Introduction

AirPixel-Quad is a Wifi ArtNet/sACN(E1.31) to WS2811/12 (NRZ) Driver interface. It is capable of receiving up to 16 DMX universes of up to 512 channels per universe. The data is then converted into a continuous NRZ data stream that will appear on JST outputs. There are four outputs, sending 4 universes consecutively on each output. Network connection can be made by utilising a special Access-Point Mode. Device IP, ArtNet/sACN, and pixel settings are adjustable directly from a second browser interface once the Wireless Network Connection has been made. Product Firmware updates can be sent over-the-air, and a serial configuration & diagnostics interface has also been included.

Specifications

Browser Configuration Server and UDP Client mode
Serial Configuration Server
Sixteen Universe ArtNet II & III and sACN E1.31 decoding DMX512 data to WS2811/12 in NRZ Format
Radio Module : Wireless standard 802.11 b/g/n, Frequency range 2.4-2.5 GHz
Power input : 5V USB Powered, or **MAX 5V** external power applied to RED wire of Output A

Parts Supplied

AirPixel-Quad Interface   1 x USB-MM Cable   4 x 3 pin JST Cable

Status LEDs

Network Select : Flashing RED=APMode, not connected – Flashing GREEN=APMode, connected
Network Connect : Flashing RED=ClientMode, not connected – Flashing GREEN=ClientMode, connected
Data Streaming : Flashing BLUE=ArtNet/sACN data being received that matches universe selection group

Access-Point Connection

On first power-up (when the device has not been set up before), it will appear as an Access Point(AP). If you check your list of wireless network connections you will find the device in the list as 'AirPixel xxyy' (where xxyy are the last two octets of the device mac). The devices 'Network Select' LED will be flashing RED. Select the device from the list of wireless network connections and enter 'smartshow' for the password. Once connected the 'Network Select' LED will be flashing GREEN.

```
[Laptop/PC] <--- direct wifi connection ---> [AirPixel in APMode : 192.168.4.1]
```

'Join A Network' Configuration Page

To access the '*Join A Network*' configuration page, type into the URL bar '192.168.4.1' and press return, the configuration interface should appear as follows:

Network SSID & Password Settings

Network SSID: Enter the name (SSID) of the wireless router for the network you wish to join
Network PASS: Enter the password (PASS) for the above network.
[Save SSID & Password] The above SSID and Password will be saved so that next time the device reboots, the connection will be made automatically (unless the Network/Pass cannot be verified)
[Connect to Network] This will allow the device to connect to the Network as specified above, the device will close down its Access-Point 'join-a-network' connection and restart as a Network Client/Node. The 'Network Connect' LED may briefly flash RED before changing to flashing GREEN which confirms the connection to your chosen Wireless Network.

Device Settings & IP Configuration

Device IP Address: It is possible to set the IP Address of the AirPixel 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.
Note : If you change this IP address, the new IP address will be the one that will allow you access to this configuration page next time you reboot. Also take care to only change to an IP address that you actually have access to.
Device SubNetMask: Normally this should be left at 255.255.255.0, which will cover most applications.
[Save Device Settings] Saving the configuration will write the Device IP and SubNetMask values to the AirPixel's internal memory, so on next power-up the new settings will be used.

Resuming Network Connection

Once the device has connected to your chosen Network (Flashing 'Network Connect' Green LED), then you should disconnect your Laptop/PC from the AirPixel's AP-Mode (it might automatically do this anyway), and then manually connect your Laptop/PC back to your existing Network (Same SSID as above)

```
[Laptop/PC] <--- wifi ---> [ROUTER] <--- wifi  ---> [AirPixel in ClientMode : 192.168.1.200]
```

***Note** : If the 'Network Connect' LED stays flashing RED then you have not been able to connect to your desired network (you may have entered the SSID & PASS incorrectly). If you cycle the power to the device you will start in AP mode once again, the device will do this until a confirmed network connection has been made.*

Browser Configuration Mode

Note : Access to the Browser Configuration page is only available when ArtNet/sACN data is NOT streaming to the device over the network, therefore access can only be granted when the 'Network Connect' LED is flashing GREEN.

To access the browser configuration page, type into the URL bar the Network IP Address (this will be default value '192.168.1.200' unless you have changed it from within the 'Join-a-Network' page) and press return. The configuration interface should appear as follows:

Device Settings & IP Configuration

Network: The page should announce the currently connected network name as 'Connected to..'

RSSI Value: Received signal strength indication as received at the AirPixel

Device IP Address: It is possible to set the IP Address of the AirPixel 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. *Note : If you change this IP address, the new IP address will be the one that will allow you access to this configuration page next time you reboot. Also take care to only change to an IP address that you actually have access to.*

Device SubNetMask: Normally this should be left at 255.255.255.0, which will cover most applications.

MAC Address: This is not adjustable and is a unique number created when the device was manufactured.

[SAVE] New IP configuration will not take place until the AirPixel has its power cycled (or by pressing [Reboot]). Saving the configuration will write the Device IP and SubNetMask values to the AirPixel'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 will take immediate effect after they are saved to the AirPixel.

Art-Net/sACN Starting Universe

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

Net: any value in the range 0-127

Sub(SunNet): any value in the range 0-15

Uni(Universe): ArtNet : any value in the range 0-15 – sACN : any value in the range 1-15

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

Pixel LED Test

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

UNIVERSE > Universe Sizes

If your application is unable to set the size of the Universes, then each universe size can be entered into the boxes, one for each of the four universes 1/2/3/4, on each of the four outputs A/B/C/D

Reboot

Pressing [Reboot] will restart the AirPixel Device (a bit like cycling the power). All newly saved settings (including IP values) will be used after reboot.
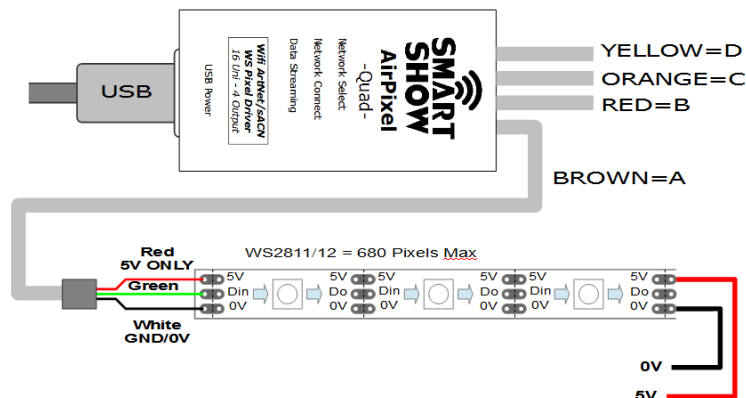
Delete Connection

Pressing [Delete Connection] will remove the details of the currently connected network from the device, this may be required if you want to move from one wireless router to another. The next time you power up the device it will go into Access-Point mode again which will allow a new SSID & PASS to be entered.

Firmware Upload

Pressing [Firmware Upload] will open the connection and allow new firmware to be sent to the device over the wifi using the current connection (see further details below)

Product Connections

Each of the four outputs can be connected directly to WS2812 LED strips. The Red (5V) wire of the First output (Brown-A) can be used to power AirPixel if you do not want to use the USB-A connection.

Each 3-wire Pixel LED JST cable has the following connections: **WHITE** : Ground - **GREEN** : Data Out

RED : **5V ONLY** (power into the AirPixel, only from BROWN(A) output)

Note : The RED wire does not need to be connected on the RED(B), ORANGE(C) or YELLOW(D) outputs

JST Output Colours : A=BROWN – B=RED – C=ORANGE - D=YELLOW

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 AirPixel device, by selecting it as an 'ArtNet or sACN' device type from the *'SetUp>OutputDevices'* menu
2. Universes/Devices can be added manually (see below) or automatically using 'SCAN' (only available for ArtNet). If a scan is done and 16 universes are automatically added, you may need to edit each entry with the specific requirement of your set-up.
3. Ensure the Broadcast check box is <u>not checked</u>
4. Enter the IP number of your AirPixel interface (as you have set in AirPixel config)
5. Select the number of <u>data channels</u> required for this universe, and set Net, SubNet and **<u>First</u>** Output Universe (as you have set in AirPixel config)
6. Click OK to save changes
7. For the all 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) – <u>Note : sACN starts at universe ONE</u>
8. Design your matrix size and shape within *'SetUp>MatrixOptions'*
9. Patch your matrix to the AirPixel universe(s) 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. If you have configured and patched everything correctly the BLUE streaming LED will flash.
13. 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 a power output, but it can be used to supply 5V power to the AirPixel rather than using the USB connection. **This device is 5V ONLY** !
14. Select the effect you want to see from the Channel Effects and have fun !

Serial (Alternative) Configuration Mode – Set-Up

Firstly, you will need to install the correct CP2104 serial driver, these can be found at :
https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers
Once installed, connect the AirPixel 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/CP2104 device)
If you haven't already got a Serial Communications application, for Windows, we recommend HTComm.
You can find HTComm at http://www.hobbytronics.co.uk/ht-comm
Set the **PORT number** to the ComPort that the AirPixel is connected to
The serial communications use 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, open the Serial Communications Application (above), and set the port and baud rate. Then type '?' in the HTComm chat window and press return. In response to sending a '?' the device will respond with its Device Settings, and a Function Guide:

```
******* SmartShow AirPixel-Quad ******
Firmware v1.21 – SerialNo 12345
*********** DEVICE SETTINGS **********
Network SSID  ShowNetOne
Network PASS  MyPassword
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
DMX Protocol  ARTNET
*********** FUNCTION GUIDE ***********
'i192.168.1.200<CR>'   Change local IP
's255.255.255.0<CR>' Change SubNetMask
'c1<CR>'         Change AP Wifi Channel
'u0<CR>'                Change Start Uni
'e<CR>'      Change to sACN(E1.31) Mode
'?<CR>'         Display settings & help
'$RESET<CR>'  Reset Defaults (CAUTION)
***(ensure <CR> is enabled on send)***
```

It is possible to change and configure AirPixels settings using this interface, which is very useful if you happen to forget its IP address or need to reset the device back to defaults. Other settings are also available. For example, pressing 'i2.0.0.1' and pressing return will change the device IP to 2.0.0.1. For all other functions see the function guide above.

Serial Configuration Mode – Additional Features

Change AP Wifi Channel: AirPixel defaults at Wifi Channel 1 when in AP(join-a-network) mode. Sometimes this channel is already busy with other local devices. To change the wifi channel to another channel (1-9 only) press 'c1<CR' to 'c9<CR>'.

Change Start Universe: A simple option to just set the Universe start value (0-15 ArtNet, 1-15 sACN) for the device, to change the start universe type 'u' and the value you want to start at and press <CR>

RESET DEVICE TO FACTORY DEFAULTS: To reset the device completely, type '$RESET<CR>'. This full reset will also remove the network connection SSID and Password.

RSSI During Data Streaming

While data is being streamed to the device the BLUE LED will flash, its rate is determined by the strength of signal that it is receiving from the router, A fast flash ~2/sec means good signal strength, and will slow to ~1/sec for poor signal strength

Universe Manager

Unlike other multi-output devices, AirPixel Quad has the ability to deal with different sized universes. Therefore any universe can be any length and AirPixel 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 : A(Brown)=Uni1-4, B(Red)=Uni5-8, C(Orange)=Uni9-12, D(Yellow)=Uni13-16. You don't have to send all universes for a particular output. See example below:

```
OutputA (Brown)  : [Uni-1...][Uni-2.......][Uni-3][Uni-4....................]
OutputB (Red)    : [Uni-5...........][Uni-6.........]
OutputC (Orange) : [Uni-9......][Uni-10...............][Uni-11][Uni-12..]
OutputD (Yellow) : [Uni-13....................]
```

ArtNet/sACN Unicast, Multicast & Broadcast mode

It is recommended that Unicast mode is used when sending ArtNet/sACN data to AirPixel.
Limited and 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 for Artnet and 5568 for sACN.

Dimensions

Length : 65mm (plus JST cables and antenna) – Width 32mm – Height 12mm

Software Compatibility

AirPixel 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 Uploads

From time to time we may issue revised firmware for our products. The latest firmware can be uploaded wirelessly to AirPixel, for this you will need the .Bin firmware file. Please ensure that the firmware file matches the product you are downloading to. For AirPixel 'over-the-air' firmware upgrades, there are several options depending on your operating system :

Windows : Use Chrome Browser
Mac OSX and iOS : support is already built in, no any extra software required
Linux : Avahi http://avahi.org/

Firmware uploads can be initialised by pressing [Firmware Upload] found at the bottom of the Browser Configuration Page. Now open your browser, for Windows this will be Chrome. Type "192.168.1.200/update" (or whatever your device IP is) into the URL bar and press return. You should now be faced with the options to 'Browse' for a file and 'Upload'. Pressing [Browse] will allow you to select the required .Bin file you wish to upload to AirPixel, once selected press [Upload]. Once the upload is complete a message will show it is complete and rebooting (the browser page may timeout at this point). DO NOT disconnect AirPixel, the device will require up to a minute to transfer its data internally and reboot, during this time no LEDs will be shown, but once complete the device should go back to connecting to your current network and the GREEN LED will be flashing. The upload success can be tested by accessing the browser configuration page and checking the firmware version number, written as "AirPixel Quad vX.XX

Note : *If you press [Firmware Upload] from within the browser configuration page and decide not to go ahead with it, no damaged has been done and recycling the power to the device will resume normal operation.*

IMPORTANT : Please note that this is a 5V Device only, if the power input exceeds 5V the AirPixel could be damaged internally

Technical Support

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