

Introduction

AirPlay-Mini is a multifunction Pixel-LED driver device. It is capable of capturing up to 4 universes (680xRGB/512xRGBW Pixel-LEDs) of Wi-Fi Art-Net Pixel data and saving the data-stream direct to a standard micro SDCard inserted in the front panel. Up to 100 separate animation files can be recorded, and they can be recalled and played-back to the Pixel-LED output (center connection of the 3pin connector). The output is capable of driving Pixel-LEDs using the standard WS2811/12/13/15/SK6812-style protocol. The mode of operation and file selection can be done via a simple deployed WebApp that can be accessed via mobile-phone or tablet. The device can also be put into 'LiveStream' mode where pixel data-streams can be sent directly to the AirPlay-Mini and then sent directly out to the Pixel-LEDs (without recording/playback). AirPlay-Mini can also operate in a Standalone mode called 'FilePlayer' where no network connection is needed. Operation Mode is indicated by a simple Red-Blue status LED.

Specifications

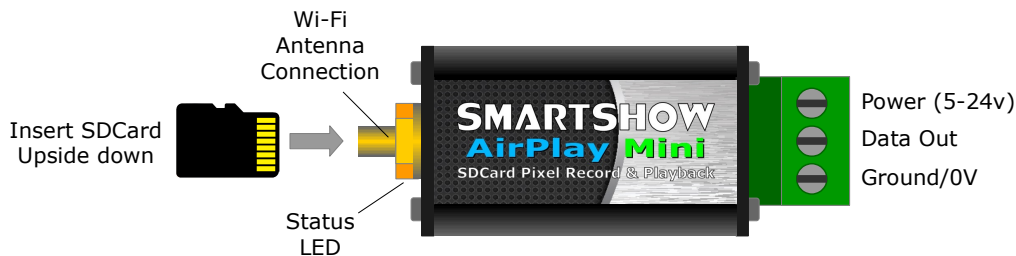
Radio Module : Wireless standard 802.11 b/g/n, Frequency range 2.4-2.5 GHz
 Protocol : Art-Net over Wi-Fi, 4 Universe Art-Net II & III decoding pixel data at 25fps typical
 Power Input : 5-24V across Power and Ground connections of 3pin plug, reverse connection protected
 Pixel-LED Data Output: **RGB:** Up to 680 pixels, **RGBW:** Up to 512 pixels

Parts Supplied

AirPlay-Mini device, 3-Pin Pluggable screw connector

Product & Pixel LED Connection

Power for the AirPlay-Mini can be tapped off the local Pixel power as long as it is within 5-24V range. **Applying more than 24V to the product may cause damage internally.** Connect the Pixel Ground (0V) connection to the AirPlay-Mini 'GND' connection and connect the local Pixel +Ve power to the PWR connection. Connect the AirPlay-Mini Pixel Output (Data Out) to a Pixel strip Data-In (DI) connection, and ensure the GROUND(0V) of the Pixel Strip is commoned with the AirPlay-Mini's GROUND connection (see the illustration below)



SDCard Insertion

Please note, the SDCard should be inserted upside down into the slot, so that the manufacturer logo is facing downwards and the contact strip of the SDCard is facing upwards. Please do not force the SDCard into the slot the wrong way around as this will damage the slot. TO remove the SDCard, simply press the SDCard inwards lightly until the spring releases/ejects it outwards.

Antenna Connection

Screw the Wi-Fi antenna to the gold coloured antenna connection, which ever way round you mount the AirPlay-Mini always try to face the Antenna in the same 'plane' as the Wi-Fi routers Antenna. For example, both vertical. The antenna supplied has a gain of 2dBi, alternative antenna can be used as long as the pin/socket arrangement matches that of the AirPlay-Mini. Similarly, antenna extension cables can also be used.

Status LED

The Status LED on the device front panel can show either RED, BLUE or OFF. All connection & operational modes are shown using this simple indicator by various flashes and sequences :

Initialisation Processes

Solid Purple

Red/Blue equal medium flash (Red=250ms:Blue=250ms)

Red/Blue equal fast flash (Red=100ms:Blue=100ms)

Short Slow Red flash (Red=75ms:OFF=925ms)

Long Red On, Long OFF (Red=1s:OFF=1s)

Solid Blue

WIFI.INI Config Errors (see DEBUG.TXT)

No Card detected or No WIFI.INI file

Reading WIFI.INI configuration

Connecting to WiFi Network

Network not found or no connection possible

Network Connected

Operation Modes

Solid Blue

Very fast Blue flashing (Blue=50ms:OFF=50ms)

Short Blue flash twice per second (Blue=25ms:OFF=475ms)

Solid Red

Very fast Red flashing (Red=50ms:OFF=50ms)

Solid Blue, dips when new changes are received

Standby Mode / LiveStream (waiting for data)

Playback Mode Playing

LiveStream Mode (receiving data)

Record Mode (waiting for data)

Record Mode (capturing data)

RemoteControl Mode active

Firmware Update (see relevant section)

Fast flickering Purple

Device Configuration

The entire configuration for AirPlay-Mini is done through one simple 'WIFI.INI' file that should exist on the SDCard. The SDCard supplied has an example 'WIFI.INI' file. This file needs to be opened using a standard text file reader (like Windows Notepad) so changes can be made and saved. Then the SDCard can be inserted into the AirPlay-Mini front panel slot and AirPlay-Mini can then read it. The contents of the 'WIFI.INI' file should look something like this:

```
*STARTUP_MODE=STANDBY
*NETWORK_SSID=myNetworkSSID
*NETWORK_PASS=myNetworkPassword
*ADMIN_PASS=admin
*DEVICE_IP=192.168.1.200
*DEVICE_SNM=255.255.255.0
*START_UNI=0
*REMOTE_UNI=20
*REMOTE_DMX_CHAN=1
*OUTPUT_TYPE=WS2812
*SD_PROTECT=OFF
*BRIGHTNESS=255
*PLAYLIST=0,1,2,3,4,5,6,7,8,9
*END*
```

There are also some instructions in the file to help you set the configuration, these will look like this:

*STARTUP_MODE= options:

If you want AirPlay-Mini to power up directly into a specific mode, then you can set that here. This is very useful when you have finished creating all your content and you just want AirPlay-Mini to start working automatically once you have applied the power.

STANDBY - Connects to Wi-Fi, then waits in standby mode awaiting user control from the WebApp

LIVESTREAM - Connects to Wi-Fi, and starts in LIVESTREAM Mode, for playing Pixel data direct from a host pixel application

REMOTECONTROL - Connects to Wi-Fi, and allows files to be selected via Remote uni/dmx channels (no Record or Delete functions)

FILEPLAYER - Starts playing files from PLAYLIST one after another, no Wi-Fi connection required

*NETWORK_SSID=

*NETWORK_PASS=

The SSID and Password of the Wi-Fi Network you are trying to connect to. If you are using any of the features that requires AirPlay-Mini to be on a network then you should fill these in carefully & correctly

*ADMIN_PASS=

The Password required to access the WebApp that can be deployed to your mobile-phone/tablet, after the Wi-Fi Connection is made (username is always 'admin', default password='admin')

*DEVICE_IP=

The static network IP of the AirPlay-Mini device once it has connected to the network, this IP must be available and free to use on the network (default is 192.168.1.200), and its value must be within the class A/B/C range.

*DEVICE_SNM=

The Subnet mask of the network you want to connect to, generally this is either 255.0.0.0 (class A), 255.255.0.0 (class B), or 255.255.255.0 (class C). The default is 255.255.255.0

*START_UNI=

The starting universe of the Art-Net data that you want to record over the Wi-Fi network, AirPlay-Mini will consume up to 4 universes starting from this start value, the value range is 0-239

*REMOTE_UNI=

*REMOTE_DMX_CHAN=

If the device is being controlled remotely (via STARTUP_MODE=REMOTECONTROL, or by selecting Remote Control in the deployed WebApp), then these are the Universe number (0-255) and Starting DMX channel (0-250) respectively. AirPlay-Mini consumes 3 channels : FileNumber (0-99), Stop/Start/Loop & Brightness (0-255)

*OUTPUT_TYPE=

Insert the type of pixels being used here, WS2811, WS2812, SK6812 etc, if the pixel you enter is not on our list then it will default to WS2812

*SD_PROTECT=

You can protect the SDCard from accidental file delete only from within the WebApp by setting this to ON (default=OFF)

*BRIGHTNESS=

You can reduce the overall level of the Pixel brightness output by setting a value here from 25 to 255 (10% to 100%), default is 255. This feature is useful when you have recorded animations too bright

*PLAYLIST=

Up to 10 numbers can be entered separated by a comma, these are the files that you want to play when the device has powered and the *STARTUP_MODE=FILEPLAYER. AirPlay-Mini will only play the file numbers in the Playlist if they actually exists on the SDCard, otherwise it will skip and move onto the next one in the list. Once the list is complete, the playlist will start from the beginning again

Once you have finished configuring the device, it may be useful to print out the WIFI.INI file for reference

Using Blank SDCards

If you place a blank SDCard into the SDCard slot, AirPlay-Mini will know that there are files missing and will automatically create a WIFI.INI file (prefilled with default values) and also create the /DATA/ directories where your pixel data will finally reside

Configuration Troubleshooting

If you have any issues in any of the above features, or AirPlay-Mini rejects your configuration (for example, unable to connect to the network because of missing or incorrect values) the results will be reported in a file written back to the SDCard called 'DEBUG.TXT'. This file can be read by any text file reader, and you will clearly be able to trace where you may have gone wrong with the configuration.

How do I know the DEVICE_IP and DEVICE_SNM for the network I am trying to connect to ?

Firstly, you must be connected to the Wi-Fi router that you intend to use. On windows, in the generic search box, find and run 'command prompt', then once the shell screen loads, type 'ipconfig' after the prompt and press return. In the list you will see the following (make sure you scroll down to the Wireless LAN section) :

```
Wireless LAN adapter Wi-Fi:
Connection-specific DNS Suffix . . : home
IPv6 Address. . . . . : 2a32:2977:f545:d98e:bbl1a:3dfe:2d6a:7aad
Temporary IPv6 Address. . . . . : 2a1f:5fc7:f5fe:d992:51ab:c66e:9ba4:ec7e
Link-local IPv6 Address . . . . . : fefa::55de:3d7:ee4a:abcd%31
IPv4 Address. . . . . : 192.168.1.184 <- THIS is the IP address of your PC on Wi-Fi
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fa82::be9d:1afe:f456:a0a2%12
                            192.168.1.254
```

Make a note of the 'IPv4 Address' and 'SubNet Mask' (as shown)

In the WIFI.INI file, enter the SubNet Mask value into the ***DEVICE_SNM=** line, and on the ***DEVICE_IP=** line type the first THREE numbers of the IPv4 address followed an individual number you want to be associated with this particular device (each number separated with a dot), for that last number, higher values from 200-254 are usually fine to use, but to be absolutely sure you are choosing an IP address that is free, go back to the Command Prompt box and type '**ping 192.168.1.200**' (or whatever IP you have decided to use for the device). If the IP address is free on the network you will see something like the following:

```
>ping 192.168.1.200
Pinging 192.168.1.200 with 32 bytes of data:
Reply from 192.168.1.111: Destination host unreachable. (similar line x 4)
Ping statistics for 192.168.1.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
```

If the IP address is currently used by another device then you will see something like this :

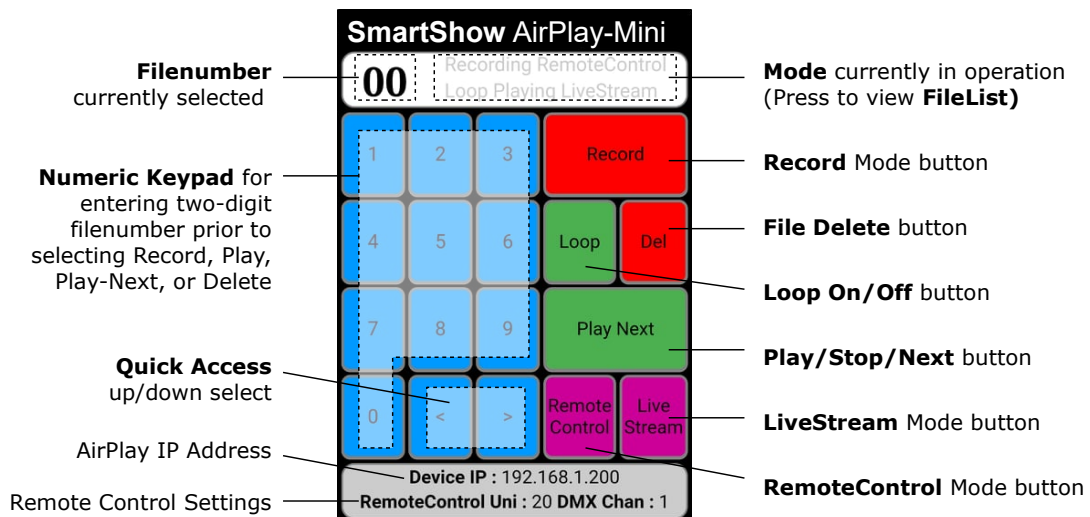
```
>ping 192.168.1.200
Pinging 192.168.1.200 with 32 bytes of data:
Reply from 192.168.1.200: bytes=32 time=287ms TTL=64 (similar line x 4)
Ping statistics for 192.168.1.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 23ms, Maximum = 384ms, Average = 199ms
```

Once you have found a free IP address, you can now enter the details into the WIFI.INI file. For example, if the IPv4 address was 192.168.1.184, and the Subnet Mask is 255.255.255.0, then you should ensure you have the following in your WIFI.INI file :

```
*DEVICE_IP=192.168.1.200
*DEVICE_SNM=255.255.255.0
```

The WebApplication (WebApp)

To access the WebApp, the AirPlay-Mini must have first connected to the Network (using the credentials in the WIFI.INI file). Your mobile-phone/tablet also should be connected to the same network. Open a browser page and enter the Device IP as you have set in WIFI.INI (DEVICE_IP=). The WebApp should load and may ask you for an access password, this will be the ADMIN_PASS that is set in the WIFI.INI file (default is 'admin')



Setting up Jinx ready for LiveStream or Recording

Open your Pixel-LED animation application, we suggest Jinx which can be downloaded from <http://www.live-leds.de/>. The following is an example of how to set up Jinx to use with AirPlay-Mini

1. Ensure that your AirPlay-Mini is connected to the Wi-Fi Network (shown by a solid Blue led) and that the PC running Jinx is also on the same network
2. Configure Jinx to talk to your AirPlay-Mini device by selecting '*SetUp>OutputDevices*' menu
3. To start from scratch, delete any current devices that are already in the list
4. Press 'SCAN' and wait for Jinx to communicate with AirPlay-Mini
5. If communication is successful, Jinx will automatically fill out all 4 universes based on the AirPlay-Mini reply
6. If SCAN is unsuccessful, then you can ADD each universe one at a time manually (up to a maximum of 4)
7. You may need to edit each of the Universe entries for the right amount of Pixels you are using per universe, if you are using 170 WS2812 Pixels, then enter '510' for channels (3*number of pixels, since they are GRB)
8. Design your matrix size and shape within '*SetUp>MatrixOptions*'
9. Patch your matrix to the AirPlay-Mini universe(s) within '*SetUp>OutputPatch*' - be careful to select the correct colour order for your Pixel-LEDs; WS2812 are GRB, and NOT RGB, always starting at channel zero.
10. Ensure ALL universes are patched to different parts of the Matrix.
11. Ensure your mobile-phone/tablet is also connected to the same network and open a browser page at the IP you have set for the device. For example, enter 192.168.1.200 as the web URL to access the device.
12. The WebApp should load and may ask you for an access password, this will be the ADMIN_PASS that is set in the WIFI.INI file (default is 'admin')
13. The WebApp should then open (see WebApplication above)
14. Press the 'LiveStream' button, the LiveStream button should appear highlighted in Yellow, all other buttons should disappear, and 'LiveStream' should be shown in the top Window of the WebApp
15. From Jinx, go to '*SetUp>StartOutput*' to start the show.
16. Ensure your Pixel-LEDs are connected to the data outputs at the rear of AirPlay-Mini, and independently powered following the correct connections.
17. If you have all the information correct, then the AirPlay-Mini status LED should be making a short flash, twice per second
18. Select the effect you want to see from Jinx channel effects and have fun !

Frame-rates when Recording or Livestreaming

AirPlay-Mini will work most effectively at 25 Frames per second, this is taking into account the fact that pixel data output can be up to 4 universes in length, and the fastest AirPlay-Mini can refresh its outputs is highly dependant on the LONGEST pixel output. For example, if you have the output sending all 4 universes (that is 680 RGB Pixel-LEDs), this takes over 20ms to send. If a frame's incoming Wi-Fi data packets arrive at 25 frames per second that equates 40ms for each frame, which gives AirPlay-Mini enough time to collect/calculate/send the data.

Recording Pixel Streams

To record a data-stream to an SDCard file, firstly you need to prove that the above procedure works. You can only Record if ***SD_PROTECT=OFF** in the WIFI-INI file, otherwise the action will be blocked

1. If you are in 'LiveStream' mode (shown highlighted in yellow), then press the LiveStream button to exit back to Standby. All other buttons should not be visible and active
2. From Jinx, go to '*SetUp*' and make sure '*StartOutput*' is unchecked
3. Select a file number like '0 0' (this will be shown on the window at the top of the WebApp)
4. Press RECORD
5. If the file already exists then a message will be shown 'This file is NOT empty'. If you want to record in this slot then you will need to delete it first (see '*Deleting an Animation File*' below) otherwise just select a different file number and try again
6. If the selected file is free for Recording, then the top window of the WebApp should show 'Recording'
7. AirPlay-Mini will wait until you start the data-stream from Jinx, go to '*SetUp*' and check the '*StartOutput*' box
8. The data-stream will now be recording to the SDCard, and any changes you make from Jinx will have immediate effect on the file data that is saved
9. Once you have finished, either press 'STOP' on the WebApp, or on Jinx go to '*SetUp*' and uncheck the '*StartOutput*' box, this will put the AirPlay-Mini WebApp back into Standby Mode
10. The file number of the file you have just recorded will still be in the top window of the WebApp, so if you now press PLAY, the data you have just recorded will be played back to your pixels

NOTE : It is not possible to simultaneously record the data-stream AND preview the data on the Pixel-LEDs, these actions should be done separately

NOTE : When setting up for recording Pixel data-stream, it is best to create a quiet/private Wi-Fi network, meaning a network that is not used by any other devices other than the PC, Mobile-Phone/Tablet and the AirPlay-Mini. Also close all 'network needy' applications other than your Pixel host application. It is also a benefit to do a local Wi-Fi channel frequency analysis to ensure that your network is using the quietest Wi-Fi frequencies, and you can change your Wi-Fi router channel to overcome channel-crowding. You can view locally used Wi-Fi channel frequency usage with 'WifiAnalyser' app for Android. One final benefit would be to have the Wi-Fi router within a local range of a few meters of where you are recording.

Playing back a Recorded Pixel File

As long as a Pixel data file exists on the SDCard it can be played back from AirPlay-Mini using the WebApp

1. Ensure AirPlay-Mini is in Standby mode, this is normally indicated by no buttons (apart from LOOP) being active (yellow outlined)
2. If the top window of the WebApp shows the File number of the file you want to play (in large numerals) then proceed to the next step, otherwise type the two digit number of the file you want to play
3. Press the 'PLAY' button
4. If the file doesn't exist on the SDCard, the you will see a message 'This File is Empty'
5. Once the pixel animation has completed, AirPlay-Mini will return to Standby Mode, unless..
6. If the LOOP button is active then once the pixel animation is completed it will return to the start and continue looping round until you press STOP or deactivate LOOP and wait for the sequence to finish
7. You can press STOP at any time

Selecting the 'Next' file while a file is still playing

While one file is playing you can press the two digits of the next file you want to run. The PLAY button text will be replaced by 'PLAY NEXT'. When you are ready press 'PLAY NEXT' and this should immediately jump to play the new file.

Using the Quick Access buttons

There are two buttons at the bottom of the keypad, '<' and '>', these are used to select the NEXT or PREVIOUS file by moving up or down one file number at a time.

Viewing the SDCard 'Available File List'

To examine what files already exist on the SDCard, press anywhere in the top window of the WebApp
A 10 x 10 array of numbers will appear; the existing files found on the SDCard are shown in **BOLD**

Deleting an Animation file

You can only Delete animations files if ***SD_PROTECT=OFF** in the WIFI.INI file

If you have a file you want to delete, then from Standby, simply enter the file number and press the DELETE button. If the file exists on the SDCard then you will see a message 'Do you wish to delete FILE xx?'. You can either Cancel or press OK. Pressing OK will delete the file and another message will appear to confirm that. If you try and delete a file that doesn't exist, then you will see a message 'This file is empty'

Sample files on the SDCard

On the SDCard that comes with a newly purchased AirPlay-Mini, you may find there are some sample/demo files that are stored in the upper file numbers (90-99). There are very basic colour tests that can be played to check that the pixel connections are working well and everything is wired correctly. If they are not needed they can be deleted at any time

LiveStream : Multiple Device Connections

If required, you can add several AirPlay-Minis (in LiveStream mode) to your Wi-Fi network and have them controlled from the same host application. Each AirPlay-Mini would need to have a different DEVICE_IP address (x.x.x.201, x.x.x.202, x.x.x.203 etc) and be added to your host application as a new device and patched accordingly into its own area of the matrix.

LiveStream : Art-Net ArtSync synchronisation

If you are using LiveStream mode and have several AirPlay-Mini devices that need to be synchronised together, then you should enable 'ArtSync' from your host application. Unfortunately Jinx does not support ArtSync. Consult your Application user guide for more information.

FILEPLAYER mode : Playlist

If you decide to use ***STARTUP_MODE=FILEPLAYER**, and enter up to 10 file numbers in the ***PLAYLIST=** list, then on power up, AirPlay-Mini will play each of the list entries in order **ONLY if they exist on the SDCard**. If a particular file is non-existent it will be skipped, and the next one in the list checked and played. Once the list is exhausted, the Playlist will start again and continue on an endless loop.

Universe Manager

Unlike other multi-output pixel drivers, AirPlay-Mini has the ability to deal with many different sized universes. Therefore any incoming universe can be any length and AirPlay-Mini 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).

You don't have to send all universes to the output, and it is possible to skip universes, but you must **ALWAYS send Universe ONE**. See example below:

```
Output : [Uni-1...] [Uni-2.....] [Uni-3] [Uni-4.....]
```

Getting the best performance from your SDCard

A newly Fat32 formatted SDCard will give you the best record/playback performance due to utilising contiguous flash memory rather than fragmented. Continual experimenting with record/del/record may end up fragmenting your card and cause jitters during the recording cycle. Files can be copied to a freshly formatted SDCard, but it is important to know that for each recorded animation there are TWO Files : **FILEXX.DAT** contains the pixel data and **FILEXX.INI** contains the universe and recorded frame rate information, you cannot have one without the other, and if one of the file-types is missing from the SDCard the file slot will appear as empty. These files are held in the SDCard's '/DATA/' folder and not in the root.

What can you fit on a standard 32G SDCard ?

In general, if running 4 Universes at 25 frames per second, you could get one continuous animation that runs for over a week. Alternatively you could have 100 animations of about 3 hours each. Smaller SDCards will obviously store an overall lesser amount.

Hot-Swapping of SD-Cards

SD-Cards can be hot-swapped at any time. Once an SD-Card is removed, any residual pixel display will be cleared down. Once a new SD-Card is inserted a reboot will take place and the WIFI.INI is read from the SDCard as normal. Therefore if you want to work with multiple SDCard on the same setup, then the WIFI.INI file will need to be the same on each card.

Using RGBW (4-colour) LEDs

AirPlay-Mini is able to output data to either RGB or RGBW LEDs (depending on your host application, or what has been previously recorded). RGB LEDs use 3 channels per pixel and RGBW LEDs use 4 channels per pixel. Since RGBW uses 4 channels and there is a maximum of 512 channels per universe on Art-Net, the maximum number of RGBW Pixel-LEDs that will fill one universe is 128.

Art-Net Unicast & Broadcast mode

It is recommended that Unicast mode is used when sending Art-Net data to the AirPlay-Mini. Using Art-Net Data broadcasting is not recommended

Art-Net Device Discovery & DHCP

There is the ability to discover IP addressing and device information using ArtPoll, Some applications allow an Art-Net scan which will pickup the device details and make it quicker to configure.

There is no DHCP function on AirPlay-Mini as IP addressing is Static only, utilising client port 6454.

Pixel-LEDs that can be driven from the AirPlay-Mini

WS281x, UCS1903, UCS290x, TM1804, SK6812, GS8208

Dimensions

Length : 59mm (including connectors) – Width 25mm – Height 29mm

Software Compatibility

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

Power Supply

It is recommended that you use a quality power source with this product, if powering the AirPlay-Mini independently, we recommend a 5-24V supply capable of providing a minimum of 500mA. Please ensure all ground(0V) connections are commoned between AirPlay-Mini, Pixel-LEDs and Power supplies.

Mounting your AirPlay-Mini

The AirPlay-Mini end plates have slots that can be used to pass either Velcro straps or cable ties through so the device can be mounted to a solid surface. Alternatively, a DIN-rail mounting plate can be purchased from SmartShow UK which simply fits between the slots provided.

Upgrading AirPlay Firmware

From time to time we may issue revised firmware for our products. The latest firmware can be uploaded to the AirPlay-Mini by placing the **APMINIFW.BIN** file onto the SD-Card. Once powered the device will read the firmware file, program it (showing continuous fast flickering PURPLE LED) and show a confirmation (Solid BLUE LED) at the end, after which the device will reboot running the newly install firmware. **Do not remove power or SDCard during the update process.** Please ensure that the firmware file matches the product you are installing to. On completion of a successful upgrade the **APMINIFW.BIN** file will be deleted from the SDCard.

Licensing Upgrade firmware

If you are upgrading from a *SmartShow AirPixel-Mini-II*, then you can contact us for the new firmware for your device to turn it into an AirPlay-Mini. Once the firmware has been loaded you will need to purchase a [special license key](#) to activate the new firmware features. With the new firmware on the device and an SDCard in the slot, apply power. The device will automatically create a LICENSE.txt file on the SDCard which you will need to read-back with a PC. The license key can be obtained by contacting our technical support with the MAC number of the device you want to upgrade and then paying the license fee. The license key (which only works on one device) must be entered into the space provided in the LICENSE.txt file on the SDCard. Save the file and place the SDCard back in your device and power on as usual. The firmware licensing will then take place automatically and the new AirPlay-Mini features will be unlocked. The contents of the LICENSE.txt file should contain :

```
*MAC=aabbccddeeff
*LICENSE=insert-your-license-key-here
*END*
```

NOTE : If you have purchased a new AirPlay-Mini then you will not need be concerned with a LICENSE.txt file

Technical Support

email : sales@smartshow.lighting

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