

ENTTEC

PIXEL PORT

ETHERNET PIXEL DRIVER



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Package Contents

- Pixel Port (76302-16, 76302-26 or 76302-55)
- Pixel Output Connector (76301)
- 1RU Mount kit (79105)
- This user manual

Safety Information

- This unit is intended for indoor use only.
- Do not expose this device to rain or moisture, doing this will void the warranty.
- Make all the connections before you plug in the mains power
- Do not remove the cover, there are no user serviceable components inside.
- Never plug this unit in to a dimmer pack
- Ensure proper earth connections
- Always be sure to mount this unit in an area that will allow proper ventilation. Allow about 6" (20 cm) between this device and a wall.
- Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, pay particular attention to the point they enter and exit the unit.

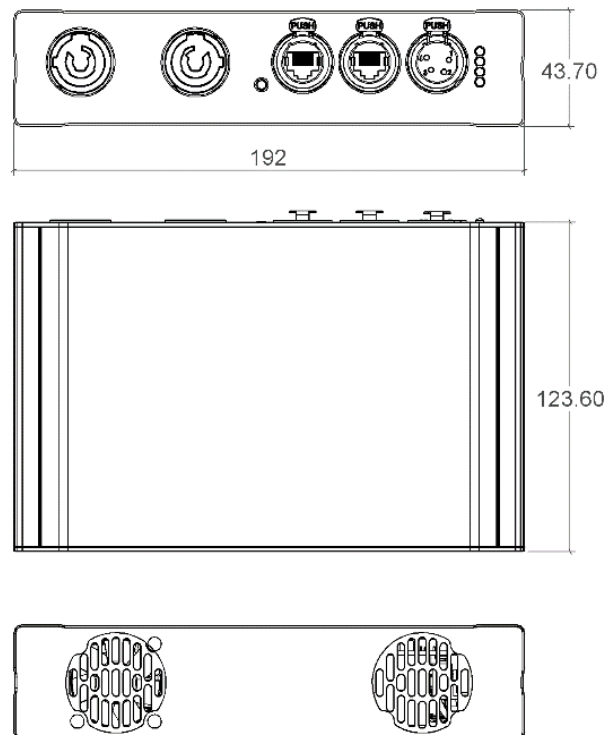
LED Protocols Supported

- 9PDOT-8bit
- 9PDOT-16bit
- WS2811, WS2812, WS2812B, WS2813
- SK6812
- TM1804
- TM1812
- APA-104 LEDs

Note:

We cannot claim to support all led protocols, but if you do happen to find one that does work, and is not listed, please let us know, so we can update our documentation

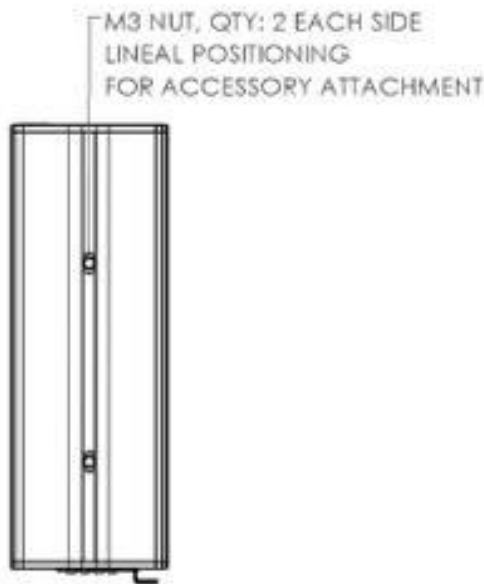
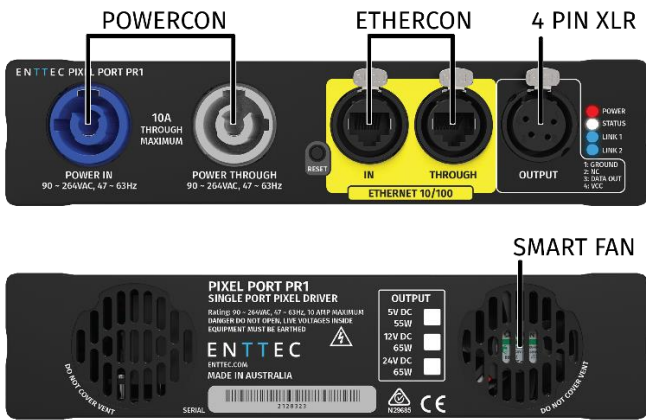
Dimensions



Note

All dimensions are in millimetres (mm)

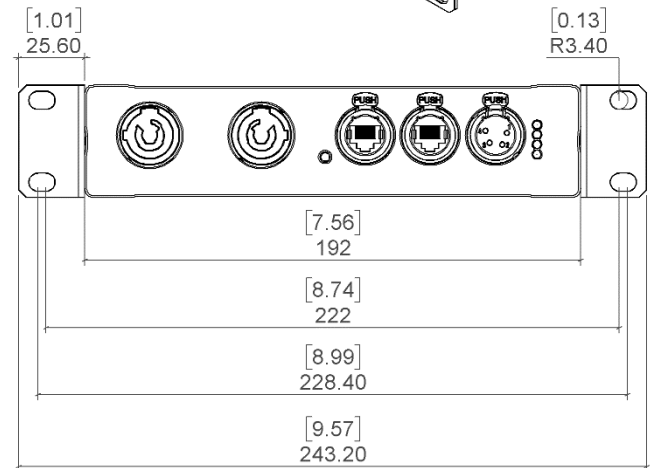
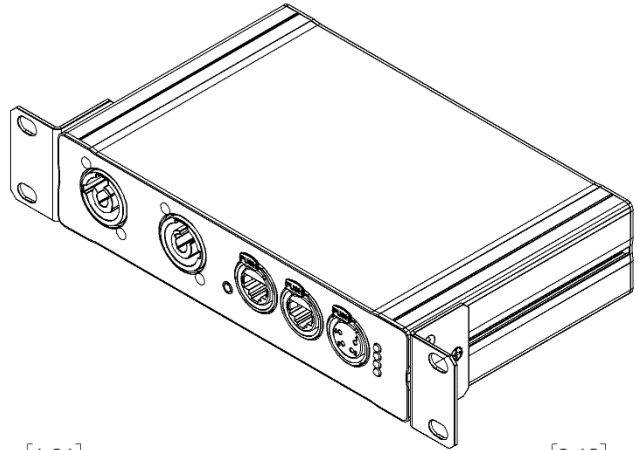
Hardware Features



- Anodised enclosure
- Scalable design for large projects
- powerCON in/out sockets
- etherCON Link through
- 4-pin XLR pixel data output socket.
- Captive M3 nuts compatible with a range of ENTTEC mounting accessories.

Mounting options

- Provided standard, 9.5" rack ears



Notes

- All dimensions are in millimetres (mm)
- An optional accessory is the Universal Bracket (Part number: 79160), this kit allows various mounting options including: Truss, surface mount, DIN rail 35mm. See the product specific web page for more information.

Hardware Options

Pixel Port is available in the following 3 options:

Product Part No.	Output Voltage	Maximum Power	Current	
			Max.	Leakage
76302-16	12V	65W	5.41 A	<2mA
73602-26	24V	65W	2.7 A	<2mA
73602-55	5V	55W	10 A	<2mA

Software Features

- Supports the following DMX over Ethernet protocols:
 - Art-Net 1/2/3
 - Streaming ACN (sACN)
 - ESP
- Configurable Static or Dynamic (DHCP) IP (DHCP by default).
- Up to 2 ethernet universes support.
- Controls up to 340 RGB or 256 RGBW pixel LEDs (model dependent).
- Configurable Pixel Grouping - RGB (1 to 340) RGBW (1 to 256).
- Configurable Pixel ordering.
- Monitors and maintains device temperature
- Web configurable
- Easily extendable network – daisy chain
- Executes live effects on the fly
- Standalone mode: record and activate using a list of presets
- User friendly settings enable quick plug and play setup

LED Status

The Pixel Port driver comes with four LED indicators located in the front panel:

1. Power
2. Status
3. Link 1
4. Link 2



Power

- This LED is red in colour
- Indicates whether the internal power supply is working and the unit is ready to operate.
- If the LED is off after the mains cable is connected to a working wall outlet, it means that there is a problem in the unit. In such case please contact ENTTEC support.

Status

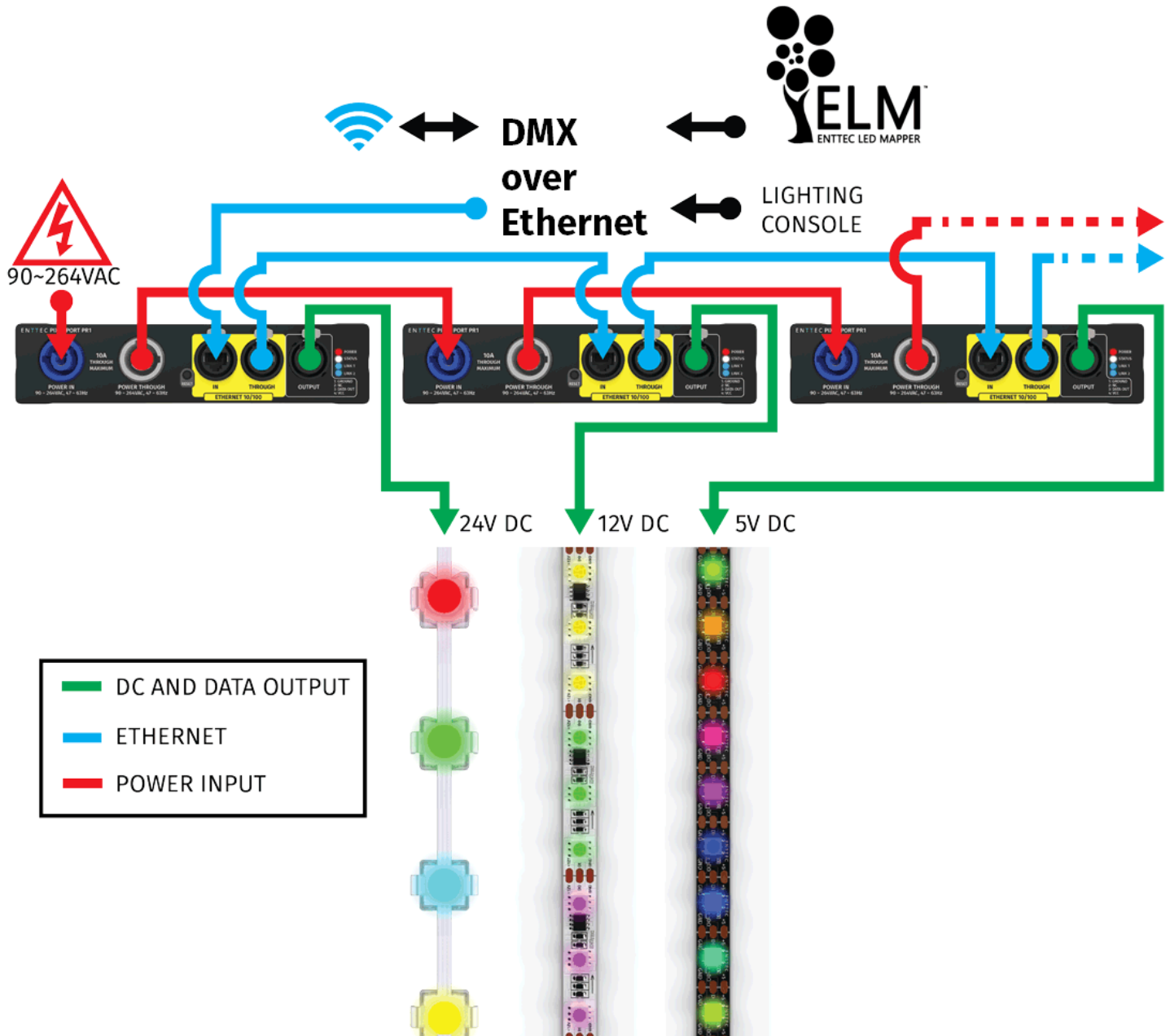
- This LED indicates the Pixel Port status and should be constantly flashing.
- The current operating status of the LED is indicated as follows:

LED Colour	Unit Status
Red (static)	Device in boot
White (static)	Idle
Purple (static)	IP Conflict
Yellow over white	Effect mode data receiving
Green over white	Direct mode data receiving
Black over white	Preset mode

Link 1 and Link 2

- These two LED indicate network status for each etherCON port

Wiring Diagram

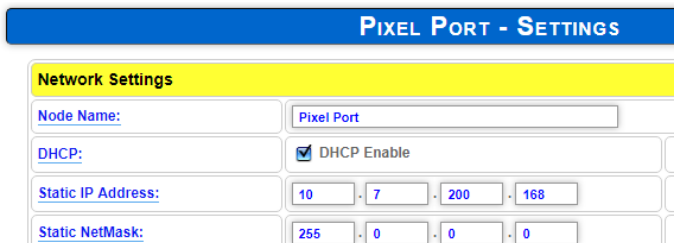


Notes

- Always check that the voltage and output of Pixel Port matches that of the tape/dots, before connecting.
- Each unit has a leakage current of <math><2\text{mA}</math>, this should be used to calculate the maximum units, when powered in a daisy chain fashion.
- Network delay: 48 micro seconds per unit, for a standard 600bytes Art-Net packet (when connected in network daisy chain)
- Only one ethernet source must be used to drive the device at any single time.

Default IP

Right out of the box, the Pixel Port is factory configured to be a DHCP node, so you can plug it into your existing router, and it's good to go.



PIXEL PORT - SETTINGS				
Network Settings				
Node Name:	Pixel Port			
DHCP:	<input checked="" type="checkbox"/> DHCP Enable			
Static IP Address:	10	7	200	168
Static NetMask:	255	0	0	0

If router is unable to assign an IP address to the Pixel Port the default static IP Address is used.

Default static IP address is mentioned on the outer label of the Pixel Port box. However, one can easily calculate the IP address, using the following:

10.(Octet1).(Octet2).(Octet3)

Note

Where the three octets are the last three octets of the mac address in decimal.

For e.g.:

- If mac address is 0050C207C8A8 where last three octets are 07, C8 and A8 default static IP for the above mac 10.7.200.168
- Where Octet1 07 in 7 in decimal
- Where Octet2 C8 is 200 in decimal
- Where Octet3 A8 is 168 in decimal

Using the IP address, one can access the built-in web-interface inside the Pixel Port via any modern web-browser. The web-interface allows the settings of the unit to be changed.

Finding IP Address Using NMU

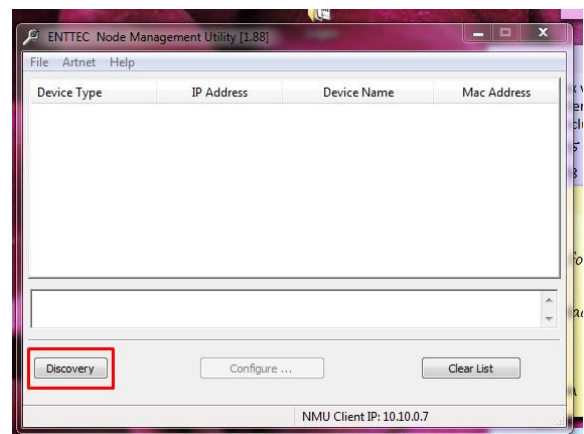
ENTTEC provides a free App (available for Windows and Mac) called NMU (Node Management Utility), which will find the Pixel Port and display its IP address.

Note:

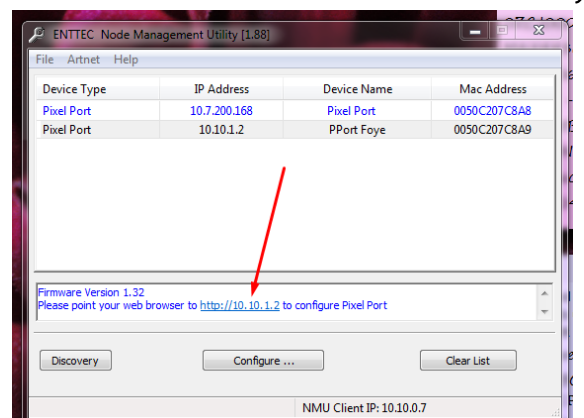
Pixel Port is only supported by NMU V1.88 and above.

NMU (Node Management Utility) is used to manage compatible ENTTEC DMX over Ethernet nodes. NMU will help you find your unit's IP address and then open a browser window to access the web-interface. Please follow these steps:

1. Download NMU from www.enttec.com/nmu
2. Pixel Port should be connected physically by an Ethernet cable to the same physical network (or router) as the computer on which you will run NMU.
3. Open NMU. If prompted with multiple networks, select the correct network. (identified by the IP address of your computer on that network)
4. Press the Discovery button, and wait till NMU finds all supported ENTTEC devices



5. Once found, select Pixel Port and use the IP address to access the web-interface via your



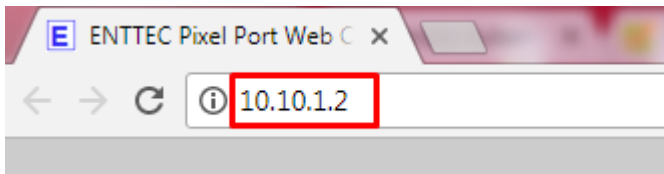
web browser.

Web Configuration

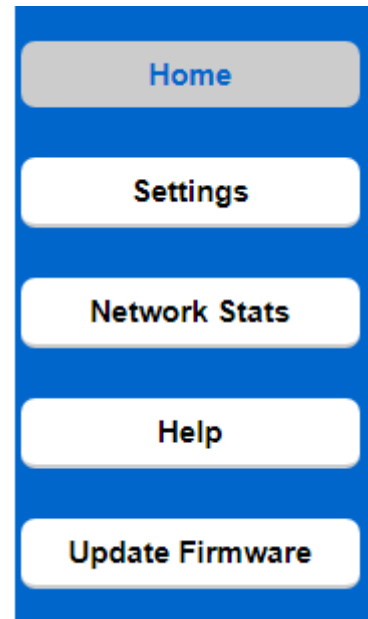
Once setup, any Art-Net/sACN/ESP enabled software/app or a lighting control desk can be used to drive the Pixel Port output.

The Pixel Port can be configured and controlled through a web browser, running on a computer system, located on the same Local Area Network. Any modern web browser, such as Chrome, Firefox, Internet Explorer, Safari or Opera, running under any operating system, including Windows, Mac OS X or Linux can be used.

Either click on the underlined URL displayed in NMU, or type the IP address (as detected by NMU e.g.: 10.10.1.2) into your web browser to access the Web Interface.



The left side menu allows all the Pixel Port web pages to be accessed.



Home

PIXEL PORT - HOME	
System Information	
Node Name:	Pixel Port
Firmware Version:	ENTTEC Pixel Port Firmware V1.1
Serial No:	C207C8A8
Internal Temperature:	44.3 °C
System uptime:	19 secs
Input:	Art-Net
Output:	WS2811, WS2812, WS2812B, WS2813, SK6812, TM1804, TM1812
Personality:	Standalone mode
Current Network Information	
DHCP:	Enabled
IP Address:	10.10.1.8
NetMask:	255.0.0.0
Gateway:	10.0.0.254
Mac Address:	00:50:c2:07:c8:a8
Link Speed:	100 Mbps

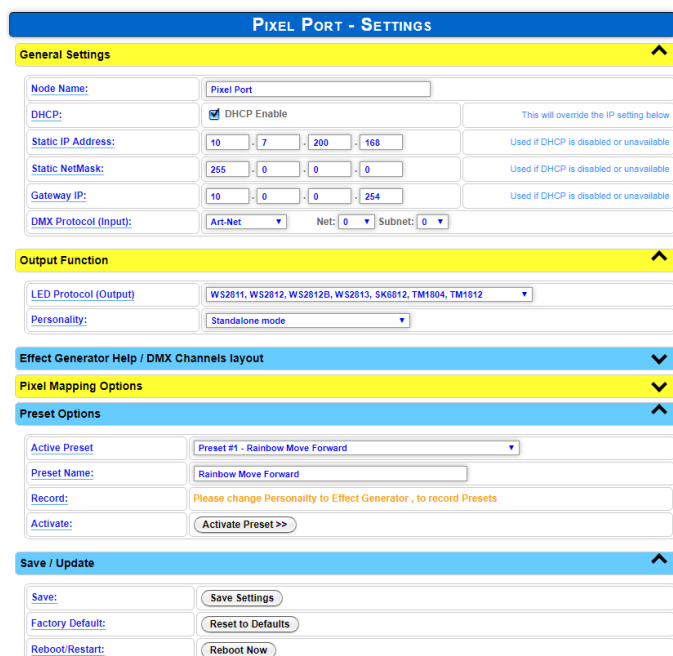
The Home tab displays the following information:

- Device Name
- Firmware version on device
- Serial number of device
- Internal temperature of the processor
- System uptime
- DHCP status – whether enabled
- IP address

- NetMask
- Gateway
- Mac Address
- Link Speed
- Input protocol set on device
- Output LED protocol set on device
- Personality device is on

- Map an Art-Net universe to the output
- Configure how colours are mapped to pixel
- Set number of pixels that are controlled during effects mode
- Pixel grouping settings
- Reset to factory defaults
- Reboot device

Settings



The Settings tab allows an end user to do the following:

- Change a device name for identification
- Enable/disable DHCP
- Set a specific Static IP address
- Set a specific Static NetMask
- Set the input DMX Protocol
- Set the output LED Protocol
- Chose a personality for mode of operation
- Set the number of universes output

Network Stats

The Network tab shows statics such as:

- Poll packets received
- Last IP poll packets were received from
- Data packets received
- Data packets send

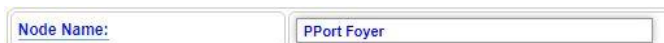
Update Firmware

In addition to providing a method to update the device firmware this tab shows the following:

- The boot version on the device
- The firmware version on the device
- The device mac address
- The device serial number
- DHCP status
- Device IP address

Network Settings Explained

Node Name



Node name is used to identify the unit on the network. Any meaningful name can be used.

DHCP



DHCP is enabled by default. When enabled, the router on the network, which the device is connected to, is expected to automatically provide the IP address to

the unit. If no DHCP router/server is present on the network, the manual IP address will be used.

If for some reason, the unit does not get an IP address via DHCP, please restart the unit with the Ethernet cable connected. It will listen for DHCP on start-up and wait for a few seconds, before giving up.

IP Address and Netmask are only used if DHCP is disabled or is unavailable on the network. Pixel Port web-page will warn, if non-standard IP address or netmask is used.

If the device is assigned an IP Address that can't be connected to later, please perform the reset procedure (as described under [Tips and Tricks](#)). The reset will re-enable DHCP on Pixel Port.

The Pixel Port in direct mode allows conversion of up to two universes of DMX over Ethernet to pixel data.

DMX Protocol



This setting allows the input DMX over Ethernet protocol to be picked. Available options:

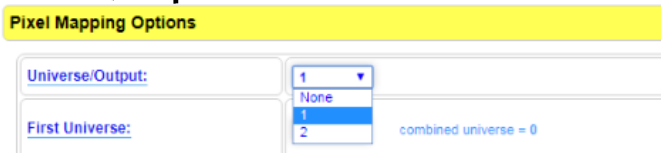
- Art-Net
- sACN
- ESP

Notes:

For Art-Net, Net and Subnet can be specified and should comply with Art-Net 3 protocol.

Pixel Mapping Options Explained

Universe/Output



Available options are:

Option	No. of universes mapped
None	No output
1	One universe drives first 170 pixels in RGB mode or first 128 in RGBW
2	Two universes drive first 340 pixels in RGB mode or first 256 in RGBW

First/Second Universe

Pixel Mapping Options

Allows selections of the universe that the output will be mapped to.

The first universe drives the first 170 Pixels in RGB modes, or the first 128 Pixels in RGBW modes.

The second universe drives pixels 171-340 in RGB modes, or the pixels 129-256 in RGBW modes.

The second universe setting is disabled if Universe/Output is set to one as shown in image.

Pixel Mapping Options

For Art-net universe, please change Net/Subnet to increase combined universe beyond 15. (Combined universe is shown under the selection).

Pixel Order

There are 30 different pixel order options. Ordering controls how the DMX slots are mapped to the LED

pixel colour on each LED pixel. The ordering selected here should match the ordering on the Pixel Tape or Dots being used. The Pixel ordering selected, will also determine the number of Pixels being driven on the output.

Pixel Order	DMX Channels per Pixel
RGB	3
RGBW	4

The default ordering assumes that both the DMX over Ethernet input and the led strip outputs are in RGB order.

Mapped Pixels

This setting together with the Universe/Output and Pixel Group eventually determine the number of pixels switched on at the output.

The number of pixels switched on for different settings in direct mode when 1 universes worth of pixels are sent over the ethernet is shown in the table below:

Universe/ Output	Mapped Pixels	Pixel Group	Output Seen
1	340	1	170 pixels on
1	340	2	340 pixels on
1	100	1	100 pixels on
1	20	2	20 pixels on

The number of pixels switched on for different settings in direct mode when 2 universes worth of pixels are sent over the ethernet is shown in the table below

Universe/ Output	Mapped Pixels	Pixel Group	Output Seen
1	340	1	170 pixels on
1	340	2	340 pixels on
2	340	1	340 pixels on

Note:

Max. possible pixel output is 340

Pixel Group

The maximum possible value is 340. Where a single pixel output from the DMX over ethernet source could be used to drive 340 LED.

DMX Start Address

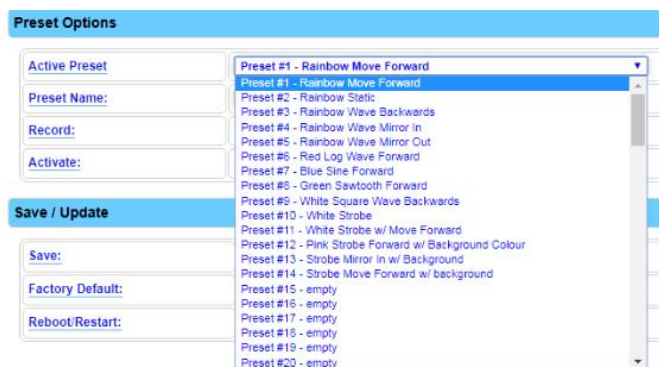
Selects DMX slot number for the first pixel to output. This option is only available when One Universe/Output is selected. Defaults to 0.

Device Personalities Explained

It is only possible to use one mode at a time. The Pixel Port has three modes of operation:

- **Standalone**
- **Direct**
- **Effect generator**

Standalone (Default Mode)



The Pixel Port comes loaded with 14 factory preset shows. Out of box the default preset show is:

- 7-coloured rainbow wave travelling forward
- WS2811, WS2812, WS2812B LED protocol
- Capable of driving 340 RGB pixels

The preset show set will run and loop every time you power the unit up. The playback sequence will stop only when, another personality is selected, or another preset is activated.



If you do not want the Pixel Port to generate any output when powered up, simply change the personality to Direct mode.

When the Pixel Port is restored, the first 14 presets will always be reset to factory default .

Notes:

- Select correct LED protocol

- Select correct pixel order

Direct Personality

In this mode, you are able to send DMX over Ethernet to Pixel Port using the following protocols:

- Art-Net
- sACN
- ESP

The following are available as output LED output protocols:

- 9PDOT-8bit
- 9PDOT-16bit
- WS2811, WS2812, WS2812B, WS2813, SK6812
TM1804, TM1812
- APA-104

Note:

We cannot claim to support all led protocols, but if you do happen to find one that does work, and is not listed, please let us know, so we can update our documentation

Effect Generator Mode

In this mode, you can send DMX over Ethernet to Pixel Port using the selected output protocol.

Universe/Output in Effect Mode

17 input DMX channels are used to create effects and drives a maximum of two universes worth of pixels

Effect Sync

In Effect Generator Mode, when multiple Pixel Ports are daisy chained together, all running the same effect, it is advisable to turn on/enable effect sync option. The output of units, which have Effect sync on/enabled will be synchronized.

Effects Explained

When operating in this mode note the following:

- RGBW tape is supported but W channels is always off and cannot be controlled
- 9PDOT-16bit protocol is not supported

The light output should be visualized as two layers.:

- Background
- Foreground

Background

The following control the background effects

Channel	Effects Function	Values
1	Master Intensity	(0-255)
2	Background Red	(0-255)
3	Background Green	(0-255)
4	Background Blue	(0-255)
5	Background strobe frequency	(0-255)
6	Background strobe duration	(0-255)

By only enabling the background layer the Pixel tape/dots will be similar to a standard RGB tape. The background can be:

- Set to a constant colour –
- Dimmed
- Made to strobe

The controllers affect the entire length up to the 340 pixels or mapped pixel number set (if mapped pixels value is less than 340).

Master Intensity

Controls the overall brightness of the output. Where:

- 0 – no LEDs are switched on
- 255 – LEDs on are at full brightness

Background Red/Green/Blue

- Separate DMX channel controls each pixel colour. [Please refer to table](#)
- Each DMX channel controls the corresponding pixel colour of the entire tape up to 340 or mapped pixels (if <340)
- When 0 – LEDS are not switched on
- When 255 – Pixel colour to full brightness

Background Strobe Frequency

Controls the time between LED(s) on and off time.

- 0 – LEDs switch on and off at slowest speed
- 255 – LEDs switch on and off at fastest speed

Background Strobe Duration

Controls the time that the LEDs are on

DMX fader value	On time
0	Always on

1	Smallest duration
255	Longest duration

Foreground

This layer create effects that overlay on the background colour.

The following control the foreground effects

Channel	Effects Function	Values	
1	Master Intensity	(0-255)	
7	Foreground Red	(0-255)	
8	Foreground Green	(0-255)	
9	Foreground Blue	(0-255)	
10	Foreground strobe frequency	(0-255)	
11	Foreground strobe duration	(0-255)	
12	Wave function	Sine Wave	0-9
		Log Wave	10-19
		Square Wave	20-29
		Sawtooth Wave	30-39
		Rainbow Sine	40-49
		Rainbow Log	50-59
		Rainbow Square	60-69
		Rainbow Sawtooth	70-255
13	Wave direction	Stationary	0
		Forward	(1-63)
		Reverse	(64-127)
		Mirror Out	(128-191)
		Mirror In	(192-255)
14	Wave Amplitude	(0-255)	
15	Wave length	(0-255)	

16	Wave speed	(0-255)
17	Offset	(0-255)

Foreground Red/Green/Blue

- Separate DMX channel controls each pixel colour. [Please refer to table](#)
- Foreground colours overlay background ones when both effects are controlling pixels
- When 0 – LEDs not overlaid with colour
- When 255 – LED pixel colour at full brightness

Foreground Strobe Frequency

Controls the time between LED(s) on and off time.

- 0 – LEDs switch on and off at slowest speed
- 255 – LEDs switch on and off at fastest speed

Foreground Strobe Duration

Controls the time that the LEDs are on

DMX fader value	On time
0	Always on
1	Smallest duration
255	Longest duration

Wave function

Output pixels overlaid with pattern consisting of:

- Sine wave
- Log wave
- Square wave
- Sawtooth wave
- Rainbow Sine Wave
- Rainbow Log Wave

- Rainbow Square Wave
- Rainbow Sawtooth

0	Minimum speed
255	Maximum speed

Wave Direction

The wave pattern can be set to travel. Wave direction setting determines which way the pattern travel. The wave can be set to move:

- Forward
- Backward
- Mirror out – pattern travelling out of centre
- Mirror in – pattern travelling into centre

Wave Amplitude

This setting determines the brightness of each pixel in a period of the wave.

DMX fader value	Brightness of Pixels in One Wave Period
0	Vary between 50% and full
255	Vary between off and full on.

Wave Length

This setting determines the number of pixels in one period of the wave.

DMX fader value	Wavelength
0-2	2 pixels
>2<=255	Fader Value

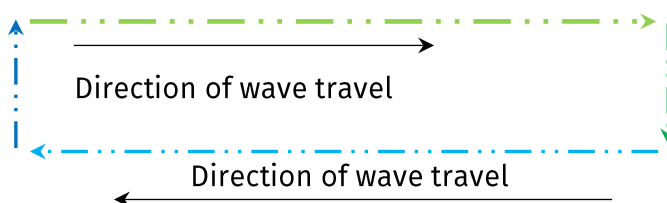
Wave Speed

This setting controls the speed at which the wave pattern travels across tape.

DMX fader value	Speed
-----------------	-------

Offset

When two or more Pixel Ports are daisy-chained, this setting allows the output pattern of each device to be delayed to create shapes out of the wave such as a square shown in the image below



Update Firmware

It is strongly recommended that the device is updated with the latest firmware, available on the ENTTEC website (www.enttec.com/pixel-port). This firmware can be loaded to the driver through its web interface. As shown in the image below:

Current System Information	
Boot Version:	ENTTEC Pixel Port Boot V1.4
Firmware Version:	ENTTEC Pixel Port Firmware V1.1
Mac Address:	00:50:c2:07:c8:a8
Serial No:	c207c8a8
Link Speed:	100 Mbps

Current Network Settings	
DHCP:	enabled
IP Address:	10.10.1.8

Update Firmware	
Select firmware file:	<input type="button" value="Choose file"/> No file chosen <input type="button" value="Update Firmware"/>
Update progress:	Please do not interrupt while the firmware is being updated. Unit will restart once firmware update is complete

After selecting the correct file, click on the Update Firmware button and let the update proceed.

refresh automatically, please open the home page on the browser manually, and verify that the update has succeeded. By checking the firmware version as shown:

System Information	
Node Name:	Pixel Port
Firmware Version:	ENTTEC Pixel Port Firmware V1.20
Serial No:	C207C8A8

Reset to Factory Defaults

Using Web Interface

PIXEL PORT - SETTINGS	
General Settings	▼
Output Function	▼
Effect Generator Help / DMX Channels layout	▼
Pixel Mapping Options	▼
Preset Options	▼
Save / Update	▲
Save:	<input type="button" value="Save Settings"/>
Factory Default:	<input type="button" value="Reset to Defaults"/>
Reboot/Restart:	<input type="button" value="Reboot Now"/>

The reset to defaults command can be found under the Settings tab of the Pixel Port.

Once the command is pressed, a pop-up would appear as shown in the image below:

10.10.1.1 says:

Reset the settings to Factory Defaults?
Please Confirm...

Once confirmed, a loading screen will appear as shown in the image below:



Reset to Defaults in progress please wait ...

Once finished, the page will automatically refresh, and device information will be updated to reflect the reset to defaults.

PIXEL PORT - UPDATE FIRMWARE	
Current System Information	
Boot Version:	ENTTEC Pixel Port Boot V1.4
Firmware Version:	ENTTEC Pixel Port Firmware V1.1
Mac Address:	00:50:c2:07:c8:a8
Serial No:	c207c8a8
Link Speed:	100 Mbps
Current Network Settings	
DHCP:	enabled
IP Address:	10.10.1.8
Update Firmware	
Select firmware file:	<input type="button" value="Choose file"/> firmware.bin <input type="button" value="Update Firmware"/>
Update progress:	<div style="width: 30%; background-color: green; height: 10px;"></div> 30%

Once finished, the page will automatically refresh, and device information will be updated to reflect the updated firmware.

Update Firmware	
Select firmware file:	<input type="button" value="Choose file"/> firmware_1.20.bin <input type="button" value="Update Firmware"/>
Update progress:	Firmware updated successfully ... Rebooting unit now ...

Note:

While the firmware is being updated, please do not power off the unit, please wait until the web interface is processing (up to a minute). If the web-page does not

- Resets the netmask

- Enables DHCP
- IP Address reset (IP address = 10.(octet1).(octet2).(octet3) where the three octets are the last three octets of the mac address in decimal)
- The 2nd LED from top remains red
- When Home option is clicked on, device starts behaving as DHCP is enabled Before reset
- Restores first 15 presets to factory default.

Using Button

The reset button restores the configuration of the Pixel Port to factory defaults:

- DHCP is enabled
- Static IP Address reset (IP address = 10.(octet1).(octet2).(octet3) where the three octets are the last three octets of the mac address in decimal)
- Netmask is set to 255.0.0.0

To reset to factory defaults, the following procedure must be performed:

- Power off the unit
- Press and hold the Reset button.
- While holding the Reset button, power up the unit, and keep holding the button for 3 seconds.
- Release the Reset button once the status led starts blinking red.
- Wait 3 seconds and cycle power

Tips and Tricks

Pixel Tape/Dots are to be connected to the output using the connector provided



Choosing a Pixel Port

When choosing a Pixel Port consider the following:

- What is the voltage of the LED tape/Dots used?
- What is the power requirement of the display?

The maximum power limit and the output voltage for the Pixel Port is provided in the table below:

Product Part No.	Output Voltage	Maximum Power	Maximum Current
76302-16	12V	65W	5.41 A
73602-26	24V	65W	2.7 A
73602-55	5V	55W	10 A

Unable to open Pixel Port web-page:

You must ensure that the Pixel Port and your computer are on the same **subnet**

To troubleshoot:

1. Give your computer a Static IP address (e.g.: **10.0.0.1**)
2. Change computer Netmask to (**255.0.0.0**)
3. Please connect the Pixel Port directly using a cat5 cable to your computer
4. Now use NMU to select the correct network (10.0.0.1)
5. If you have multiple networks (wifi etc.), please try to disable all other networks except the one Pixel Port is connected to.
6. Once NMU finds the Pixel Port, you will be able to open the device web-page and

configure it

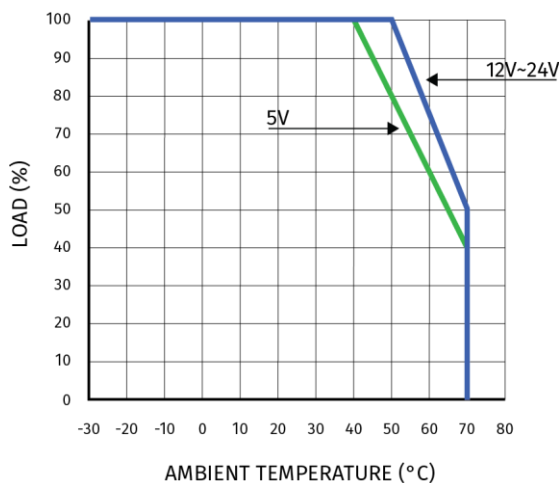
Can you run tapes and dots at the same time?

No, only one LED protocol can be selected to drive the output at a given time

Thermal Management

The Pixel Port driver constantly monitors the hardware's internal temperature and acts on the condition of overheating. Fan is controlled based on internal MCU temperature sensor.

- If temperature < 30°C : Fan PWM duty cycle = 30%
- If 30°C to >= 50°C: Fan PWM duty cycle ramps linearly from 40% to 100%



The

degenerative curve for the pixel Port is shown:

Accessories and Recommended Products

Part Number	Description
73910	US Mains plug powerCON cable
73911	UK Mains plug powerCON cable
73912	EU Mains plug powerCON cable
73913	AU Mains plug powerCON cable
70581-ARC	ENTTEC LED Mapper Software (ELM) Architectural (512 Universes)

70581-PRO	ENTTEC LED Mapper Software (ELM) Professional (96 Universes)
70581-STU	ENTTEC LED Mapper Software (ELM) Standard (16 Universes)
9PDOT (1-8)	HI-RES SMART RGB PIXEL DOTS
8PL60-F-12	RGB PIXEL TAPE 60 LEDS/METER 12V - 5M Roll
8PL30-F	RGB PIXEL TAPE 30 LEDS/METER 5V - 5M Roll
8PL60-F	RGB PIXEL TAPE 60 LEDS/METER 5V - 5M Roll
8PL144-2	RGB PIXEL TAPE 144 LEDS/METER 5V - 2M Roll
8PX60-4	RGBW PIXEL TAPE 60 LEDS/METER 5V - 4M Roll
8PXW60-4-B	RGBW PIXEL TAPE 60 LEDS/METER 5V - 4M Roll Black No Coating
8PX30-F	RGBW PIXEL TAPE 30 LEDS/METER 5V - 5M Roll
8PW60-F	WWA (CTA+AMBER) PIXEL TAPE 60 LEDS/METER 5V - 5M Roll
8PW30-F	WWA (CTA+AMBER) PIXEL TAPE 30 LEDS/METER 5V - 5M Roll
8P60-5-B	Pixel tape 60 LEDS/METER 5V - 5M Roll Black No Coating
79160	Universal Bracket

Product Registration

Please register your ENTTEC product to get latest software updates and to validate your warranty.

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