Introduction

NetTWIN is an ArtNet/sACN to dual DMX512, or dual 680-Pixel WS2812 Interface. It is capable of creating two single universe differential DMX outputs from Ethernet ArtNet or sACN(E1.31) to 2 3-pin XLR Connectors. The alternative 3-pin JST cables can be connected so that dual WS2812 pixel outputs are available either as 'differential', which can be used to transmit long distances over twisted-pair, or DMX-style cable. Alternatively, only one of each JST connection is required for sending data to pixel locally. Device IP, ArtNet/sACN settings, output type, pixel testing/settings & DMX speed are adjustable from either a browser configuration interface or via a USB/Serial terminal application. Operational Mode is indicated by a simple 7 segment display.

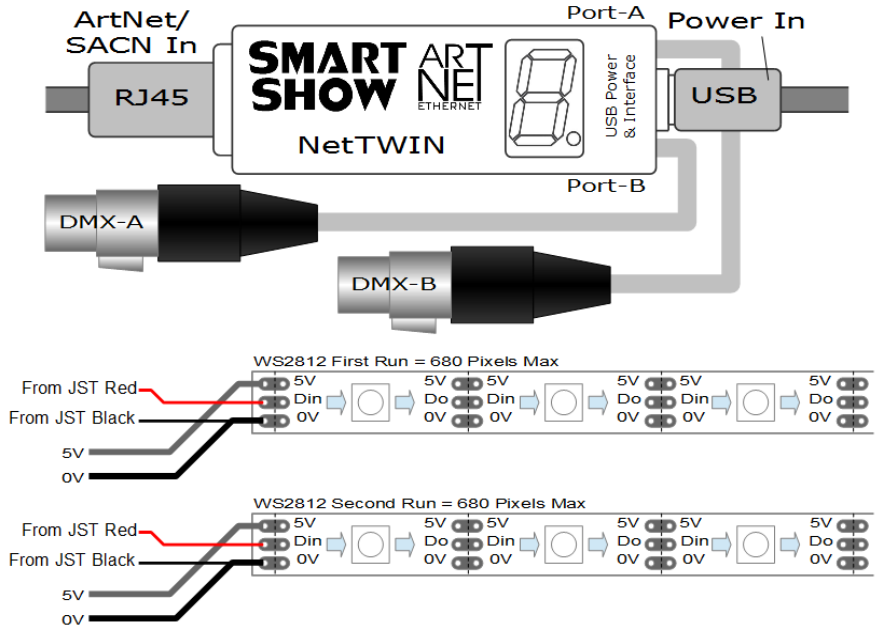
Specifications

IEEE 802.3 compatible Ethernet controller, integrated MAC and 10/100 Base-T/TX PHY
USB/Serial configuration server, Browser configuration server and UDP Client modes
Isolated RJ45 Ethernet connection
Dual Universe ArtNet II & III and sACN (E1.31) decoding DMX512 data, outputting @ 25/35/44Hz selectable
Eight universe ArtNet II & III and sACN (E1.31) decoding NRZ data, split over two outputs, at 25fps typical

Parts Supplied

NetTWIN Interface 1 x USB cable (for power, configuration & firmware upload) 1 x 1m Ethernet Cable
2 x JST to 3-pin XLR female 2 JST 3Pin cables (for alternative pixel connection)

Product Connections



For long-range WS pixel data transmission, use JST-Red=Data+, JST-White=Data-, JST-Black=GND
For short range (<2m) WS data transmission, you can use JST-Red=Data, JST-Black=GND

LAN Ethernet Connection

The NetTWIN can be configured for almost any IP setting, although a default IP of 192.168.1.203 is supplied with the unit. In general this will be a similar IP to your home router/hub, therefore the NetTWIN 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.

Direct-Wired Ethernet Connection

An alternative to a Router-Wired connection is a private direct-wired network connected directly between your PC and the NetTWIN device. Generally your home network (192.168.1.x or 192.168.0.x) could have lots of traffic that could affect the consistency of ArtNet data, and may cause disturbances within your DMX data.

To move NetTWIN 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 (255.255.255.0) in the fields provided
NOTE : The IP subnet Address MUST match the NetTWIN IP address for communications to work
Leave the DNS Settings blank, click OK then click Close
Plug in the NetTWIN (if you haven't already done so)

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, if you initially have access to it.

Browser Configuration Mode

To access the browser configuration, the NetTWIN must be put in configuration mode. Configuration mode is available at any time when data IS NOT streaming to the device. To activate configuration mode you should open your PC browser (most browsers are supported) and type into the URL bar 192.168.1.203 and press return and will show a 'C' on the display. As long as the PC and the NetTWIN are connected to the same network at 192.168.1.203 the configuration interface should appear as follows:

Ethernet Settings & IP Configuration

Device IP Address: It is possible to set the IP address of the NetTWIN 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 be used, 255 is not allowed.

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

Gateway IP: You can set the last value of the IP to match your router/switch IP.

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

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

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 are saved to the NetTWIN, taking effect after next Reboot.

Output A & B

Select whether you require both outputs to be DMX output, or WS Pixel data outputs.

[SAVE] New output settings will take effect only AFTER the next Reboot.

Art-Net/sACN Settings

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

Net: [Art-net only] any value in the range 0-127.

SubNet: [Art-net only] any value in the range 0-15.

Universe: ArtNet : any value in the range 0-15 – sACN : any value in the range 1-63,999.

Art-Net Node Name *(Art-net only)*: each NetTWIN can be numbered (0-255) so it can be identified easily with ArtPoll.

[SAVE]: New ArtNet/sACN settings are saved to the NetTWIN, taking effect after next Reboot.

Pixel LED Test (only available if WS2812 output is selected)

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

Universe Sizes & Pixel Colour Order (only available if WS2812 output is selected)

Universe Size: If your application is unable to set the size of the Universe (in bytes), then the universe size can be entered into the boxes, one for each of the eight universes (four of output A, four on output B), a value of zero will be ignored and the value sent by the application will be used.

[SAVE]: New universe sizes are saved to the NetTWIN, taking effect after next Reboot.

Pixel Colour Order: If your application sends data out as RGB, then select RGB, otherwise default is GRB.

[SAVE]: New pixel order is saved to the NetTWIN, taking effect after next Reboot.

DMX Speed (only available if DMX512 output is selected)

Select between MAX (fastest, 44Hz), 35Hz and 25Hz (slowest) to adjust for your fixture needs.

[SAVE] New DMX Speed is saved to the NetTWIN, taking effect after next Reboot.

REBOOT DEVICE

Pressing [REBOOT DEVICE] will restart the NetTWIN interface (a bit like cycling the power) and display the devices IP Address before entering ArtNet/sACN streaming mode, indicated by 'A' or 'S'. All newly saved settings (including IP values) will be used after reboot.

DMX Universe Addressing

Please note that in DMX Output mode, DMX Output-A sends the data that appears on the 'Starting Universe', and DMX Output-B is the next universe after the starting universe. For example if you set the 'Starting Universe' to 8, DMX Output-A will be from universe 8, and DMX Output-B will be from universe 9.

Pixel Universe Addressing

Similarly to the above, when in WS2812 Output mode, pixel data that appears on Output-A will be from universes starting at the 'Starting Universe', for the next 4 universes. Output-B will be sequentially after those 4 universes for the NEXT 4 universes.

Serial Configuration Mode - Set-Up

Firstly, you need to install drivers for the Serial and DFU (upload devices).
Please install and run drivers/win/install_drivers.bat, these can be obtained on request from SmartShow-UK
Once installed, connect the NetTWIN via the USB connection.
Make a note of the serial port number for the device (see Device manager/Com Ports/'Maple Serial')
If you havent already got a serial communications application, we recommend 'Termite' for simplicity.
You can find Termite at https://www.compuphase.com/software/termite-3.3.zip
Once installed and launched, adjust the settings for COM number, 9600/8/1/none, and set flow=DTR/DSR
Also select 'append CR' and chose the Font 'Monospaced'.
NOTE: After a device reboot, Termite must be restarted.

Serial Configuration Mode - Use

To access the configuration settings, the NetTWIN must be put into configuration mode. Configuration mode is available at any time when data IS NOT streaming to the device. To activate configuration mode you should type '?' in the Termite chat window and press return and will show a 'C' on the display. 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:12:34
Device IP     192.168.1.203
SubNetMask    255.255.255.0
Starting Uni  (Net)0 (Subnet)0 (Uni)0
DMX Protocol  Art-Net
Output Type   DMX512
********** FUNCTION GUIDE **********
'i192.168.1.203<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
'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 and DMX protocol.
For more information see 'Browser Configuration'.

***NOTE** : It is recommended that you DO NOT have your DMX lights connected while operating the Serial Configurator, ignoring this may result in unexpected results on your DMX lighting.*

Testing out WS2812 Pixel Animation

With your NetTWIN in WS2812 output mode, 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 NetTWIN 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 NetTWIN interface (as you have set in NetTWIN configuration).
4. Select 510 channels, and set Net, SubNet and first output universe (as you have set in NetTWIN configuration).
5. Click OK to save changes.
6. For the second and subsequent output universes, add another device (as above) but with the NEXT universe value. (the second Universe assumes it is one after the first universe) – Note : sACN always starts at universe ONE.
7. It is also possible to press SCAN in the output devices window, Jinx will communicate with the NetTWIN and create 8 universes automatically, but you may need to edit each one to your individual needs.
8. Design your matrix size and shape within *'SetUp>MatrixOptions'.*
9. Patch your matrix to the NetTWIN universes within *'SetUp>OutputPatch'*. Be careful to select the correct colour order for your LEDs, WS2812 are GRB, and NOT RGB, starting at channel zero.
10. Ensure ALL universes are patched to different parts of the Matrix.
11. *'SetUp>StartOutput'* to start the show.
12. Ensure the NetTWIN is in ArtNet/sACN mode this should be identified by an 'A' or 'S' on the LED display.
13. Ensure your WS2812 LED strip/matrix is connected to the outputs, following the correct connections as described above.
14. Once ArtNet/sACN data is being received the 'A' or 'S' LED display will flash. It will flash faster the more universes that are being sent to the device (a slow flash for 1 universe, and a fast flash for 8 universes).
15. Select the effect you want to see from Jinx's channel effects and have fun !

Universe Manager

Unlike other multi-output devices, NetTWIN has the ability to deal with different sized universes. Therefore, any universe can be any length and NetTWIN will work out the best way to output the data. All you need to do is set the number of channels per universe in the hosting software (channels=3*pixels for RGB pixels). Each output has its own universe numbers assigned to it : OutputA=Uni1-4, OutputB=Uni5-8. You don't have to send all universes to a particular output, and it is possible to skip universes. See example below:

```
OutputA : [Uni-1...][Uni-2.......][Uni-3][Uni-4...................]
OutputB : [Uni-5...........][Uni-7.........]
```

Multiple Device Connections

If required, you can add several NetTWIN to your network and have them controlled from the same application. Each NetTWIN 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. Your Ethernet connection can be split into several outputs using a simple and inexpensive Ethernet 4 or 8 way switch.

ArtNet/sACN Unicast, Multicast & Broadcast mode

It is recommended that Unicast mode is used when sending ArtNet/sACN data to the NetTWIN.
Limited & Directed Broadcasts are also accepted.

ArtNet Device Discovery, DHCP, and ArtSync

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. NetTWIN is ArtSync-ready so that if several NetTWIN are run from one application that is sending ArtSync they will all synchronise together to ensure you have no image-tearing on large matrix displays.

Dimensions

Length : 73mm (plus DMX cable and XLR-5 plug) – Width 24mm – Height 24mm

Software Compatibility

NetTWIN works with all free and commercial Art-Net compatible software.

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 our upload tool plus the latest .bin file for the product. Please ensure that the firmware file matches the product you are uploading to.

SmartLoader can be provided on request or downloaded from our website www.smartshow.lighting
For further instructions, see the README file in the downloaded zip.
Once the upload is complete, the NetTWIN will resume normal operation with a reboot.

***NOTE** : Do not attempt to run SmartLoader and Termite simultaneously.*

Technical Support

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