



Our Wi-Fi Layout Initiative - Applying the WifiTrax Vision to the Whole Layout

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The WifiTrax concept will allow you to connect your entire model railroad to your home Wi-Fi network giving you a flexible and versatile method of control from almost any hand-held device or computer on your network. In our WifiTrax Vision Document we described our approach centered mainly on Cab Control of locomotives but describing the concept as a total layout control system.

[Read the WifiTrax Vision Document here...](#)

Now this new document continues the thoughts and describes how our new range of software and hardware products forming our Wi-Fi Layout initiative will provide full capability to control all the operational features on your layout directly from your desktop, tablet or phone without the need for wired networks of any description, or track signals.

Of course, Wi-Fi layout is completely compatible with traditional DCC that uses the NMRA standardized track signals. You can power our Wi-Fi Layout electronic modules from DCC track power, DC or AC as described in the specification for each module. You can run traditional DCC locomotives and DCC stationary decoders in parallel with Wi-Fi Layout. You can therefore try out Wi-Fi Layout first on a small section – perhaps an extension – before converting your entire layout.

You can even use Wi-Fi Layout on a DC only system – just using it to control switch machines, lighting, signals or whatever! In that DC case though, you can't power our devices from the track since it will vary as you control your DC locos.

## Wi-Fi Layout Components

In implementing our Wi-Fi Layout initiative, we need to develop quite an extensive set of components, most of them hardware and firmware, but with one quite large piece of software. That's the Tower Operator App, which will run on Windows 10, Android and possibly other platforms.

## Hardware Components

The hardware components are made up of a set of modules that control operational layout features such as switch machines, power blocks or districts, lighting, signals, level crossings etc. Each of these modules contains firmware that exposes a Web API on your Wi-Fi network allowing our Tower Operator App to control each one. A Web API is a bit like a web site without any visible pages – the modules are all web servers that respond to commands from our software Apps.

Typically, our Wi-Fi Layout hardware modules each have a specific function and are intended to be installed on, under or at the front of your baseboard. Each unit has a set of screw connectors allowing its control outputs to be wired to the features being controlled. For example, a 4-Way Universal Switch Machine controller such as the WFS-46 has four outputs consisting of two or three leads each that can each be easily wired to a local switch machine.

Of course, you would mount the WFS-46 close to a set of switches, such as a freight yard or station throat so that the wiring is short. You can read about the WFS-46 here:

[WFS-46 4-Way Universal Switch Machine controller](#)

The Universal Controller provides for dual coil, solenoid type switch machines such as those sold by Atlas and Peco and also stall-motor switch machines such as the Tortoise from Circuitron<sup>1</sup>. In addition, the WFS-46 also supports *bi-directional (or bipolar)* solenoid switch machines that have two connections and require bi-directional current pulses. LGB and Kato switch machines come into this category. Our range of switch machine controllers is described here:

[WifiTrax Switch Machine Controllers](#)

Similarly, our WFG-80 8-Way Lighting and General-Purpose Controller can be mounted close to a set of buildings, or a set of colored light signals, so that the eight pairs of wires from the controller to the lights are fairly short. You can read about the WFG-80 here:

[WFG-80 8-Way Lighting and General-Purpose Controller](#)

Since the wires are short, you do not need to worry much about voltage drop, so you can use quite thin wire.

## Tower Operator

The Tower Operator App provides a diagrammatic Control Panel approach to your layout. You can have multiple control panels on a complex layout and each Tower Operator in an operating session can be responsible for one, viewing it on a tablet or sitting at a desktop computer. Control Panels show a track schematic for a region of – or perhaps the entire – layout. On the schematic, each switch, etc. appears and can be controlled by tapping or clicking. Figure 1 shows an example.

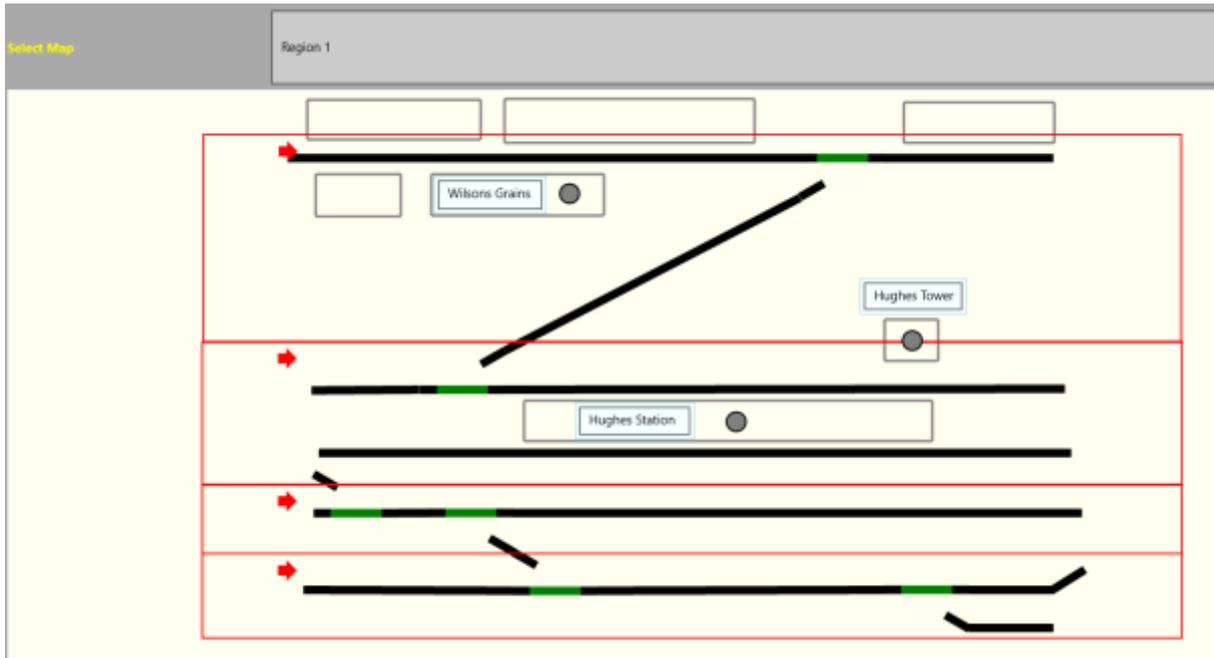


Figure 1 An example of a Track Schematic Control Panel (preliminary)

The Tower Operator App allows you to define as *Logical Units*, as many as you like. A Logical Unit is something like a Switch Machine, Signal, Light or Power District, i.e. a real feature on your layout that needs to be controlled. These can be placed on one or more Control Panel Maps. The map shown in Figure 1 contains four types of logical units: LH Switches, RH Switches, Lights and power districts.

Once you have defined a Logical Unit, you must implement it by mapping its controls to a physical Wi-Fi Layout Module somewhere on your baseboard. For example, a Switch has one control – the throw bar switch machine – which is either thrown or straight. The mapping is shown in Figure 2.

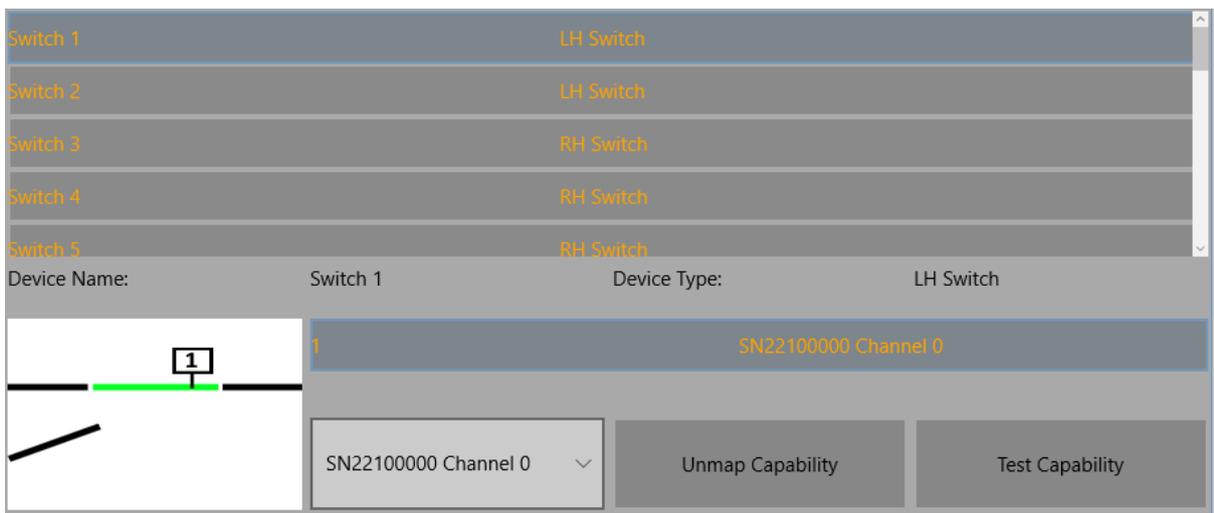


Figure 2 Mapping a Logical Unit. Here a LH Switch called Switch 1 is mapped to Channel 0 of a Switch Machine Controller called SN22100000.

However, a double slip switch or three-way switch has two throw bars and requires two switch machines. Thus, if you were setting up a double slip switch using Tower Operator, you would need to

map two controls from the logical unit to perhaps two channels in a WFS-40 Unit described earlier. You could use the other two channels for two more LH or RH turnouts or another double slip switch.

Once you have defined some logical units, you can create some Region Maps as in Figure 1 – i.e. schematic control panels – and add some of your logical units to them. You can also draw passive features such as lengths of track, building outlines and labels.

When you have finished you can switch to run mode and control all those layout features by clicking or tapping on the symbols on the region map.

You can save all of your configurations and share them between computers so your time spent setting everything up is not wasted.

## Notes

1. Tortoise is a trademark of Circuitron Inc.