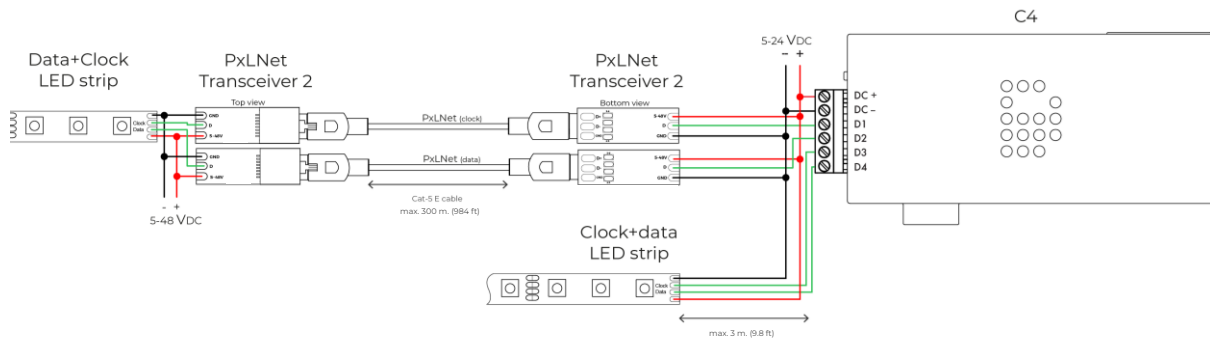
PxLNet Transceivers can also be used to convert two PxLNet data lines to Data + Clock SPI signals. For this option a dual Transceiver setup is required.



Wiring scheme 7

Combine short & long range Data + Clock SPI

DiGidot Controller with PxLNet Transmitter connected by Cat-5E network cables to PxLNet Transceivers which are soldered directly to a pixel controlled LED strip which is powered from an alternative section.

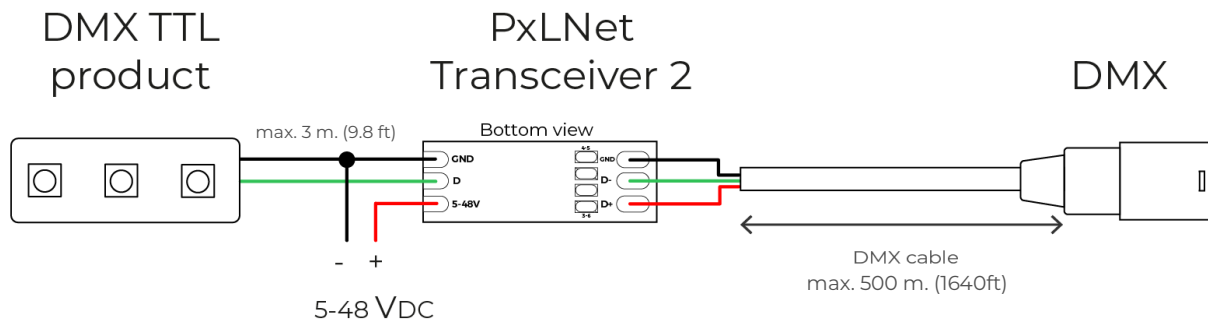


Wiring scheme 8

Extending DMX TTL signals

DiGidot Controller with PxLNet Transmitter, connected by Cat-5E network cables to PxLNet Transceivers

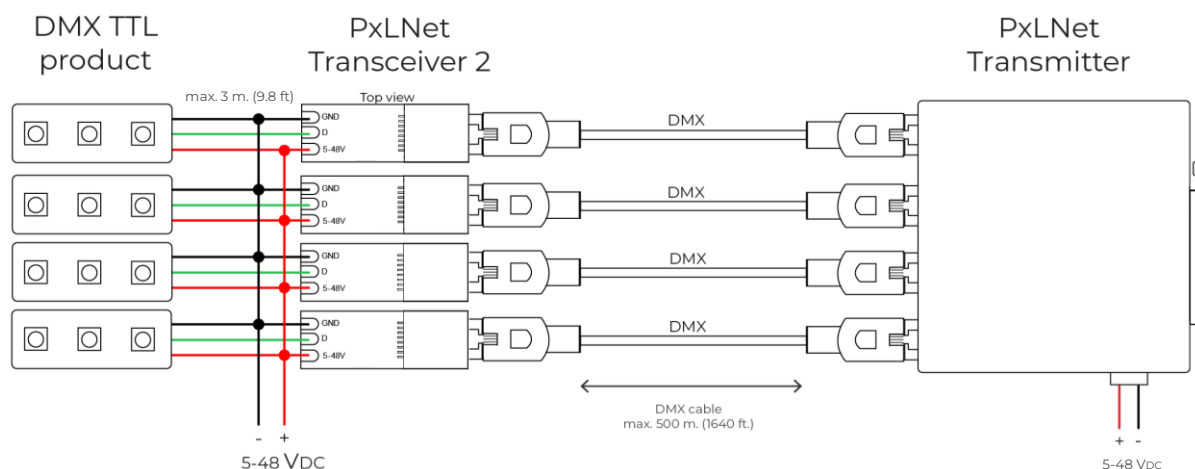
Please note that DMX TTL must be configured on the DiGidot Controller In/out configuration page. Configure all ports to DMX TTL in the DiGidot Controller In/out configuration.



Wiring scheme 9

Converting DMX to DMX TTL

Using an external DMX signal, connected to a PxLNet Transceiver which is connected to a DMX TTL controlled LED product. The DMX signal can be soldered, as indicated in the drawing or can be inserted in the RJ45 bus on the top side (DMX pinout according to USITT standard, see page 5)



Note

These wiring schemes do not necessarily show correct powering your LED products. All wiring schemes in this manual are for reference only, please refer to the technical information or user manual of your LED product, supplied by the manufacturer.

PROPAGATION DELAY

The PxLNet Transceiver is designed to relay signals at very high speeds.

When multiple PxLNet Transceivers are used to extend the signal, there is a negligible build-up of propagation delay of only 1,6 μ s (micro seconds), which is equal to ± 6 SPI IC's.

This means that large numbers of PxLNet Transceivers (possibly more than 100), can be used without visual decline of performance. It's safe to assume that in case any visual performance decrease, it's most likely due to other (external) factors.

AUXILIARY BREAK OUT

The PxLNet Transceiver uses at least 3 wires Data +, Data -, GND (GND is connected twice) for the PxLNet signal, this means that there are two unused wire pairs inside a network cable (not applicable to DMX cable). These wires can be used for low voltage purpose up to 48 Vdc and a maximum current of 200 mA. Use solder pads [14][15][16][17] to make use of these wires.

TIPS & TROUBLESHOOTING

In case you run into any trouble, please check your setup according to following checklist.

Standard troubleshooting checklist:

1. Is the Rx/Tx switch in the correct position?
2. Double check all cables and connections.
3. Double check soldered connections
4. Double check Network cable pinout and any crimped connectors
5. Is the DiGidot Controller powered correctly?
6. Are the LEDs powered correctly?
7. Are all power supplies connected correctly to your mains power supply?
8. Are the Power and data led indicators lit on the PxLNet Transceiver?
9. Are the DiGidot Controller inputs and outputs configured correctly?
 - Make sure that the correct IC/SPI protocol is configured.
 - Make sure that input and output matches the system setup.Use the highlight option to test the outputs.
10. Is your DiGidot controller network setup done correctly?
 - Prevent IP Address conflicts
 - Make sure that the subnet mask range is set correctly and that all IP Address are set within the appropriate range.
 - Refer to further trouble shooting tips in the DiGidot Controller user manual.
11. Is your ground (DC-) from the DiGidot Controller output terminal connected to all the grounds of the LED products power supplies? The grounds run through the network cables.

GENERAL INFORMATION

Online resources

For technical specifications, latest documentation, manuals, product information, support and upgrades, please visit www.digidot.eu.

Remarks

We have put great care in writing this manual. However, in case you encounter any discrepancies or unclarities, please contact us.



Compliances & EU declaration of Conformity

This product is designed and produced by DiGidot Technologies B.V., Amsterdam, The Netherlands. Hereby, DiGidot Technologies B.V. declares that this product complies with and was tested according to essential requirements of all relevant CE directives.



Warranty

This product is covered by a carry-in manufacturer's warranty of 1 year which covers any design faults, production faults and component failures.

Warranty voids if the product was installed or used incorrectly or not in accordance with this manual and/or if the product was damaged due to external factors, modified or electrically overloaded. Warranty conditions of DiGidot Technologies B.V. apply. Warranty claims have to be issued by email: support@digidot.eu.



Disposal and recycling

This product should not be disposed with other household waste. When you decide to dispose this product, do so in accordance with local environmental and recycling regulations.



Feedback

Tell us all about your experience with DiGidot!

The continuous development of the DiGidot control platform is only possible thanks to feedback from our users. If you have any suggestions, please contact us by email:

info@digidot.eu.

Imprint

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