

## Introduction

NetWS-340 will drive up to two ArtNet/sACN Pixel Universes (340 WS2811/WS2812/Neopixel Pixel-LEDs) over a wired Ethernet network. DMX Protocol Selection, Device IP, ArtNet/sACN Settings and LED configuration is adjustable directly from your Browser interface. Two 3-pin JST connections are provided for outputting the NRZ-data to the Pixel LED strips/matrix. Operational Mode is indicated by a simple 7 segment display. Product Firmware updates can be sent over USB, and a serial diagnostics interface has also been included.

## Specifications

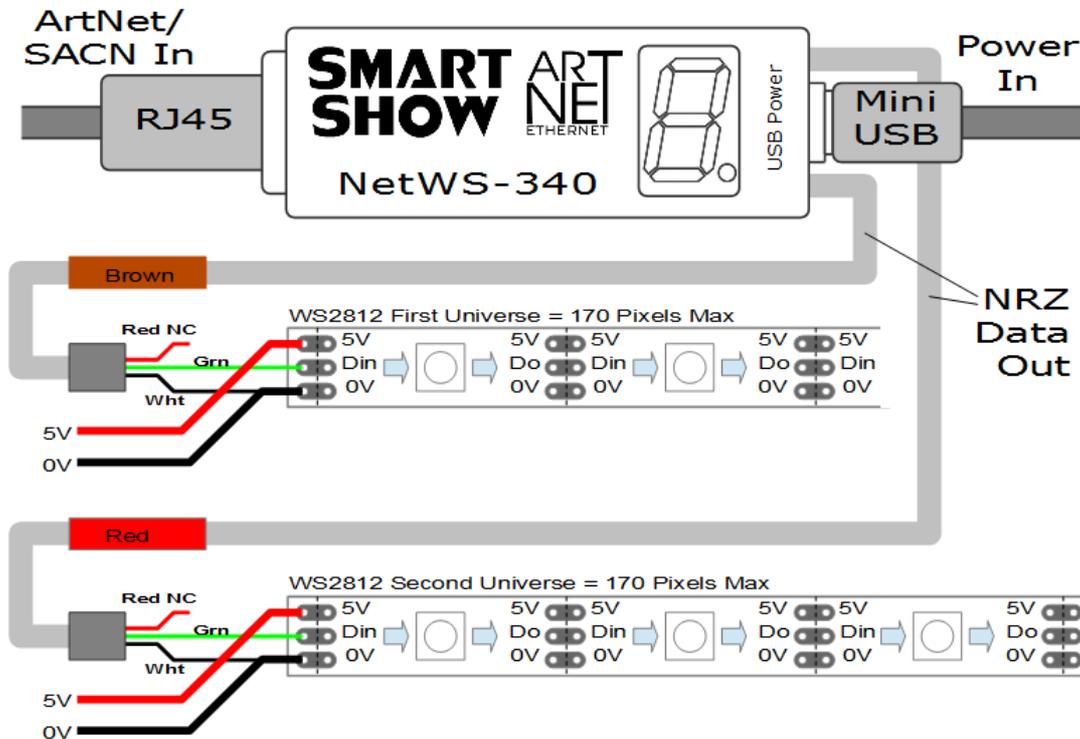
- IEEE 802.3 compatible Ethernet Controller, Integrated MAC and 10BASE-T PHY
- Browser Configuration Server and UDP Client modes
- Isolated RJ45 Ethernet Connection
- Dual Universe ArtNet II & III and sACN (E1.31) decoding NRZ data at 25fps typical

## Parts Supplied

NetWS-340 Interface, 2 x 3-Pin JST Plug/Cable, 1 x USB-MiniUSB cable (power, configuration & firmware upload)

## Product & Pixel LED Connection

Connect a strip of WS2811 or WS2812 LEDs to the 3-pin JST connector. Most Pixel-LED strips come with this connector already supplied, if not then a female 3-pin JST connector is supplied with the kit. Use a 5V external power supply capable of powering your LEDs. To calculate the power supply required, multiply the number of LEDs by 0.25 (each Pixel-LED draws 0.25W). For example 340 Pixel-LEDs will require  $340 \times 0.25W = 85W$ , therefore a 100W/5V power supply should be perfectly adequate.



## LAN Ethernet Connection

The NetWS-340 can be configured for almost any IP setting, although a default IP of 192.168.1.200 is supplied with the unit. In general this will be a similar IP to your home router/hub, therefore the NetWS can be connected directly to one of your router LAN Ports. Once connected it can be accessed from a PC that is also connected to that same Network.

## Device Configuration

It is possible to configure your device in one of two ways, either directly from your PC Browser (if you are on a 192.168.1.x network) or via a Serial Configuration using the USB connection, this is useful for directly setting to an alternative network.

## **Browser Configuration Mode**

To access the browser configuration, the NetWS must be put in Configuration mode. Configuration mode is available for the first 10 seconds after power up, this is shown as a circulating symbol on the LED display. To activate Configuration mode you should open your PC browser (most browsers are supported) and type into the URL bar 192.168.1.200 and press return, hitting the return within the 10 second window will activate Configuration mode and will show a 'C' on the display (If you allow 10 seconds to elapse without any browser intervention then the NetWS will go directly into ArtNet mode 'A', or sACN mode 'S'). As long as the PC and the NetWS are connected to the same network at 192.168.1.200 the configuration interface should appear as follows:

### **DMX Protocol**

Select either ArtNet or sACN (E1.31) to match the DMX Data Protocol coming from the host application  
**[SAVE]** New DMX Protocol settings will take immediate effect after they are saved to the NetWS.

### **Ethernet Settings & IP Configuration**

**MAC Address:** This is not adjustable and is a unique number created in conjunction with the serial number of the supplied unit

**Device IP:** It is possible to set the IP Address of the NetWS to almost any value, (Many ArtNet devices will use standard IP addresses of 10.x.x.x or 2.x.x.x) only values of 0-254 can used, 255 is not allowed.

**SubNet Mask:** Normally this should be left at 255.255.255.0, which will cover most applications.

**[SAVE Configuration]** New IP configuration will not take place until NetWS has its power cycled (or by pressing REBOOT). Saving the configuration will write the Device IP and SubNetMask values to the NetWS internal memory, so on next power-up the new settings will be used.

### **Art-Net/sACN Settings**

These values can be configured to match the requirements of your system. There is a total of 256 Universe values for ArtNet II and 32,768 for ArtNet III, and 63,999 for sACN

**Net:** any value in the range 0-127

**SubNet:** any value in the range 0-15

**Universe:** ArtNet : any value in the range 0-15 – sACN : any value in the range 1-15

**[SAVE Configuration]:** New ArtNet/sACN settings will take immediate effect after they are saved.

### **LED Configuration**

**RGB and RGBW:** 3 or 4 'channels per Pixel' LEDs can be used with NetWS, typical WS2812 types use 3 channels (RGB), whereas some of the newer SK6812 LEDs use 4 channels (red, green, blue and white)

**[SAVE Configuration]:** New LED configuration settings will take immediate effect after they are saved to the NetWS internal memory

### **Pixel LED Test**

4 Buttons have been provided for testing connected Pixel LEDs, both output connections are tested at the same time. Pressing **[TEST 1]**, **[TEST 2]** or **[TEST 3]** will test the individual colour channels.

Pressing **[ALL OFF]** will clear all colour channels.

### **REBOOT DEVICE**

Pressing **[REBOOT DEVICE]** will restart the NetWS interface (a bit like cycling the power) and once again test for browser intervention (circulating symbol) before entering ArtNet/sACN streaming mode, indicated by 'A' or 'S'. All newly saved settings (including IP values) will be used after reboot.

## **Private Wired Network Connection**

It is highly recommended that you move the NetWS away from your home network and onto a private wired network connected directly between your PC and the NetWS device. Generally your home network (192.168.1.x) could have lots of traffic that could affect the consistency of ArtNet/sACN data, and may cause visual disturbances.

To move NetWS to a direct-wired network follow these instructions (MS Windows):

Go to Control Panel, select Network and Internet, then select Network and Sharing Centre

In the left hand column, click on 'Change Adapter Settings'

'Local Area Connection' should be shown, double click on it

Under the 'Networking' tab, select the line that says 'Internet Protocol Version 4 (TCP/IPv4)'

Then click 'Properties'

Click the radio button beside 'Use the following IP address'

Enter your required IP address & Subnet mask (eg 255.255.255.0) in the fields provided

**NOTE :** The IP Address entered here MUST match the NetWS IP address for communications to work

Leave the DNS Settings blank, click OK then click Close

Plug in the NetWS-340 (if you haven't already done so)

## **Serial Configuration Mode - Set-Up**

Firstly, you will need to install the correct CH340 serial driver for the NetXX devices these can be found at :

Windows 7 - <http://www.arduined.eu/tag/windows-7/>

Windows 8 - <http://www.arduined.eu/ch340-windows-8-driver-download/>

Once installed, connect the NetWS via the USB connection and allow the driver install to complete.

Make a note of the serial port number for the device (see Device manager/Com Ports/CH340 device)

If you haven't already got a Serial Communications application, we recommend HTComm for simplicity.

You can find HTComm at <http://www.hobbytronics.co.uk/ht-comm>

Set the **PORT number** to the ComPort that the NetWS is connected to

The serial communications uses a serial settings of 9600 N/8/1, so set **Baud to 9600**

Ensure that the **checkbox for [CR] is set**, to allow a carriage return to be sent after any communications

## **Serial Configuration Mode - Use**

To access the Serial Configurator, the NetWS must be put into Configuration mode. Configuration mode is available for the first 10 seconds after power up, this is shown as a circulating symbol on the LED display. To activate Configuration mode you should type '?' in the HTComm chat window and press return, hitting the return within the 10 second window will activate Configuration mode and will show a 'C' on the display (If you allow 10 seconds to elapse without any user intervention then the NetWS will go directly into ArtNet mode 'A' or sACN mode 'S'). In response to sending a '?' the device will respond with its Device Settings, and a Function Guide:

```
***** DEVICE SETTINGS *****
MAC Address   CA:EF:FF:1E:02:34
Device IP     192.168.1.200
SubNetMask    255.255.255.0
Starting Uni  (Net)0 (Subnet)0 (Uni)0
LED Config    3 channel Pixel
DMX Protocol  ARTNET
***** FUNCTION GUIDE *****
'i192.168.1.200<CR>'  Change local IP
's255.255.255.0<CR>' Change SubNetMask
'u0<CR>'             Change Start Uni
'a<CR>'              Change to Artnet Mode
'e<CR>'              Change to sACN(E1.31) Mode
'x'/'y'<CR>         3 or 4 channel pixel Mode
'r<CR>'              Reboot device
'?<CR>'             Display settings & help
'$RESET<CR>'        Reset Defaults & Reboot
*** (ensure <CR> is enabled on send) ***
```

For example, pressing 'i2.0.0.1' and pressing return will change the device IP to 2.0.0.1  
Changes can be made to IP, SubNetMask, Starting Universe, DMX protocol and LED Configuration.  
For more information see 'Browser Configuration'

## **Lets Animate !**

Open your LED animation application, we suggest Jinx as a good starting point, this can be downloaded free of charge from <http://www.live-leds.de/>

1. Configure Jinx to use your NetWS device, by selecting it as an 'ArtNet or sACN' device type from the '*SetUp>OutputDevices*' menu
2. Ensure the Broadcast check box is not checked
3. Enter the IP number of your NetWS interface (as you have set in NetWS config)
4. Select 512 channels, and set Net, SubNet and **First** Output Universe (as you have set in NetWS config)
5. Click OK to save changes
6. For the **Second** Output Universe, add another device (as above) but with the NEXT Universe value. (the second Universe assumes it is one after the first Universe) – Note : sACN starts at universe ONE
7. Design your matrix size and shape within '*SetUp>MatrixOptions*'
8. Patch your matrix to the NetWS universe(s) within '*SetUp>OutputPatch*'. Be careful to select the correct colour order for your LEDs, WS2812 are GRB, and NOT RGB, starting a channel zero.
9. Ensure BOTH universes are patched to different parts of the Matrix
10. '*SetUp>StartOutput*' to start the show.
11. Ensure NetWS is in ArtNet/sACN mode this should be identified by an 'A' or 'S' on the LED display.
12. Ensure your WS2812 LED strip/matrix is connected to the JST outputs, following the correct connections of GREEN=DataOut, WHITE=GROUND/0V. The Red Connection is not used.
13. Once ArtNet/sACN data is being received the 'A' or 'S' LED Display will flash. It will flash twice a second for TWO universes received, and Once a second for ONE universe received
14. Select the effect you want to see from the Channel Effects and have fun !

## **Multiple Universe Connections**

If you have more than one universe of 170 RGB Pixels, the second universe will always be the Configured Universe PLUS ONE, the BROWN output will be the FIRST Universe and the RED output will be SECOND Universe

Make sure you patch different device outputs to different areas of the overall matrix design. As an example, you could create a 26 wide by 13 high matrix, patch Universe0 to the left 13\*13 array, and Universe1 to the right 13\*13 array.

## **Multiple Device Connections**

If required you can add several NetWS to your network and have them controlled from the same application. Each NetWS would need to have a different IP address (x.x.x.1, x.x.x.2, x.x.x.3 etc) and be added to your application as a new device and patched accordingly into its own area of the matrix. Your Ethernet connection can be split into several outputs using a simple and inexpensive Ethernet 4 or 8 way switch.

### **Using RGBW (4-colour) LEDs**

In the configuration mode it is possible to select either RGB mode or RGBW mode. RGB mode uses 3 channels per pixel and RGBW uses 4 channels per pixel. If you select RGBW mode and are using RGB Pixel-LEDs then expect an unusual effect !

Since RGBW uses 4 channels and there is a maximum of 512 channels per universe on ArtNet/sACN/DMX, the maximum number of Pixel-LEDs that can be connected to one universe is 128.

### **ArtNet/sACN Unicast, Multicast & Broadcast mode**

It is recommended that Unicast mode is used when sending ArtNet/sACN data to the NetDMX.

Limited & Directed Broadcasts are also accepted.

### **ArtNet Device Discovery & DHCP**

There is the ability to discover IP addressing and device Information using ArtNetPoll, IP Scan is available on most software, if unavailable addressing can be done manually as described above. There is no DHCP function as IP addressing is Static, utilising client port 6454.

### **Pixel-LEDs that can be driven from the NetWS-340**

WS2811, WS2812, UCS1903, UCS2903, TM1804, SK6812

### **Dimensions**

Length : 68mm (plus JST cables) – Width 24mm – Height 24mm

### **Software Compatibility**

NetWS-340 works with all free and commercial Art-Net/sACN compatible software. For free software, Jinx is highly recommended, visit <http://www.live-leds.de/> for more information.

### **Firmware Upgrades**

From time to time we may issue revised firmware for our products. The latest firmware can be uploaded to any of our products using the Xloader tool plus the latest HEX file for the product. Please ensure that the firmware file matches the product you are downloading to.

Xloader can be provided on request or downloaded from our website [www.smartshow.lighting](http://www.smartshow.lighting)

Unpack the zip file and run the Xloader executable

Select the '...' browse button and navigate to the hex file, and select it

Select the device as 'NetWS/SPI/DMX ArtNet Interface'

Select the COM port which the NetWS is connected to (see Device manager/Com Ports/CH340 device)

Leave the BaudRate as 57600 and press UPLOAD

Once the upload is complete, there will be a notification

### **Additional Software**

On request we can supply an alternative version of NetWS-340 software that will output both universes into ONE output, thus enabling 340 Pixel-LEDs to be connected in one long string. This version of software does not have the Browser Configuration Interface, but just uses a simple Serial Configuration Interface.

### **Technical Support**

email : [bob.lynas@btinternet.com](mailto:bob.lynas@btinternet.com) or [sales@smartshowlighting](mailto:sales@smartshowlighting)

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