

WFD-30 NEC Cab Bus Wi-Fi Interface

Operating Manual

This document is online at <http://www.wifitrax.com/manuals/WFD-30/WFD-30-Manual.pdf>.

IMPORTANT NOTICE

This manual describes the WFD-30 with Firmware Version 2.0.0 or later. If you have Version 1 firmware, please refer to the link below:

<http://www.wifitrax.com/manuals/WFD-30/WFD-30-Manual-V1.pdf>.

Please see our website for information on our limited warranty.

WifiTrax Model Science



www.wifitrax.com

Version 2.0 May 30, 2022

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This product is not a toy. Keep away from children. It is not suitable for use by persons under 14 years of age. Warning: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Version History

Version	Changes
1.0	Initial Release
1.1	Added info on LEDs. Added section on UWT-100.
1.2	Added EU Declaration of Conformity.
1.3	Updated Power Cab usage information to require 1.65B.
1.4	Added images to Factory Reset section
2.0	Extensive changes to match Version 2 Features

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What does WFD-30 NCE Cab Bus Wi-Fi Interface do?

The WFD-30 allows you to drive your DCC trains from a hand-held untethered controller by providing a Wi-Fi connection to NCE command stations and boosters. It connects to one of the CAB Bus sockets on your NCE Command Station or to the right-hand “Extra Cab” socket on the Power Cab Panel, and allows Wi-Fi control of your DCC locos via the WiThrottle Server that it provides.

- You can drive trains using a smart phone or tablet as a hand-held throttle provided it has Wi-Fi capability and you have installed one of our recommended apps in Table 2
- You can use a special-purpose hand-held throttle designed to control trains using the Hoffman WiThrottle protocol, such as TCS UWT-100.
- You can use a Windows or Apple computer, such as a laptop or desktop, with a recommended installed app from Table 2.
- Four throttles at a time can join the WFD-30 Wi-Fi Access Point, but you can avoid this limit using “[Home Net](#)” mode as described later in this manual.

You don't need to install JMRI to use the WFD-30

If you have been using an app on your phone to drive trains, via a computer running JMRI, you can now bypass JMRI and connect your phone directly to the WFD-30. You can still use JMRI if you want to – it just means that the WFD-30 and the JMRI installation will both appear as WiThrottle servers in your app. Similarly, if you use [more than one WFD-30](#), they will each appear as WiThrottle servers available to your app.

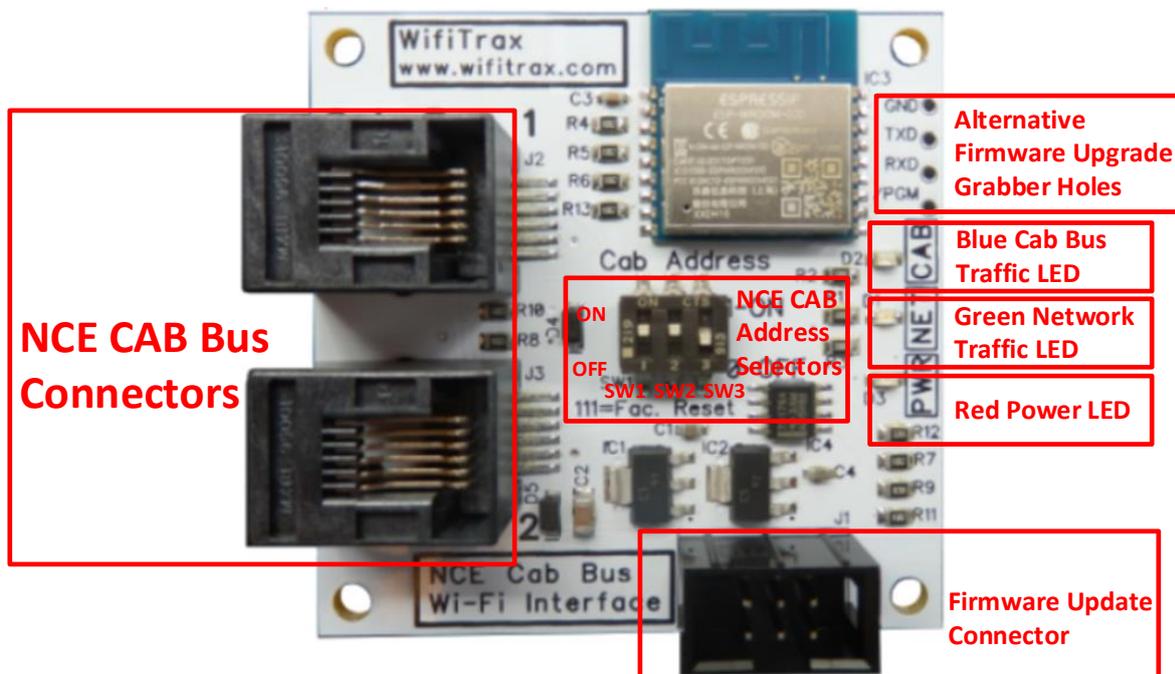


Figure 1 Connections and switches on the WFD-30.

Figure 1 shows the WFD-30 module with its connectors labelled. There are two NCE CAB Bus connections on the left of the module. Either of these can be connected to one of the CAB Bus connections on your NCE Command Station. You should always use NON-REVERSED cables with RJ-12 6P4C Modular Plugs on each end –

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the coiled cable from NCE is, of course ideal. **Warning: Some phone cables are reversed. The WDM-30 will not work with these but it will not be damaged.** See the section “More about Cables” if making your own. The unused Cab Bus socket on the WDM-30 can be used to connect any other NCE Cab such as a Pro cab. **If you are using a Power Cab, do not connect the flat cable to the spare connector on the WFD-30. Only connect the flat cable to the Power Cab Panel (PCP) as instructed by NCE.**

The switches in the middle of the module are used to set the address that the module will respond to on the NCE Cab bus, the factory default being address 10. Please refer to Table 1 if you need to change the Cab Bus address to avoid conflict with other NCE Cabs that you might be using on your layout, or if you are using NCE equipment that has a limited range of Cab Bus addresses.

What is WiThrottle protocol?

WiThrottle protocol is a set of commands and data formats, authored by B. Hoffman and used by JMRI, that allows devices such as iPhone, Android phones and tablets to control trains and turnouts through a WiThrottle server. It has become something of a standard and is used by other products. You can find technical information here:

<https://www.jmri.org/help/en/package/jmri/jmrit/withrottle/Protocol.shtml>

What is JMRI?

JMRI (Java Model Railroad Interface) is a system of computer programs and support software that can be installed on a computer to do many things with your model railroad including running trains, controlling turnouts and programming DCC decoders. JMRI provides a wiThrottle server to allow you to run trains from phones etc. You can learn about JMRI here:

<https://www.jmri.org/>

Let's get Started!

Connecting your new WFD-30 Cab Bus Wi-Fi Interface

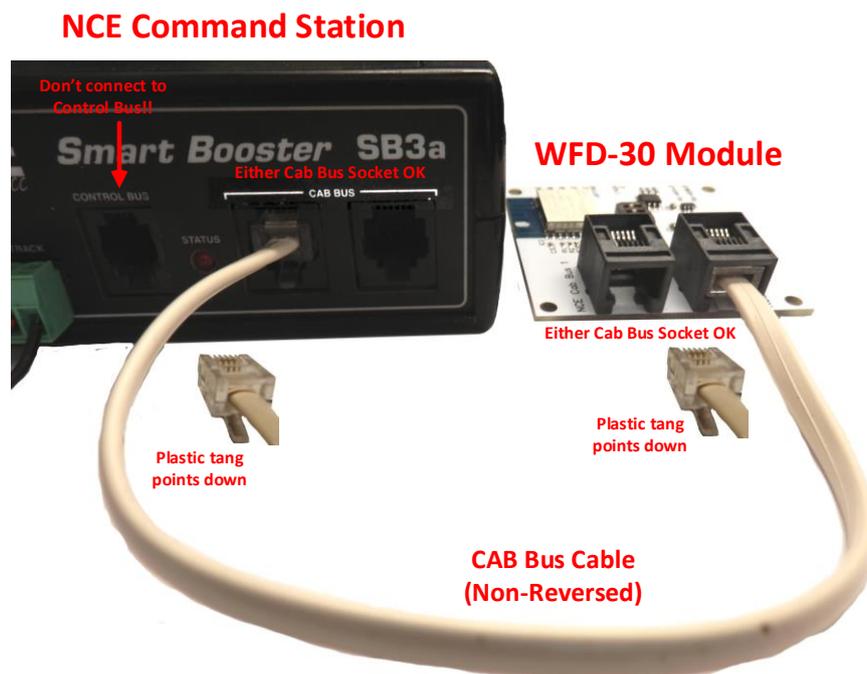


Figure 2 Connecting the WFD-30 Module to your NCE Command Station

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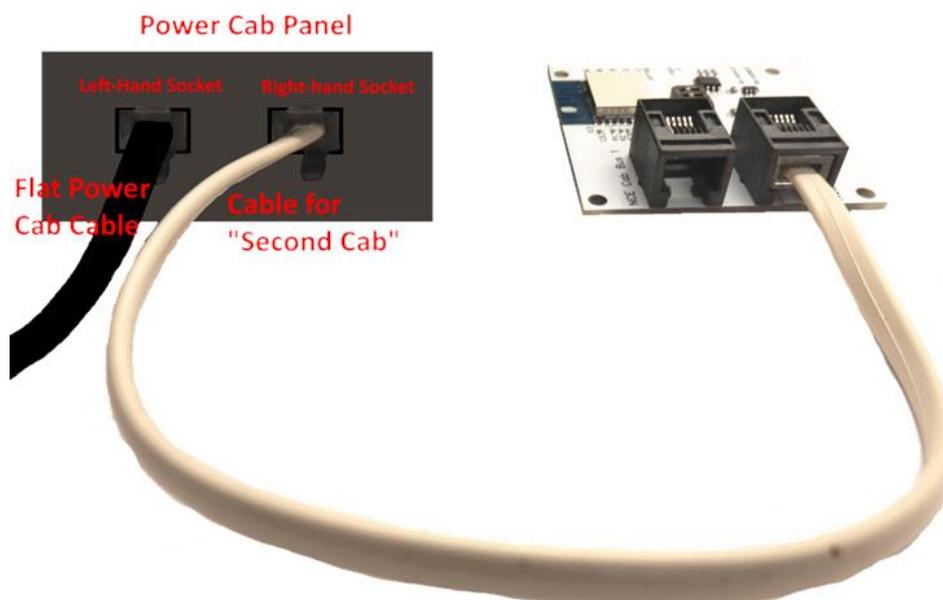


Figure 3 Connecting the WFD-30 Module to a Power Cab Panel

- (1) CAB Bus Address:** All Cabs connected on the NCE Cab Bus must have a unique address. Use Table 1 to set the Address Switches to select an unused CAB address. The factory default is CAB Address 10. NCE Power Cab earlier than version 1.65 and some early NCE command stations do not scan beyond 4, so in that case, you must use address 3 or 4.

The last entry in Table 1 causes factory reset. If you wish to completely reset the unit, power down, set the switches to this position, power up and wait 10 seconds, power down and return them to select the Cab address you want. Do not leave the switches in the factory reset position.

Important note for Power Cab users: If you are using a Power Cab in “Master” mode so that it acts as the DCC command station, **it will work best with version 1.65B**. WFD-30 will work with versions of Power Cab with version 1.28 and later. Version 1.28 only supports Cab Addresses 3 and 4, so you must set your WFD-30 to one of these using the DIP switches as in Table 1. With version 1.65B, you can leave it in the default Cab Address 10 but if something else uses Cab Address 10 you will need to change it. If you are using Power Cab in Pro-Cab mode, as a cab on another NCE system, this does not apply, but you must make sure the WFD-30 is given a different address to the Power Cab.

- (2) Mounting:** Mount your WFD-30 Module in a convenient location where nothing metal will touch it, either in a plastic box or at a convenient location on your baseboard or fascia. Please see the “Mounting Suggestions” section. As a minimum, make sure it will not be dragged around by pulling on a connected cable and touch on some metal object. **Do not let the unit touch powered track or it may be damaged beyond repair!**
- (3) Connect:** Use an NCE Cab Bus cable to connect to your NCE Command Station as in Figure 2. Make sure your NCE Command Station is connected to power and track or booster according to its instructions. Turn on power to your NCE Command Station. The WFD-30 module gets its power from the command station via the CAB Bus. If you are using an NCE Power Cab in “Master” mode, you must connect the flat cable supplied with the Power Cab to the **left-hand** socket of the Power Cab Panel (PCP) use the coiled cable to connect your WFD-30 to the **right-hand** socket of the Power Cab Panel.

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Setting the NCE CAB Bus Address of your WFD-30

SW1	SW2	SW3	NCE CAB Bus Address
0	0	0	3
1	0	0	4
0	1	0	5
1	1	0	10 (default)
0	0	1	20
1	0	1	CAB Address 1* (Default 40)
0	1	1	CAB Address 2* (Default 50)
1	1	1	10 (Causes Factory Reset!)

Table 1 CAB Bus Address Selection Options (0 = Off, 1 = On)

* Address 40 & 50 may be set to any CAB address using Web Pages

LEDs on the WFD-30

The WFD-30 has three LEDs.

Red LED. This will light as soon as power is applied to the module through the NCE Cab Bus connection. It will stay alight continuously. Any flashing indicates a power fault.

Blue LED. This will light as soon as the NCE command station begins polling the module on its Cab Bus. The blue LED will also flash briefly off when the module responds to a poll on the Cab Bus. If the blue LED does not come on at all it may indicate that the command station is not working properly or is not polling the address to which the WFD-30 is set.

Green LED. This has two modes. In direct mode, the green LED will normally be unlit but will flash when the module receives Wi-Fi Network traffic, for example, when it receives a command from your hand-held device. In Home-net mode, the green LED will light continuously when it has successfully connected to your home network Wi-Fi router. It will also flash briefly off, when the module receives Wi-Fi traffic such as a command from your hand-held device. Hand-held devices need to provide a “heartbeat” to the WFD-30 WiThrottle server, so the green LED will flash regularly even when no commands are being sent.

Driving your First Trains

You can drive trains using any of the throttles described in Table 2.

Some throttles use an installed app on a smart phone or tablet. WiThrottle and Engine Driver are examples that use the [WiThrottle protocol](#) and provide driving of trains, and control of accessories and routes.

Wifitrax Web Throttle is an app that runs as a web page in a browser such as Safari, Chrome or Edge. It is automatically installed from the WFD-30 itself.

TCS UWT-100 is a dedicated Wi-Fi throttles.

The WFD-30 does not support Layout Power or JMRI panels. You can configure the WFD-30 using its [Web Pages](#) which are accessible using WiThrottle (Full Version) or Engine Driver or indeed any web browser via the device’s default URL <http://192.168.7.1>

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Without installed Throttle App

Method	Software	Get From:	Operating System	WFD-30 Web Pages
UWT-100	None required.	Train Control Systems (TCS).	Not Applicable.	Not Available. Use browser on another device.
Wifitrax Web Throttle	Safari, Chrome, Edge.	Included in WFD-30.	Apple IOS, Android, Windows 10	Same browser as for Web Throttle.

Using an installed Throttle App

App Name	Author	Get from:	Operating System	WFD-30 Web Pages
WiThrottle (Full)	Beth Hoffman	Apple Store	Apple IOS	Via web page.
WiThrottle (Free)	Beth Hoffman	Apple Store	Apple IOS	Use Safari.
Engine Driver	Steve Todd	Google Play Store	Android	Via web page in app.
Train Throttle	Drew Hoffman	Microsoft Store	Windows 10	No, Use Browser.

Table 2 Recommended Apps that work with the WFD-30

Getting Started with Wifitrax Web Throttle

Wifitrax Web Throttle is a Throttle app that is contained within the WFD-30 and runs in most browsers on most devices using a language called HTML and JavaScript. To use the app on your device, you must first connect your phone or computer to the Wi-Fi network provided by the WFD-30.

Make sure power to your NCE Command Station and booster is on, the WFD-30 is connected and there is a locomotive on the track with a DCC address that you know.

Connect your Phone, Tablet or Computer to the WFD-30 Wi-Fi Network. The WFD-30 provides its own Wi-Fi network with the name (SSID) of wftrx_WFD30_1_XXXXXXXX_7 where XXXXXXXX is your module's serial number. **You must connect to this network to use WFD-30.** Connecting to the network is a bit different for Apple, Android and Windows.

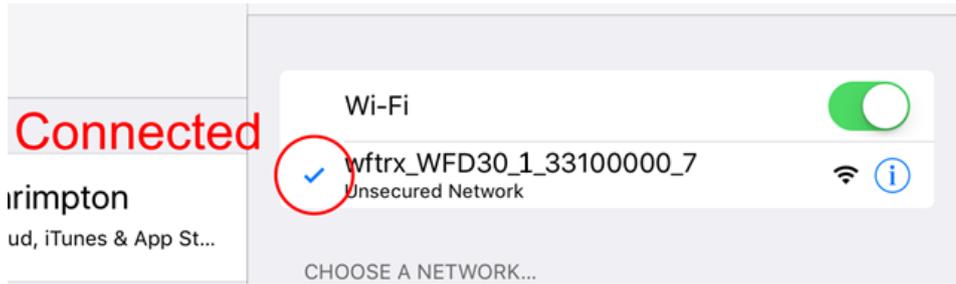
Connecting from Apple IOS

- (1) Tap the Settings icon on your iPhone or iPad, etc.



- (2) Tap Wi-Fi on the left-hand menu. Under CHOOSE A NETWORK on the right, the list should include one like wftrx_WFD30_1_XXXXXXXX_7, where XXXXXXXX is the serial number of your unit that appears on its label. Tap that Wi-Fi Network. **You must always connect to this Network otherwise your device will not see the WFD-30.**
- (3) No password is required and after a few moments you should see that it has connected.

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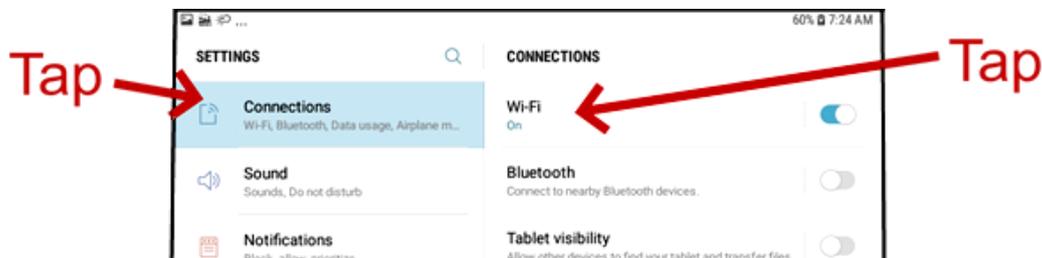


Connecting from Android

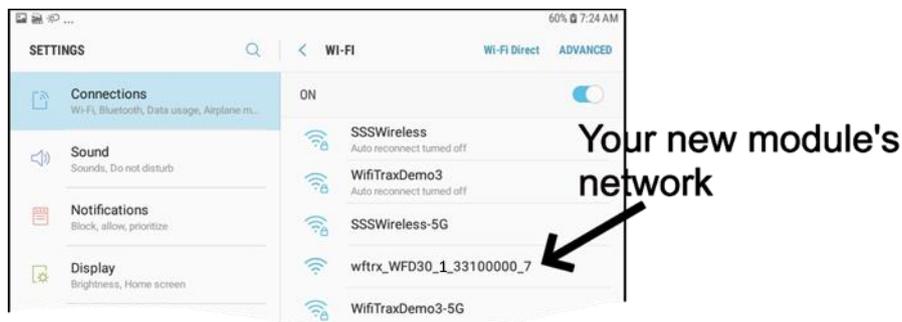
- (1) Press the Home button and tap the settings icon on your Android phone or tablet:



- (2) Find the Wi-Fi option. On Android 7, you tap Connections on the left, then Wi-Fi on the right.

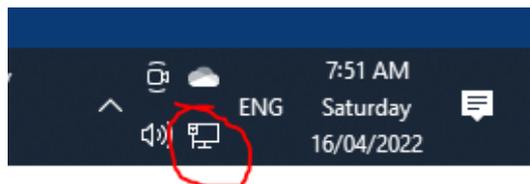


- (3) You see a list of available Wi-Fi Connections on the right. Look for one like wftrx_WFD30_1_XXXXXXX_7, where XXXXXXXX is the serial number of your unit that appears on its label. Tap on that – no password is required – and wait for it to connect.



Connecting from Windows 10

- (1) Click on the Networks icon in the System Tray on the bottom right of your screen.



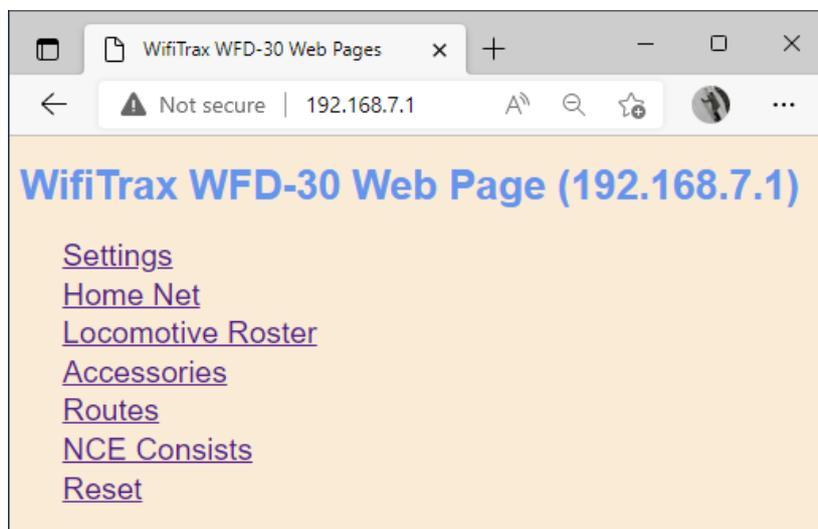
- (2) You see a list of available Wi-Fi Connections. Look for one like wftrx_WFD30_1_XXXXXXX_7, where XXXXXXXX is your serial number. Tap on that and click Connect. No password is required.

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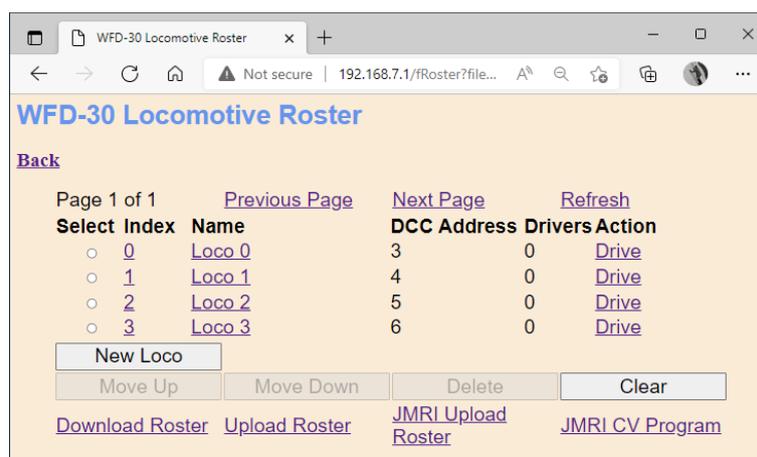


Driving Trains with Web Throttle

- (1) Once you have connected your device to the WFD-30 Wi-Fi Network, open a browser, e.g., Safari on Apple IOS, Chrome on Android or Edge on Windows.
- (2) Type 192.168.7.1 into the bar at the top in which you would normally type the URL of the site you want to visit, then hit Go or Enter.

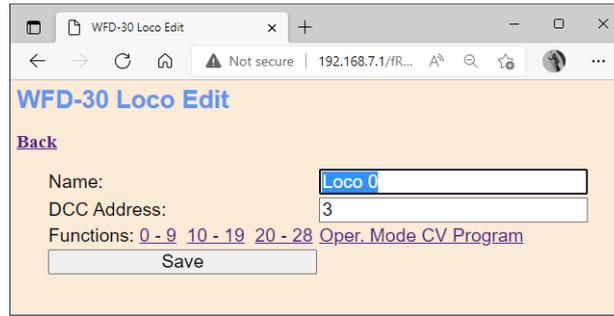


- (3) You will see the WFD-30 main menu as above. Tap Locomotive Roster to display the roster page below.

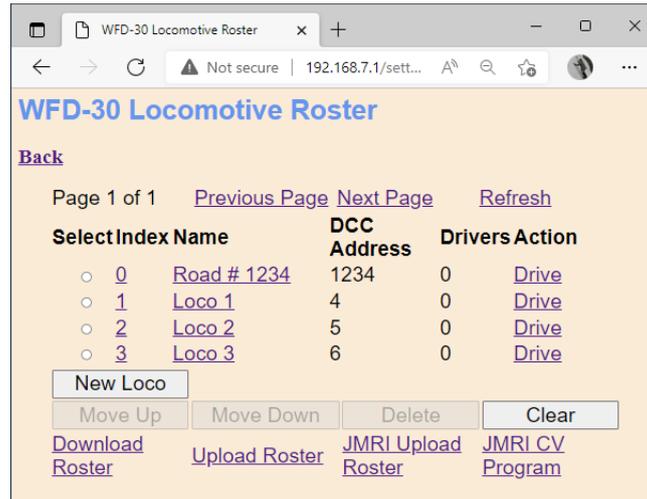


- (4) Before you can drive your loco, you need to configure your first roster entry, so tap on Loco 0 to display the details page for the first loco in the roster.

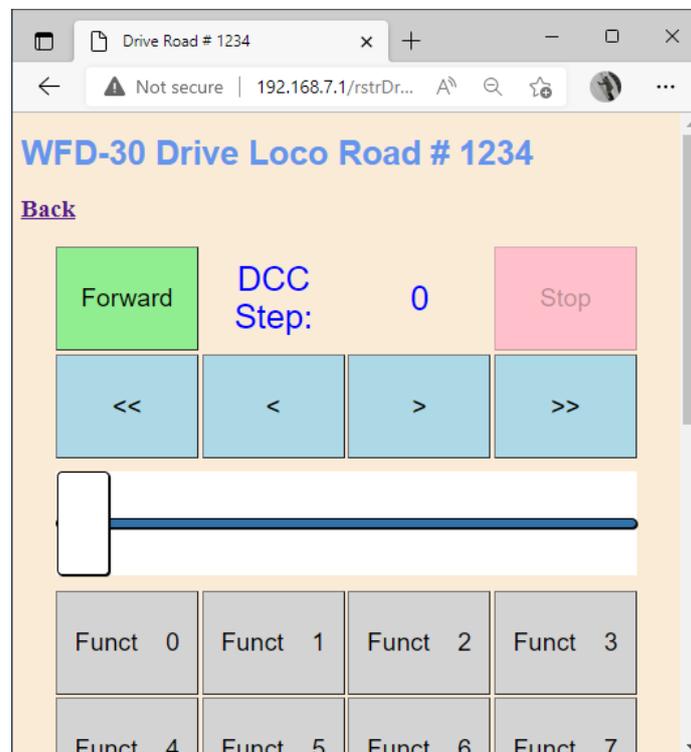
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(5) Type a name for your first loco such as Road # 1234 then type the DCC Address of your loco. Tap Save. Now you see your roster configured with one loco as below.



(6) Tap Drive to the right of the first loco to get the Wifitrax Web Throttle page.



The buttons labelled > and >> increase the speed by one and ten steps respectively. The buttons < and << reduce by one or ten steps. Tap the button labelled Forward to change direction, only when

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stationary. You can also use the slider. Tap the function buttons to turn on lights etc. according to your decoder.

Getting Started with WiThrottle on Apple IOS

- (1) On your iPhone, iPad or iPod device, make sure you are connected to the internet then go to the home screen and run the App Store app:



- (2) Tap Search at the bottom right, type “WiThrottle” in the Search box at the top, tap the Search key, and tap either the Lite or full version, tap “Get” to download and install. This is a great app and the full version is well worth the small fee so we definitely recommend buying it! Don’t open the app yet.

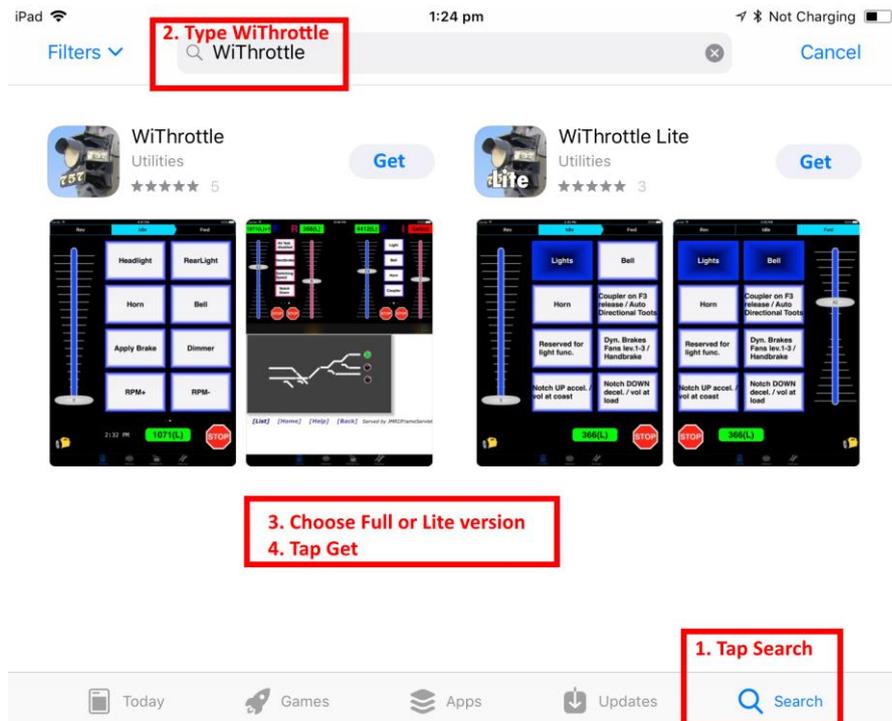


Figure 4 The Apple App Store page for WiThrottle

- (3) Before opening the app, make sure your WFD-30 is connected to your NCE Cab Bus, your NCE Command Station is powered up and there is a locomotive on the track with a known DCC address. Both the red power LED and the blue Cab Bus indicator LED should be alight.
- (4) Now run the Settings app on your iPhone (or iPad etc.):



- (5) Tap Wi-Fi on the left-hand menu. You should see a collection of available Wi-Fi Access Points on your right. Look for one that is of the form wftrx_WFD30_1_XXXXXXX_7, where

WFD-30 NCE Cab Bus Wi-Fi Interface Operating Manual

XXXXXXXX is the serial number of your unit that appears on its bag and the unit itself. Tap that Wi-Fi Access Point as Figure 5.

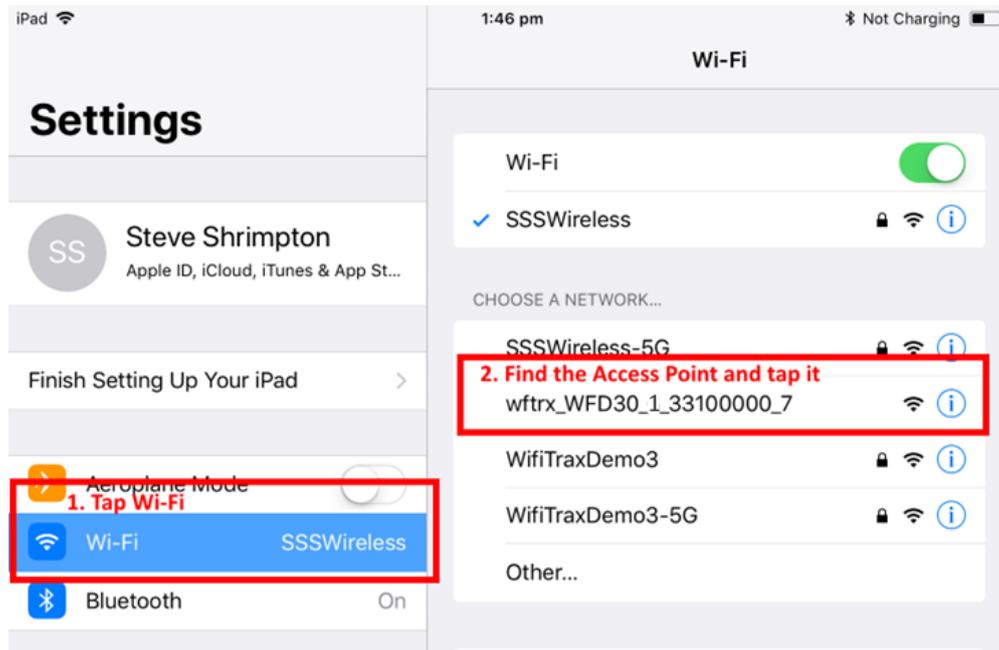


Figure 5 Connecting to the WFD-30 Wi-Fi Access Point

- (6) No password is required and after a few moments you should see that it has connected as in Figure 6. The left-hand menu shows Wi-Fi wfrtx_WFD30_1_XXXXXXX_7. You will not be able to access the internet while you are connected to the Wi-Fi access point of the WFD-30, but consult the manual to find out how to put everything on your home network.

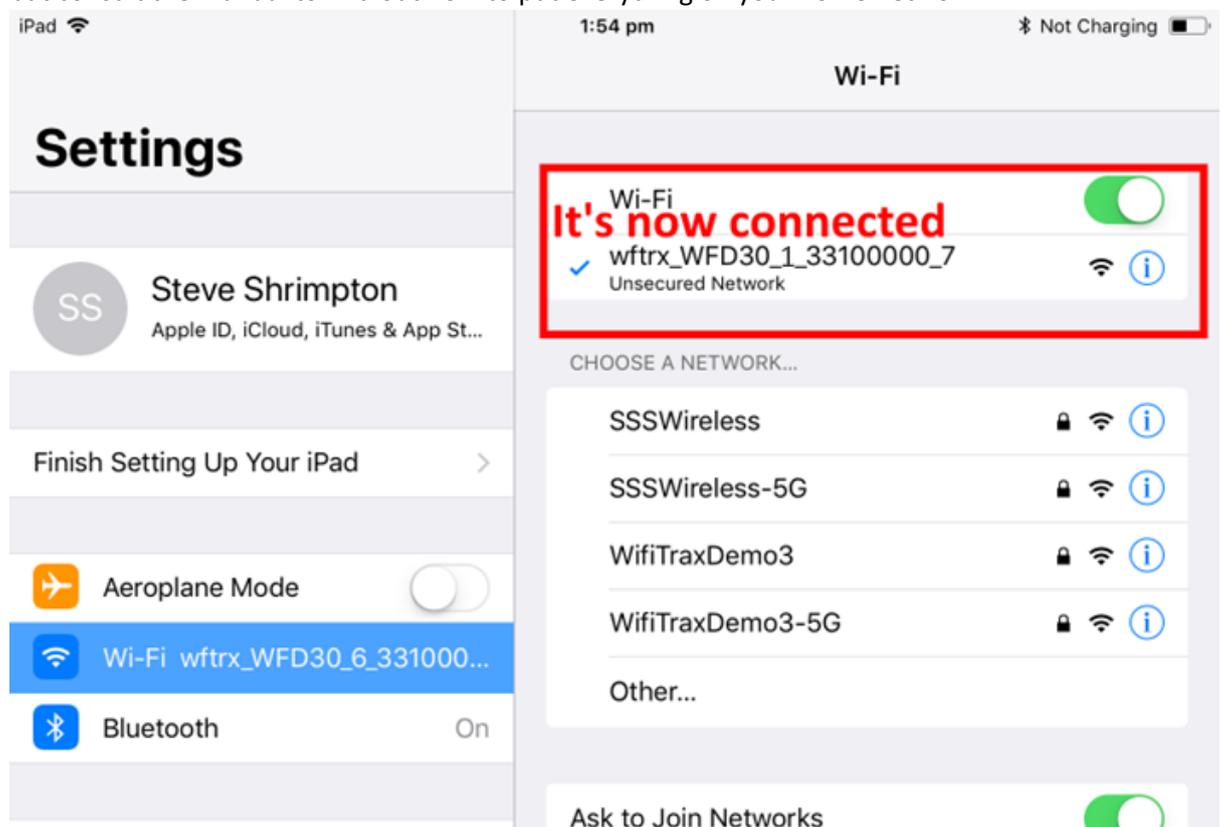
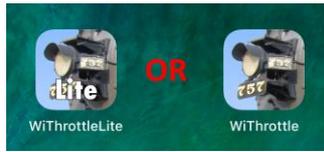


Figure 6 The iPad has connected to the WFD-30 Wi-Fi Access Point

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(7) Go to the Home Screen and find and open the WiThrottle app by tapping its icon:



(8) You should see the connection screen headed by “wftrx_WFD30_1_XXXXXXXX_7”. The WFD-30 is a WiThrottle Server and it should appear in the “Available WiThrottle Servers” section, identified by its serial number. If it is visible, tap it as Figure 7. You may need to wait a few moments.



Figure 7 The WiThrottle app Server screen

- (9) If for some reason there is nothing in the “Available WiThrottle Servers” list, tap “Configure” or “Search for Wi-Fi Modules” and follow a. or b. below.
- Configure: The WFD-30 always has the IP Address 192.168.7.1 on its own access point, so type this IP Address. Then type 12090 into the Port textbox and tap the Connect button as Figure 8. The green network LED on your WFD-30 should now flash regularly to show that the UWT-100 is communicating with it.
 - Search for Wi-Fi Modules. The same as a. but IP Address and port are pre-entered, so just tap “Connect”.

WFD-30 NCE Cab Bus Wi-Fi Interface Operating Manual

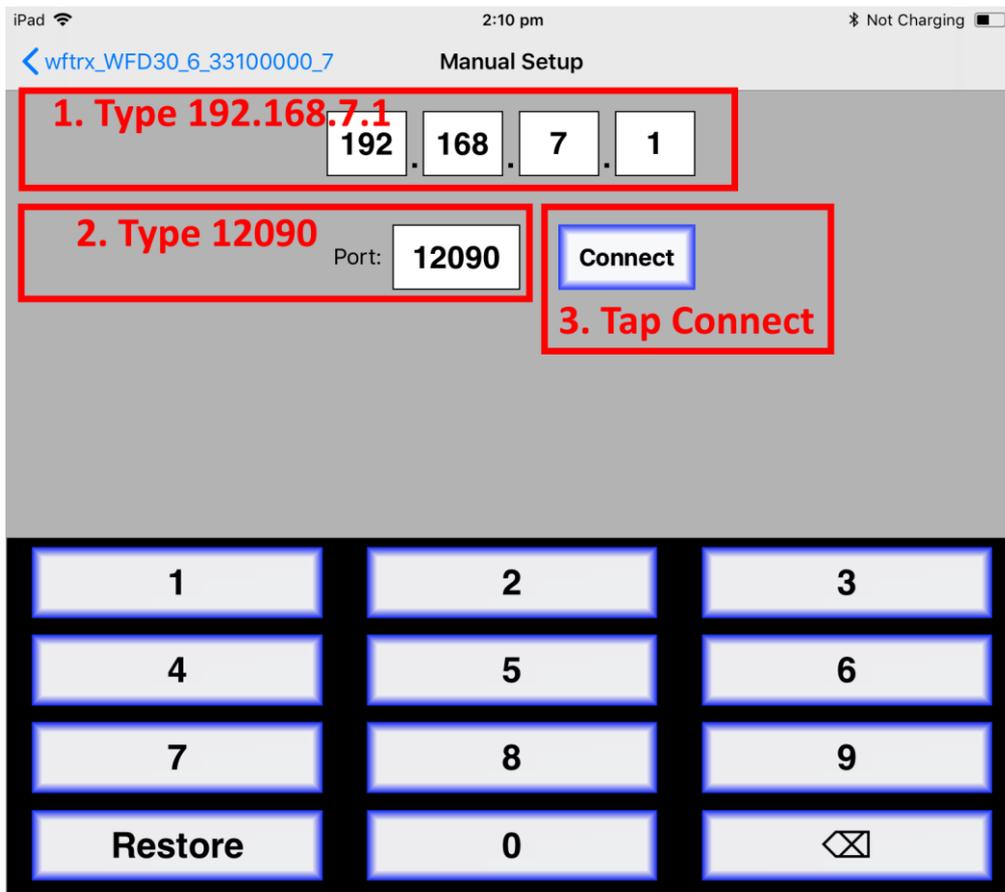


Figure 8 Connect manually if needed

(10) Now tap the "Address" tab at the bottom (it might go there automatically), tap Keypad and key in the DCC address of the locomotive that you wish to drive then tap the Set button as Figure 9.

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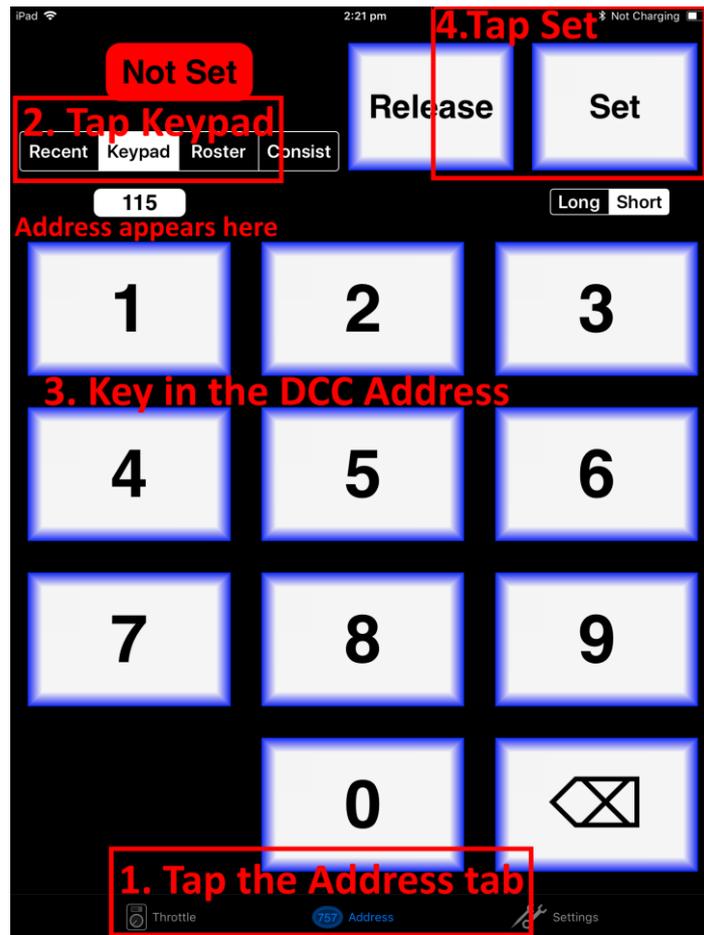


Figure 9 The Address tab of WiThrottle. Select a loco to drive

(11) The red button at the top left should turn green to show the loco is selected as Figure 10.

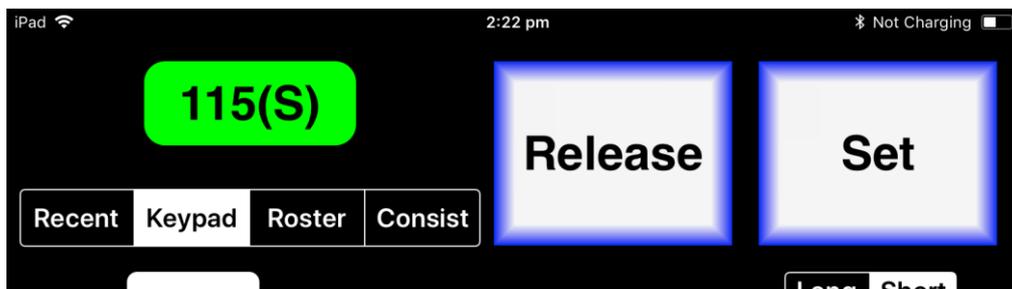


Figure 10 The loco is successfully selected

(12) Tap the Throttle tab at the bottom-left of the screen and you can begin driving as Figure 11. Each time you make a change to the locomotive's state, both the green network LED and the blue Cab Bus LED will flash.

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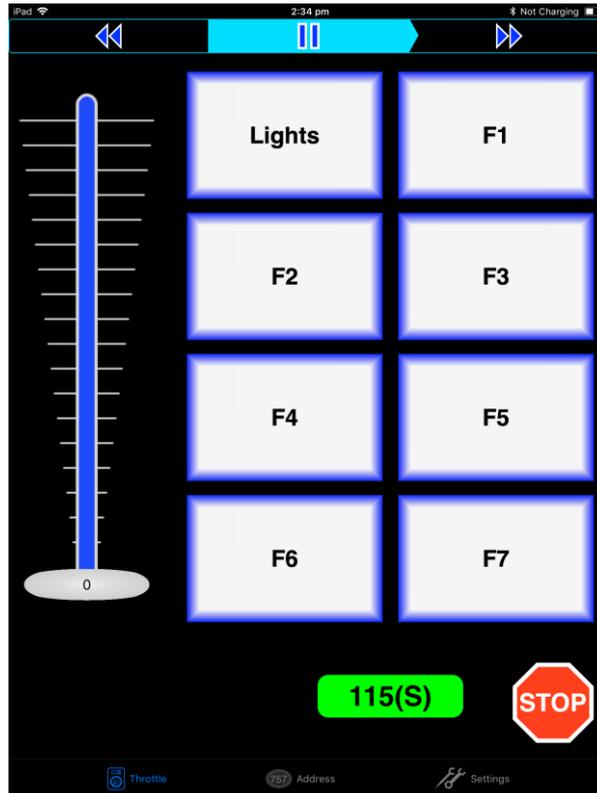


Figure 11 The WiThrottle "Throttle" screen

(13) Please consult the WiThrottle manual for more information:

<https://www.withrottle.com/html/manual.html>

Please note that WiThrottle, has many features that may vary according to the version that you install. WifiTrax has no control over the features of WiThrottle, but has tested carefully its operation with our product. If you have trouble working with WiThrottle and our module, please email us your problem rather than using the WiThrottle support. WiThrottle support persons do not necessarily know details of WifiTrax products, so please do not expect it. Support email: wifitrax@steveshrimpton.com or check our website.

Making it Easier Next Time

You can make connecting to the WFD-30 easier by setting your iPhone to automatically connect to the wftrx_WFD30_1_XXXXXXX_7 access point whenever your system is powered up. Do this by going to the Settings page on your iPhone, connecting to the wftrx_WFD30_XXXXXXX access point, then tapping it. You will see a list of options. Make sure the Auto-Join option is enabled – the Slide Switch will be green. Then, when you turn on your railroad power, after a few seconds your iPhone will join. To make this reliable, you must disable Auto-Join on any other Wi-Fi Access points such as your home router. You can always enable it again when you have finished your model railroad session.

The WiThrottle app has an option "Use Automatic Network Configuration". Set that to "on" and WiThrottle should connect automatically if your WFD-30 is powered up.

Use the recent option when selecting locos to save typing the DCC address each time, but please read the section "Locomotive Roster Web Page" to find out about defining rosters that you can pick from.

It is a good idea to always release locomotives before powering down your WFD-30. If for some reason you can't select a locomotive, just restart the WiThrottle app by tapping its icon on the home screen.

Getting Started with Engine Driver on Android

- (1) On your Android phone or tablet, make sure you are connected to the internet and run the Google Play Store app from the home screen:



- (2) Search for Engine Driver by M. Steve Todd, download and install it. To do this:
 - a. Tap in the “Search” Text Box at the top,
 - b. Type “Engine Driver” into the text box and click the Search button, make sure the correct app “Engine Driver Throttle” displays as in Figure 12,
 - c. Tap on the “Engine Driver Throttle app” (Figure 12). The app detail page displays.
 - d. Tap the Install button (Figure 13). The app downloads and install on your device. Do not open the app until after the next steps.

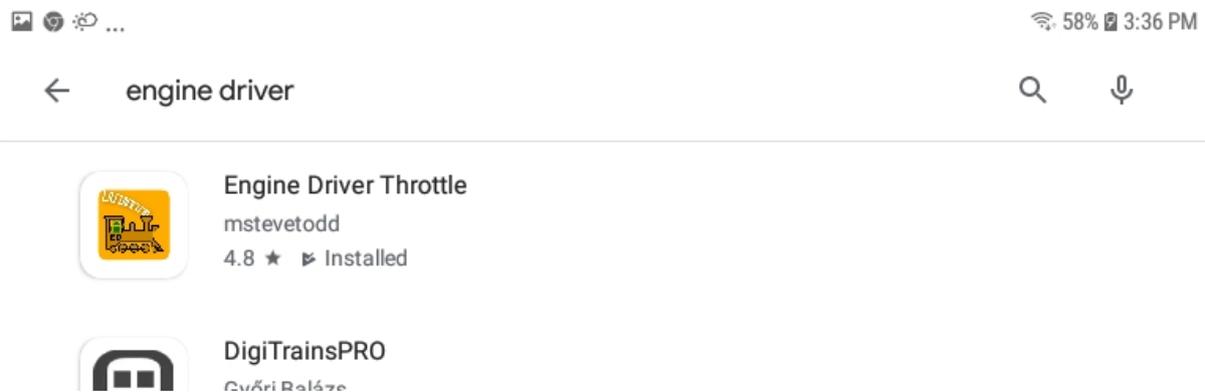


Figure 12 Searching for the Engine Driver app in Google Play Store

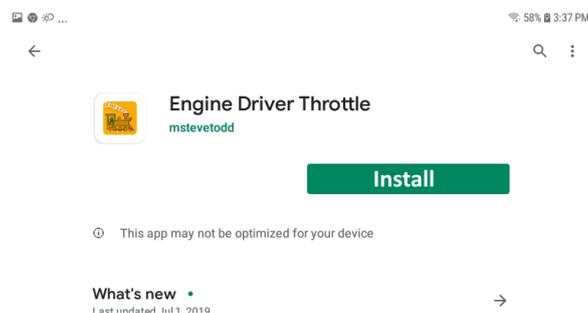


Figure 13 The Engine Driver Throttle detail page in the play store

- (3) Make sure power to your NCE Command Station and booster is on, the WFD-30 is connected to the command station and there is a locomotive on the track with a DCC address that you know. Both the red power LED and the blue Cab Bus indicator LED should be alight.
- (4) Tap the Home button, and run the settings app on your Android phone.



- (5) Tap Connections on the left, then Wi-Fi on the right as Figure 14 (This may vary with different versions of Android).

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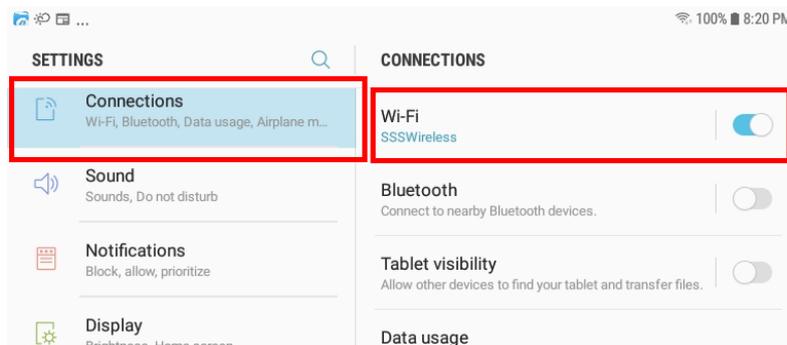


Figure 14 The Wi-Fi Connection page in the Android Settings app

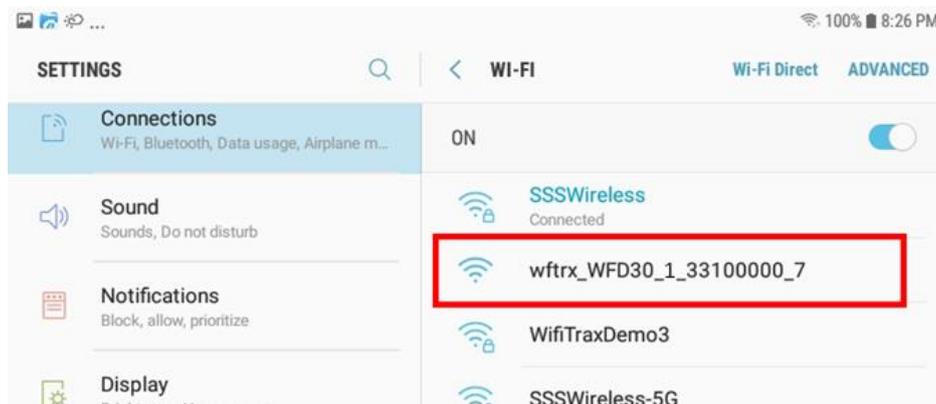


Figure 15 WFD-30 Wi-Fi Access Point is visible

- (6) You now see a collection of available Wi-Fi Access Points. Look for one that is of the form `wfrx_WFD30_1_XXXXXXXX_7`, where `XXXXXXXX` is the serial number of your unit that appears on its bag and the unit itself, like Figure 15. Tap that Wi-Fi Access Point – no password is required – and wait for it to connect. You will not be able to access the internet while you are connected to the Wi-Fi access point of the WFD-30 but consult the manual later to see how you can put everything on your home network. After a few moments the Access point should show “Connected, no internet” as Figure 16

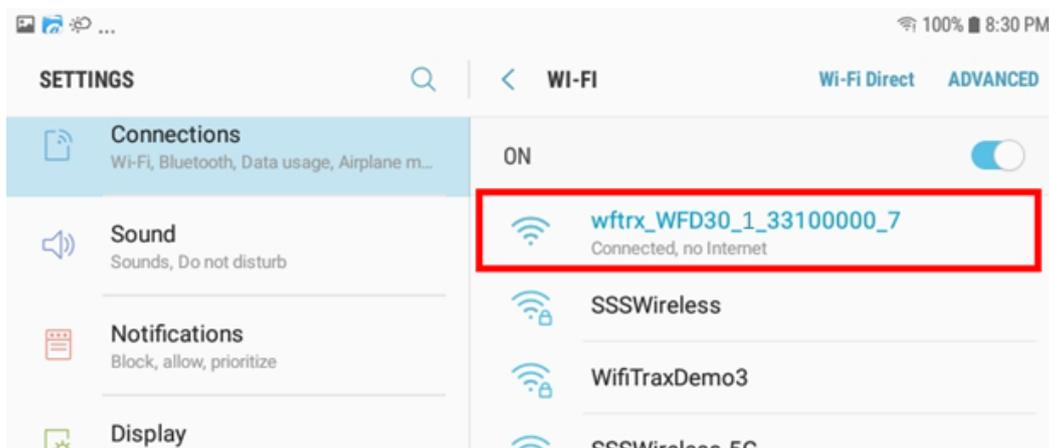


Figure 16 Connected to the WFD-30 Wi-Fi Access Point

- (7) Now you can open the Engine Driver app that you installed. Do that by going to the Home Screen and clicking the Apps icon:

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- (8) On the Apps find the Engine Driver app icon – you may have to swipe right (for convenience you could add a shortcut to your Home Screen), then tap it:



- (9) Go through the setup sequence, accepting all the defaults and allowing the required privileges.
- (10) After setup, you should see the “Connect to Server” page with your WFD-30 listed as a “Discovered Server” as Figure 17. Tap on it to connect. The green network LED on your WFD-30 should now flash regularly to show that the UWT-100 is communicating with it.

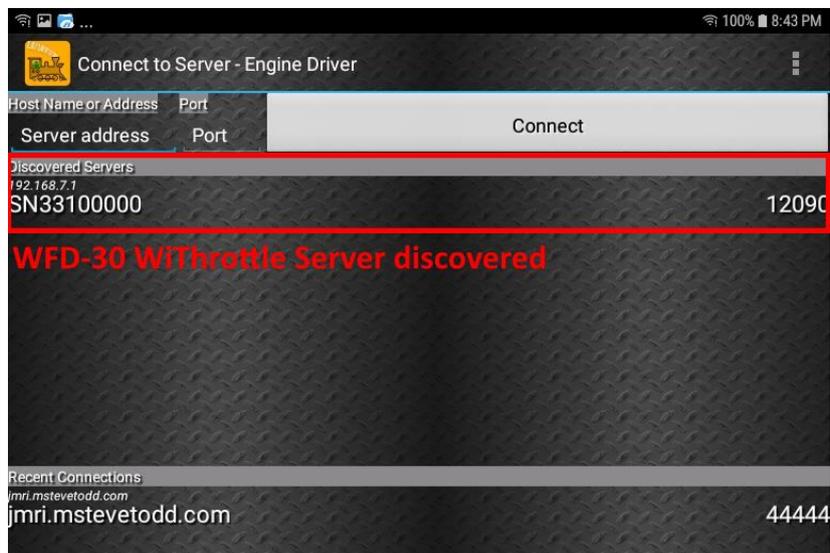


Figure 17 The WFD-30 WiThrottle Server is discovered by the Engine Driver app on Android

- (11) **Only if the WFD-30 is not discovered** for some reason, after waiting a few moments, you must type the IP Address of the WFD-30 unit always 192.168.7.1 in the “Server Address” box at the top-left and the port value of 12090 in the port textbox as Figure 18, then tap the “Connect” button.

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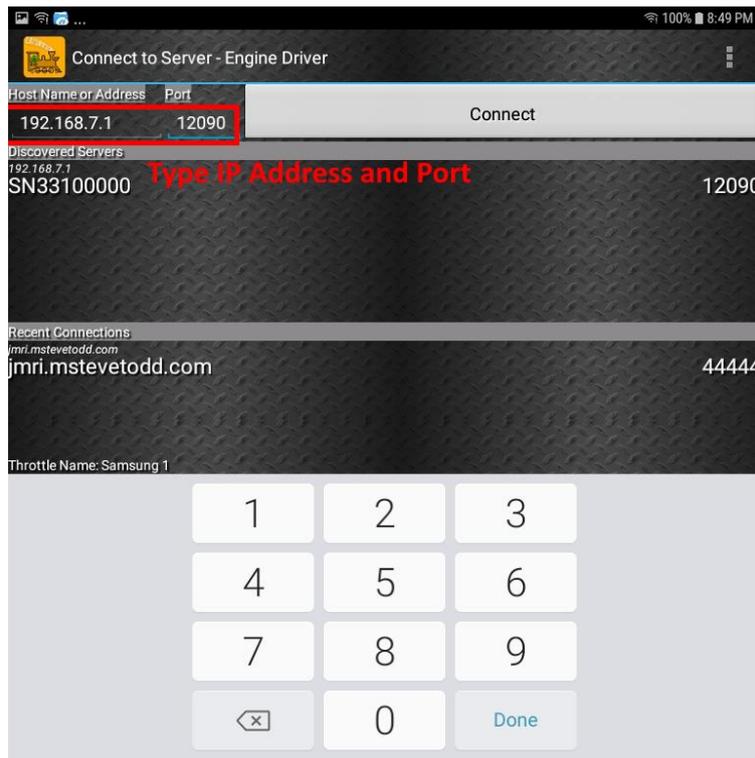


Figure 18 Connecting manually to the WFD-30 WiThrottle Server

- (12)The Throttle screen should then appear, ready to select a loco and drive. Tap the Select button, check the “DCC Address” option and type the address of your locomotive either short or long as in Figure 19. Then tap Acquire.

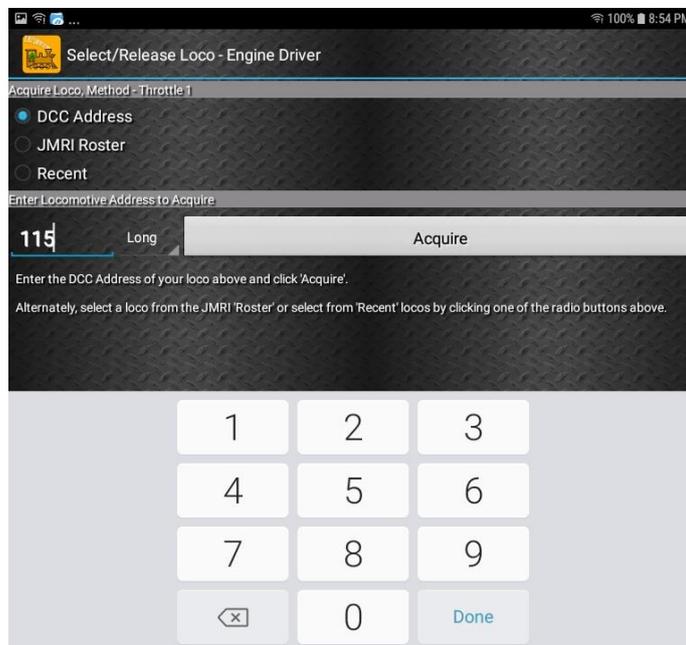


Figure 19 Selecting a locomotive by typing its DCC Address

- (13)Now the Throttle screen appears with your DCC address as the selected loco as Figure 20. Try the function buttons and throttle slider to make sure your loco responds. Each time you make a change to the locomotive’s state, both the green network LED will flash briefly on, and the blue Cab Bus LED will flash briefly off.

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Figure 20 The Throttle screen of Engine Driver with a locomotive selected to drive

(14) Please consult the Engine Driver “About” menu for more information about the app. It is possible to control more than one locomotive at a time and select different display appearances and preferences. There are much better display options than the one shown in Figure 20. Consult the website for more information:

<https://enginedriver.mstevetodd.com/>

Please note that Engine Driver, has many features that may vary according to the version that you install. WifiTrax has no control over the features of Engine Driver, but has tested carefully its operation with our product. If you have trouble working with Engine Driver and our module, please email us your problem rather than using the Engine Driver support. The author of Engine Driver will not know details of WifiTrax products, so please do not expect it. Support email: wifitrax@steveshrimpton.com or check our website.

Making it Easier Next Time

You can make connecting to the WFD-30 easier by setting your Android phone to automatically connect to the wfrx_WFD30_6_XXXXXXX_7 access point whenever your system is powered up. This varies according to the Android version. Once this is done, when you turn on your railroad power, after a few seconds your iPhone will join the WFD-30's access point.

To make this reliable, you must disable Auto-reconnect on any other Wi-Fi Access points such as your home router. You can always enable it again when you have finished your model railroad session.

The WiThrottle app has an option “Auto-Connect to First WiThrottle Server” on the Preferences menu. If you enable that, Engine Driver should connect as soon as you power up your WFD-30. Use the recent option when selecting locos to save typing the DCC address each time, but please read the section “Locomotive Roster Web Page” to find out about defining rosters that you can pick from.

It is a good idea to always release locomotives before powering down your WFD-30. If for some reason you can't select a locomotive, just restart the Engine Driver app.

There are other options to make things easier described in the section “General Settings Web Page”. You can install the WFD-30 onto your Home Net, so you can operate and access the internet, control turnouts etc. at the same time as driving trains.

Getting Started with TCS UWT-100

- (1) Make sure power to your NCE Command Station and booster is on, the WFD-30 is connected to the command station and there is a locomotive on the track with a DCC address that you know. Both the red power LED should and the blue Cab Bus indicator LED should be alight.

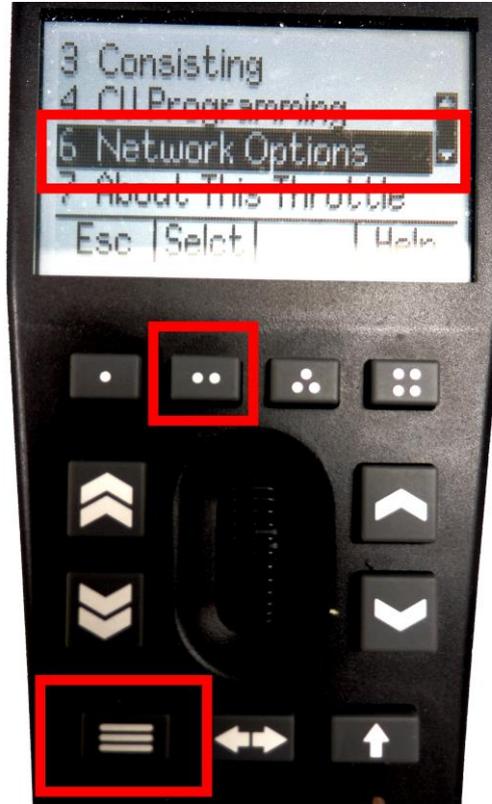


Figure 21 Selecting the Network Options menu on the UWT-100

- (2) Press the Menu button on your UWT, then use the up/down chevron buttons to choose Network Options, then press the Selct button [.] to open the Network menu as in Figure 21.



Figure 22 Select the Add Network option

(3) Select option 3, Add Network as Figure 22



Figure 23 Select Scan for Wi-Fi

(4) Select option 1, Scan for Wi-Fi as Figure 23.

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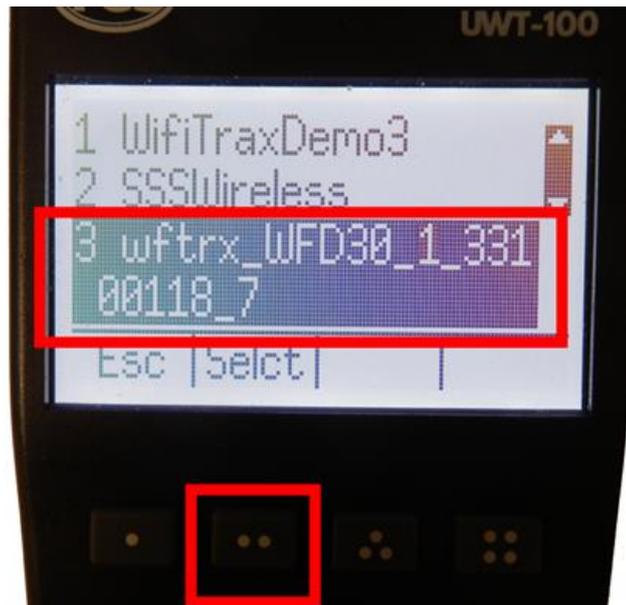


Figure 24 Select the Wi-Fi Network of the WFD-30

- (5) In the Found Networks list, identify the one which has the form wftrx_WFD30_1_XXXXXXXX_7, where XXXXXXXX is the serial number of your unit as Figure 24. Select that Network, using the Selct [..] key.



Figure 25 The WFD-30 WiThrottle server has been found. Now save it!

- (6) There will be a number of messages appear but eventually you should see the message “Found WiThrottle Server” as Figure 25. Press the Save [..] key.
- (7) Briefly, the message “Connected to wftrx_WFD30_1_XXXXXXXX_7 should appear. The green network LED on your WFD-30 should now flash regularly to show that the UWT-100 is communicating with it.

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Figure 26 Select a locomotive with a known DCC address

- (8) Press the Locomotive button on the keypad. Type the DCC address of a locomotive on your layout, followed by the Enter key as Figure 26
- (9) The DCC Address should show in the top left of your screen.
- (10) Test the lights, horn and bell using the HLght, F2 and F1 buttons (if your loco has sound). Verify that the loco moves forward and backwards using the Up/Down chevron buttons and the thumb wheel. Test the Emergency Stop too! Each time you make a change to the locomotive's state, both the green network LED and the blue Cab Bus LED will flash.

More Features in WFD-30 Setup Web Pages

The WFD-30 unit provides setup of advanced features via a set of web pages that may be accessed via any browser or from within apps using WiThrottle protocol, Engine Driver and WiThrottle. Note that WiThrottle Lite does NOT provide this feature, but you can use Safari instead on an Apple device. Please understand that this is NOTHING TO DO WITH THE INTERNET OR THE WORLD WIDE WEB! The web pages are served **from the WFD-30 itself** so you do not need to be connected to the internet. The WFD-30 just uses the same protocol as the internet: HTTP, HTML and JavaScript.

The apps WiThrottle (full version) on IOS and Engine Driver on Android have built-in Web Browsers you can use these for most features but not all. For example, you cannot access files using this built-in browser. Using a browser such as Chrome, Safari or Edge allows you can access and use all advanced features.

These advanced features include the Wifitrax Web Throttle, which you may already have used.

Below, we explain how to access the WFD-30 Setup Web Pages from Engine Driver, WiThrottle and a browser.

Access Advanced Features using Engine Driver

- (1) Connect to the Wi-Fi Access Point that your WFD-30 is using.
 - a. If you are working in direct mode, that is, you have not set up a home net yet, connect to the wftrx_WFD30_1_XXXXXXXX_7 Wi-Fi access point using the Settings App on your Android device.
 - b. If you are working in Home-Net mode, you need to connect to your home Wi-Fi network.
- (2) Run Engine Driver and on the Connect to Server page select the SNXXXXXXXX entry in the Discovered Servers list. If you have changed the module name, your new module name will appear in this list instead.
- (1) Tap the “three dots” icon at the top right of the screen and select Web in the menu. You should now see the Web Setup Main Menu as in Figure 27. You can click or tap on any of the headings in the menu to access the setup for that feature. The later sections provide information about all of the menu options.

Access Advanced Features using WiThrottle

- (1) Connect to the Wi-Fi Access Point that your WFD-30 is using.
 - a. If you are working in direct mode, that is you have not set up a home net yet, connect to the wftrx_WFD30_1_XXXXXXXX_7 Wi-Fi access point using the Settings App on your Android device.
 - b. If you are working in Home-Net mode, you need to connect to your home Wi-Fi network.
- (2) Run WiThrottle and the Connect to Server will display. Select the SNXXXXXXXX entry in the Available WiThrottle Servers list. If you have changed the module name, your new module name will appear in this list instead.
- (2) You now should see the WiThrottle Address page. At the bottom there should be four tabs Throttle, Address (highlighted in blue), WebServer and Settings. Tap on the WebServer tab and you should now see the Web Setup Main Menu as in Figure 27. You can click or tap on any of the headings in the menu to access the setup for that feature. The later sections provides information about all of the menu options.

Note that WiThrottle Lite does not have this WebServer tab so if you are using the Lite version you will have to use Safari as described in the section “Access Advanced Features using a Browser”

Access Advanced Features using a Browser

- (1) If you are working in Direct Mode, connect your device to the Wi-Fi Access Point of your WFD-30, that is wftrx_WFD30_1_XXXXXXXX_7, where XXXXXXXX is the 8-digit serial number. If you are working in Home Net mode you do not need to do this – just connect to your normal home network.
- (2) On your hand-held device or computer open a browser such as in Table 3.

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Device	Operating System	Browser Options
iPhone, iPad	IOS	Safari
Android Tablet or Phone	Android	Chrome
Windows Computer	Windows XP, 7, 8, 10	Internet Explorer, Edge, Chrome etc.

Table 3 Web Browsers available on different platforms. You may be able to install others.

- (3) Type the URL of the WFD-30 into the Address Bar of the browser.
 - a. In Direct Mode type 192.168.7.1 and hit the enter key or “Go” button (the http:// may appear automatically. Do NOT use “https” (the WFD-30 does not support secure sockets).
 - b. In Home Net mode, type the IP Address that was assigned by your router and hit the enter key. Please see the section “Tips to Manage your Home Network” to see how to find this out.

WFD-30 Main Menu

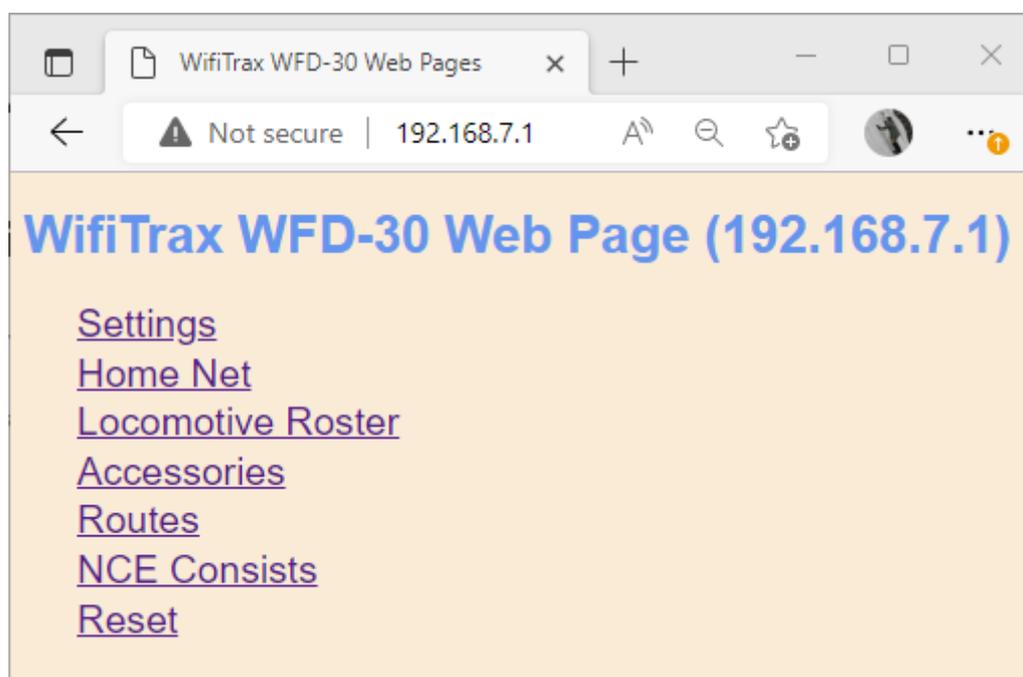


Figure 27 The WFD-30 Web Setup Main Menu

Once you connect to the web pages, you should see the Web Setup Main Menu as in Figure 27. You can click or tap on any of the headings in the menu to access the setup for that feature.

General Settings Web Page

To modify General Settings, tap the Settings heading in Figure 27. The various settings are described in the following sections.

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IP, Rg, SN, Cab Addr:	192.168.7.1, 0, 33100417, 10
F/W Ver. Heap B/C/W, Locos, Clients:	2.0.19, 29808/29808/28224 0 0
Module Name (10 char max no space):	SN33100417
Wi-Fi Channel (1-13):	1
Wi-Fi Password (8 - 32 chars):	
Net Number (1-14):	7
WiThrottle Port (1-65535):	12090
CAB Address 1:	40
CAB Address 2:	50
LEDs Disabled:	<input type="checkbox"/>
Control Loss Timeout(Sec.):	15
Refresh	<input type="button" value="Save"/>

Figure 28 The WFD-30 General Settings Web Page

IP Address (IP)

If you are working in direct mode this will display 192.168.7.1. If you are in Home-Net mode it will display the IP Address assigned by your router. You cannot change this from the Settings page.

Region (Rg)

This is the region that was assigned to your device at the factory. 0 indicates Europe and Asia/Pacific (EU/AP). 1 indicates North America (US/CA). The only effect of this is to limit the Wi-Fi channels that can be used. In North America 1 to 11 are available, the rest of the world allow 1 to 13. You cannot change this from the Settings page. This will also appear on the bag in which your device was supplied.

Serial Number (SN)

This is a unique serial number assigned to your module at the factory. You cannot change this but you may be asked for it if you seek Wifitrax support.

NCE Cab Bus Address (Cab Addr)

This is the NCE Cab Bus address assigned by the DIP switches in the center of your module. For two switch positions, see Table 1, the Cab Bus Address is determined by the values that are shown in the Cab Address 1 and Cab Address 2 text boxes lower down in Figure 28.

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Firmware Version (F/W Ver.)

This is the version of the WFD-30 firmware installed at the factory. You cannot change this from the settings page but you can use Wifitrax Workshop together with an FWA-20 or FWA-10 module to upgrade the firmware. If you ask for WifiTrax support, you may be asked for it.

Heap State (Heap B/C/W)

The three numbers separated by slashes show Best, Current and Worst free heap available during the last minute of operation. Normally you can ignore this technical information as Wifitrax has thoroughly tested that these remain high. However, if they do become low, you may want to restart your module. If it happens frequently you may want to look at a firmware upgrade and/or report the issue to Wifitrax.

Current Locomotives (Locos)

The locomotives that you record in the roster as described later, are stored in Flash memory. When a loco is being driven a page is allocated for it in RAM memory. The number of such pages is shown here.

Current Clients (Clients)

This shows the number of throttle clients currently connected to the module via its WiThrottle Server, e.g., devices running WiThrottle or Engine Driver, or TCS UWT-100. You should not try to run more than four throttles in direct mode or six in Home Net mode.

Module Name

This defaults to the value SNXXXXXXXX where XXXXXXXX is the 8-digit serial number. You can change this to a name up to 10 characters long which cannot include spaces. Type the name you want in the text box (such as "NCE_Wi-Fi") and tap Save. After cycling power, this name will appear to all apps using WiThrottle protocol such as Engine Driver and WiThrottle as the name of the discovered WiThrottle Server.

Wi-Fi Channel

This is the Wi-Fi channel in the 2.4GHz Wi-Fi band that the WFD-30 will use when operating in Direct Mode. It will have no effect in Home Net mode as the channel will be determined by your router. You can set the channel to a value from 1 to 13 and the default value is 1 after a factory reset. You do not normally need to change this but it may be helpful if other interfering devices are being used nearby. You need to cycle power before the channel change will have an effect. Once you have cycled power, the WFD-30 Wi-Fi access point will be of the form wftrx_WFD30_N_XXXXXXXX_7 where N is your selected channel.

Note: Only channels 1 to 11 may be used in North and South America and Taiwan, and 1 to 13 may be used in Europe and Asia/Pacific. It is your responsibility to avoid breaking the law by adhering to these conditions.

WFD-30 NCE Cab Bus Wi-Fi Interface Operating Manual

Setting Wi-Fi Channel using DIP Switches

Sometimes when working in an environment in which Wi-Fi suffers from interfering radio signals it may not be possible to connect to the module and change its Wi-Fi channel setting, using the method above. It is possible to change the channel using the DIP switches which are normally used to determine the NCE CAB bus address to which the module responds. If a link is connected between the holes marked RXD and /PGM at the top right of the module with the unit powered down, it will enter Wi-Fi Channel Select Mode on power up.

When in this mode the setting of the DIP switches will determine the Wi-Fi channel that is adopted and saved on power up.

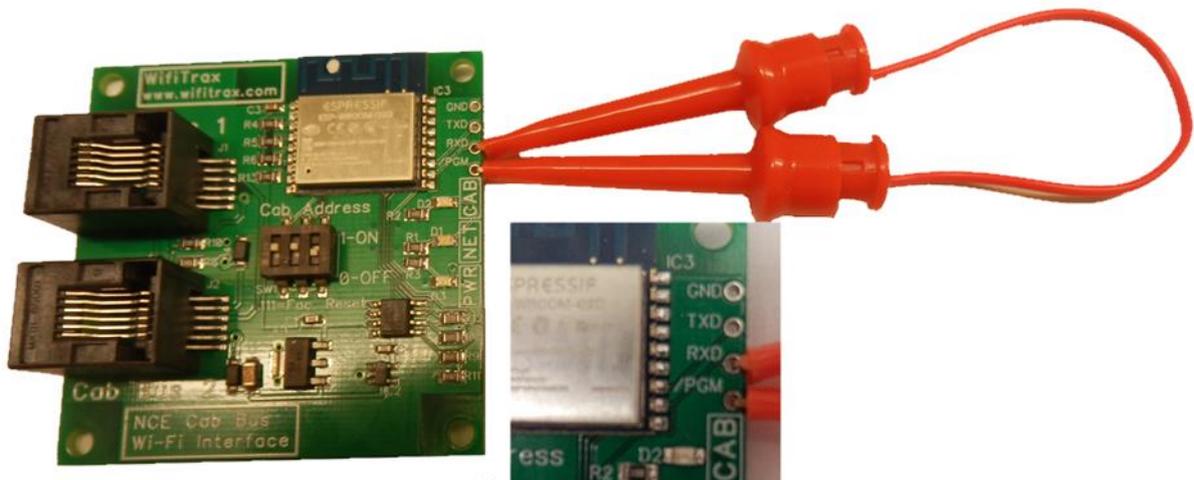
To set the Wi-Fi Channel in this way use the following sequence:

- (1) Remove power from the module.
- (2) Set the DIP switches to the required channel as in Table 4
- (3) Attach a link between RXD and /PGM.
- (4) Apply power.
- (5) Your unit will now be operating on the new channel, but CAB Bus will be disabled.
- (6) Wait 10 seconds.
- (7) Remove power, remove the link and return the DIP switches to the required setting for your desired NCE CAB bus address.

SW1	SW2	SW3	Wi-Fi Channel
0	0	0	1
1	0	0	2
0	1	0	4
1	1	0	6
0	0	1	8
1	0	1	10
0	1	1	12
1	1	1	13

Table 4 DIP Switch Positions for Wi-Fi Channel Selection (0 = Off, 1 = On)

Note: Only channels 1 to 11 may be used in North and South America and Taiwan. 1 to 13 may be used in Europe and Asia/Pacific. It is your responsibility to avoid breaking the law by adhering to these conditions.



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Figure 29 Link attached to force module into Wi-Fi Channel Select Mode on power-up

Wi-Fi Password

This allows you to set a password on the Direct Mode Wi-Fi Access Point. If you set a password, you will need to provide this when any hand-held phone or tablet, or computer, connects to the access point. You would use the Settings app on Android or Apple IOS to connect using a password NOT Engine Driver or WiThrottle. The password will have no effect in Home Net mode since your home router takes care of security. In direct mode, the password stops another user from connecting to and controlling your locos using Engine Driver or WiThrottle, perhaps accidentally from a neighbor or in a club environment.

To set a password type from 8 to 32 case sensitive characters into the Wi-Fi Password text box and tap Save. The password will not be effective until you cycle power. Passwords with less than 8 characters will not be accepted.

To remove an unwanted password, delete all characters from the Wi-Fi Password textbox and tap Save.

If you have set a password and forgotten it you can do a factory reset using the following sequence:

1. Power down,
2. Set all the switches on your WFD-30 to the on position (See Table 1),
3. Power up, wait 10 seconds and power down,
4. Reset the switches to their required position and power up again.

Unfortunately, factory reset removes all settings that you may have made, such as rosters and function labels, and returns everything to their default values, so it's best to avoid this!

DO NOT LEAVE THE SWITCHES IN THE FACTORY RESET POSITION OR THE MODULE WILL RESET EACH TIME YOU TURN IT ON and any features you change will be lost.

Net Number

This defines the subnet that the WFD-30 will use to set its own IP Address and to allocate IP Addresses to hand-held devices that connect in Direct Mode.

It has no effect in Home Net mode.

If you change this value, by typing an integer from 1 to 14 and tapping Save, the WFD-30 will use this after cycling power. The subnet will be 192.168.N.0 where N is the net number. The unit's IP Address will then be 192.168.N.1 and it will assign IP Addresses: 192.168.N.2 to 192.168.N.5

The WFD-30 Wi-Fi access point will be of the form wftrx_WFD30_1_XXXXXXX_N where N is your selected net number.

WiThrottle Port

This is the port number that will define how your WiThrottle Protocol app such as Engine Driver, WiThrottle or TCS UWT-100 connects to your module. Normally you should leave this at its default value of 12090. Even if you use multiple WFD-30, or JMRI as well as WFD-30, you should have no

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need to change this since the servers will be distinguished by their IP addresses. Nevertheless, there are some subtle cases where model railroaders do need to change this.

CAB Address 1

This sets the NCE Cab Address that the WFD-30 module will respond to when the switches on the module are set to the CAB Address 1 position (SW1 = On, SW2 = Off, SW3 = On) (See Table 1), The factory default is Cab Address 40 for this switch position. You can set it to any value from 2 to 63 by typing an integer in the textbox and tapping Save. Changing this setting will only have effect if you select the CAB Address 1 switch position and cycle power.

CAB Address 2

This sets the NCE Cab Address that the WFD-30 module will respond to when the switches on the module are set to the CAB Address 2 position (SW1 = Off, SW2 = On, SW3 = On) (See Table 1), The factory default is Cab Address 50 for this switch position. You can set it to any value from 2 to 63 by typing an integer in the textbox and tapping Save. Changing this setting will only have effect if you select the CAB Address 2 switch position and cycle power.

LEDs Disabled

This disables the Network LED to prevent it flashing if you are annoyed by it. The Blue LED may still remain lit. We recommend leaving it unchecked.

Control Loss Timeout

This value determines the amount of time in seconds that a locomotive will continue running if the throttle loses contact with it.

Some apps, WiThrottle on IOS in particular, deliberately stop any locos if the user leaves the Throttle screen for more than this period of time. The logic of this is clear, in that you really should have your locomotive under continuous control. However, sometimes when dual throttles are used on WiThrottle, you may want to select and start another loco (or consist) on the second throttle. By default, the timeout is 15 seconds, so you should have enough time. However, if that is not enough, you can increase this value up to 60 seconds.

Engine Driver on Android actually does not do this – just a different philosophy.

The timeout also is effective if your throttle app loses contact because you are out of range.

Note however, that if you release a loco that is running, either from WiThrottle, Engine Driver or UWT-100, the loco will continue running until you reselect it and bring it to a stop. You may or may not like this, so you may adopt the rule that all locos should be stopped before deselecting them. However, it can be useful where you want to alternate between controlling two or more locos on the TCS UWT-100 or other single loco device. It's your call.

Home Net Web Page

This page allows you to change your WFD-30 from Direct Mode to Home Net Mode and back again. Once you have changed to Home-Net mode, you will not be able to work in Direct Mode, but if for

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some reason the WFD-30 cannot join your Home Net (maybe you typed it wrong, put in the wrong password or the router was turned off), the WFD-30 will attempt to connect for about 30 seconds then revert to Direct mode. You will then see the wftrx_WFD30_1_XXXXXXX_7 access point which you can connect to and correct the problem. It's always worth restarting your home router if you've checked everything and connection does not succeed, as these so often seem to get locked up somehow! If all goes wrong for some reason, you can always do a factory reset using the switches on the module.

To change to Home Net mode, tap the Home Net heading in Figure 27.

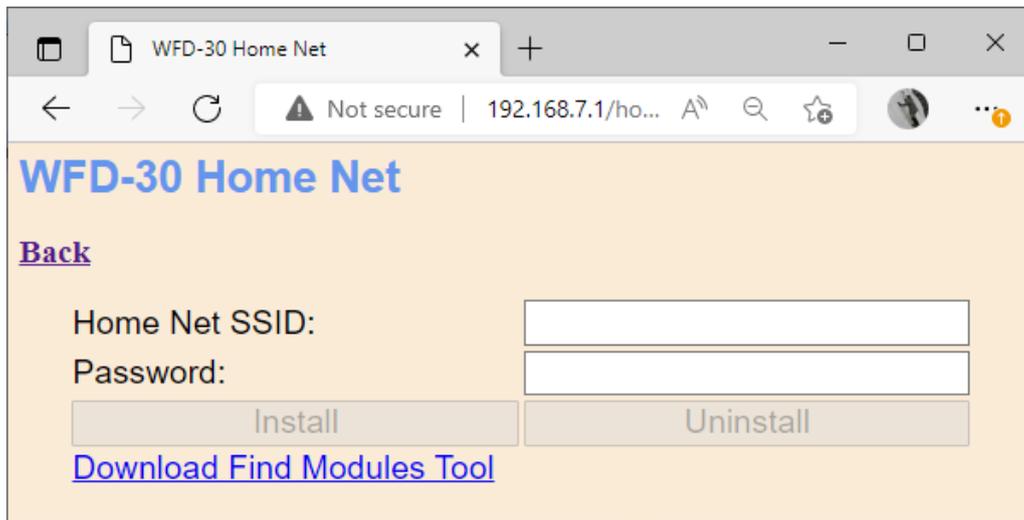


Figure 30 The Home Net Web Page

Figure 30 shows the Home Net web page. Type the SSID of your home Wi-Fi router in the Home Net SSID textbox. Type the password (shared key) for your home Wi-Fi Access Point into the Password textbox. Be careful as passwords and SSIDs are case sensitive. Check the section “Tips to Manage your Home Network” to find some tips on finding out your SSID and password. This will often be provided by your internet service provider on a card, but you may have changed it.

You may at this point want to download the Find Modules tool by clicking on the “Download Find Modules Tool” hyperlink. This will download an HTML/JavaScript file called FindModules.html as in Figure 31. This tool will help you find the IP Address assigned to your module by the router. Do not open it yet. See the Section “Find Modules Tool” to find out how to use this.

When you are satisfied the SSID and Password are correct, tap “Install”. The unit will restart and connect to the Home Wi-Fi Network you have specified. To continue, you must reconnect your phone, tablet or computer to your home network and use the WFD-30’s IP Address on that network.

To obtain the roster and drive trains when operating in Home Net mode, make sure your device is connected to your home net, then run Engine Driver or WiThrottle. The app should see the WFD-30 as a Discovered Server.

Select the WFD-30 WiThrottle server from the Discovered Servers list, or manually configure using the IP Address assigned to the WFD-30 module. Please see the section “Tips to Manage your Home Network” and “Find Modules Tool” to find out the IP Address and to set your router so it always assigns the same address. Once you have connected to the server, the operation of Engine Driver and WiThrottle is the same as in Direct mode.

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To access the web pages, you need to use the IP address that has been allocated to the WFD-30 by your router instead of the fixed 192.168.7.1 address in direct mode. Engine driver provides a menu item to access the web page and WiThrottle (Full Version) shows a tab at the bottom. Once you have the Web Pages visible, you can note down the IP Address at the top of the Main Menu so you can connect just using your browser if required.

If you have not downloaded an app and have been using Wifitrax Web Throttle in Direct mode, see the next section or the section “Tips to Manage your Home Network”.

Find Modules Tool

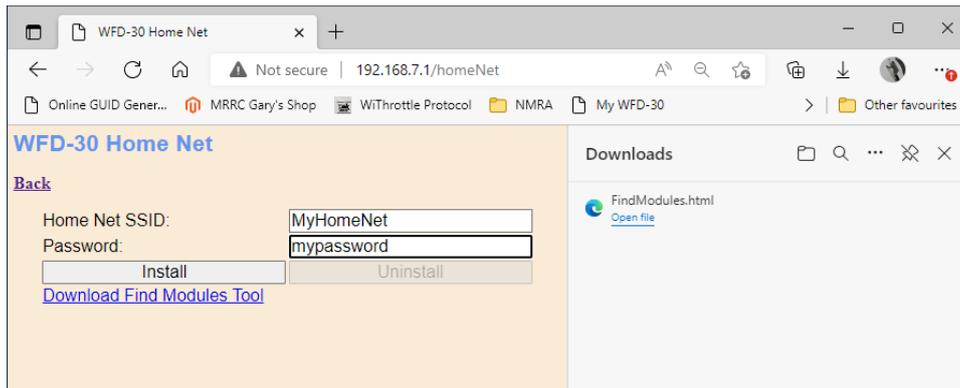


Figure 31 Downloading the FindModules.html Tool in Widows 10 Edge Browser

If you have downloaded the FindModules tool while in Direct mode, you can use it to find the IP Address of your module once it is on your home network.

In Windows 10, after installing on the home net, your browser will look like

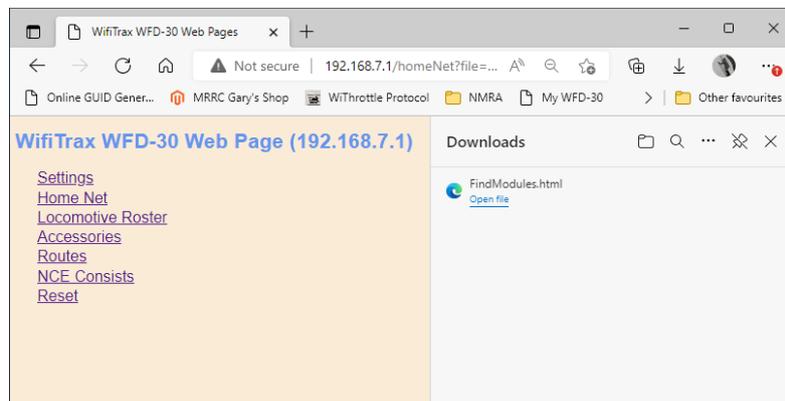


Figure 32 Open the Find Modules Tool once your Module is on your Home Net

However, this is now the wrong IP Address since, if the green LED is lit continuously, your module has now been assigned an IP Address by your router.

So, now connect your computer to your home network, then open the FindModules.html tool by clicking on it in the Downloads pane in Figure 32. The FindModules tool opens to display a page as Figure 33.

To use this, first click on the Find Subnet button. If the subnet shown is correct, this should display green.

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Next click the Scan Subnet button. The progress bar will move across the screen and stop when the module is found as in Figure 34.

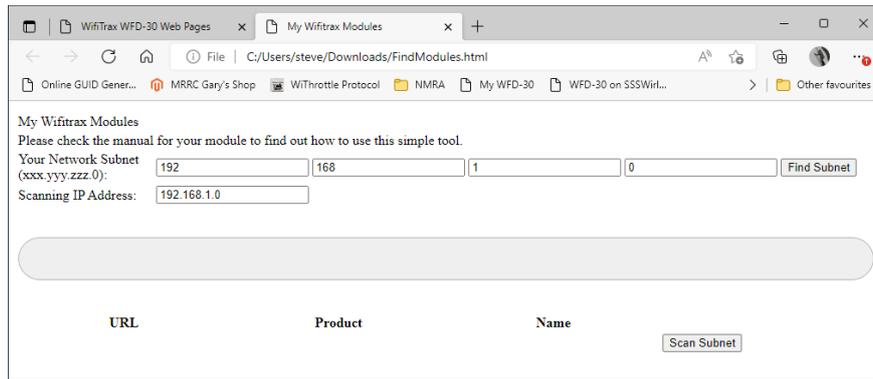


Figure 33 FindModules Tool Display

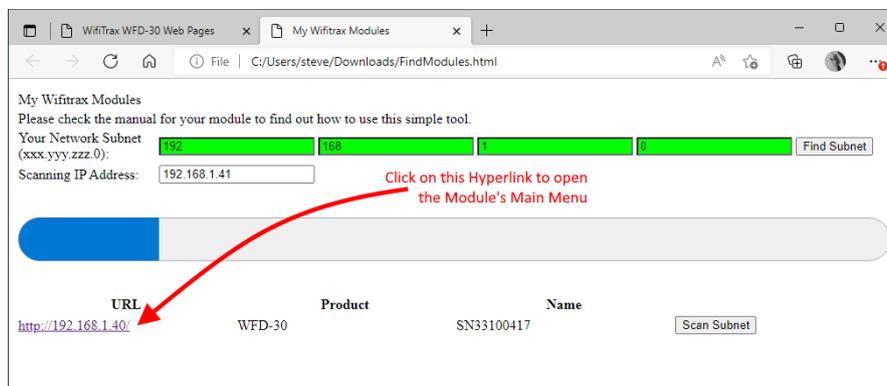


Figure 34 The FindModules Tool has Found your WFD-30 module. Click on the URL to open the Main Menu.

Figure 34 shows that the FindModules tool has found your WFD-30 module and, in this case, the router has assigned it an IP Address of 192.168.1.40. Click on the hyperlink to open the Main Menu of the module as Figure 35. You should now save this as a bookmark in your browser so that you can always access it in future. Note however that the router may assign a different IP address and you would then have to repeat the process. Consult Section “Tips to Manage your Home Network” to learn how to allocate a reserved IP Address.

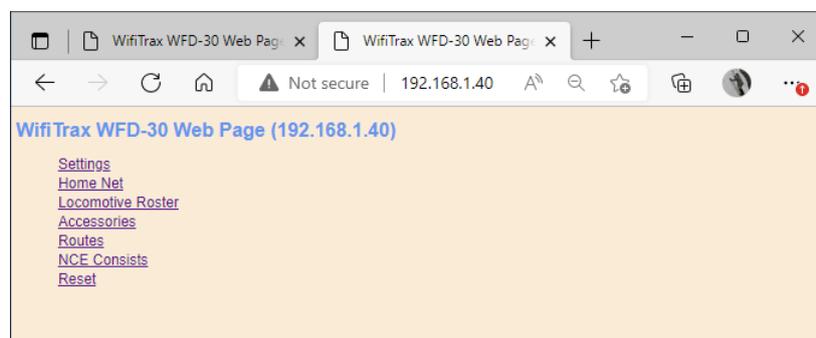


Figure 35 The WFD-30 Main Menu Opened from the Find Modules Tool

The FindModules tool may not always work on your network. In particular, it may not find your subnet correctly. If you know your subnet, you can type it in. You can find your subnet on Windows by opening a command prompt and typing ipconfig <enter>.

Locomotive Roster Web Page

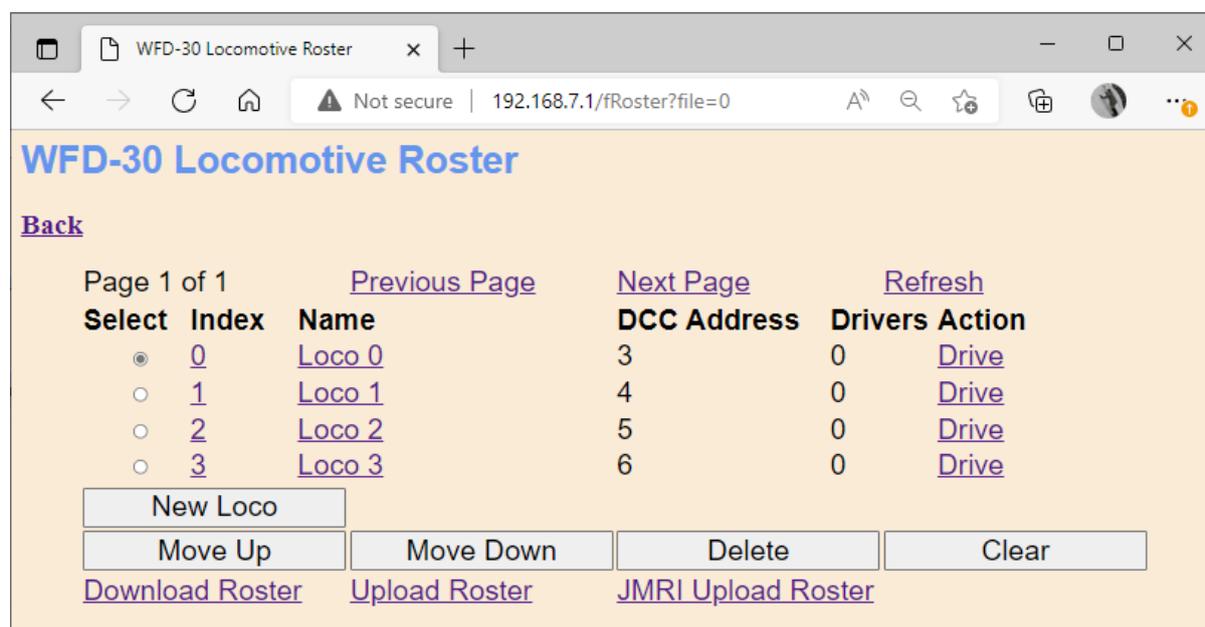


Figure 36 The Locomotive Roster Page

This page allows you to change the entries in the locomotive roster of your WFD-30. You can give each entry a Name and a DCC Address. You can then select from the roster when using Engine Driver or WiThrottle instead of needing to type the DCC Address. You can also name the function keys to match the usage by your DCC decoder and loco wiring.

This page also allows you to download part or all of your roster to be saved and restored later. Driving locos using Wifitrax Web Throttle and CV programming in operational mode (Program on the Main) are also accessible via this page.

View the Locomotive Roster by tapping the Locomotive Roster item in the Web Setup Main Menu. By default, as shipped and after factory reset only four entries are displayed and given the names “Loco 0” through “Loco 3” with DCC Addresses 3 through 6. Locos can be added, up to maximum of 100.

Adding, Deleting and Moving Locos Up or Down

You can add more locomotives to your roster up to a maximum of 100. Add a loco by tapping the “New Loco” button on the Loco Roster page. A new loco will be added with a default name, DCC address and set of functions. Once you reach 100 locos, tapping the New Loco button will have no effect.

You can delete a loco by selecting it using the radio button in the left-hand column and tapping the Delete button. after a warning, the rostered loco will be deleted. This operation cannot be reversed.

All locos in the roster have an index. This simply indicates the position of the locomotive in the roster. If you delete a locomotive, a gap will occur in the indices. Adding new locos will fill any gaps in the roster index sequence before appending new locos at the bottom.

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Display of the locomotive roster is paged, 10 locos to a page, so a full roster will have 10 pages. Initially, when you enter the Roster page, the first page will be displayed. Move forward and backwards in the pages by clicking the Next Page and Previous Page links.

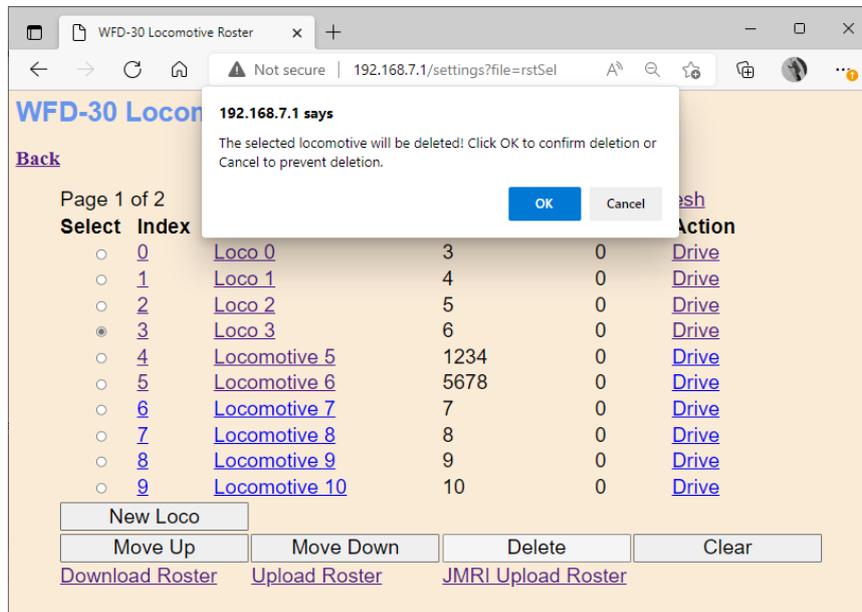


Figure 37 Deleting a loco from the roster

A loco may be moved upwards and downwards in the roster. To move a roster down by one step, select the required loco by clicking the radio button at its left. Then click Move Down. The index of the selected loco will be increased by one so that the loco will move one place downwards in the roster. Similarly, you can move a loco one place up by selecting and clicking the Move Up button. Note that if you have gaps in the index sequence, locos will increase or decrease their index as they move through the gap and only appear to move down or up when an adjacent index is occupied.

Clearing the Entire Locomotive Roster

You can clear the entire roster and begin again by clicking the Clear button. After a warning, all locos will be deleted. This operation cannot be reversed. However, if you have downloaded some or all of your locomotives you can restore them by uploading the file as described in the Section "Downloading Locomotives to a File".

Editing Rostered Locos

To edit one of the entries, tap the name, to show the edit page as Figure 38, and enter what you require in the Name and DCC Address text boxes and tap Save. Names can be up to 15 characters and may contain spaces. DCC addresses must be in the range 1 – 9999.

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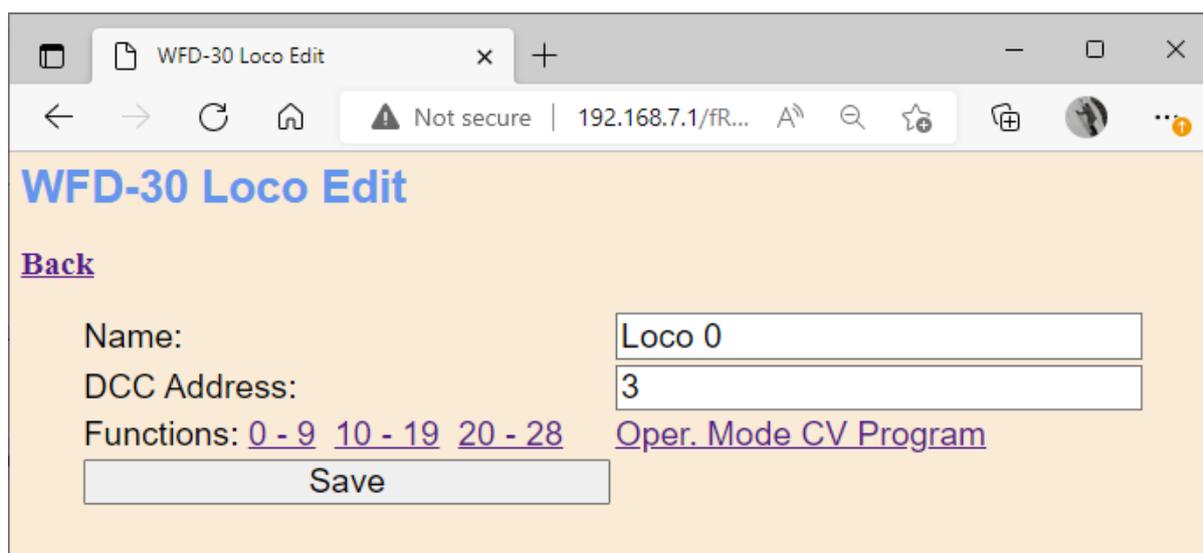


Figure 38 The Locomotive Roster Entry Edit Page. You can also access the Function labels from here.

Function Labels Web Page

If you want to add function labels, go into the edit page for the required loco and tap the Functions hyperlink, either “0 – 9”, “10 – 19” or “20 – 28”. The selected range of functions is displayed for that locomotive as in Figure 39.

The screenshot shows a web browser window with the address bar displaying '192.168.7.1/ffuncs0?file=0'. The page content includes a blue header 'WFD-30 Loco Functions', a purple 'Back' link, and a table with the following data:

Function	Display Name	Latched	Display Latched
0	Funct 0	Yes	Yes
1	Funct 1	Yes	Yes
2	Funct 2	No	Yes
3	Funct 3	Yes	Yes
4	Funct 4	Yes	Yes
5	Funct 5	Yes	Yes
6	Funct 6	Yes	Yes
7	Funct 7	Yes	Yes
8	Funct 8	Yes	Yes
9	Funct 9	Yes	Yes

Figure 39 The function labels displayed for a given locomotive

To edit any function, tap the name of the function and change its name in the textbox. The name can be up to 10 characters long. You can also change whether the function is latched or not using the “Latched” checkbox. When a function is latched, the WFD-30 will send a 1 value when the key is first tapped, then a 0 value when it is tapped a second time. For unlatched functions a 1 is sent when the button is pressed and a zero when released. There is also a “Show Latched” checkbox that is occasionally useful. We have found some DCC decoders seem to perform the function once on each transition, so sometimes it is useful to mark a function as latched but to display is as though it were not latched.

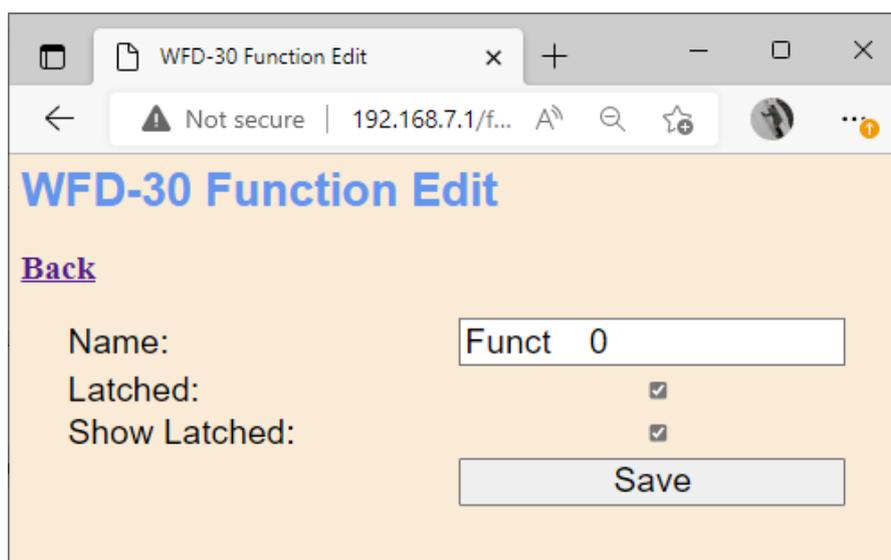


Figure 40 Editing a function key for a given locomotive

Driving Rostered Locomotives using Wifitrax Web Throttle

WFD-30 provides a means of driving rostered locomotives, called Web Throttle, that does not require an app such as Engine Driver or WiThrottle. It is likely you will get a better experience using either of these apps on your phone or tablet, but if you do not want to install an app or you are working on an operating system such as Windows where apps are not so readily available, you can use Web Throttle. Web Throttle is itself an app written in a language called JavaScript and is downloaded from the WFD-30 when you use it. It is a simple app providing a basic driving experience and control of DCC functions such as Lights, Horn etc. It makes use of the function labelling that can be applied to rostered locos. It will run on most browsers such as Safari, Chrome and Edge on Apple IOS, Google Android and Windows 10.

To drive a rostered loco open the Locomotive Roster page by selecting Locomotive Roster from the main menu. Find the loco that you want to drive, paging down or up as needed and click the Drive hyperlink as in Figure 41. This displays the Web Throttle page as Figure 42.

You cannot, at present, drive a non-rostered loco using the Web Throttle page.

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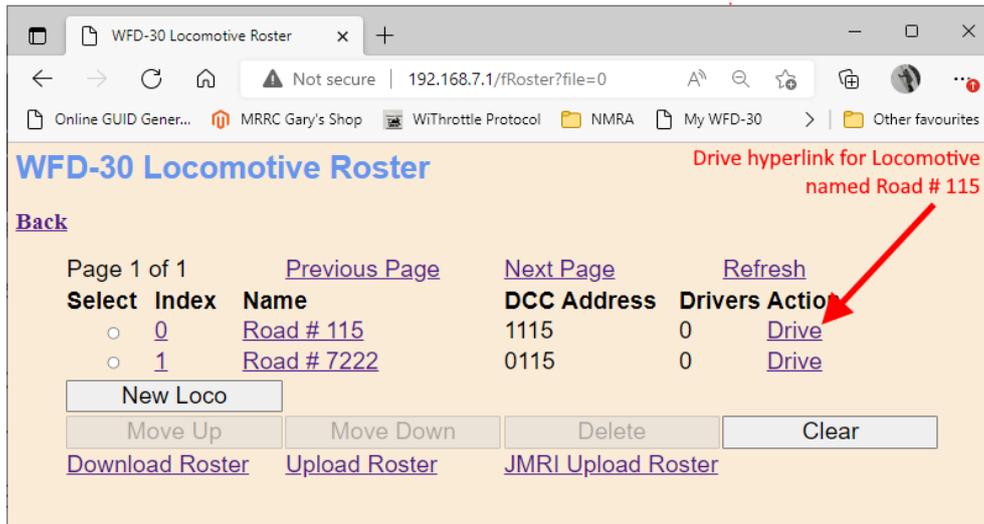


Figure 41 The Drive Hyperlink in the Locomotive Roster Page. Click this to drive the loco.

Figure 42 is fairly self-explanatory.

The button labelled Forward at the top left toggles between forward and reverse when tapped or clicked. It is only operational when the loco is stationary. It shows green when in forward direction and red when in reverse.

The button at the top right labelled Stop is an emergency stop button that will stop the locomotive. It is active only when the loco is running.

The button labelled >> increases the speed by ten DCC steps while the button labelled << reduces the speed by ten DCC steps. Do not confuse these with forward and backwards buttons!

The button labelled > increases the speed by one DCC step while the button labelled < reduces the speed by one DCC step. Do not confuse these with forward and backwards buttons!

The Horizontal Slider allows you to increase or decrease the speed. You can drag it right or left with a finger or mouse, or you can tap or click at any point on its range to set the speed to that value.

All the buttons below the slider are function keys that show the names defined in the function key definitions in the Loco Edit pages.

When you have finished driving the locomotive click the Back hyperlink to return to the Locomotive Roster page.

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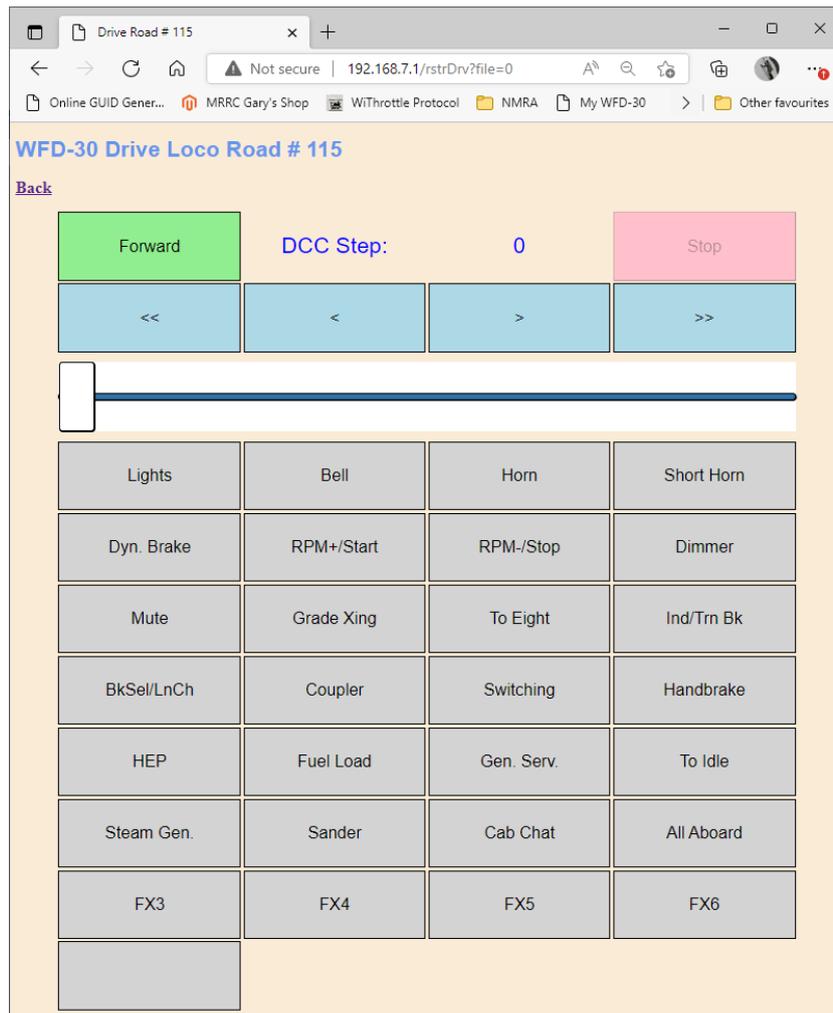


Figure 42 The Web Throttle Page for a Locomotive whose Function Names have all been Configured

Driving multiple locomotives with Web Throttle.

Following the procedure above, you may think that you can only drive one locomotive at a time. However, if you right click on the Drive hyperlink on the Locomotive Roster page in Figure 41, you can open the Web Throttle page in a new tab on your browser or a new window. Figure 43 shows this for the Microsoft Edge browser on Windows.

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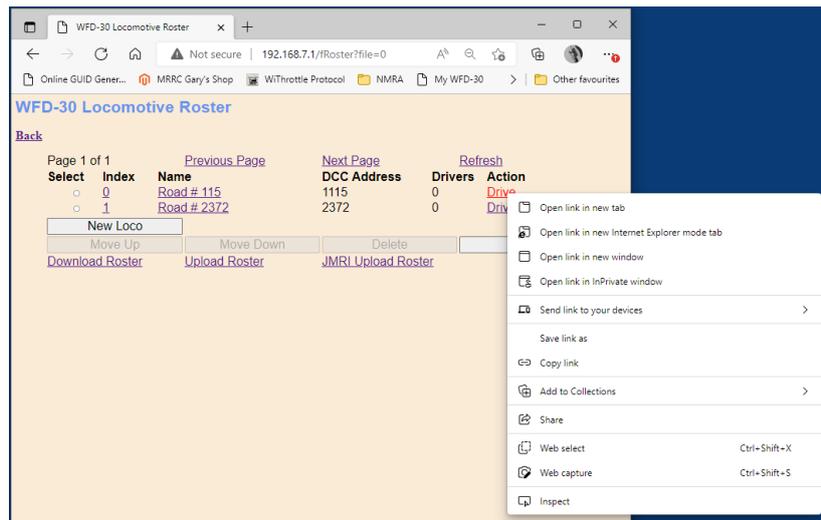


Figure 43 Opening a new Web Throttle Tab or Window

If you open a Web Throttle page in this way do not click the back button when you have finished driving the loco. Instead, close that browser window or tab. This will avoid leaving too many browser windows connected to the WFD-30.

You can probably drive up to six locomotives in direct mode using Web Throttle pages on one or more devices, but you cannot connect more than four devices. If you have too many windows open, the WFD-30 will not respond and may even crash. You may need to experiment to find the maximum.

In Home Net mode, there is no limit on the number of throttle devices and again, around six locos can be driven at the same time. You may be able to drive up to ten locos if only a few function keys are active.

For the technically inclined: The Wifitrax Web Throttle, unlike throttle apps that use the WiThrottle protocol, does not rely on establishing a socket connection continuously with the WFD-30 module. Therefore, it is not limited by the modules limit of around six continuous socket connections. Instead, it uses the HTTP protocol just like any other web page and updates using JavaScript interaction with the WFD-30.

Operational Mode Programming (Programming on the Main)

The WFD-30 provides the capability to program any CV in a decoder whose locomotive is placed on the NCE Main Track. This is called Programming on the Main, or Operational Mode CV Programming. WFD-30 uses the Operational Mode Programming capabilities in your NCE Command Station to do this by sending it commands on the Cab Bus.

To program CVs, first open the Locomotive Roster page from the main menu of the WFD-30. Enter the Loco Edit Page by clicking on the name of the locomotive. Then click on the Oper. Mode CV Program hyperlink (Figure 44) to display the programming page as Figure 45.

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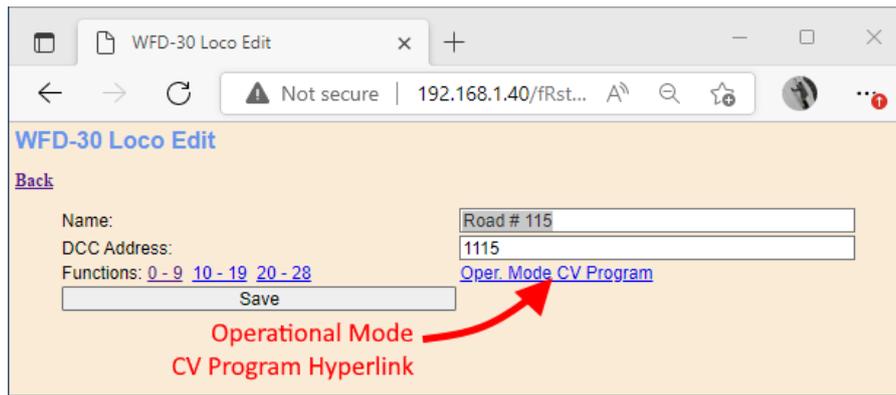


Figure 44 The Hyperlink to enter Programming on the Main or Operational CV Programming for a Locomotive

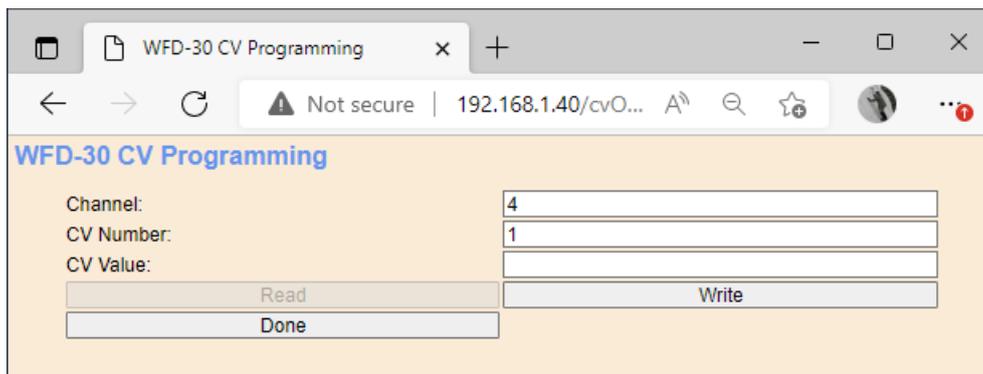


Figure 45 The Operational CV Programming Page

On this page, the channel is actually the same as the locomotive index in the roster and is determined by which loco you selected from the roster.

To program a CV, type the CV number into the textbox labelled CV Number and type the required value into the textbox labelled CV Value, then click the Write button.

For example, on a SoundTraxx Tsunami 2 decoder, the master volume is controlled by CV number 128. This is a good one to test, so for example the settings in Figure 46 will reduce the volume to rather a quiet setting.

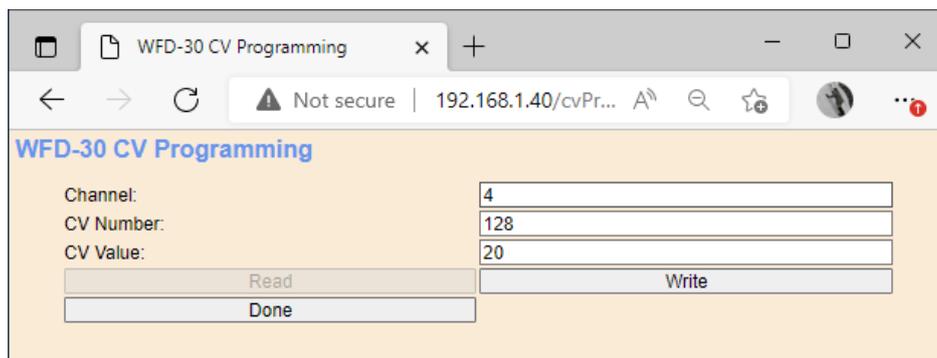


Figure 46 Programming the Master Volume on a SoundTraxx Tsunami 2 Decoder

When you have finished programming CV values, click the Done button, followed by Back to return to the Locomotive Roster.

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IMPORTANT: You should be able to program all CVs using this page, however the response and behavior of CV programming is dependent on your decoder. For example, most decoders allow changing the DCC Address using Programming on the Main like this, but the decoder may prevent you from changing the short or long DCC address if the decoder is using that address. To set the address, you may be better to use your NCE Pro-Cab or Power Cab.

Downloading Locomotives to a File

Once you have set up a set of locomotives in your roster, including function names, it is a good idea to download and store it in a file on your PC or other device. For example, if you need to reset the module for some reason, the roster will return to its default and you will have wasted all that work. You also might like to have separate rosters if you use the WFD-30 at a club as well as your own layout.

IMPORTANT: On the Engine Driver and WiThrottle apps, you cannot use the Web display within the app to download or upload a locomotive roster. You must open the setup web pages in a browser such as Safari or Chrome by typing 192.168.7.1 into the browser. If you are in home net mode you use the IP Address assigned by your router. Select the Locomotive Roster page and proceed as described.

To download all or part of a roster, click Download Roster on the WFD-30 Locomotive Roster page. The page that you are currently displaying has no effect. The Roster Download page will appear as in Figure 47.

The screenshot shows a web browser window with the address bar displaying '192.168.7.1/fRstrDnld'. The page content includes a blue header 'WFD-30 Roster Download', a purple 'Back' link, and a paragraph explaining that the collection will be downloaded as a JSON file. Below this is a form with the following fields: 'File Name' with the value 'LocoRoster', 'Download All Active' with a checked radio button, 'Download Range' with an unchecked radio button, 'First Index (0-16):' with the value '0', and 'Last Index (0-16):' with the value '16'. At the bottom of the form is a 'Download' button and a 'Progress:' label followed by a horizontal progress bar.

Figure 47 The Roster Download Page

There are 100 indices (loco numbers not DCC Address) in the roster, numbered 0 to 99. Usually only some have been filled and are therefore active, so only active roster entries will be downloaded.

The File Name is the name given to the file that will be downloaded, so give it a meaningful name that you will recognize.

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You can elect to include all of the active loco entries in the file or just a range. Therefore select “Download all Active” or “Download Range” accordingly.

If you select “Download Range” enter the First and Last Index as required. For example, if you just want to download the first 10 locos, use 0 and 9 as the values. Notice that indices begin at 0. You may want to go back to the Locomotive Roster page and jot down the first and last index.

Click the Download button. A Progress Bar shows the download progress as in Figure 48.

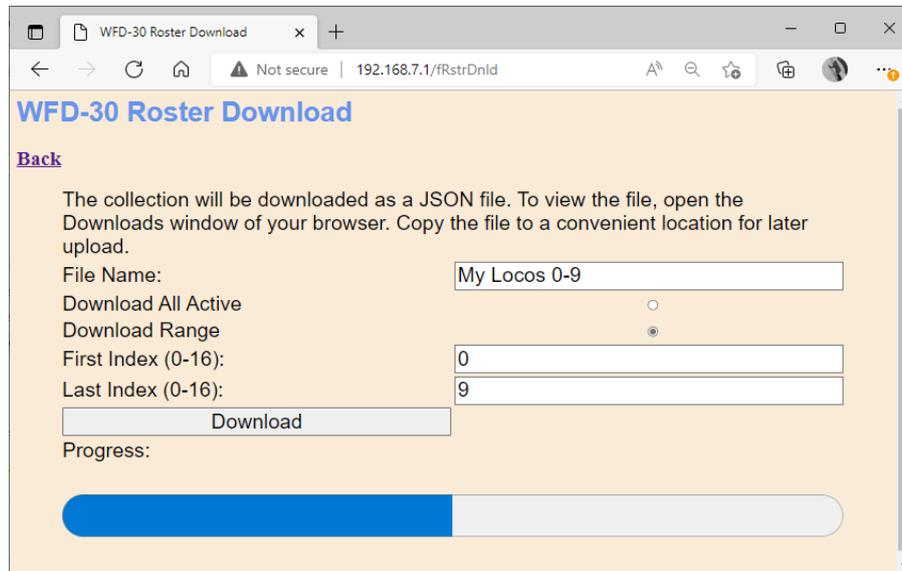


Figure 48 A Download in Progress

When the download is complete, the action depends on the browser and device you are using.

Accessing the Roster Download File on Windows 10

Using Microsoft Edge on Windows 10, the browser automatically opens the Downloads pane as on the right of Figure 49.

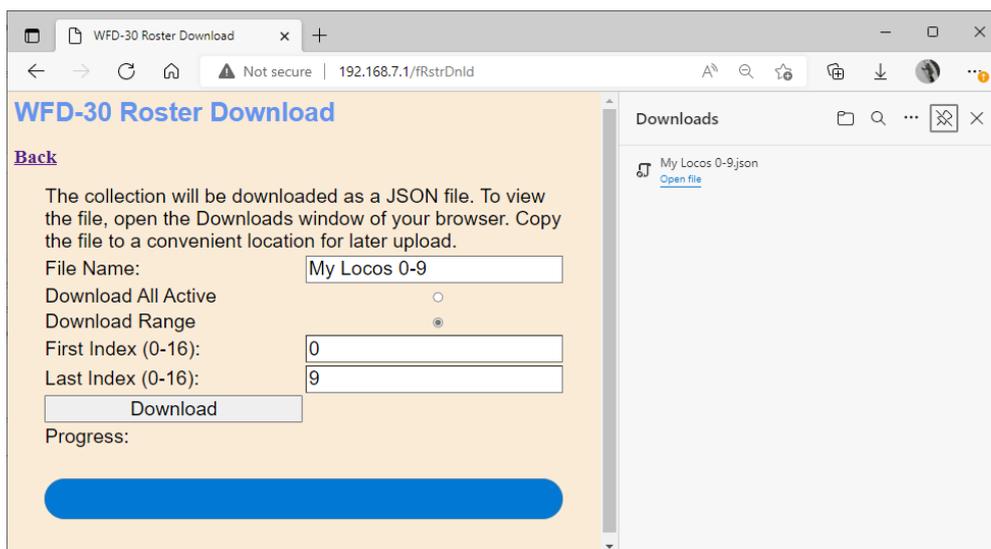


Figure 49 Download Complete on Windows using Edge Browser

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This behavior is the same as downloading any file from the internet. The file is placed in the Downloads folder for the account on your machine. How you access this will depend on your device and operating system.

On Windows 10 this will be

C:\Users\\Downloads

Where <User Name> is the name of the Windows user account on your machine. You can open the Downloads folder in Edge by clicking on the folder icon in the Downloads pane to see the folder in Windows Explorer as in Figure 50.

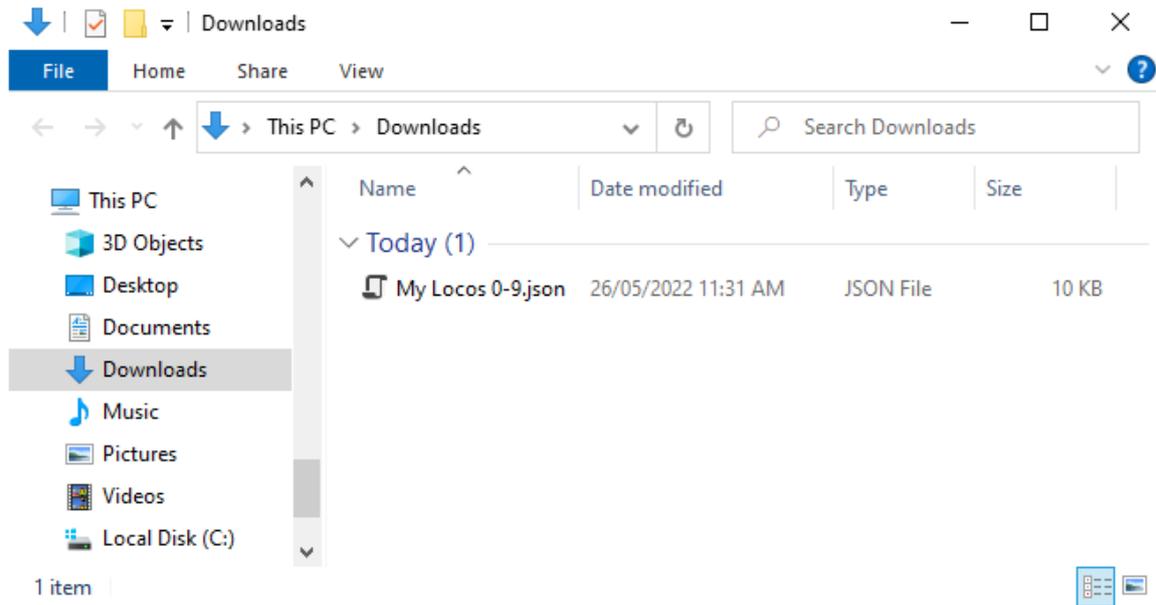


Figure 50 The Downloaded Roster File in Windows Explorer

Now you should copy the file to a suitable location on your computer that you have prepared for rosters. If you leave it in the Download folder it will get lost if you delete the downloads to clear up space on your disk drive.

For the technically inclined, the file is in JSON format and contains locos as JSON objects with 29 function definitions as an array of sub-objects. A section of the file is shown in Figure 51. It is possible to modify this manually, but be careful, as uploading an invalid file may crash the firmware in the WFD-30 and require a factory reset.

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```
Schema: <No Schema Selected>
1  {
2  "roster": [
3  {
127  {
251  {
252  "Index": 2,
253  "Name": "Loco 2",
254  "DccAddr": 5,
255  "Flags": 128,
256  "Functions": [
257  {
258  "name": "Funct 8",
259  "Flags": 3
260  },
261  },
265  },
269  },
273  },
277  },
281  },
285  },
289  },
293  },
297  },
301  },
305  },
309  },
313  },
317  },
321  },
325  },
329  },
333  },
337  },
341  },
345  },
349  },
353  },
357  },
361  },
365  },
369  },
373  },
374  },
375  },
499  },
623  },
747  },
871  },
995  },
1119  },
1243  },
1244  }
```

Figure 51 A Loco entry in a JSON Roster File

Accessing the Roster Download File on Apple IOS

On Apple IOS, for example an iPad, Safari puts up a dialog "Do you want to download My Locos 0-9.json.txt". When you tap Download, it places the file in the Downloads folder which you can open by tapping the little Downloads Icon at the top (a down arrow with a circle) followed by the Magnifying Glass Icon. Alternately you can open the Files app and tap Downloads.

You can create a Rosters folder either on the iCloud drive or locally and move the downloaded file to that location.

Accessing the Roster Download File on Android

On Android, after the download completes, you are given the option to open the file. You don't really want to do that, you need to store the file in your desired location, so tap the "three dots" to get the menu on Chrome and tap Downloads to open the Downloads folder. You can use the File

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Manager app to copy the file from Downloads to a new folder called Roster which you create in Main Storage.

Different versions of the Google operating system Android may work differently. Study the features of your device to find the best approach to storing your roster files.

Uploading a Previously Downloaded Locos File

IMPORTANT: On the Engine Driver and WiThrottle apps, you cannot use the Web display within the app to download or upload a locomotive roster. You must open the setup web pages in a browser such as Safari, Chrome or Edge by typing 192.168.7.1 into the browser. If you are in home net mode you use the IP Address assigned by your router. Select the Locomotive Roster page and proceed as described.

To upload a previously saved set of locos go to the Locomotive Roster page and click the Upload hyperlink. On the Roster Upload page, click the Choose File button and navigate to your saved locos file. Click Open. The chosen file name should show against the Choose File button as in Figure 68. To complete the upload, click the Upload button.

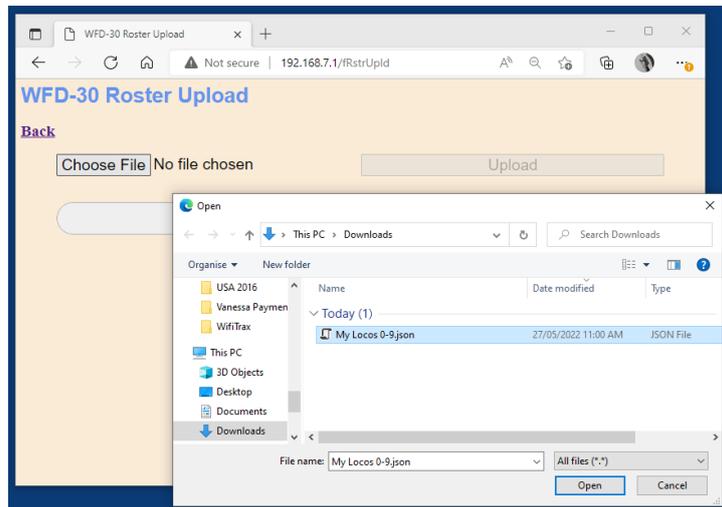


Figure 52 Opening a Previously Saved Locomotives File

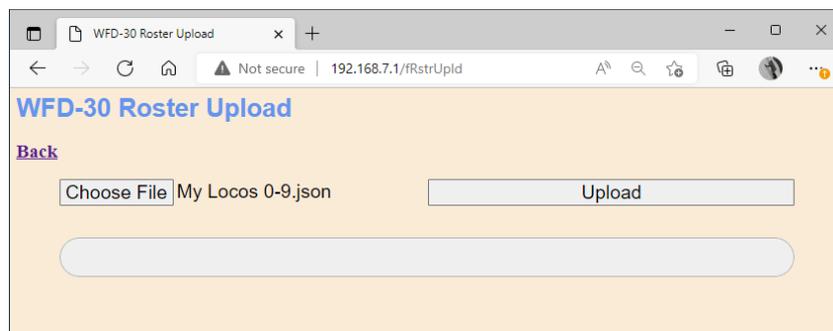


Figure 53 The Chosen File to be Uploaded is Displayed

The progress bar shows upload progress. When complete, the Locomotive Roster page is displayed showing the newly uploaded locomotives.

Note that uploading is controlled by the indices assigned to locomotives (i.e., location numbers in the loco roster), that are stored in the file. If locos already exist at those locations in the list within

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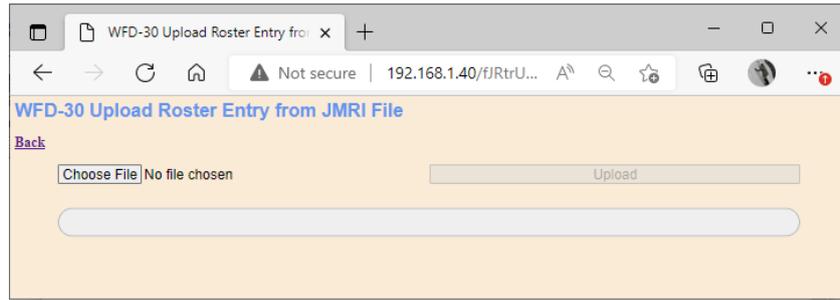


Figure 55 Uploading a Locomotive Roster Entry from a JMRI Export File

Use the Choose File button to select the JMRI Loco Export file as Figure 56. Click the Open button on the File Select dialog. Then click the Upload button on the Upload Roster Entry page as Figure 57.

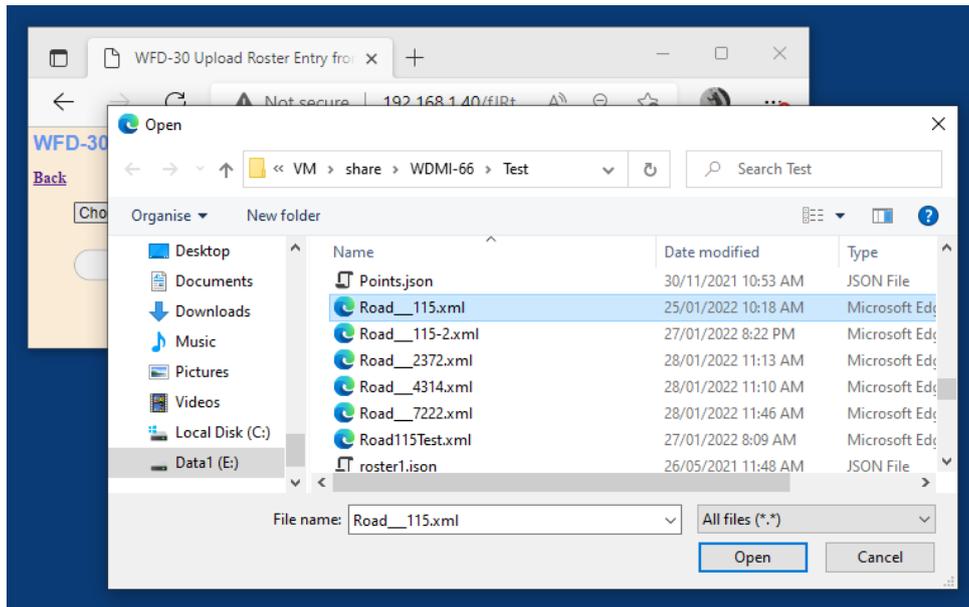


Figure 56 Choosing a JMRI Locomotive Export File

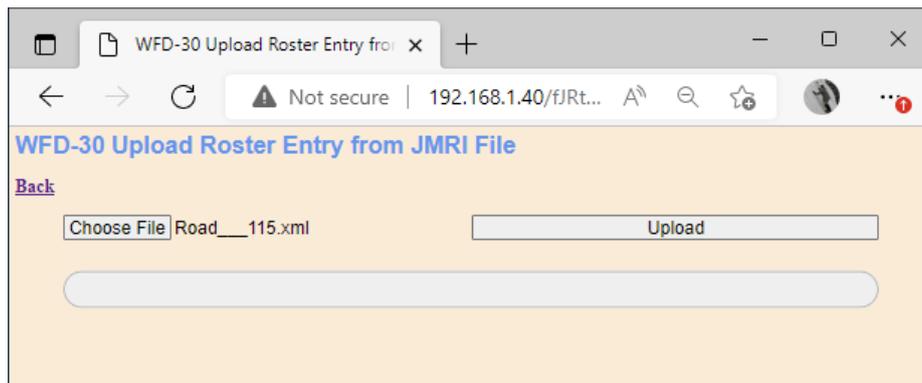


Figure 57 Click the Upload Button, once the file is Selected

The upload proceeds and a new locomotive is created in the roster as Figure 58.

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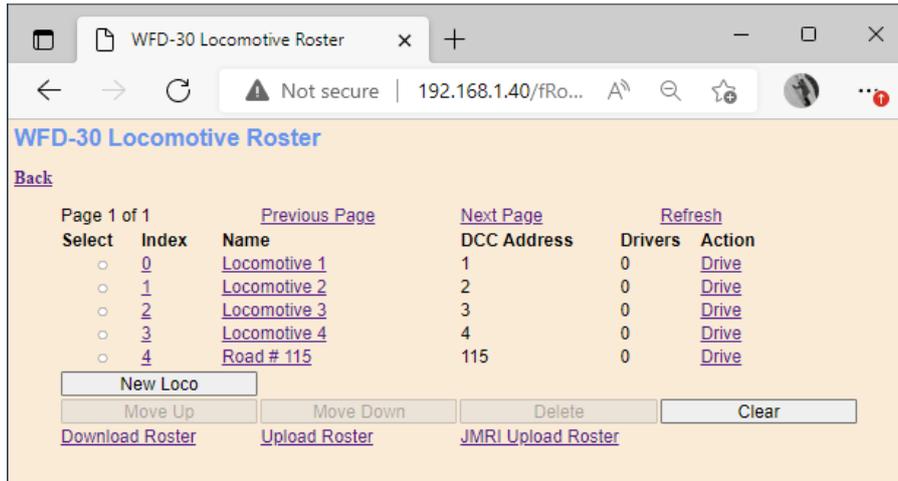


Figure 58 A new JMRI Loco has been Uploaded

Accessories

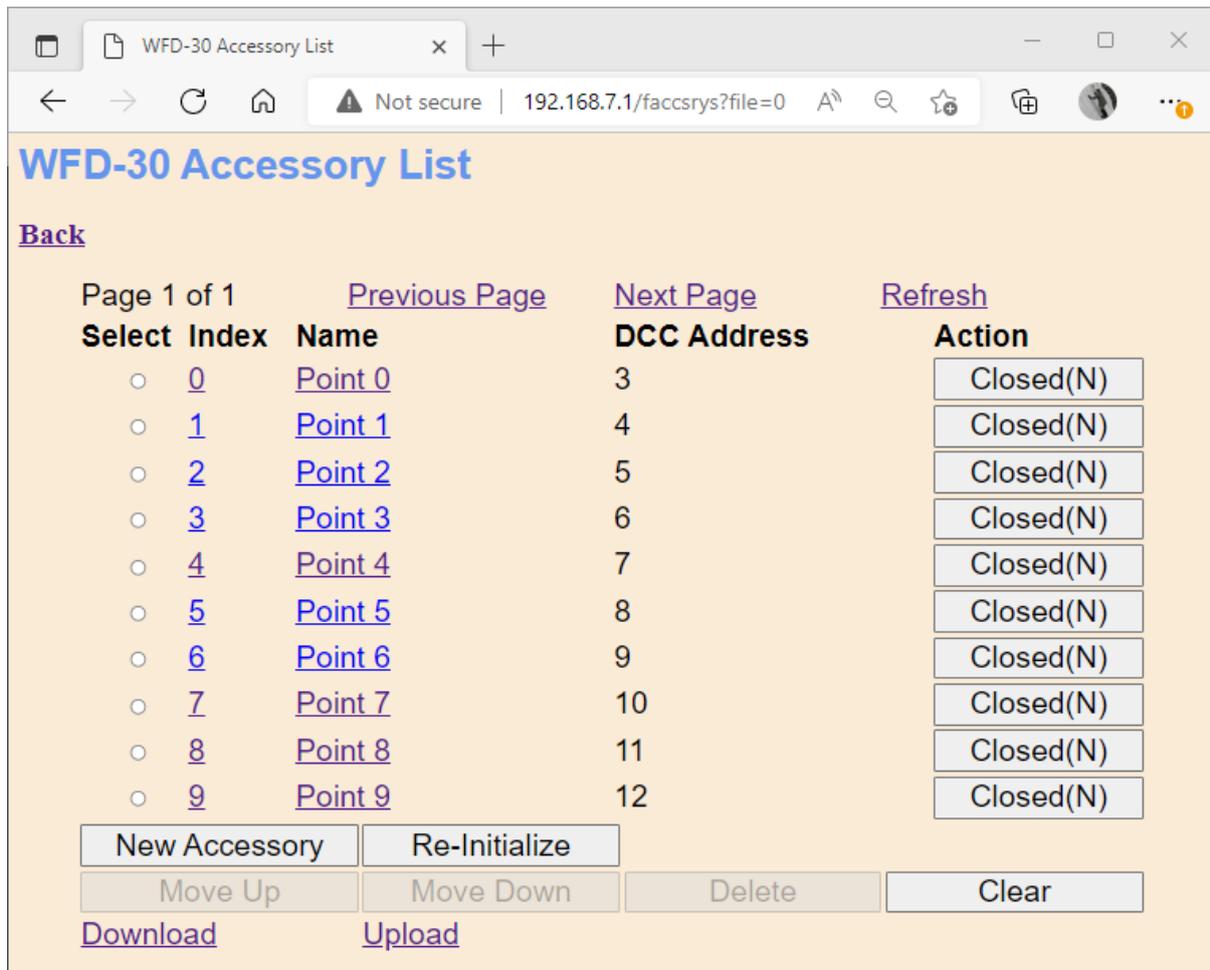


Figure 59 The Accessory List Page

This page allows you to change the entries in the accessory (points) list of your WFD-30. You can give each entry a Name and a DCC Accessory Address. You can then select from the list when using Engine Driver or WiThrottle instead of needing to type the Accessory Address.

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This page also allows you to download part or all of your accessory list to be saved and restored later. You can also toggle the accessory between closed and thrown from this page.

View the Accessory List by tapping the Accessories item in the Main Menu. By default, as shipped and after factory reset only ten entries are displayed and given the names “Point 0” through “Point 9” with DCC Accessory Addresses 3 through 12. Accessories can be added, up to maximum of 200.

Adding, Deleting and Moving Accessories Up or Down

You can add more accessories to your list up to a maximum of 200. Add an accessory by tapping the “New Accessory” button on the Accessory List page. A new accessory will be added with a default name, DCC address and set of functions. You can edit this to what you require. Once you reach 200 locos, tapping the New Accessory button will have no effect.

You can delete an accessory by selecting it using the radio button in the left-hand column and tapping the Delete button. After a warning, the accessory will be deleted. This operation cannot be reversed.

All accessories in the list have an index, 0 to 199. This simply indicates the position of the accessory in the list. If you delete an accessory, a gap will occur in the indices. Adding new accessories will fill any gaps in the accessory index sequence before appending new accessories at the bottom.

Display of the accessory list is paged, 10 accessories to a page so a full list will have 20 pages. Initially, when you enter the Accessory List, the first page will be displayed. Move forward and backwards in the pages by clicking the Next Page and Previous Page links.

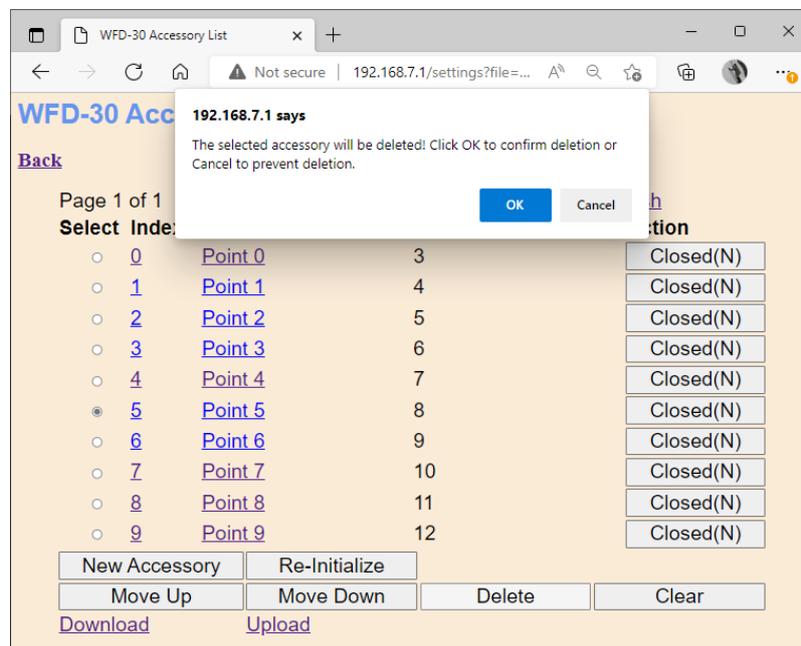


Figure 60 Deleting an accessory from the list

An accessory may be moved upwards and downwards in the list. To move an accessory down by one step, select the required accessory by clicking the radio button at its left. Then click Move Down. The index of the selected accessory will be increased by one so that the accessory will move one place downwards in the list. Similarly, you can move an accessory one place up by selecting the accessory and clicking the Move Up button. Note that if you have gaps in the index sequence, accessories will

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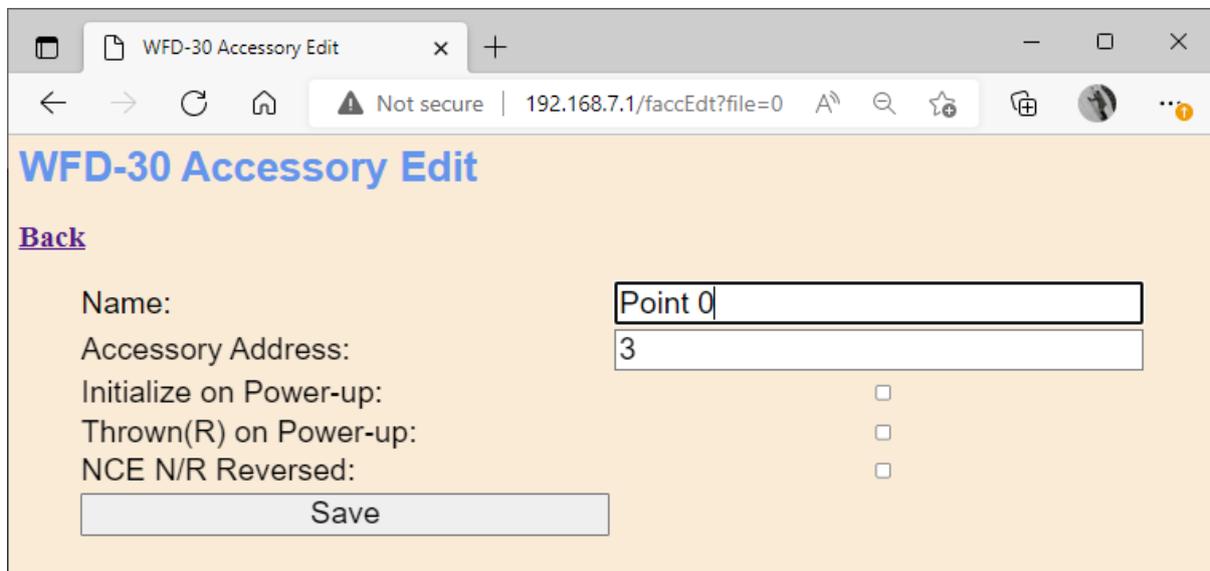
increase or decrease their index as they move through the gap and only appear to move down or up when an adjacent index is occupied.

Clearing the Entire Accessory List

You can clear the entire list and begin again by clicking the Clear button. After a warning, all accessories will be deleted. This operation cannot be reversed. However, if you have downloaded some or all of your accessories you can restore them by uploading the file as described in the Section “Downloading Accessories to a File”.

Editing Listed Accessories

To edit one of the entries in the Accessory List, tap the name, to show the edit page as Figure 61, enter what you require in the Name and Accessory Address text boxes and tap Save. Names can be up to 10 characters and may contain spaces. DCC addresses must be in the range 1 – 2048.



The screenshot shows a web browser window titled "WFD-30 Accessory Edit" with a "Not secure" warning and the URL "192.168.7.1/faccEdt?file=0". The page content includes a "Back" link, a "Name:" field with the value "Point 0", an "Accessory Address:" field with the value "3", and three unchecked checkboxes for "Initialize on Power-up:", "Thrown(R) on Power-up:", and "NCE N/R Reversed:". A "Save" button is located at the bottom of the form.

Figure 61 The Accessory Edit Page.

Accessory Initialization

Accessories can be set to initialize to a particular state on power up of the WFD-30 module. For example, you may wish that every time you turn on your system, all the points are set to the closed state, or perhaps all main-line routes are setup as default.

To cause an accessory to set to a defined state on power up, check the Initialize on Power-up checkbox on the Accessory Edit page. To define the state of the point on power-up either check or leave unchecked the Thrown (R) on Power-up checkbox. Note that in NCE Terminology “Thrown” is defined as “Reversed” as would be displayed on your Power Cab or Pro-Cab.

The third checkbox allows for reversal of the commands sent to the NCE Command Station (Power Cab or Power Pro) for the Thrown and Closed settings. Normally Closed = “N” and Thrown = “R”. Checking the NCE N/R Reversed checkbox reverses this sense which might be useful in some rare situations. Normally leave this unchecked.

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Once a set of accessories in the list are set to initialize, they will set the states you require each time the WFD-30 is powered up. Back on the Accessory List Page in Figure 59, a button marked Re-initialize will have the same effect when clicked.

Operating Accessories from the Accessories List Page

The buttons on the right in the Accessory List Page in Figure 59 will toggle accessories that are connected on your DCC circuit and which have programmed accessory address matching the definition in the accessory list. The state of the accessory will be shown on the Accessories List Page. The state will also be updated when re-initialization occurs, on power-up and if accessories are changed from a WiThrottle Protocol app or device such as Engine Driver, WiThrottle or TCS UWT-100.

The display will not show the correct state if an accessory is changed using a Power Cab or Pro-Cab, neither will it update if the web page on a Wifitrax WFS series controller is used to change the state. You can, of course, use WFS Series Switch Machine Controllers with your NCE Command Station/Booster, whether Power Cab or Power Pro, but to be consistent you should try to change them from the same place, either the WFD-30 or the WFS web page.

Downloading Accessories to a File

Once you have defined a set of accessories in your roster, it is a good idea to download and store it in a file on your PC or other device. For example, if you need to reset the module for some reason, the accessory list will return to its default and you will have wasted all that work. You also might like to have separate accessory lists if you use the WFD-30 at a club as well on your own layout.

IMPORTANT: On the Engine Driver and WiThrottle apps, you cannot use the Web display within the app to download or upload an accessory list. You must open the WFD-30 Web Pages in a browser such as Safari or Chrome by typing 192.168.7.1 into the browser. If you are in home net mode you use the IP Address assigned by your router. Select the Accessories page and proceed as described.

To download all or part of an accessory list, click Download on the WFD-30 Accessory List page. The page within the list that you are currently displaying has no effect. The Accessories Download page will appear as in Figure 62.

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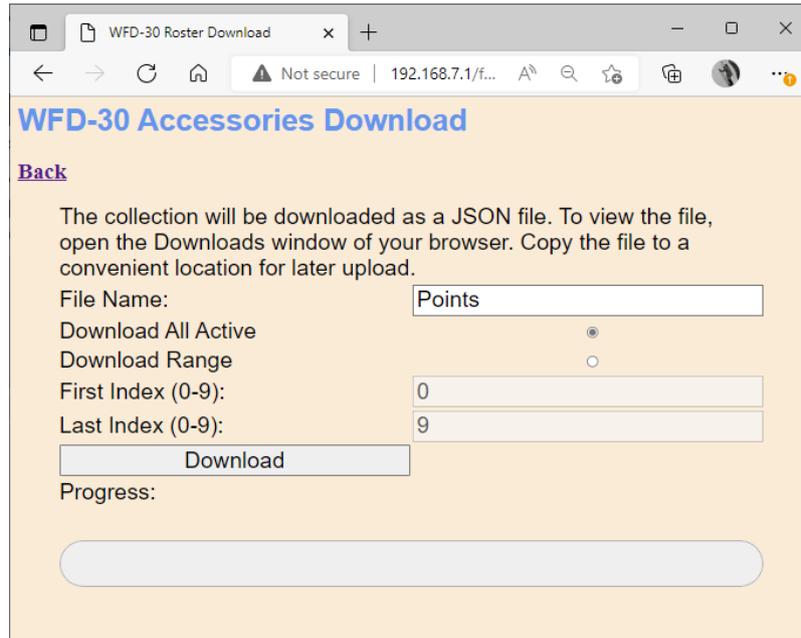


Figure 62 The Accessories Download Page

There are 200 indices (accessory numbers not DCC Address), 0 – 199, in the list. Usually only some have been filled and are considered active, so only active list entries will be downloaded.

The File Name is the name given to the file that will be downloaded, so give it a meaningful name that you will recognize.

You can elect to include all of the active accessory entries into the file or just a range. Therefore select “Download all Active” or “Download Range” accordingly.

If you select “Download Range” enter the First and Last Index as required. For example, if you just want to download the first 10 accessories, use 0 and 9 as the values. Notice that indices begin at 0. You may want to go back to the Accessory List page and jot down the first and last index.

Click the Download button to start the download. A Progress Bar shows the download progress as in Figure 63.

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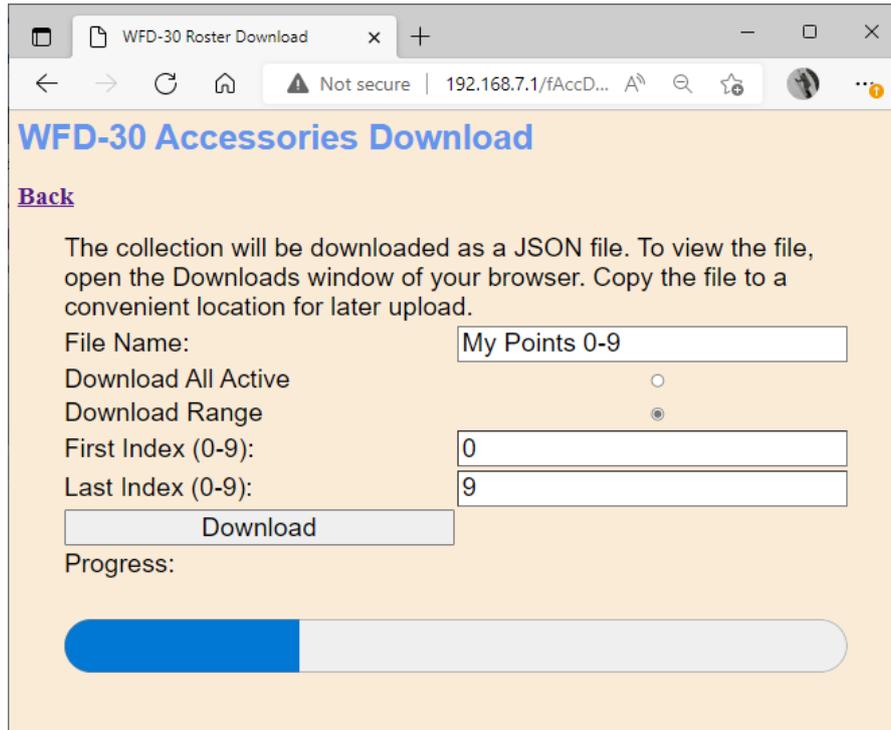


Figure 63 Accessory Download in Progress

When the download is complete, the action depends on the browser and device you are using.

Accessing the Accessory Download File on Windows 10

Using Microsoft Edge on Windows 10, the browser automatically opens the Downloads pane as on the right of Figure 64.

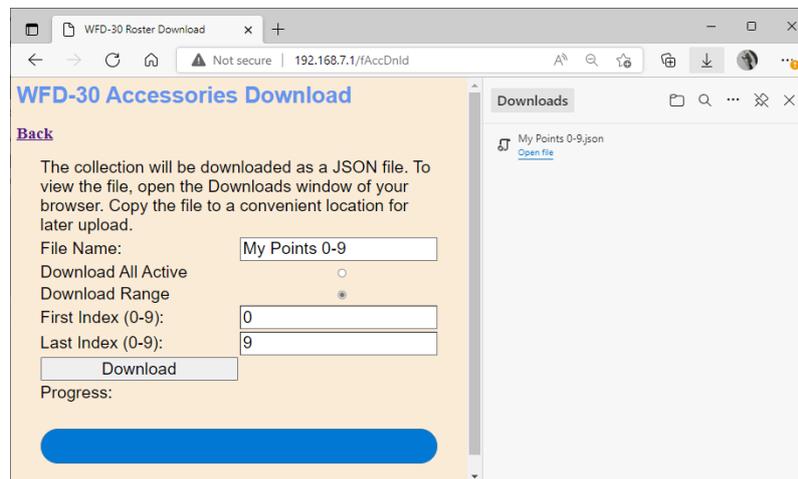


Figure 64 Accessory Download Complete on Windows using Edge Browser

This behavior is the same as downloading any file from the internet. The file is placed in the Downloads folder for the account on your machine. How you access this will depend on your device and operating system.

On Windows 10 this will be

C:\Users\\Downloads

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Where <User Name> is the name of the Windows user account on your machine. You can open the Downloads folder in Edge by clicking on the folder icon in the Downloads pane to see the folder in Windows Explorer as in Figure 65.

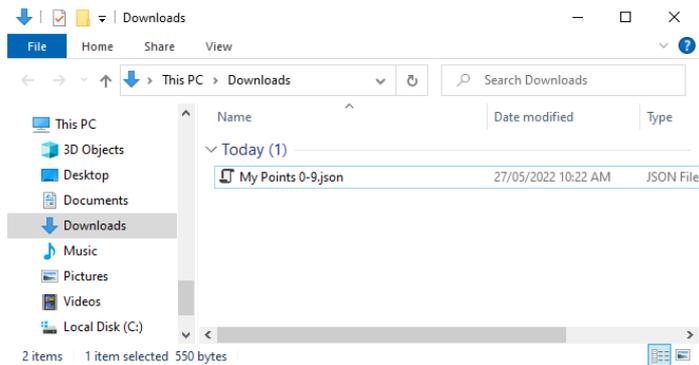


Figure 65 The Downloaded Roster File in Windows Explorer

Now you should copy the file to a suitable location on your computer that you have prepared for accessories. If you leave it in the Download folder it will get lost if you delete the downloads to clear up space on your disk drive.

For the technically inclined, the file is in JSON format and contains accessories as JSON objects. A section of the file is shown in Figure 66. It is possible to modify this manually, but be careful, as uploading an invalid file may crash the firmware in the WFD-30 and require a factory reset.

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Uploading a Previously Downloaded Accessories File

To upload a previously saved set of accessories go to the Accessories List page and click the Upload link. On the Accessories Upload page, click the Choose File button and navigate to your saved accessories file as Figure 67. Click Open. The chosen file name should show against the Choose File button as in Figure 68. To complete the upload, click the Upload button.

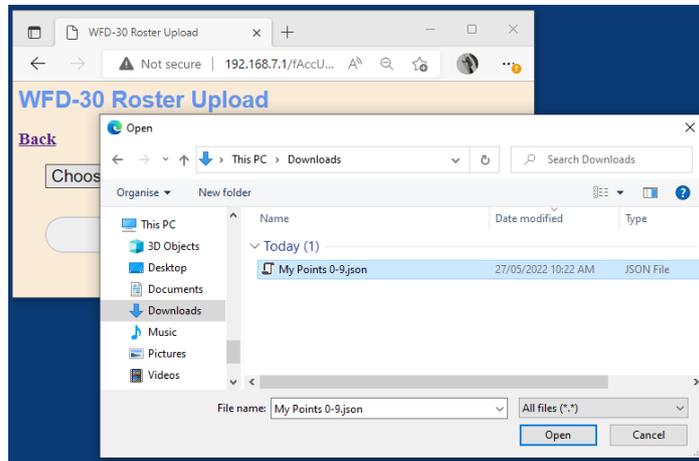


Figure 67 Opening a Previously Saved Accessories File

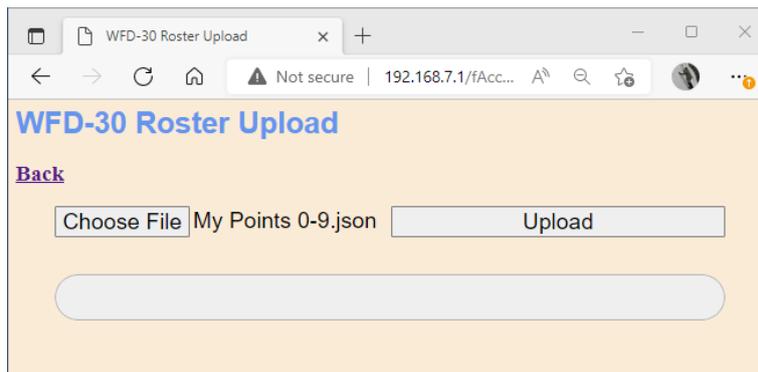


Figure 68 The Chosen File to be Uploaded is Displayed

The progress bar shows upload progress. When complete, the Accessories List page is displayed showing the newly uploaded accessories.

Note that uploading is controlled by the indices assigned to accessories (i.e., location numbers in the accessory list), that are stored in the file. If accessories already exist at those locations in the list within the WFD-30, they will be overwritten. If they do not exist, they will be created. If you upload several files that have sets of accessories with gaps between indices either within a file or between files, accessories will appear in the WFD-30 list with those exact same indices. So, there may be gaps in the list. This does not matter but, if you add accessories, you will fill the gaps. You can also move the accessories up or down and save the whole file again.

Routes

Many model railroaders like to use routes as collections of points set in a particular configuration. One simple example is two left hand or two right hand turnouts that form a crossover. You always

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want to operate the turnouts together – either both closed or both thrown. Any other configuration results in a derailment. Another example is a switching yard with many sidings and multiple points defining which siding will be the destination from the main line.

NCE provide a concept called Macros, which are really the same thing as routes. You can define NCE Macros using your Power Cab, or your Pro-Cab connected to a Power Pro command station/booster.

Wifitrax allows you to name your existing NCE Macros and allows them to display on WiThrottle apps and devices such as Engine Driver on Android, WiThrottle on IOS and TCS UWT-100.

But Wifitrax WFD-30 also has its own built-in routes that do the same thing and may be easier to set up and edit. Also, you can download your Wifitrax routes to a file to save and re-establish them again by uploading the file.

So, the WFD-30 Routes capability allows you to use your existing NCE Macros if you already have them defined, or to define your own Wifitrax Routes using accessories listed in the WFD-30 accessories list. You can have up to 50 routes that can be a mix of NCE macros or Wifitrax routes as you wish.

To start defining Routes, tap the Routes option in the main menu to display the WFD-30 Route List as in Figure 69.

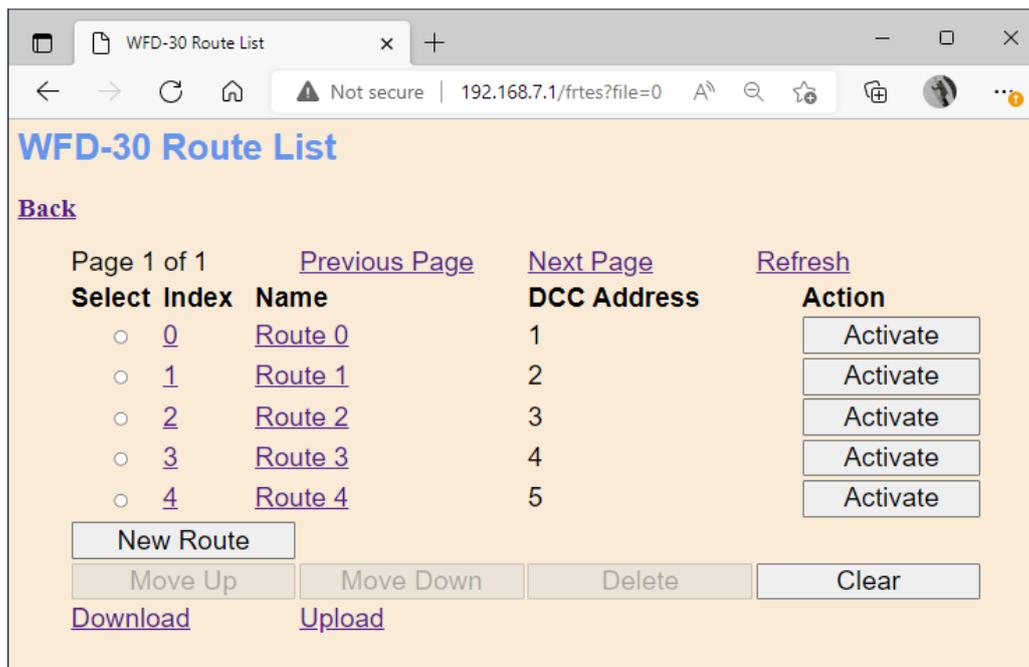


Figure 69 The WFD-30 Route List

When WFD-30 leaves the factory or after a factory reset, 5 routes are automatically created but you can add more by clicking the New Route button.

Adding, Deleting and Moving Routes Up or Down

You can add more routes to your list up to a maximum of 50. Add a route by tapping the “New Route” button on the Route List page. A new route will be added with a default name and initially configured as an NCE Macro with Macro Number set to zero. You can edit this to what kind of route you require. Once you reach 50 routes, tapping the New Route button will have no effect.

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You can delete a route by selecting it using the radio button in the left-hand column and tapping the Delete button. After a warning, the route will be deleted. This operation cannot be reversed.

All routes in the list have an index, 0 - 49. This simply indicates the position of the route in the list. If you delete a route, a gap will occur in the indices. Adding new routes will fill any gaps in the route index sequence before appending new routes at the bottom.

Display of the route list is paged, 10 routes to a page, so a full list will have 5 pages. Initially, when you enter the Route List, the first page will be displayed. Move forward and backwards in the pages by clicking the Next Page and Previous Page links.

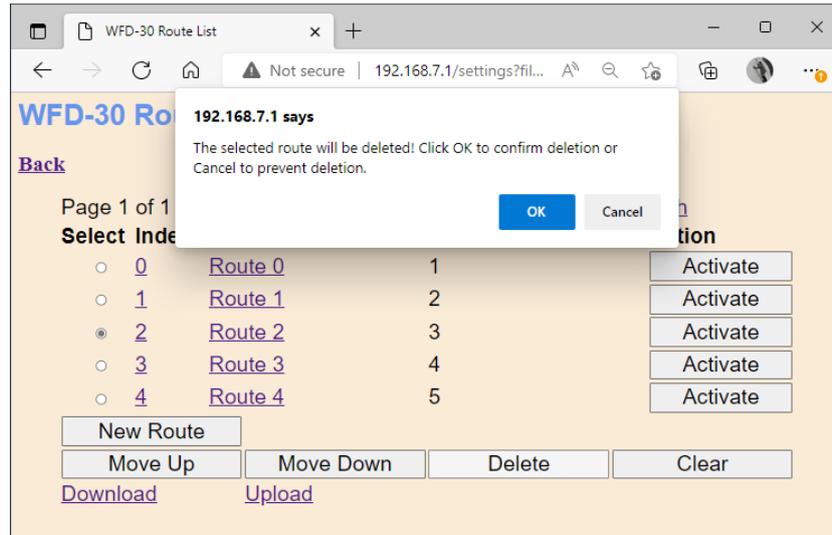


Figure 70 Deleting a route from the list

A route may be moved upwards and downwards in the list. To move a route down by one step, select the required route by clicking the radio button at its left. Then click Move Down. The index of the selected route will be increased by one so that the route will move one place downwards in the list. Similarly, you can move a route one place up by selecting and clicking the Move Up button. Note that if you have gaps in the index sequence, routes will increase or decrease their index as they move through the gap and only appear to move down or up when an adjacent index is occupied.

Clearing the Entire Route List

You can clear the entire list and begin again by clicking the Clear button. After a warning, all routes will be deleted. This operation cannot be reversed. However, if you have downloaded some or all of your routes you can restore them by uploading the file as described in the Section "Downloading Routes to a File".

Editing Listed Routes

To edit one of the entries in the Route List, tap the name, to show the edit page as Figure 71. This figure shows the default state of a newly created route. It is set to NCE Macro, with Macro Number 0.

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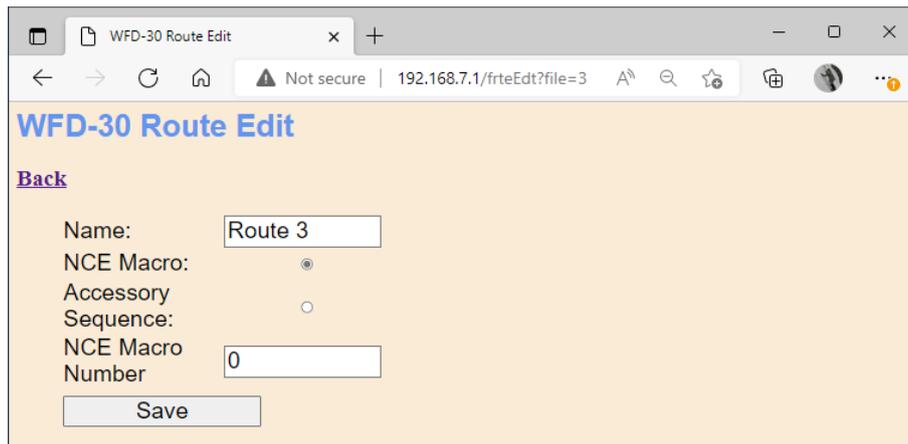


Figure 71 The Edit Page for a Newly Created Route.

NCE Macro Type Routes

If you want to keep your new route as one that references an NCE Macro, simply type your required name (up to 10 characters), type the correct macro number (0 to 255) as Figure 72 and click Save.

Please note that Power Cab, SB5 and Power Pro NCE command stations have different ranges for the number or macros they support. Consult your NCE documentation.

Remember that, before your NCE Route will actually work, you will need to use your Power-Pro or Power Cab to actually define the macro in the NCE Command Station. Check your NCE documentation to find out how to do this.

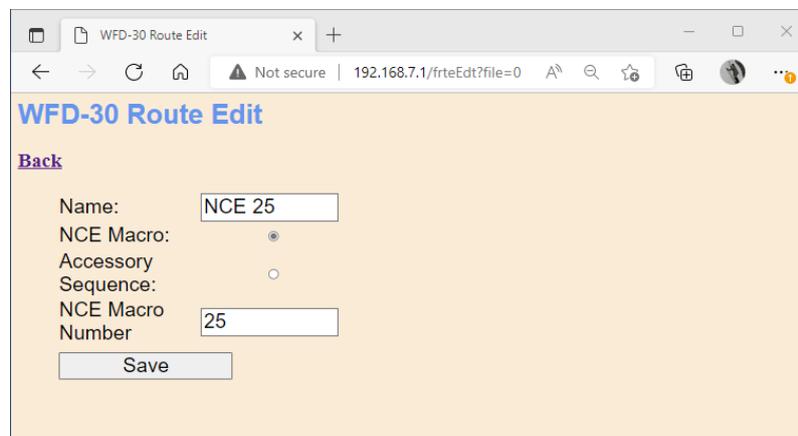


Figure 72 An Example of an NCE Macro Type Route

Wifitrax Accessory Sequence Routes

As has already been said, if you don't already have a set of NCE macros already defined, you might prefer to use Wifitrax Routes. These are sequences of accessories that must be already defined in the WFD-30 accessory list. Each step in the sequence defined on the Route Edit page specifies an accessory and its required state – thrown or closed.

To define a route as an accessory sequence, first open the route edit page and check the Accessory Sequence radio button as in Figure 73.

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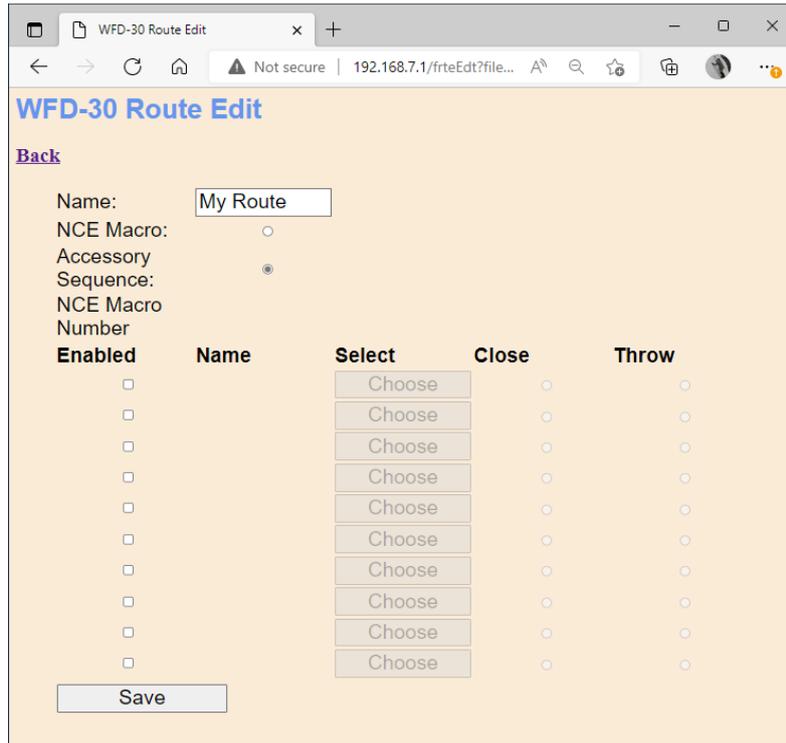


Figure 73 The First Step in Defining an Accessory Sequence Route

The Route Edit page now shows a sequence of up to ten steps. This is the maximum number of points that can be included in the route.

To start adding points to the route, check the Enabled box on the first step. This will enable the Choose button for that step. Click the Choose button to display the points in your accessory list that are available to include in your route as in Figure 74. You may need to page up or down to find the accessory that you want. Click the Select button to include the chosen accessory in your route.

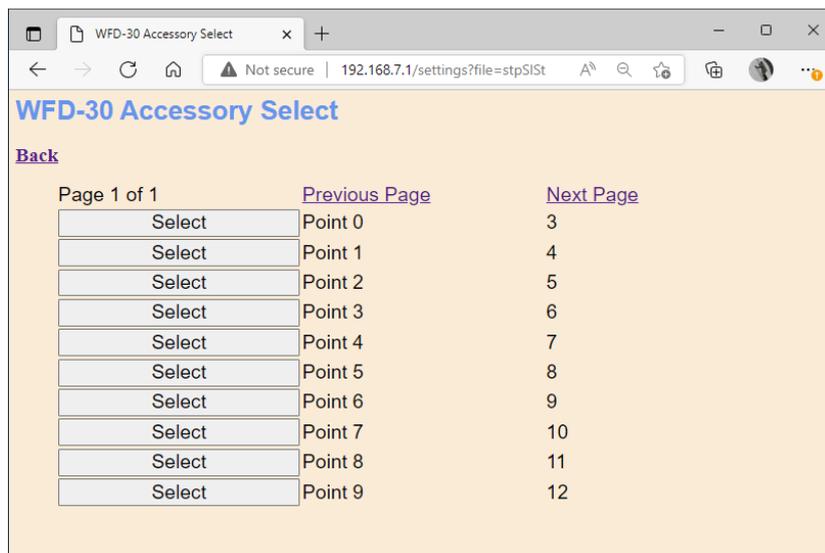


Figure 74 Choosing an Accessory to be Included in a Route

This action returns you to the Route Edit page and you now must decide if you want that step in your route to throw or close your selected accessory. Do this by clicking the Close or Throw radio button as in Figure 75.

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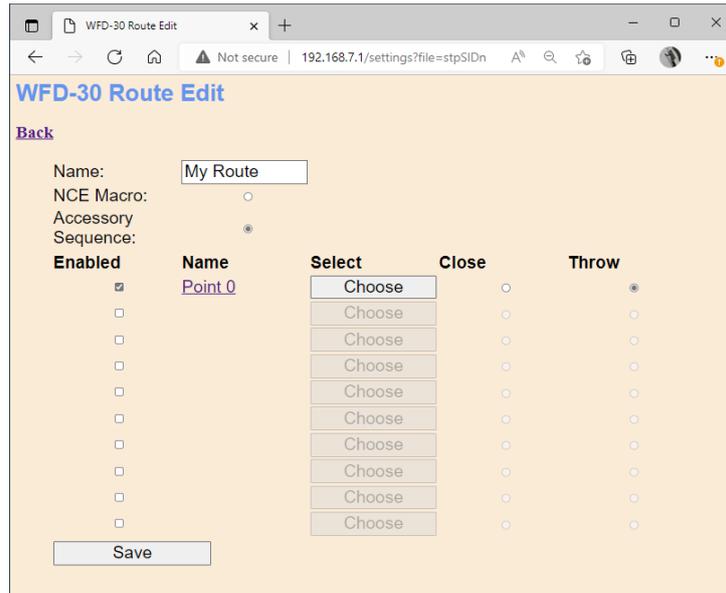


Figure 75 A Route with the First Step Added

You can now either save your route by clicking the Save button or check another step in the sequence and repeat the procedure of selecting the accessory and its required state as described above.

When you have finished the entire route definition remember to click Save.

Activating a Route

You can make a route active, that is set all the accessories in the route to the state defined in the route, by clicking the Activate button to the right of the required route.

When you connect a WiThrottle device to the WFD-30, it will receive all the Routes as well as the Accessories, so you can activate a route by tapping it in WiThrottle on IOS, Engine Driver on Android or the TCS UWT-100.

Downloading Routes to a File

Once you have defined a set of routes in your list, it is a good idea to download and store it in a file on your PC or other device. For example, if you need to reset the module for some reason, the route list will return to its default and you will have wasted all that work. You also might like to have separate route lists if you use the WFD-30 at a club as well on your own layout.

IMPORTANT: On the Engine Driver and WiThrottle apps, you cannot use the Web display within the app to download or upload a route list. You must open the WFD-30 Web Pages in a browser such as Safari or Chrome by typing 192.168.7.1 into the browser. If you are in home net mode you use the IP Address assigned by your router. Select the Routes page and proceed as described.

To download all or part of a route list, click Download on the WFD-30 Route List page. The page within the list that you are currently displaying has no effect. The Routes Download page will appear as in Figure 76.

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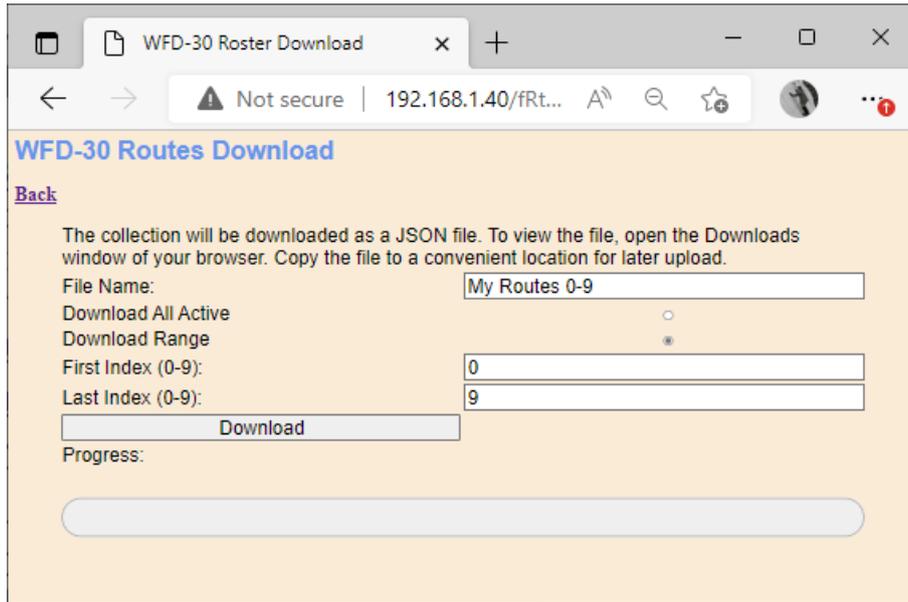


Figure 76 The Routes Download Page

There are 50 indices (accessory numbers not DCC Address), 0 – 49, in the list. Usually only some have been filled and are considered active, so only active list entries will be downloaded.

The File Name is the name given to the file that will be downloaded, so give it a meaningful name that you will recognize.

You can elect to include all of the active route entries into the file or just a range. Therefore select “Download all Active” or “Download Range” accordingly.

If you select “Download Range” enter the First and Last Index as required. For example, if you just want to download the first 10 routes, use 0 and 9 as the values. Notice that indices begin at 0. You may want to go back to the Routes List page and jot down the first and last index.

Click the Download button to start the download. A Progress Bar shows the download progress as in Figure 77.

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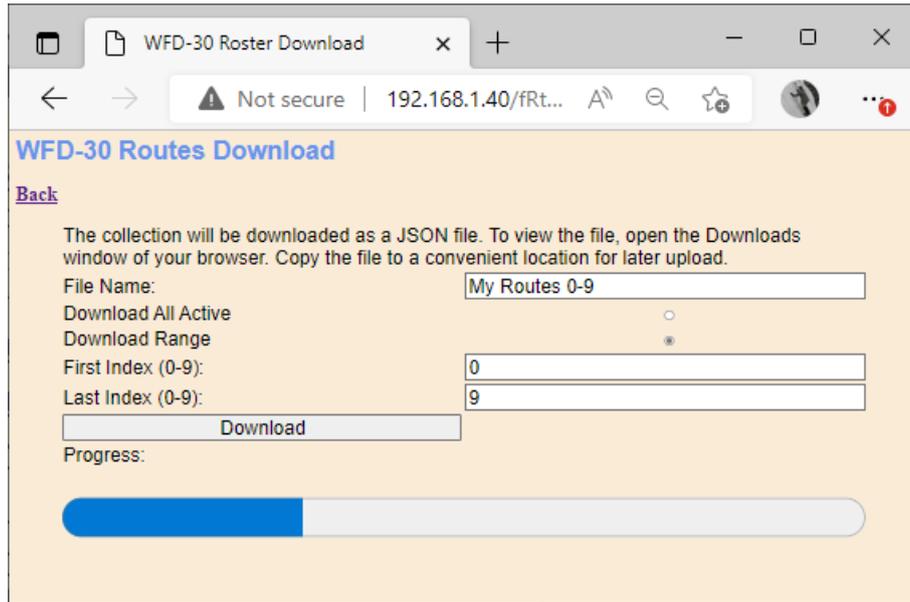


Figure 77 Routes Download in Progress

When the download is complete, the action depends on the browser and device you are using.

Accessing the Routes Download File on Windows 10

Using Microsoft Edge on Windows 10, the browser automatically opens the Downloads pane as on the right of Figure 78.

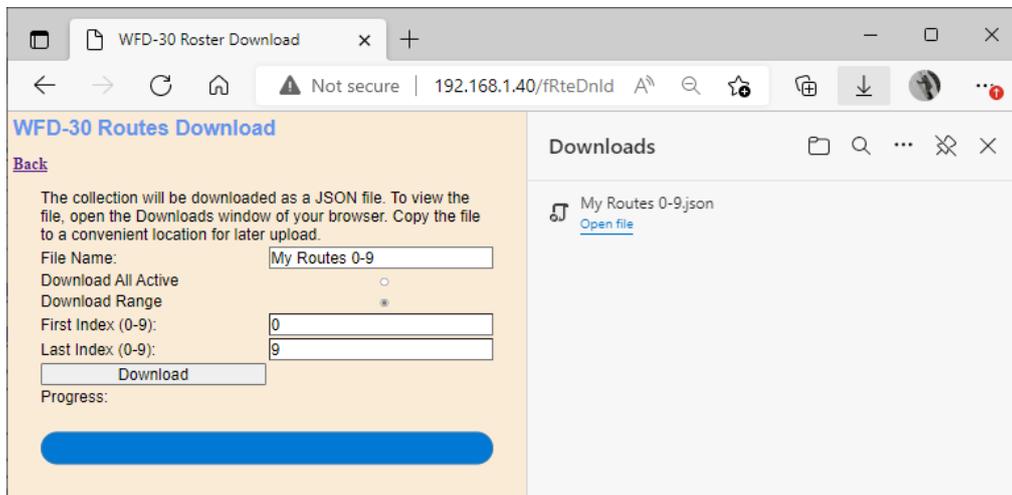


Figure 78 Routes Download Complete on Windows using Edge Browser

This behavior is the same as downloading any file from the internet. The file is placed in the Downloads folder for the account on your machine. How you access this will depend on your device and operating system.

On Windows 10 this will be

C:\Users\\Downloads

Where <User Name> is the name of the Windows user account on your machine. You can open the Downloads folder in Edge by clicking on the folder icon in the Downloads pane to see the folder in Windows Explorer as in Figure 65.

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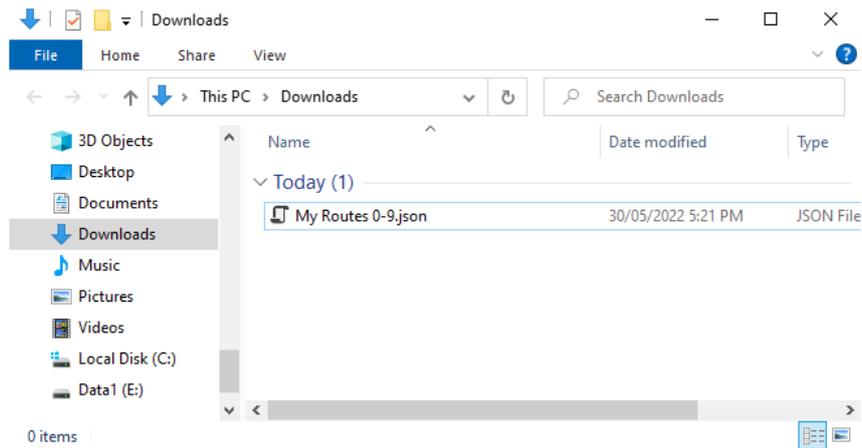


Figure 79 The Downloaded Roster File in Windows Explorer

Now you should copy the file to a suitable location on your computer that you have prepared for routes. If you leave it in the Download folder it will get lost if you delete the downloads to clear up space on your disk drive.

For the technically inclined, the file is in JSON format and contains routes as JSON objects. A section of the file is shown in Figure 80. It is possible to modify this manually, but be careful, as uploading an invalid file may crash the firmware in the WFD-30 and require a factory reset.

Uploading a Previously Downloaded Routes File

To upload a previously saved set of routes go to the Routes List page and click the Upload link. On the Routes Upload page, click the Choose File button and navigate to your saved accessories file as Figure 81. Click Open. The chosen file name should show against the Choose File button as in Figure 82. To complete the upload, click the Upload button.

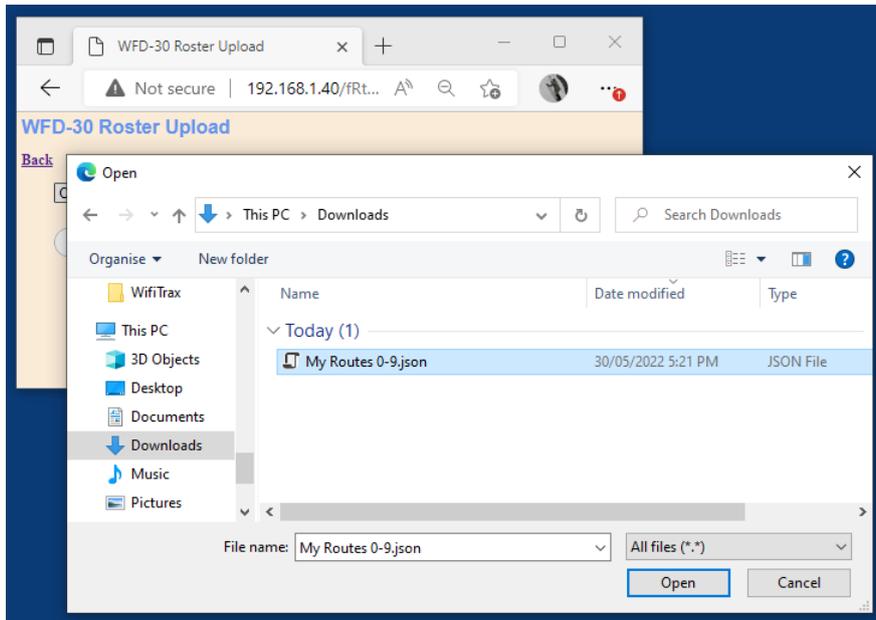


Figure 81 Opening a Previously Saved Routes File

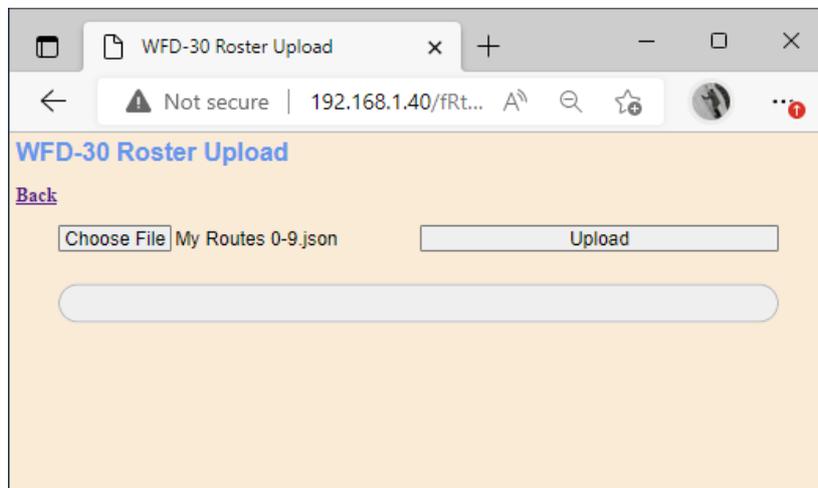


Figure 82 The Chosen File to be Uploaded is Displayed

The progress bar shows upload progress. When complete, the Routes List page is displayed showing the newly uploaded routes.

Note that uploading is controlled by the indices assigned to routes (i.e., location numbers in the accessory list) 0 - 49, that are stored in the file. If routes already exist at those locations in the list within the WFD-30, they will be overwritten. If they do not exist, they will be created. If you upload several files that have sets of routes with gaps between indices either within a file or between files,

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routes will appear in the WFD-30 list with those exact same indices. So, there may be gaps in the list. This does not matter but, if you add routes, you will fill the gaps. You can also move the routes up or down and save the whole file again.

Remember that, for Wifitrax routes to work, the accessories referenced by the routes must also be uploaded or created.

NCE Consists

The NMRA specification documents for DCC define a concept called Advanced Consists, in which a set of locomotives are given a Consist Address that is different from their regular short or long DCC address. This is placed in CV19 and is activated using special DCC commands sent from the command station. Once activated the locomotive only responds to DCC movement instructions sent to the consist address.

NCE provides an implementation of advanced consisting in the command station which allows the user to set up advanced consists with the command station generating the necessary underlying DCC commands transparently to the user. Advanced consists can be set up using a Power Cab or Pro-Cab with a Command Station/Booster. NCE manuals describe how to do this.

The WFD-30 provides a more visual way of setting up these NCE consists using its NCE Consists web page.

As an example, we have defined two locomotives in the WFD-30 roster as in Figure 83. These happen to have long addresses 1115 and 0115.

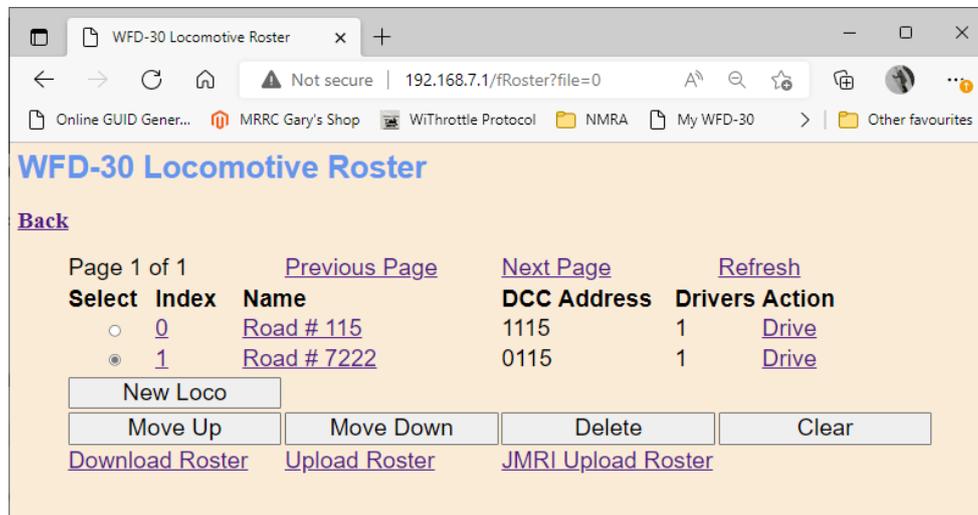


Figure 83 Two locomotives in the Roster which will form an NCE Advanced Consist

To setup an NCE Advanced Consist, tap the NCE Consists option of the main menu which displays the NCE Consists page as in Figure 84. By default, after factory reset, one consist is defined with a default name and zero locomotives.

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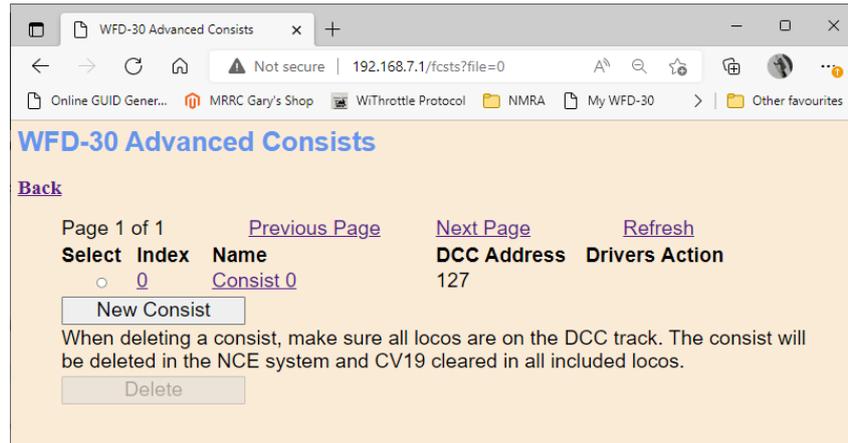


Figure 84 The NCE Advanced Consists Page

Adding and Deleting Consists

New NCE Advanced Consists can be added by clicking the New Consist button. New consists can be edited by clicking on the name to display the Advanced Consists Edit page to define them as you require. You can define up to 16 consists. Once 16 have been defined, clicking the New Consist button will have no effect.

Display of consists is paged, with 10 consists to a page. You can move from page to page by clicking the Previous Page and Next Page hyperlinks.

To delete a consist select it by clicking the radio button to its left and clicking the Delete button. After a warning, the Consist will be deleted. When you delete a consist, you should make sure all its locomotives are on the DCC powered main track. Deleting will send necessary commands to remove each locomotive from consist mode.

Editing a Consist to Define its Locomotives and their Directions

Once you have created a consist, you need to edit it to set it up the way you want. Do this by clicking the name of the consist to open the edit page as Figure 85.

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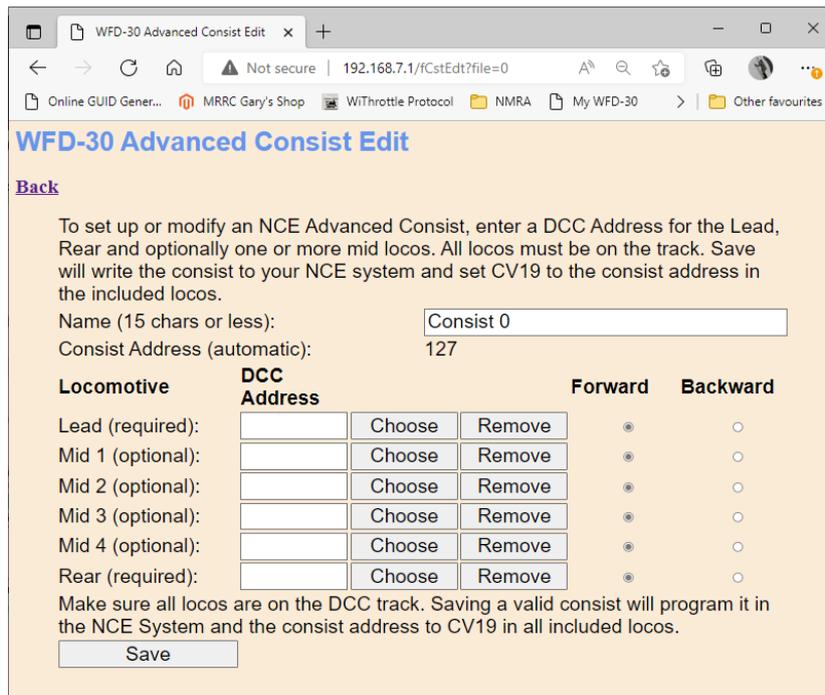


Figure 85 Editing a New NCE Advanced Consist

Give the consist a name if you wish. As a minimum you must define a Lead Loco and a Rear Loco. Do this by clicking the Choose button to the right of the Lead Loco entry in the list. This displays the first page of the Locomotives in your Roster as Figure 86 where you see the two locomotives that we defined in Figure 83.

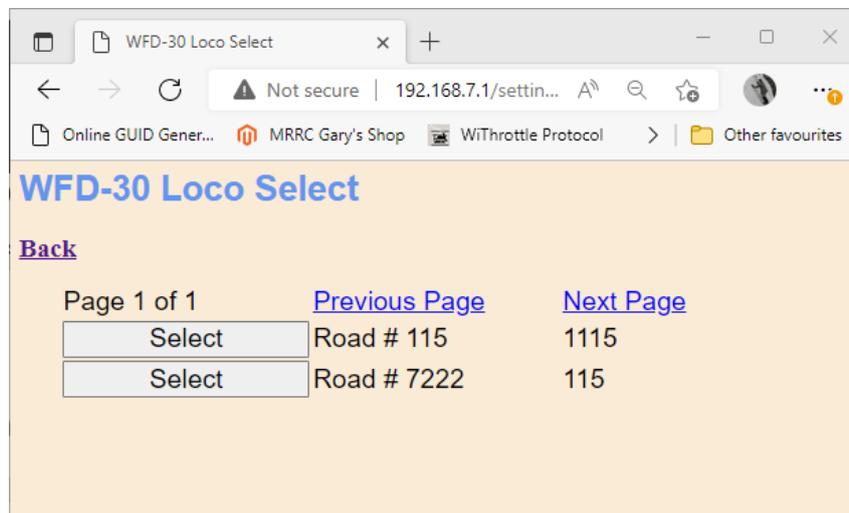


Figure 86 Selecting a Loco to Include in an NCE Advanced Consist

We will choose Road # 115 for the lead loco, so click the Select button which takes us back to the Consist Edit page with the Lead Loco included. We will leave its direction as forward.

Now click the Choose button for the Rear Loco and this time select Road Number 7222. Back on the Consist Edit page, click the Backward direction radio button.

Finally ensure both locos are on the main track powered from your NCE Command Station and click Save. This will both save the consist in the WFD-30 and also send commands to your NCE Command Station to create the consist and add the two locomotives.

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Now you can drive the consist using a WiThrottle device such as Engine Driver on Android, WiThrottle on IOS or the TCS UWT-100. Do this by selecting the Lead Loco either from the Server Roster or using its DCC Address. You can also use the Wifitrax Web Throttle by clicking the Drive hyperlink for the lead loco on the Loco Roster page.

To drive the consist backwards select the rear locomotive and drive it forward.

Adding a Locomotive to an NCE Advanced Consist

To add an intermediate locomotive to a consist, enter the Advanced Consist Edit page for that consist and choose one of the Mid locomotive positions. Click Choose and add another locomotive by the Select button on a loco chosen from the Loco Select page just as before. You can add up to four Mid Consist locomotives. You must then click the Save button. This will update the consist in your NCE command station as well as that saved in WFD-30.

Adding a non-rostered loco

Instead of using the Choose button to add a locomotive to a consist, you can simply type the DCC address. This enables you to add locos that are not included in your locomotive roster, i.e., non-rostered locos. This technique can also be used for lead and rear locos.

Removing a Locomotive from an NCE Advanced Consist

To remove a mid-consist loco, open the Advanced Consist Edit page for that consist and click the Remove button for the loco that you wish to remove. Then click the Save button. This will update the consist in your NCE command station as well as that saved in WFD-30.

Replacing a Lead or Rear loco in an NCE Advanced Consist

To replace a Lead or Rear loco, open the Advanced Consist Edit page for that consist. Remove the Lead or Rear loco by clicking the Remove button. Then Choose a new Lead or Rear loco either using the Choose button to select from the roster or by typing the DCC address. Click the Save button to Save and update the consist in the NCE command station.

Do not attempt to save a consist that was previously valid where you have now removed either the Lead or Rear loco without adding a replacement. Doing this will cause the consist in the NCE command station to not be updated properly and may cause it to be invalid.

If things do get messed up like this or in some other way, delete the consist in WFD-30 then use your Pro-Cab or Power Cab to delete the consist in the NCE command station. Then you can begin again.

Factory Reset

You may factory reset your WFD-30 by selecting the Reset option on the main menu page. You will be asked to confirm the reset and then the unit will immediately revert to its factory configuration. All the settings will take their default values and Home Net settings will be removed. The Locomotive Roster, Accessory List, Routes List and NCE Consists will return to their default values. If you don't want to lose these save the Roster, Accessories and Routes to files before resetting.

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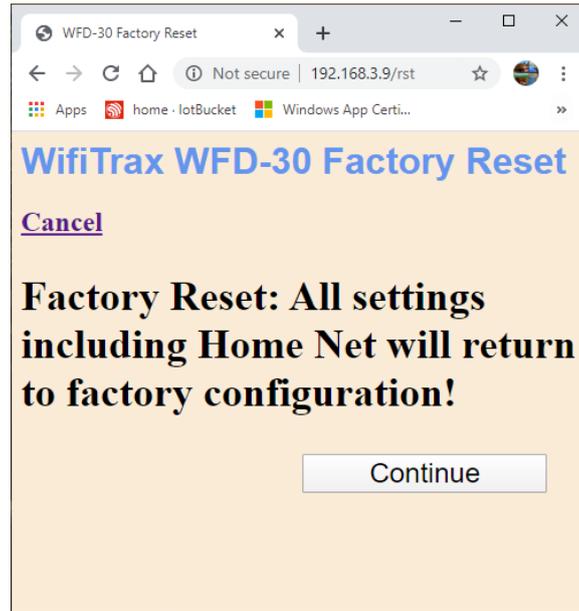


Figure 87 Factory reset confirmation page

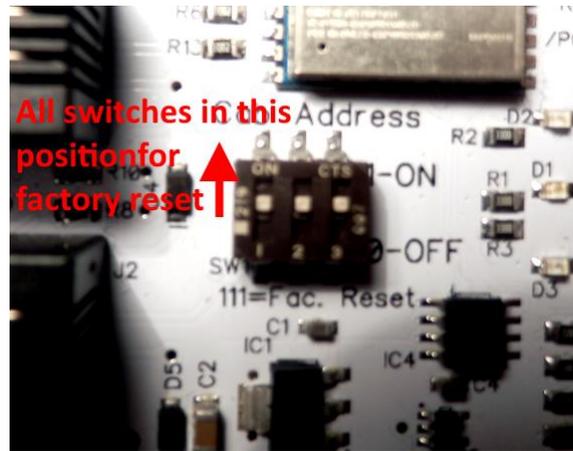


Figure 88 The DIP Switches in the Factory Reset Position

You can also do the same factory reset by setting all the DCC Address switches to their 1 or “On” positions, as in Figure 88. This procedure is useful if for some reason you have set a password and forgotten it. To do this:

- (1) Remove power to the WFD-30 module
- (2) Set all the DCC Address switches to their “1” or “On” positions
- (3) Power up the module, wait 10 seconds, then power down.
- (4) Return the switches to their positions to select the NCE Cab Bus Address that you require. DO NOT LEAVE THE SWITCHES IN THE FACTORY RESET POSITION OR THE MODULE WILL RESET EACH TIME YOU TURN IT ON. Return them to the default position shown in Figure 89 or the setting for your chosen Cab Address.
- (5) Restore Power to the module.

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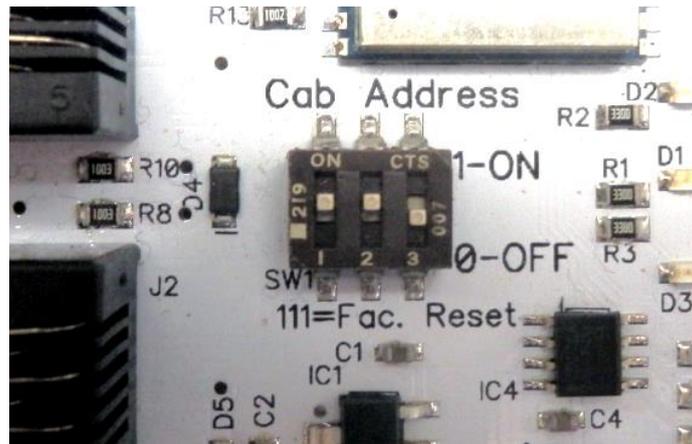


Figure 89 The DIP Switches in default position. Cab bus address 10 selected.

Your WFD-30 will now be returned to the factory default condition. After factory reset you can only access the unit in Direct Mode by joining its Wi-Fi Access point and using its default IP address 192.168.7.1.

Using WifiTrax Loco Operator 3

WFD-30 Version 2 no longer supports Loco Operator or Loco Operator 3. Please drive your trains using Engine Driver on Android, WiThrottle on IOS, the TCS UWT-100 or WifiTrax Web Throttle on any browser or device.

More about Cables

Some modellers like to build their own Cab Bus cables. If you choose to do this, you should refer to the information published by NCE:

<https://ncedcc.zendesk.com/hc/en-us/articles/201799499-NCE-DCC-Cables-Explained>

The cable between the WFD-30 and the NCE Command Station does NOT carry track power so ordinary RJ12 phone type cables will do as long as they DO NOT HAVE ANY CONDUCTORS REVERSED – in other words they are “Pass-Through”. If you choose to make them yourself you will need to buy RJ12 6P6C connectors, the flat 4 wire cable and a tool to put the connectors on. When done, if you hold the connectors in front of you pointing away from you, each with the plastic tang downwards, the black wire should be on the same side. If this is not correct, the WDM-30 will not work! It contains protection diodes to avoid damage if the Cab bus power is reversed. But the cable must be correct for it to work.

Mounting Suggestions

The WFD-30 is supplied as a bare module and no part of it must be permitted to touch any metal. If any part is allowed to touch live rails for example, it is likely that the unit will be damaged beyond repair. For this reason, it should be mounted properly before use. Two options are suggested here.

- (1) Use the mounting kit to attach the module to your baseboard or fascia, as in Figure 90, either on top or underneath in such a way as to avoid anything being placed on it or against it.
- (2) Mount the module inside a suitable plastic box with holes cut to accommodate the RJ12 connectors.

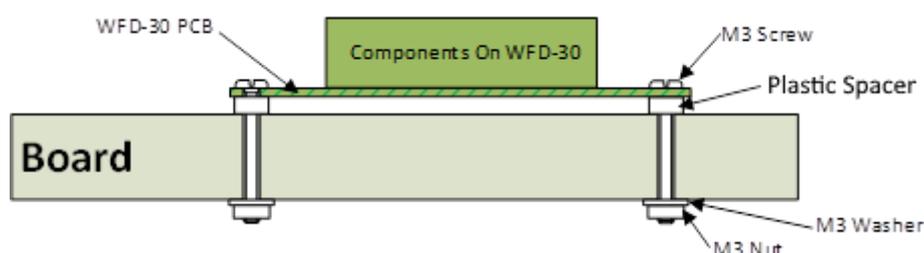


Figure 90 Mounting the WFD-30 on a board

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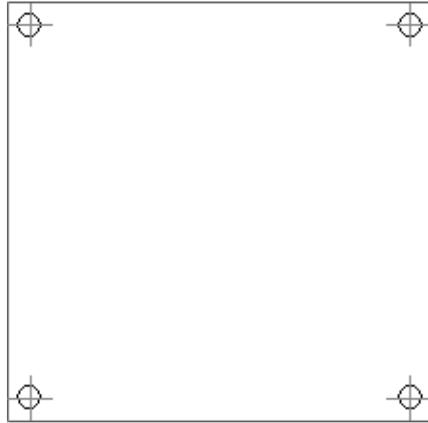


Figure 91 Drilling Template

The drilling template should be right if you print it on A4 paper, but please check it against the module before you drill as scaling during printing can be unpredictable. The holes should be 49mm apart horizontally and vertically. Print out this page and cut out the drilling template in Figure 91 to drill four 3.5mm holes in your mounting surface.

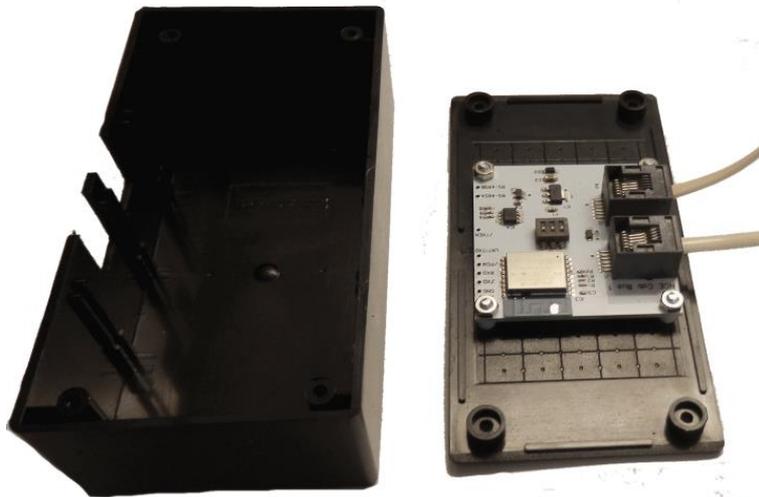


Figure 92 Suggestion for mounting inside a plastic box.

Using Multiple WFD-30 Modules on a Layout

You can connect more than one WFD-30 to an NCE Command Station, but each must have a unique Cab Address. Set the Cab addresses of each unit according to Table 1 and connect them in any configuration to the Cab Bus of your NCE Command Station. For example, you can connect one Cab Bus Socket of your first unit directly to a spare Cab Bus socket on your command station, then connect the second unit to the spare Cab Bus socket of the first unit. You can continue in “daisy chain” mode like that. It’s a good idea not to have branches but to keep the Cab bus linear. Please see the [NCE website](#) for advice on general use of the Cab bus.

With multiple WFD-30 modules, you can operate any or all of them in Direct mode or Home-net mode. If you leave them all in direct mode, any hand-held device will need to be connected to the Wi-Fi Access point of one of the modules and then it will only see the WiThrottle Server provided by that module. If you operate all the modules in Home-net mode, you can leave all hand-held devices

connected to your home Wi-Fi network and each device will see the WiThrottle servers of all the modules. You can connect to one, then select from its roster, then connect to another and select from the other one's roster. You can only connect to one WiThrottle Server at a time.

With Loco Operator, when you do a scan, you will get all of the locomotives in all modules so you can select any of them to drive. This applies in Direct or Home-net mode, since Loco Operator does the connection to the Wi-Fi Access Point automatically when you select a loco.

Tips to Manage your Home Network

Connection to your Home Router

When you set a WFD-30 module to Home-net mode, it will immediately restart and try to connect to the Wi-Fi Access point that you specified in the SSID, using the password that you supplied. From then on, it will try to connect each time you power on. If the connection is unsuccessful, it will give up after about 30 seconds and revert back to Direct mode to allow you to connect and either correct the problem or return it to Direct mode. Usually failure to connect occurs because the password or SSID is incorrect, so you would need to double check that, but it might be because your home router is too far away or is turned off.

Sometimes routers refuse connections because of some internal hang-up problem and need to be restarted from time to time. Also, occasionally there are so many people operating Wi-Fi devices in an area that there is just too much radio traffic. In this case changing the router to a different channel may work. Remember that in Home-net mode, the WFD-30 always uses the Wi-Fi channel of the router that it is connected to.

Home Net IP Address Assignment

Every device connected to a network needs an IP Address and when your WFD-30 successfully connects to your home router, the router will allocate it an IP Address from a list of unused addresses. This process is called DHCP (dynamic host control protocol) and you can Google the term to find all the information you would like. IP Addresses are leased to connected devices and it is possible that the next time you turn on your WFD-30, the lease will have expired and the router will give it a different IP Address.

This changing IP Address does not matter if you are using 3rd-party apps using the Hoffman WiThrottle protocol (like Engine Driver and WiThrottle) because they discover one or more WFD-30 modules using a protocol called Multicast DNS. The WFD-30 broadcasts its presence, with its information, to all devices connected to the network, and the Engine Driver and WiThrottle apps display WiThrottle servers found in this way in their list of discovered servers. You then connect to your choice of WiThrottle server when you start the app.

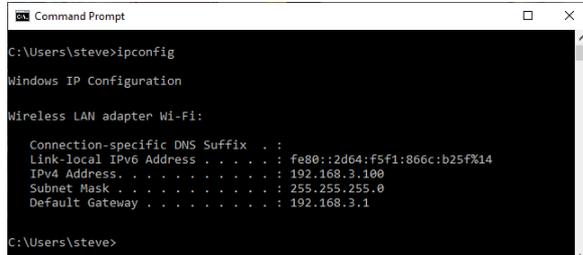
If you want to access your WFD-30 from a browser such as Internet Explorer, Edge, Chrome or Safari, you need to know its IP Address. There are several good ways of finding the IP Address assigned by your router.

- (1) Once you have connected using an app such as WiThrottle or Engine Driver, you can use the "Web Page" menu item or tab to view the Settings page as in section "General Settings Web

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Page”. Once you see the IP Address, you can make a note of it and type it into a browser as in section “Access Advanced Features using a Browser”.

- (2) Probably the best way is to visit the Admin page of your router. To do this, type the address of your gateway into a browser. You can find this by opening a Windows command console and typing the ipconfig command:



```
Command Prompt
C:\Users\steve>ipconfig

Windows IP Configuration

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::2d64:f5f1:866c:b25f%14
    IPv4 Address. . . . . : 192.168.3.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.3.1

C:\Users\steve>
```

Figure 93 Using ipconfig to find your computer's ip address and default gateway

- (3) Figure 93 shows the result. Now take the default gateway IP Address, 192.168.3.1 in this example. and type it into the address bar of your favorite browser, then hit the Enter key.

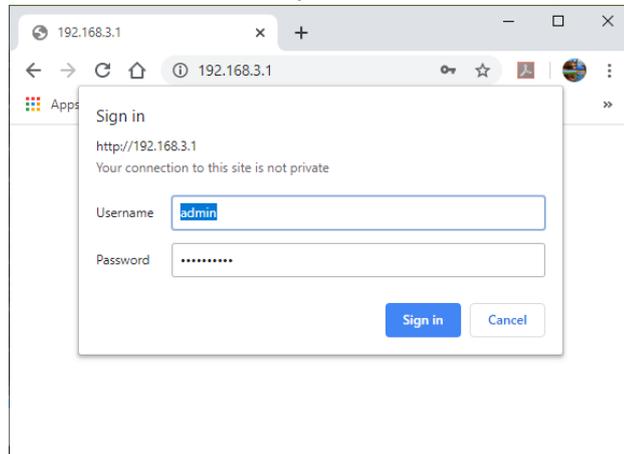


Figure 94 Access your router by using the IP Address of your default gateway in a browser

- (4) The browser will ask for your username and password to access your router’s admin page. You can find this in one of these places, unless you have changed it:
 - a. A sticker on your router, at the back or underneath. Look for the “Admin” user name and password (this is not always the same as your Wi-Fi password),
 - b. On a card supplied by your internet service provider or telco,
 - c. In the leaflet that came with your router.

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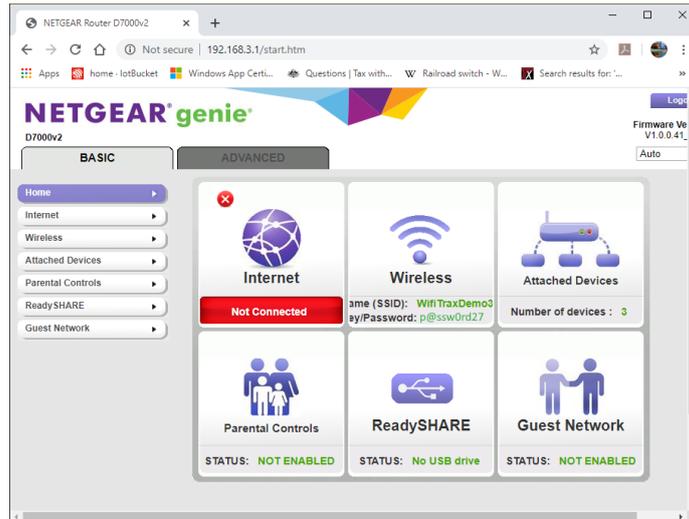


Figure 95 A typical router admin page

- (5) Once you have given the credentials, you will see the admin page. A typical one is shown in Figure 95. Find the “Attached Devices” option and click on it.

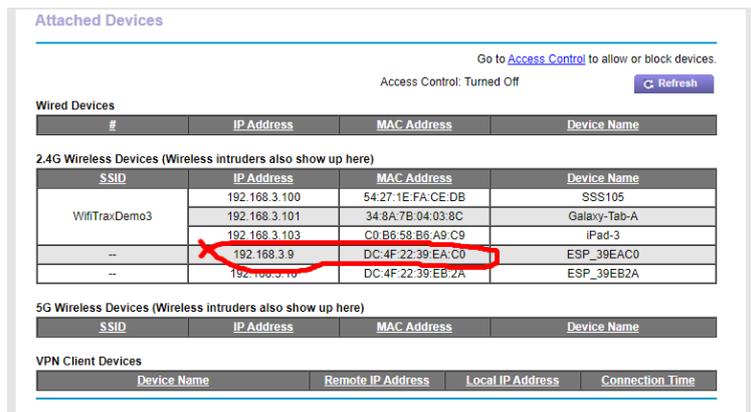
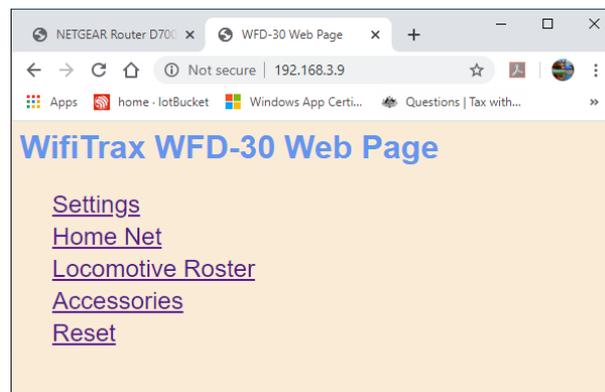


Figure 96 Typical "Attached Devices" page of a router

- (6) You will see a screen something like Figure 96. Find the row where the MAC address matches that printed on the bag label of your WFD-30 device. Here the MAC Address DC:4F:22:39:EA:C0 matches the STA MAC Address on the bag label, so the IP Address is 192.168.3.9
- (7) Now open another tab in your browser and type the IP Address, 192.168.3.9 in this case, into the address bar to get the main menu web page.



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Figure 97 Use the IP Address to open the main menu web page

Reserving a Fixed IP Address

That's all well and good but earlier it was said that routers do not always assign the same IP Address!

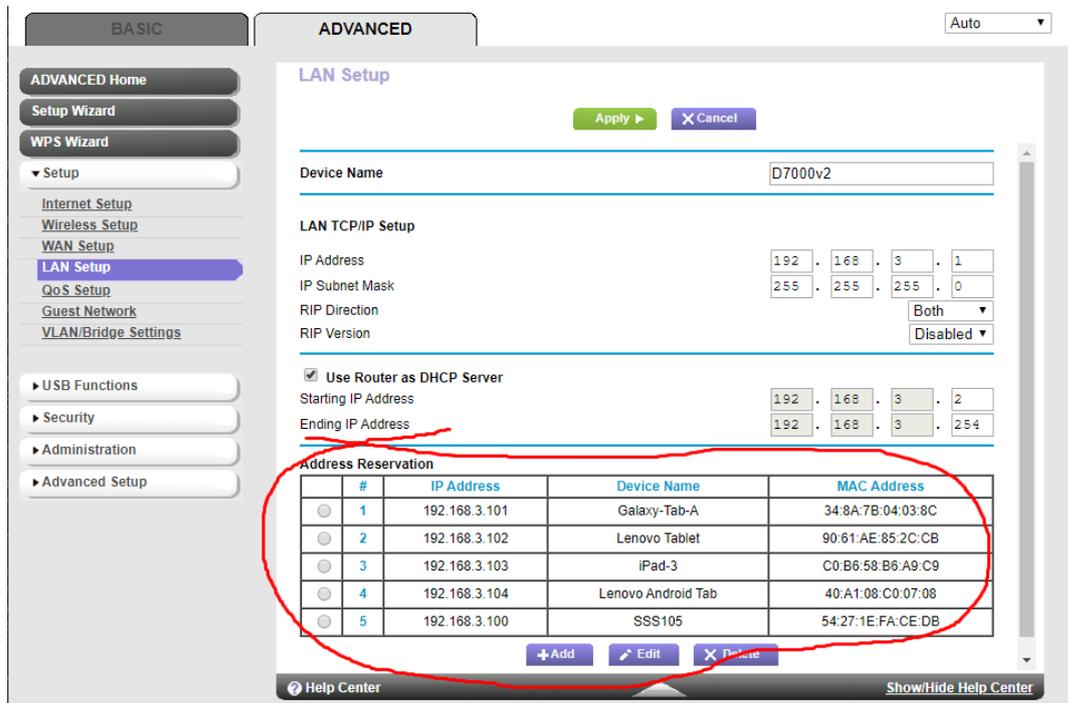


Figure 98 An IP Address reservation table in a router

Well, while you're in the router admin page you can *reserve a fixed IP Address* for your WFD-30 module. In the Netgear D7000v2 that is used here as an example, you need to click the Advanced tab, then the Setup menu and the LAN Setup sub-menu. The table at the bottom of Figure 1 shows the Address Reservation Table. In this router, you can see that there are already 5 reservations and to add a new one, we hit the Add button.

Then type in the information from Figure 96, give the reservation a name "WFD-30" and hit Add as Figure 99.



Figure 99 Adding an address reservation

Usually you have to click the Apply button to restart the router, then check the reservation page to make sure the new one is there. Now your module will always have the same IP Address.

More Information

Article about Wi-Fi/DCC:

<http://www.wifitrax.com/appNotes/WiFi-DCC.pdf>

Access all the articles:

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

FCC Information

Radio or TV Interference (this information is MANDATED by the FCC)

This equipment incorporates Espressif Wi-Fi Transceiver Module ESP-WROOM-02D.

FCC Identifier: 2AC7Z-ESPWROOM02D.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. **Note that any modifications to the equipment not expressly approved by WifiTrax voids the user's authority to operate under and be in compliance with CFR 47 rules**, as administered by the Federal Communication Commission. WifiTrax believes any conscientiously installed equipment following guidelines in this manual would be unlikely to experience RFI problems.

For Canadian Users: "This digital apparatus does not exceed the Class B limits for Radio noise emission from digital apparatus set out in the Radio Interference Regulation or the Canadian Department of Communications." Le present appareil numerique n emet pas de bruits radio-electriques depassant les limites applicables aux appareils numeriques de la classe B prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

EU Declaration of Conformity

1. Radio equipment: WifiTrax Model WFD-30 NCE Cab Bus/Wi-Fi Interface Module

2. Name and address of the manufacturer or his authorised representative:

WifiTrax Model Science (A business owned by Steve Shrimpton Sciences Pty. Ltd. a company registered with the Australian Securities and Investments Commission ACN: 076 070 258)

116 The Gully Road, Berowra NSW 2081 Australia

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Object of the declaration:

WifiTrax Model WFD-30 NCE Cab Bus/Wi-Fi Interface Module as pictured in Figure 100 and identified by a label on underside of module bearing the model number WFD-30.



Figure 100 Identifying Illustration for WifiTrax Model WFD-30 EU Declaration of Conformity

5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation: Directive 2014/53/EU

6. Description of accessories and components, including software, which allow the radio equipment to operate as intended and covered by the EU declaration of conformity:

ESP-WROOM-02D Wi-Fi Internet of Things Module, Espressif Systems (Shanghai) Co., Ltd.

EU-type Examination (Module B) Certificate No. 192140277/AA/00

Issued by Telefication BV The Netherlands, Chamber of Commerce 51565536, www.telefication.com

7. Additional information:

Manufacturer has undertaken engineering analysis and appropriate testing to determine the subject of this declaration performs in its electromagnetic characteristics in the manner specified for the radio module identified in item 6 above.

Module is configured for EU market to allow Wi-Fi Channels 1 through 13 in the 2.4GHz Wi-Fi band.

Signed for and on behalf of: WifiTrax Model Science May 20, 2020, Berowra NSW Australia

WFD-30 NCE Cab Bus Wi-Fi Interface Operating Manual

Stephen J Shrimpton, Chief Engineer, Director