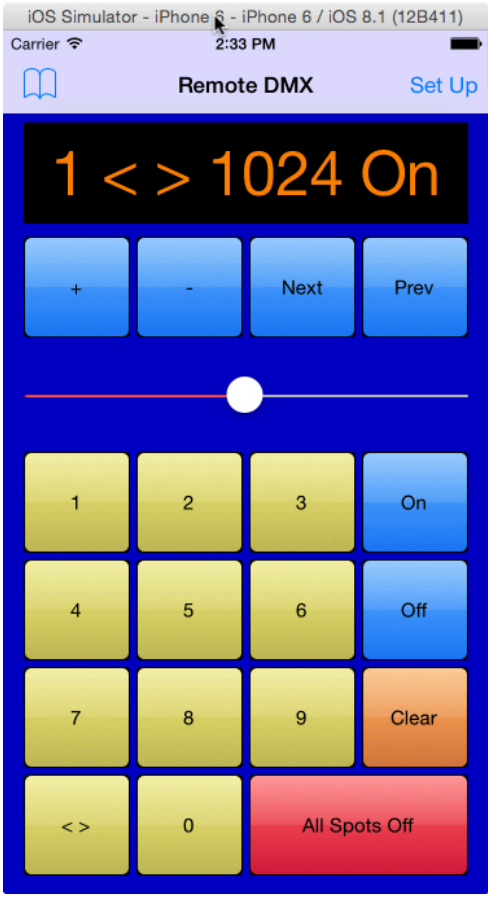
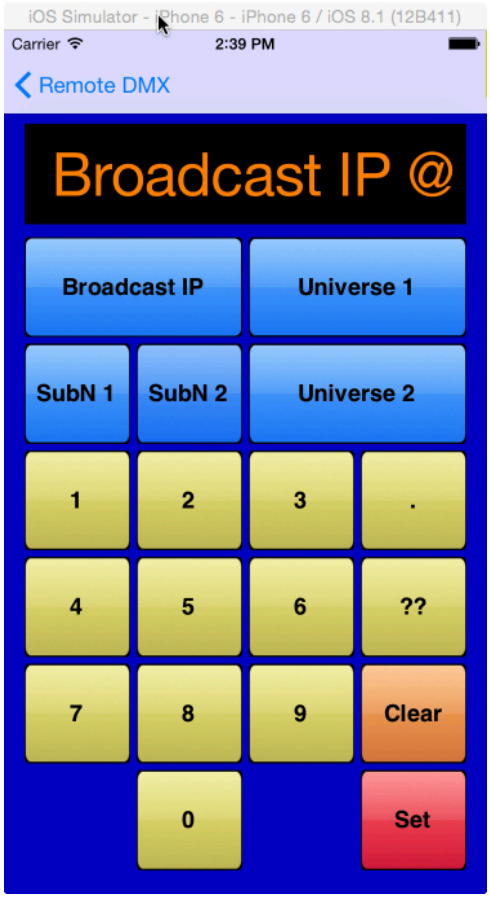
Remote DMX

Instructions manual to use and set up Remote DMX on MacBook™ or iPhone™





JG Electronics 20171215 version 3

Introduction

Remote DMX for iPhone™ is an app specifically created for theatre technicians and lighting designers to control, adjust and focus spotlights on lighting catwalks (bridges), trusses or fly-bars with a iPhone™ or iPad™ without a light board operator. Remote DMX is easy to operate, it contains special functions to turn a spotlight on and off.

There are two versions of Remote DMX available from the App Store, Remote DMX for MacBook™ and Remote DMX for iPhone™. Remote DMX for MacBook™ is free and is created as a try out for Remote DMX for iPhone™ and can be used without a Wi-Fi network.

Additional Equipment

Remote DMX sends Art-Net™ DMX data over Ethernet and Wi-Fi. To control dimmers and DMX controlled lights, you need an Art-Net™ / DMX converter and a Wi-Fi router e.g. Apple Express™. Remote DMX can be connected via an ethernet cable with the Art-Net™ / DMX converter, optional you can use a Wi-Fi network instead of a hard wired connection. The dimmers or spotlights must be USITT DMX512/1990 or DMX512A compatible.

Art-Net™ designed by and Copyright Artistic Licence Holdings Ltd

Art-Net™ is an Ethernet protocol based on the TCP/IP protocol suite. Its purpose is to allow transfer of large amounts of DMX512 data over a wide area using standard networking technology. The latest revision number of the protocol is Art-Net 4 and it is 100% backwards compatible with previous releases. Remote DMX is based on the first version of Art-Net and that means that the high byte in the Port-Address of each DMX512 Universe is always zero.

Art-Net™ Terminology

Node: A device that translates DMX512 to or from Art-Net™ is referred as a node.
Port-Address: One of the 32,768 possible addresses to which a DMX frame can be directed. The Port-Address is a 15 bit number composed of Net+Sub-Net+Universe.
Net: A group of 16 consecutive Sub-Nets or 256 consecutive Universes is referred to as a Net. There are 128 Nets total.
Sub-Net: A group of 16 consecutive Universes is referred to as a Sub-Net. (Not to be confused with the subnet mask).
Universe: A single DMX512 frame of 512 channels is referred to as a Universe.

For more information of the Art-Net™ Ethernet Communication Protocol:
http://www.artisticlicence.com/WebSiteMaster/User%20Guides/art-net.pdf

Local Area Network (LAN)

Art-Net™ Network

Art-Net™ designed by and copyright Artistic (UK) Ltd is an Ethernet protocol based on the Ethernet TCP/IP protocol suite. Its purpose is to transfer large amounts DMX512 data over a wide area using standard networking technology e.g. 100MB Ethernet.

To convert / translate a DMX512 signal to or from an Art-Net™ Ethernet signal you need a device (converter) referred to as a Node.

If your lighting desk has an Art-Net™ output or you use a MacBook™, iPad™ or iPhone™ then there is no need for a node that translates DMX512 to Art-Net™.

The Remote Control App for iPhone™ and iPad™ sends Art-Net™ DMX Ethernet wireless over Wi-Fi. To control dimmers and DMX512 controlled lights, you'll need besides an Art-Net™ to DMX512 node a wireless Wi-Fi router e.g. an Apple Airport Express™. The dimmers or spotlights must be USITT DMX512/1990 or DMX512A compatible.

It is best to experiment first with a cabled local area network (LAN) and if it works well to add the Wi-Fi router. That is why we have developed the free Remote Control App for the MacBook™ that can be downloaded from the App Store or from our website http://www.jgelectronics.nl/art-net-dmx/remote-dmx-osx.html.

Art-Net™ Protocol

DMX512 is suitable to send one DMX packet = 512 DMX values over one line (cable). If we need to send more then one DMX packet e.g. 4 DMX packets = 2048 DMX values then if we use a DMX network we need 4 DMX lines (cables).

Art-Net™ is theoretical capable of sending 16 x16 = 256 DMX packets over one Ethernet cable (network). In practice you can send 40 DMX packets = 20,480 DMX values in 40 Universes over a 100MB Ethernet Local Area Network (LAN) without a problem.

Art-Net is divided in 16 Sub-Nets and each Sub-Net has 16 Universes. One Universe can contain one DMX packet = 512 DMX values. The Sub-Nets and Universes are numbered from 0 till 15.

E.g. if you have a DMX input node with 4 DMX-inputs then you have to choose a number for the Sub-Net and to choose for each DMX-input a (different) Universe number. The DMX-output node(s) must have the same number for the Sub-Net and the DMX-outputs must have the same Universe numbers as the DMX-inputs.

The Remote DMX App can control 1024 individual DMX-channels over 2 Universes.

DMX-channel 1 till 512 will be transferred over Sub-Net1 and Universe1 and DMX-channel 513 till 1024 will be transferred over Sub-Net2 and Universe2.

In the Remote DMX's Set Up screen you can set the Sub-Net and Universe number for Remote DMX's Universe1 (DMX-channel 1 till 512) and the Sub-Net and Universe number for Remote DMX's Universe2 (DMX-channel 513 till 1024). The Sub-Net number for Remote DMX's Universe1 and Remote DMX's Universe2 may be the same or different and depends on the Sub-Net number of the Art-Net™ DMX-output node.

If you Art-Net™ DMX-output node has a NET selector then set the NET to zero.

Ethernet Protocol

The Art-Net™ data with the embedded DMX data is transferred over Ethernet with the TCP/IP protocol. Every device like a computer MacBook™ , iPhone™ , iPad™ , Art-Net™ DMX Node, a.s.o. in a Ethernet network e.g. a LAN must have an unique Ethernet IP address. Art-Net™ nodes don't support DHCP but support only static IP addressing.

To make this easy and by default, manufacturers derive the default IP address for a node from his MAC address or serial number and starts with 2 or 10 and is all ready set in the Node.

Every unit that communicates over Ethernet has a world wide unique MAC address that has been published by a commission. The derived Ethernet IP address of the MAC address will consequently be unique in a local Art-Net™ network and an Ethernet IP address derived from the serial number of the node will also consequently be unique in a local Art-Net™ network if you use nodes from one make and type. So it usually suffices for a node to only change the first part of the address (2 or 10) to comply with the Ethernet addresses used in your network.

A node has, just like a computer, a Subnet mask that has a default setting of 255.0.0.0 (not to be confused with the Art-Net™ Sub-Net). The Ethernet address and the subnet mask are both adjustable in the node with a special configuration app or by hardware (dip switch).

Ethernet Subnet Mask and Broadcast Address

For a full explanation of the Ethernet Implementation refer to the Art-Net™ manual:
http://www.artisticlicence.com/WebSiteMaster/User%20Guides/art-net.pdf

An IP-Address (IPv4) consists of 4 members with a value between 0 and 255 separated by a point e.g. 2.23.4.10. A subnet mask determines (simple explanation) what part of the address is the local network (LAN) and will determine the number of addresses the local network can contain.

The smallest local network e.g. 2.23.4.xxx has just 256 addresses (0 till 255).

A bigger local network has e.g. the addresses 2.136.xxx.xxx to its disposal and has 256x256=65536 different addresses. In the first case the subnet mask gets set at 255.255.255.0 and in the second case at 255.255.0.0.
It will be clear that all equipment in the first local network have to have an address that starts with 2.23.4 and the last number per unit must be unique. In the second larger network all addresses start with 2.136. and the last two numbers per unit must be unique.

WE CANNOT JUST ASSIGN ANY NUMBER!

Numbers 0 and 255 mustn't be assigned. These numbers have a special function! Use a number between 1 and 254 to avoid problems!

The broadcast address for a local area network (LAN) depends on the setting of the subnet mask. By default the subnet mask of every Art-Net™ Node is set to 255.0.0.0 and the broadcast address for the LAN should be set in de DMX Remote control to 2.255.255.255 if all IP-Addresses in the in the LAN start with 2. If the subnet mask is set to 255.255.0.0 then the broadcast address for the LAN should be set in de DMX Remote control to 2.23.255.255 if all IP-Addresses in the in the LAN start with 2.23.

Art-Net™ communicates through Broadcasts and Point to Point connections. A broadcast is an Ethernet transmission to all equipment connected to the local area network (LAN). For Art-Net™ this Broadcast address is 2.255.255.255 or 10.255.255.255 depending of the first number 2 or 10 of all the Ethernet addresses in the LAN. A Point to point connection is a connection between e.g. a computer (PC) and one single node, e.g. to edit the settings in the node.

The Macbook™, iPhone™ or iPad™ is part of the LAN and needs to have an unique IP address that is in the address range of the LAN. E.g. if the first number of all addresses is 2 the address of the Macbook™, iPhone™ or iPad™ should start with a 2. Set the subnet mask to 255.0.0.0 and use 2.255.255.255 as broadcast address.

Step by step Art-Net™ Network set up with MacBook™

Find out and write down the Ethernet Addresses of the Node(s) in the LAN.

E.g. there are 3 Nodes in the LAN with the following Ethernet addresses:
2.23.4.110
2.23.5.145
2.23.7.167

We see that all addresses of the nodes start with 2.23 and we assume that the subnet mask of all the nodes is the default value 255.0.0.0.

The first 2 numbers of the IP Address of our MacBook™ should be 2.23 and the following numbers should be different of the numbers used for the nodes to create an unique Ethernet address e.g. 2.23.3.95. The subnet mask can be set to 255.255.0.0 and use 2.23.255.255 as broadcast address or can be set to 255.0.0.0 and use 2.255.255.255 as broadcast address in the Remote DMX App.

[LC] = Left Click with mouse on….

Open System Preferences [LC] Network.

[LC] pop up menu Location and choose Edit Locations….

[LC] + (plus) and name the new location e.g. ArtNet 10 for a LAN that starts with 10 or ArtNet 2 for a LAN that starts with 2 and [LC] Done.

Choose by ‘Configure IPv4’ Manually.

Fill in by ‘IP Address’ e.g. 2.23.3.95

Fill in by ‘Subnet Mask’ 255.0.0.0

Leave ‘Router’ blank.

[LC] Advanced….

Configure IPv6: to Automatically.

Tab DNS: leave DNS Servers and Search Domains blank.

Tab WINS: don’t change anything.

Tab 802.1X: all blank.

Tab Proxies: in Select a protocol to configure all protocols disabled. Use Passive FTP Mode (PASV) enabled (selected).

Hardware: Here you can see your MAC Address of your PC and ‘Configure” set to Automatically.

[LC] OK button.

[LC] Apply button to activate your ArtNet location.

If the Art-Net™ location is applied switch Wi-Fi off and connect your MacBook™ with an Ethernet cable with the Art-Net™ / DMX Node. Set the Universes and Sub-Net of the node as follows: Universe for DMX output A to zero and Universe for DMX output B to one, set the Sub-Net to zero. If you can set the Net set the Net to zero.

In the set up screen of the DMX Remote App set Universe 1 (DMX channel 1 - 512) to zero and set Universe 2 (DMX channel 513 - 1024) to one. Set Sub-Net 1 and 2 to zero. Set the broadcast address to 2.255.255.255. Select in the Remote DMX screen DMX address 1 and press ON. The control LED's on the node must go on to indicate that there is Ethernet communication and if a spotlight is connected to DMX channel 1 it should go on.

If it works fine via an Ethernet cable and you have a Wi-Fi router which is correct configured you can switch on Wi-Fi on your MacBook™ and select your Wi-Fi router. Connect the Ethernet cable between your router and the Art-Net™ / DMX Node and if your Wi-Fi router is correct configured it should work the same as via an Ethernet cable directly connected to your MacBook™.

Step by step Art-Net™ Network set up with iPhone™ or iPad™

Find out and write down the Ethernet Addresses of the Node(s) in the LAN.

E.g. there are 3 Nodes in the LAN with the following Ethernet addresses:
2.23.4.110
2.23.5.145
2.23.7.167

We see that all addresses of the nodes start with 2.23 and we assume that the subnet mask of all the nodes is the default value 255.0.0.0.

The first 2 numbers of the IP Address of our iPhone™ or iPad™ should be 2.23 and the following numbers should be different of the numbers used for the nodes to create an unique Ethernet address e.g. 2.23.3.95. The subnet mask can be set to 255.255.0.0 and use 2.23.255.255 as broadcast address or can be set to 255.0.0.0 and use 2.255.255.255 as broadcast address in the Remote DMX App.

Open Settings and goto Wi-Fi.

Choose the Wi-Fi network which is connected with an Ethernet RJ45 cable to your ArtNet LAN. If the network is not know to your iOS device then tap 'Other' and enter the name and password of the network. If the network is connected you have to adjust the settings for the Wi-Fi network.

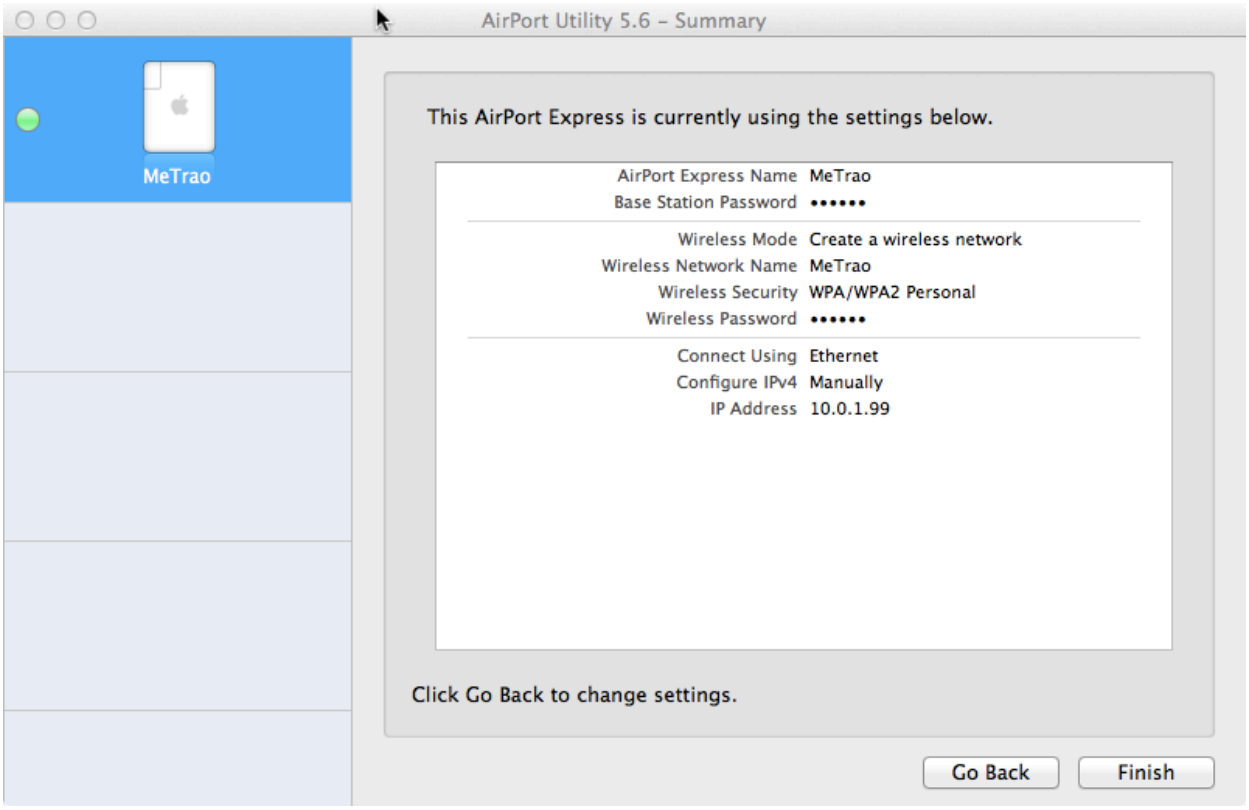
To adjust the settings tap Info , tap Static and set the IP Address e.g. to 2.23.3.95 and the Subnet Mask to 255.0.0.0 and go back to Wi-Fi.

Set the Universes and Sub-Net of the node as follows: Universe for DMX output A to zero and Universe for DMX output B to one, set the Sub-Net to zero. If you can set the Net set the Net to zero.

In the set up screen of the DMX Remote App set Universe 1 (DMX channel 1 - 512) to zero and set Universe 2 (DMX channel 513 - 1024) to one. Set Sub-Net 1 and 2 to zero. Set the broadcast address to 2.255.255.255. Select in the Remote DMX screen DMX address 1 and press ON. The control LED's on the node must go on to indicate that there is Ethernet communication and if a spotlight is connected to DMX channel 1 it should go on.

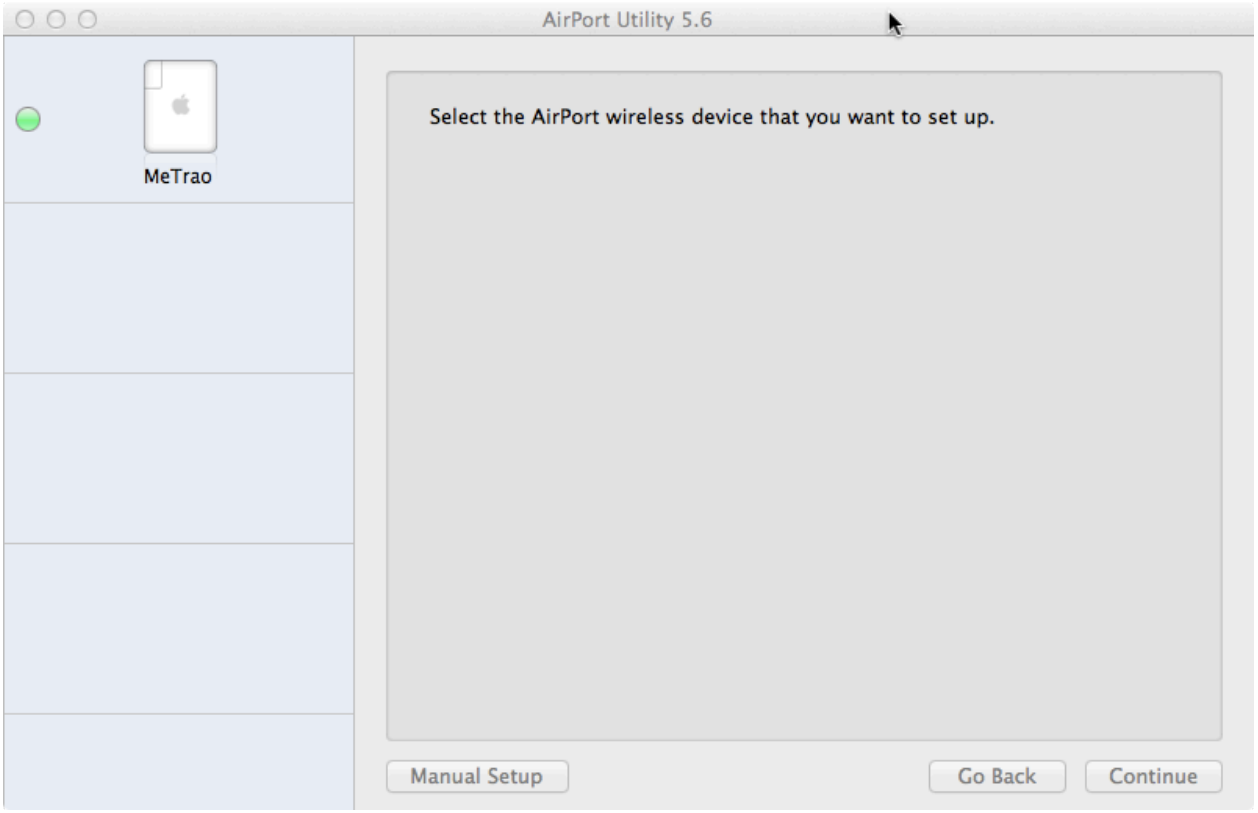
Wi-Fi Router set up

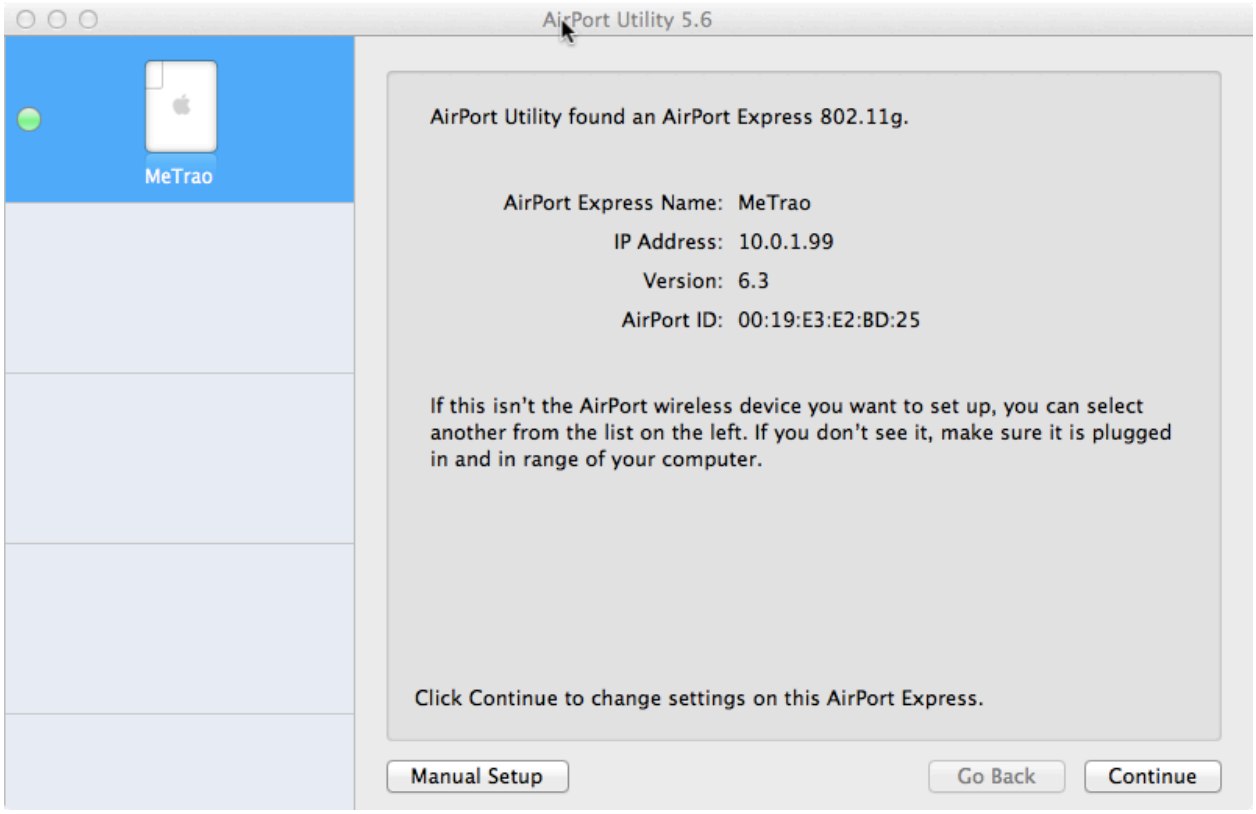
We use an Apple Airport Express™. It is set up as a wireless network only for Art-Net™. To avoid problems and conflicts the best thing you can do is to have a dedicated network not connected to the internet. The settings are as follows:

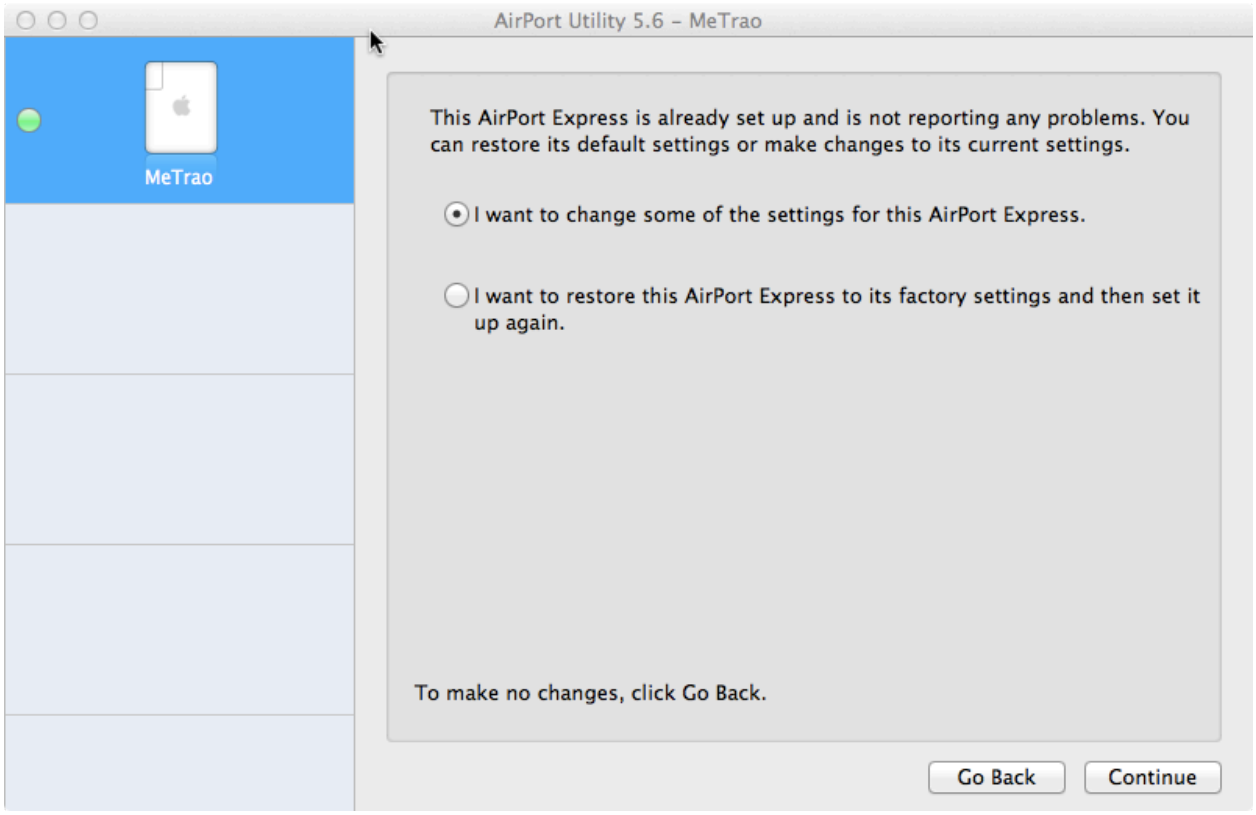


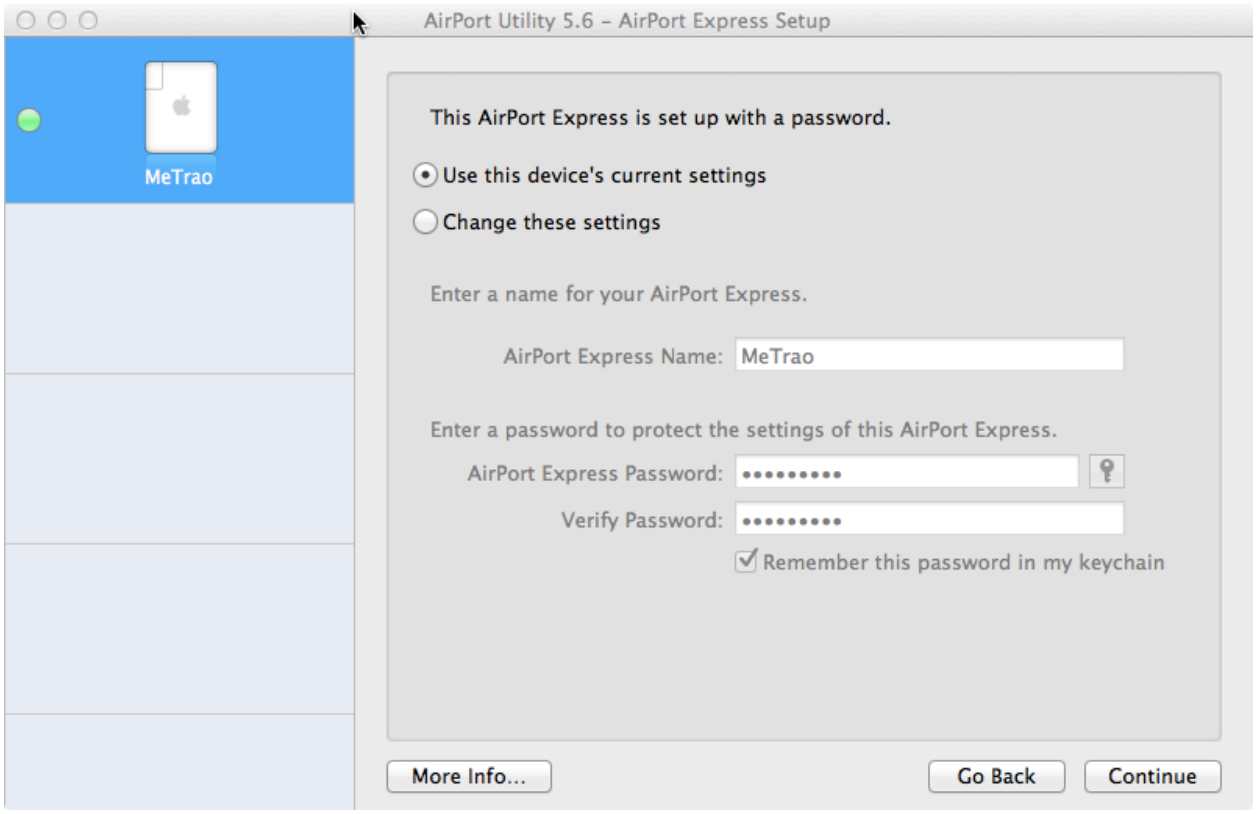
The IP Address is set to 10.0.1.99 and subnet mask is set to 255.255.255.0. This works for Art-Net™ nodes with IP Addresses that start with a 10 or a 2. The following pictures guide you trough the set up of an Apple Airport Express™ with the AirPortUtility from Apple.

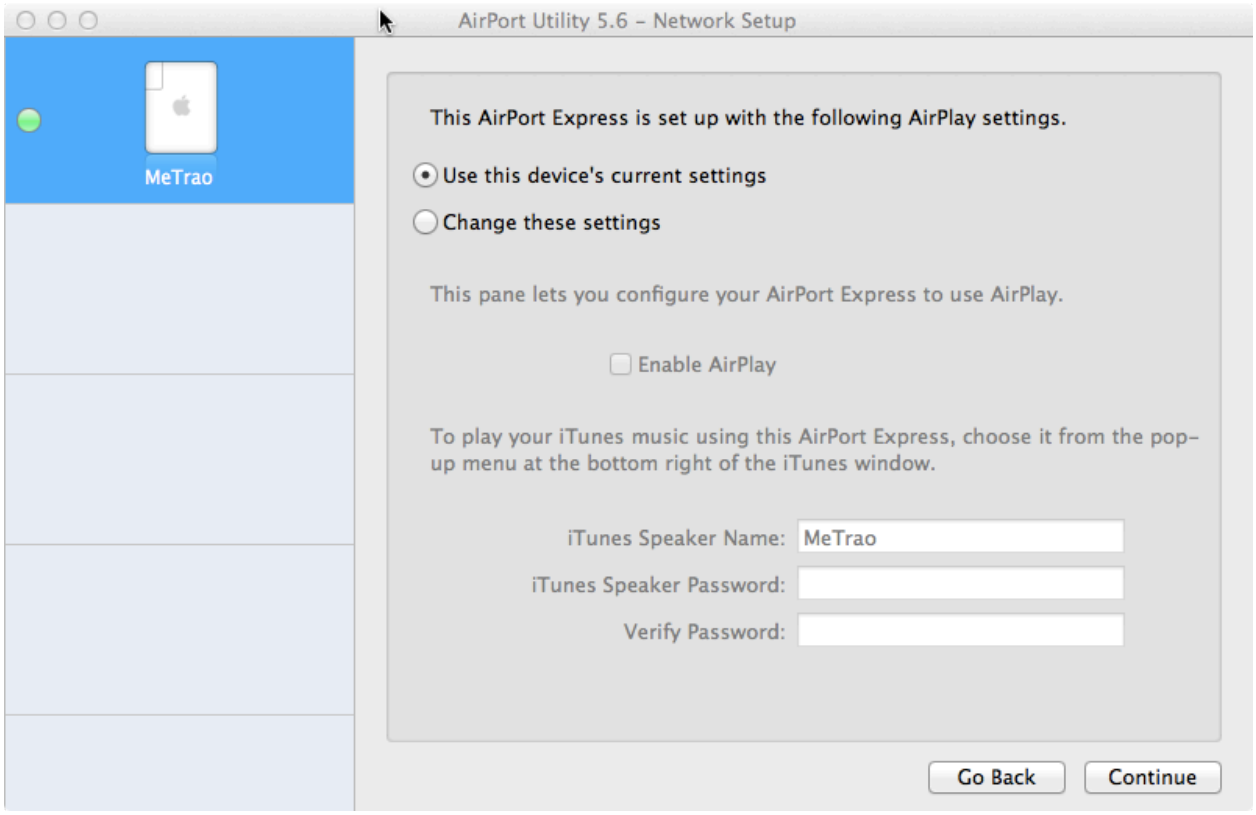

About This Mac
Mac OS X
Version 10.7.5
Software Update...
Processor 2 GHz Intel Core 2 Duo
Memory 4 GB 667 MHz DDR2 SDRAM
Startup Disk MacOSX
More Info...
TM and © 1983-2012 Apple Inc.
All Rights Reserved. License Agreement

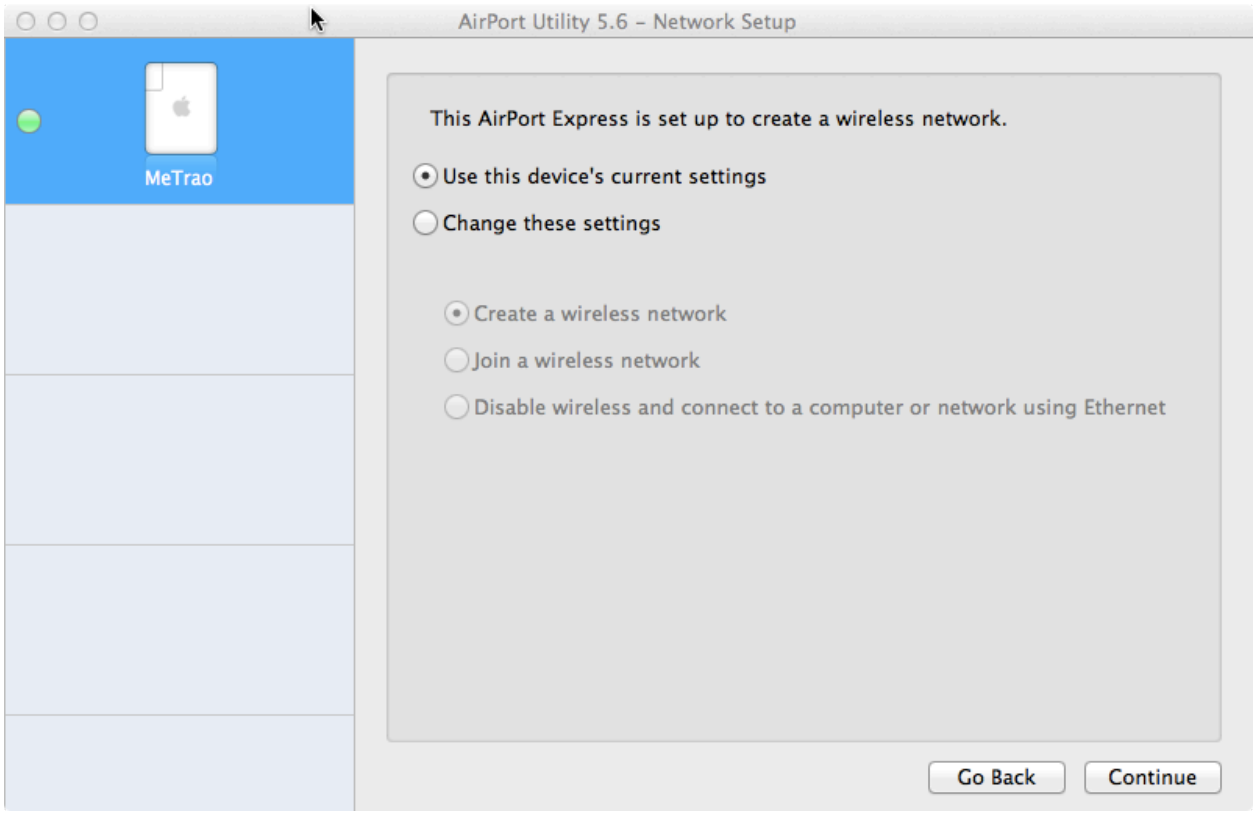

AirPort Utility 5.6
MeTrao
Select the AirPort wireless device that you want to set up.
Manual Setup
Go Back
Continue

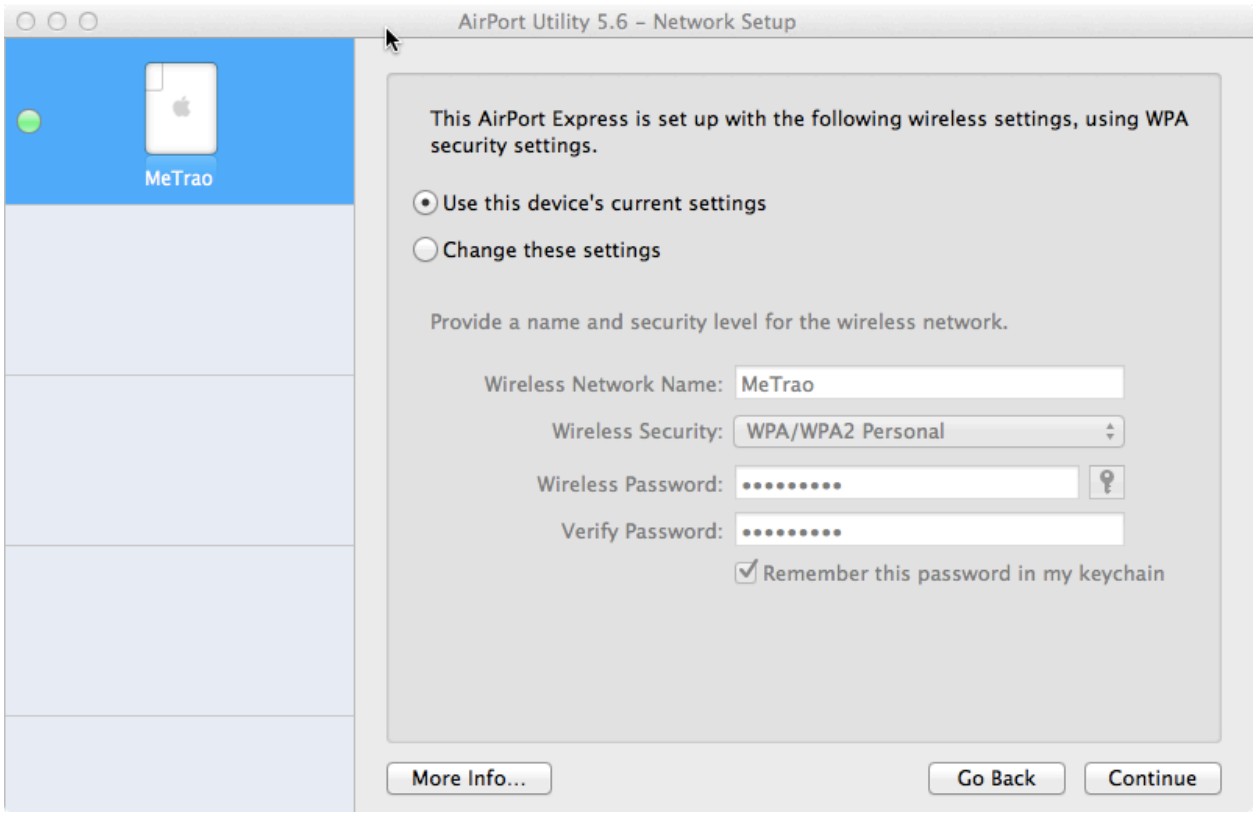

AirPort Utility 5.6
MeTrao
AirPort Utility found an AirPort Express 802.11g.
AirPort Express Name: MeTrao
IP Address: 10.0.1.99
Version: 6.3
AirPort ID: 00:19:E3:E2:BD:25
If this isn't the AirPort wireless device you want to set up, you can select another from the list on the left. If you don't see it, make sure it is plugged in and in range of your computer.
Click Continue to change settings on this AirPort Express.
Manual Setup
Go Back
Continue

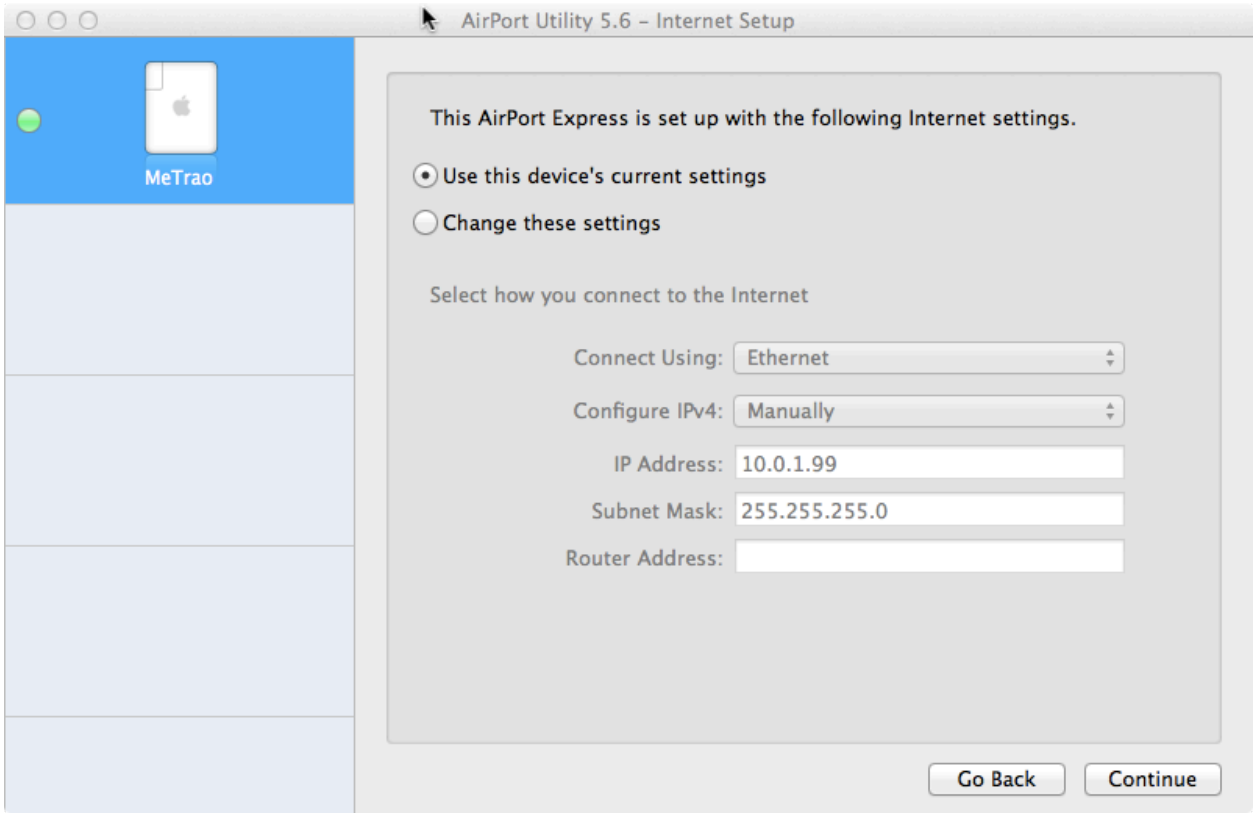

AirPort Utility 5.6 – MeTrao
MeTrao
This AirPort Express is already set up and is not reporting any problems. You can restore its default settings or make changes to its current settings.
I want to change some of the settings for this AirPort Express.
I want to restore this AirPort Express to its factory settings and then set it up again.
To make no changes, click Go Back.
Go Back
Continue

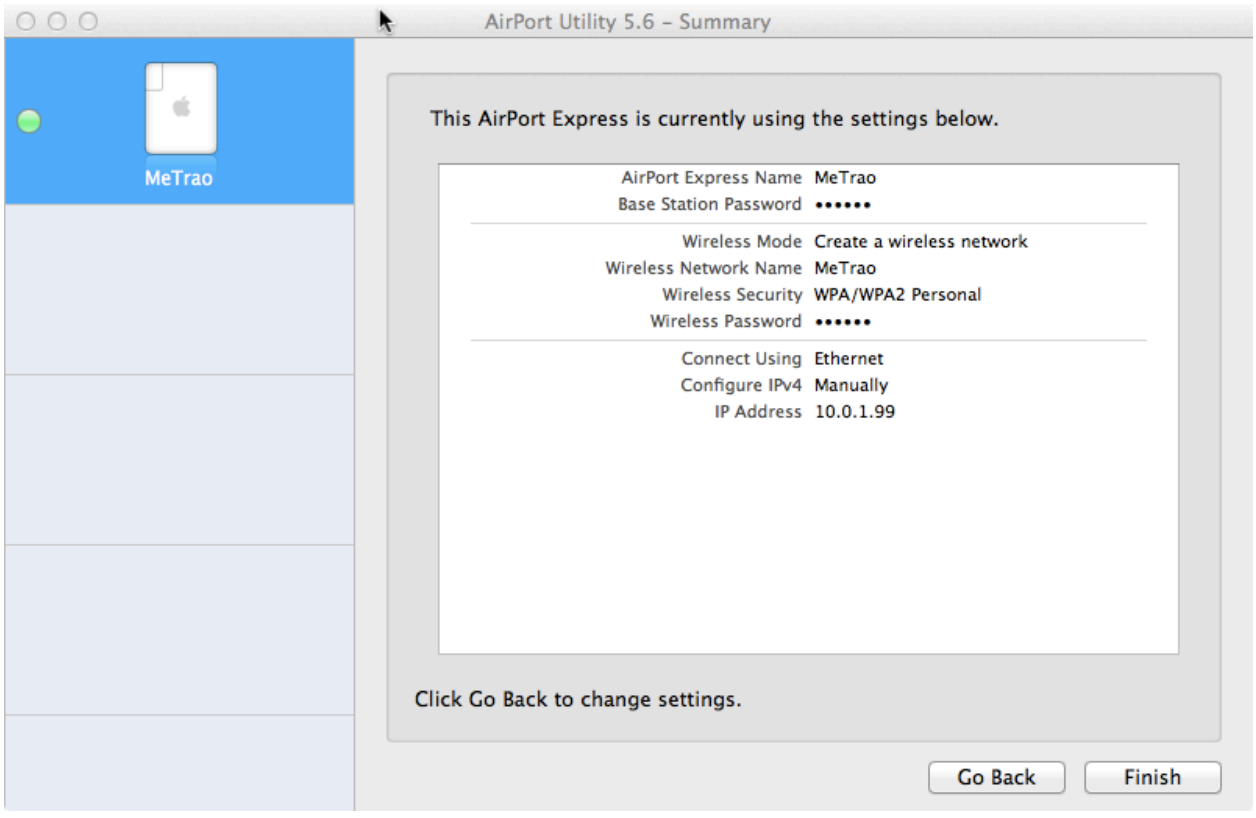

AirPort Utility 5.6 – AirPort Express Setup
MeTrao
This AirPort Express is set up with a password.
Use this device's current settings
Change these settings
Enter a name for your AirPort Express.
AirPort Express Name: MeTrao
Enter a password to protect the settings of this AirPort Express.
AirPort Express Password:
Verify Password:
Remember this password in my keychain
More Info...
Go Back
Continue


AirPort Utility 5.6 – Network Setup
MeTrao
This AirPort Express is set up with the following AirPlay settings.
Use this device's current settings
Change these settings
This pane lets you configure your AirPort Express to use AirPlay.
Enable AirPlay
To play your iTunes music using this AirPort Express, choose it from the pop-up menu at the bottom right of the iTunes window.
iTunes Speaker Name: MeTrao
iTunes Speaker Password:
Verify Password:
Go Back
Continue


AirPort Utility 5.6 – Network Setup
MeTrao
This AirPort Express is set up to create a wireless network.
Use this device's current settings
Change these settings
Create a wireless network
Join a wireless network
Disable wireless and connect to a computer or network using Ethernet
Go Back
Continue


AirPort Utility 5.6 – Network Setup
MeTrao
This AirPort Express is set up with the following wireless settings, using WPA security settings.
Use this device's current settings
Change these settings
Provide a name and security level for the wireless network.
Wireless Network Name: MeTrao
Wireless Security: WPA/WPA2 Personal
Wireless Password: ••••••••
Verify Password: ••••••••
Remember this password in my keychain
More Info...
Go Back
Continue


AirPort Utility 5.6 – Internet Setup
MeTrao
This AirPort Express is set up with the following Internet settings.
Use this device's current settings
Change these settings
Select how you connect to the Internet
Connect Using: Ethernet
Configure IPv4: Manually
IP Address: 10.0.1.99
Subnet Mask: 255.255.255.0
Router Address:
Go Back
Continue


AirPort Utility 5.6 – Summary
MeTrao
This AirPort Express is currently using the settings below.
AirPort Express Name MeTrao
Base Station Password ••••••
Wireless Mode Create a wireless network
Wireless Network Name MeTrao
Wireless Security WPA/WPA2 Personal
Wireless Password ••••••
Connect Using Ethernet
Configure IPv4 Manually
IP Address 10.0.1.99
Click Go Back to change settings.
Go Back
Finish

Remote DMX User Manual

Introduction

Remote DMX control OSX created as a try out for Remote DMX Control for iPhone is an app specifically for theatre technicians, lighting designers to control, adjust and focus spotlights on lighting catwalks (bridges), trusses or fly-bars without a light board operator.
Remote DMX is easy to operate, it contains special functions to turn a spotlight on and off.

Remote Control OSX sends Art-Net™ DMX data over Ethernet / Wi-Fi.
To control dimmers and DMX controlled lights, you'll need an Art-Net™ / DMX converter and optional a Wi-Fi network e.g. Apple Express™.
The dimmers or spotlights must be USITT DMX512/1990 or DMX512A compatible.

Set Up Screen

In the Set Up screen you can set up the Art-Net™ Broadcast IP, SubNets and Universes.
You can control a total of 1024 DMX-channels over two Universes with each 512 DMX-channels.

Control Screen

E.g. to control the light output of a spotlight enter the DMX address of the dimmer/ spotlight, press 'On' and adjust the light output with the slider.

To control the next or previous DMX channel you can use the 'Next' or 'Prev(ious)' button to walk quickly through your DMX lighting plan.

If the last command was 'On' then with the '+' or '-' button you'll add channels that must be on at the same time.

If the last command was 'Off' then with the 'Next', 'Prev(ious)', '+' or '-' button you'll black out the next or previous channel.

To control a group of channels type e.g. '10 <> 20' 'On' or 'Off'.

To release all active channels press 'All Spots Off'.

In case of a typo press 'Clear' and retype the correct number or command.

Info, Bugs, Remarks

On our website jgelectronics.nl you'll find information about updates and a contact form to report bugs, for questions or remarks send an email to: jgelectronics@icloud.com

YouTube Movies Remote DMX

https://www.youtube.com/watch?v=dnpq_1l5RTA&index=4&list=PLnkzrtwChEibzial2QR-f2IpWDsbUuTdw and a second movie:
https://www.youtube.com/watch?v=_QZ2R3J-a6k&index=5&list=PLnkzrtwChEibzial2QR-f2IpWDsbUuTdw