Wi-Fi DC

This document is available at http://www.wifitrax.com/appNotes/quickStart/Wi-Fi-DC-Quick-Start.pdf

Wi-Fi DC is a WifiTrax technology that allows you to drive DC locomotives on a layout via Wi-Fi using our Loco Operator App. Wi-Fi DC is implemented using one more modules supporting Wi-Fi DC such as WUFP-40.

These modules have two groups of features: Power Blocks and Locomotive Control Channels. WUFP-40 has four power blocks and two locomotive control channels. Either of the two channels can be allocated to any of the four blocks allowing you to drive two DC locomotives at a time. For full use of its features, you need the Tower Operator app to properly control the power blocks and the Loco Operator app to drive locomotives, but you can operate in a limited way with just Loco Operator on its own. Here are the two apps:

http://www.wifitrax.com/products/product-tower-operator-app-detail.html

http://www.wifitrax.com/products/product-loco-operator-app-detail.html

There is a much more detailed introduction to Wi-Fi DC at the location below. This goes through a detailed example layout showing how Wi-Fi DC can be used. You may want to read that first, or you can continue with this short start up guide and study the detailed information later:

http://www.wifitrax.com/appNotes/Wi-Fi-DC.pdf

Wi-Fi Direct and Infrastructure Modes
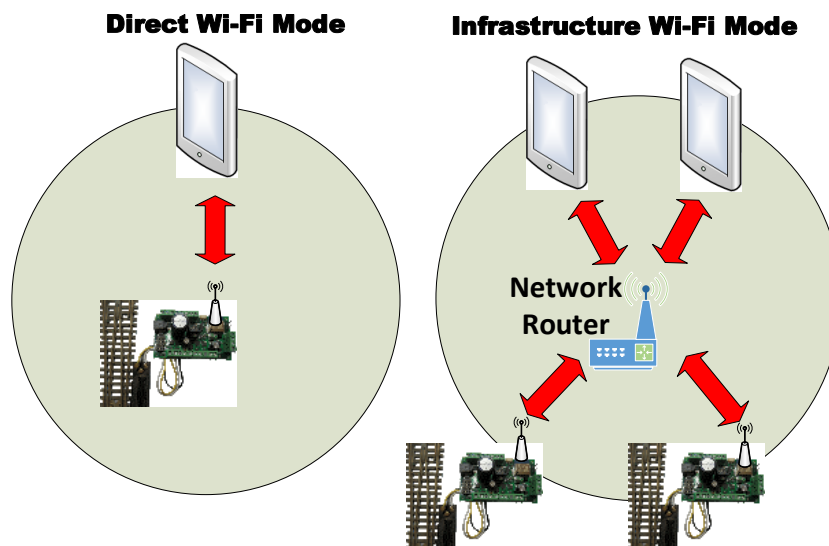
The first thing to understand is that there are two ways of controlling your Wi-Fi DC modules such as WUFP-40 via Wi-Fi, Direct Mode and Infrastructure Mode.

In direct mode, your computer or tablet must be connected to the Wi-Fi Access Point within the controller – the WUFP-40 module or similar. In this mode, you can control only one controller with each installation of Tower Operator on a computer or tablet. This mode is really only needed for initial setup of a new controller.

<u>In Infrastructure Mode</u>, the controllers and your computer, tablet or phone all connect as *Wi-Fi Stations* to the Wi-Fi Access Point of your network router. You can then build a full model railroad network with many layout features, locos, computers, tablets and phones. You can control many layout features with one installation of Tower Operator. You will usually want to work in this mode but this short document is limited to direct mode.

Quick Start – Configuring the Networks

You need to start in direct mode to configure your WUFP-40 controller.

(1) If you have not already done so, download and install the latest version of the Tower Operator app from the Microsoft Store for Windows or the Google Play Store for Android. Go to the store and do a search for "Tower Operator", then follow the instructions to install.

(2) Connect your WifiTrax controller such WUFP-40 to the track blocks it will control and apply power (refer to the Quick Start leaflet for the WUFP-40). One track would be sufficient for the first test.

(3) Connect your computer to the WifiTrax controller's access point using Settings and Wi-Fi, (THIS IS NOT WITHIN TOWER OPERATOR) just like connecting to Wi-Fi in a restaurant. You will see the access points listed and the WifiTrax controller's access point ends in the last six digits of the AP MAC printed on the label of the bag in which the unit was shipped.
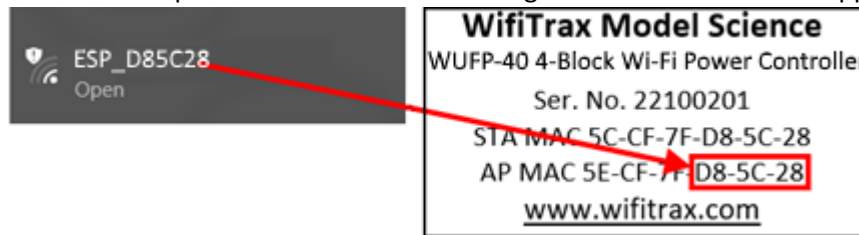
(4) Start the Tower Operator App on your computer or tablet ,

(5) On the App, select the Settings Tab , then the Networks Page , and Click or Tap the Scan Nets button . If this is the first time you have run Tower Operator, this will happen automatically – just click Continue on the "Scan Available Networks" pop-up.
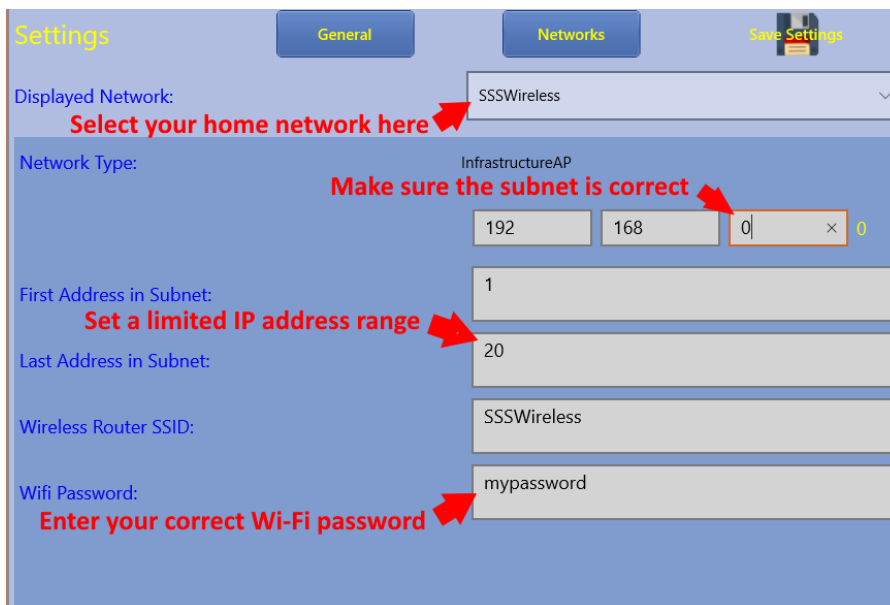

Figure 1 Setting the properties of your Home Network

WifiTrax Model Science
www.wifitrax.com

(6) The first thing you need to do is select the network that represents your home Wi-Fi (in this example SSSWireless) and set the values correctly, so that when all your WUFP-40 module joins your home network they will communicate properly. See Figure 1.

    a. First select your home network in the Displayed Network drop-down list,

    b. Then check the subnet. Most routers are set up with the subnet as shown, but yours might be different. It will be the first three numbers of your computer's IP address.

    c. Set a limited IP address range for your model railroad network. Most homes do not have as many as 20 devices so 1 to 20 is usually enough.

    d. Enter your Wi-Fi password. This is the one you need to enter when connecting a new device like a phone to your home Wi-Fi network. If you don't know it, it's probably somewhere on the router supplied by your telco.
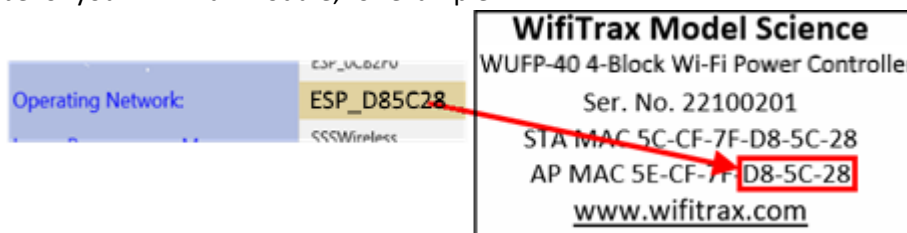
(7) Now go to the General Page [General] of the Settings screen, Click or tap on the Home Network drop-down. Select your home network that you configured above – in this case SSSWireless.
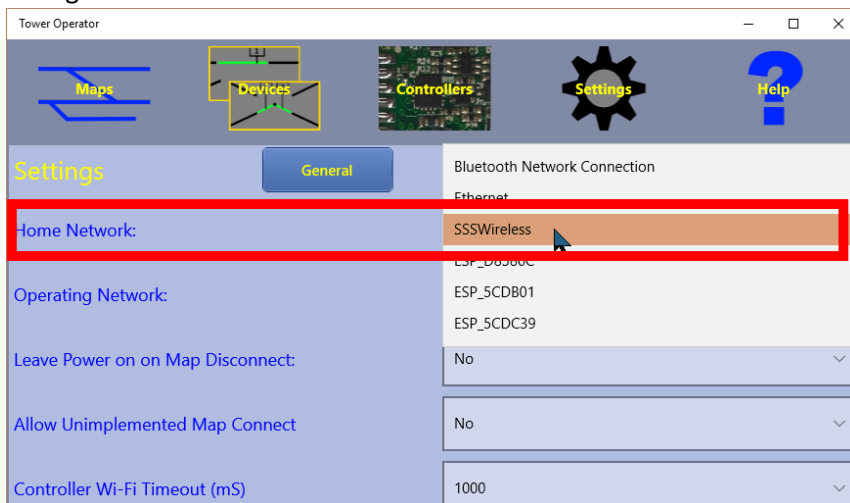
(8) Click or tap the Operating Network drop-down.

Select the network that has the last six digits equal to the last six digits of the AP MAC on the label of your WifiTrax module, for example:

This is the same network that you connected your computer to in step (3). You will use this operating network just to configure your WUFP-40 module, then return the operating network to your home network.

(9) Click or tap the Save Settings button and OK on the pop-up.

Configuring your Controller to Connect to your Home Network

(10) Select the Controllers Tab. Check the controller's network is shown, ESP_D85C28 in this example, then click the Scan Controllers button and Continue on the pop-up shown below:

Figure 2 Controller Scan Pop-up. There is only one IP Address on the Controllers own Network, ESP_D85C28

(11) Check that your controller appears and shows as On-line. Its name will be SN followed by the serial number on the label, e.g. SN22100201. You can change this later. If nothing appears, go back and check the previous steps. Your computer MUST be connected to the controller's access point during this stage as explained in step (3). Many people forget this!
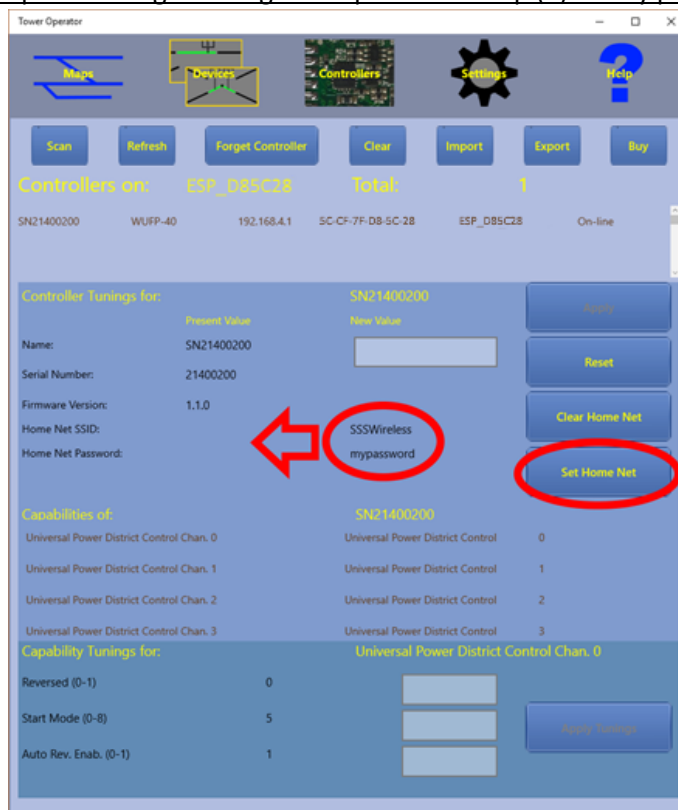

Figure 3 Your new WUFP-40 appears after a controller scan. Now you set its home net information

The important thing to do now is click on the Set Home Net button in Figure 3. This will tell the controller two things: the name of the infrastructure network to join, in this case SSSWireless, and the password needed to connect to that network, in this case "mypassword". Of course, your values will be different, the SSID is what you selected as your

home network and you typed the password in Figure 1. When you've done this, those values should have been transferred to the WUFP-40 and the screen should look like below:

Figure 4 Your new WUFP-40 is now configured as a station on your home Wi-Fi network

(12) Go back to the General page of the Settings screen and select your home Wi-Fi network as the operating network. Save the settings.

(13) Next go back to the Network Settings of your computer as you did in (3) and connect back to your home network.

(14) Now go to the Controllers screen and do a scan on your home network which should now be displayed. You should see the controller, now operating as a station on your home infrastructure network, with all of its information displayed.

Figure 5 Your new WUFP-40 Controller is now Available on your Home Network

(15) There is a great deal that you can do to configure the Controller, create Logical Devices and set up Schematic Control Panels in Tower Operator, but for now we can leave Tower Operator at this point and start using Loco-Operator.

(16) So, you can close the Tower Operator app at this point.

Driving your First Wi-Fi DC Locomotive

(1) If you have not already done so, download and install Loco Operator from either the Microsoft Store or the Google Play Store. Search for "Loco Operator" at either of the stores.

(2) Start the app and scan for networks on your computer. This should happen automatically during first install. Just click continue on the "Scanning Networks" pop-up:
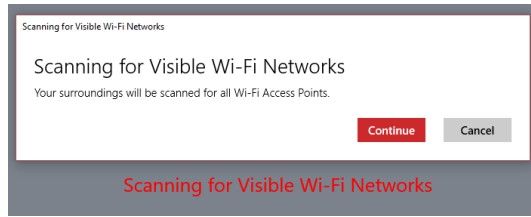
Scanning for Visible Wi-Fi Networks

Figure 6 Scanning for Wi-Fi Networks

In the Networks page of the Settings screen, select your home Wi-Fi network as the displayed network and enter all the settings exactly as you did when you first installed Tower Operator in
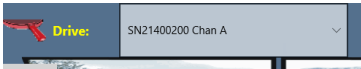
(3) Figure 1.

(4) Now go to the General page of the Settings screen and make sure your home Wi-Fi network is selected in BOTH the Home Network and Operating Network drop-down lists. You can work in Infrastructure Mode from now on as you have already added your WUFP-40 controller to your home Wi-Fi network.

(5) Click or tap the Save Settings button and OK on the pop-up.

(6) Now go to the Locomotives screen .

(7) The name of your Home Network should be displayed with zero Locos. and zero Layout Capabilities. Click the Scan button and Continue on the pop-up.

(8) You should see the two Locomotive Control Channels of your WUFP-40 in the list, in this example SN21400200 Chan A and SN21400200 Chan B, as in Figure 7.

Figure 7 The Locomotive Control Channels of your WUFP-40 are Now Available

(9) Each of the four blocks of your WUFP-40 can be set to either be controlled from Chan A or Chan B. The default power up state after leaving the factory is for all blocks to be set to be controlled by Chan A.

(10) Place a loco on the track you have connected to one of the block outputs.

(11) Now go to the Drive screen . You can select the loco you drive in the "Drive:" drop-down list .

(12) Select SN21400200 Chan A in the list. .

WifiTrax Model Science
www.wifitrax.com

(13) The screen will show a message "Contacting Locomotive", then will enable all of the controls. You can now begin driving your DC locomotive on Channel A.
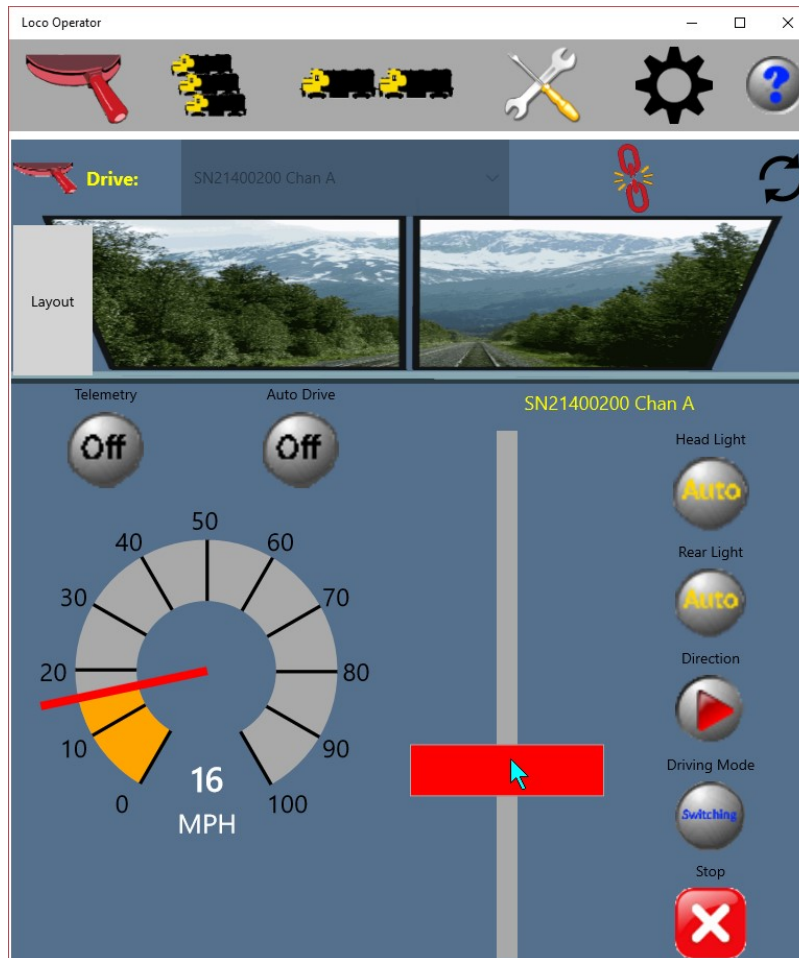

Figure 8 Driving your DC Locomotive on Channel A of your WUFP-40

More Detail

When you are ready for more detail and to start using Tower Operator to represent a real layout read the document:

http://www.wifitrax.com/appNotes/Wi-Fi DC.pdf

Also, you can consult the help pages for Tower Operator:

http://www.wifitrax.com/help/towerOperator/help.html

There you will find out about all the other things you can do with Tower Operator such as the full map editing features and how to share your maps, devices and controllers among different installations of Tower Operator.

All the articles and application notes can be found at:

http://www.wifitrax.com/appNotes/howToArticles.html