



FREEWAVE Fusion WiFi Connectivity and Dual-Radio Gateway Bridge User Guide

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FREEWAVE Fusion WiFi Connectivity and Dual-Radio Gateway Bridge



The FreeWave Fusion Wi-Fi Bridge is designed to create a seamless Wi-Fi access point (AP) anywhere on a ZumLink network. This allows Wi-Fi devices and sensors to be connected in remote and rugged locations, without

extra wiring or special networking.

This guide will walk you through the first-time setup and

configuration of the Fusion Wi-Fi Bridge, connecting the device to a ZumLink network and introducing the device's Wi-Fi parameters and functionality.

This guide assumes a level of familiarity with ZumLink networks. If information about setting up a ZumLink network is required, please visit

<https://www.freewave.com/gettingstartedwithzum/>

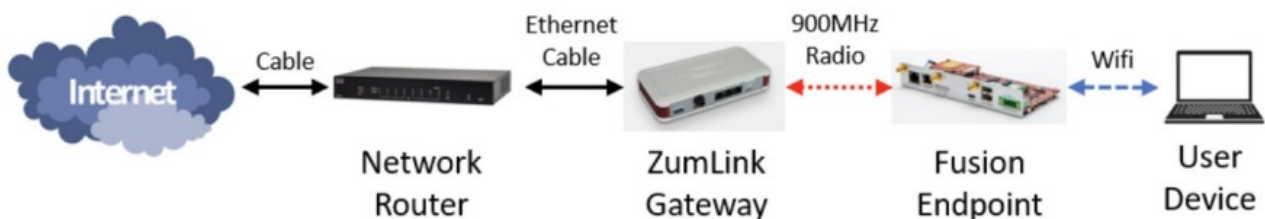
You Will Need

1. A computer running Windows with an available USB port
2. A FreeWave ZumLink 900MHz system or gateway to which the Fusion device can connect as an endpoint



Purpose of this guide

This document will guide the setup and installation of a Fusion Wi-Fi Bridge endpoint on a ZumLink network. By the end of this guide, we will have created a Wi-Fi AP that allows the user to connect Wi-Fi devices to a ZumLink network, as pictured below.



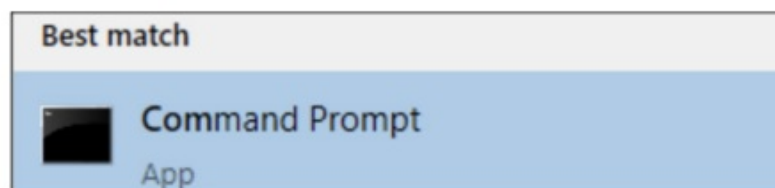
Determine the IP of Your Network Gateway

For the Fusion device to connect to the internet, it is important that it be configured with the same IP range as your network gateway. This varies from network to network, so before we configure the Fusion, we need to determine the IP of the default gateway for your test network.

Note: This guide assumes the computer used to configure the device is connected to the same network to which the ZumLink gateway is connected. If this is not the case, you'll need to find the Default Gateway value for the network router to which your ZumLink gateway is connected.

Use this value for the Default Gateway when it is mentioned in this guide.

1. Open a command prompt window (click the Start button and type "cmd" to find the Command Prompt shortcut)

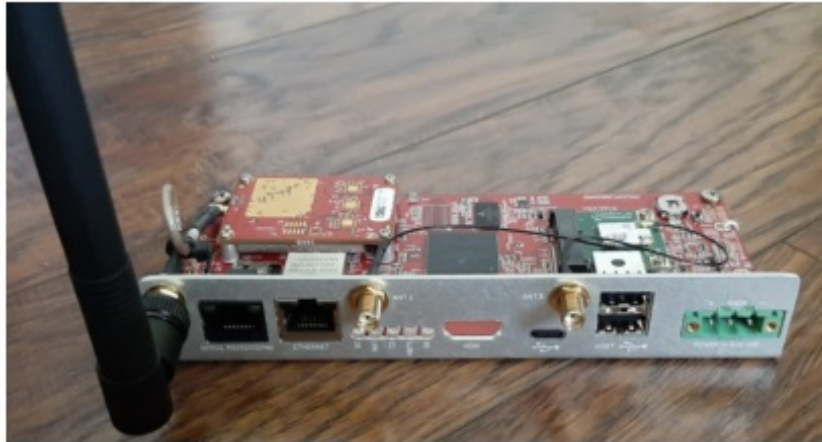


2. type "ipconfig" and press Enter (ifconfig on Linux) Look in the output for your main network connection, i.e. the interface your computer is using to connect to your network – Wi-Fi or Ethernet. In the output pictured below, the "Wireless LAN
3. apter Wi-Fi" interface is the way the computer is connecting to the wireless router

4. Make a note of the “Default Gateway” IP. In the case above, the Default Gateway is 192.168.1.1 We will use this later in Fusion configuration.

Power Up the Fusion

1. Now we'll prepare the Fusion device for configuration. To start, screw the larger SMA whip antenna into the SMA jack on the far-left side of the device.



2. . Next, connect the two smaller antennas to the remaining



3. Finally, connect the green connector from the power supply to the front of the unit, and plug the wall adapter into a wall power source. The device will power up. On first power up, the LEDs on the device will flash in sequence several times. When boot up is complete, the LED labeled “CD” should light up and hold a steady red. The device is now ready to configure.



Navigate to the configuration page

Once the device is powered, the next step is to navigate to the configuration page using a browser and begin

configuring the radios. There are two options for connecting to the radio for configuration: physically through the USB-C connection, or wirelessly by connecting to the FusionWiFi Access Point:

Connection Option 1: USB-C

1. Plug in a USB-C cable to the device, and connect the your device and connect to it as your Wi-Fi AP.

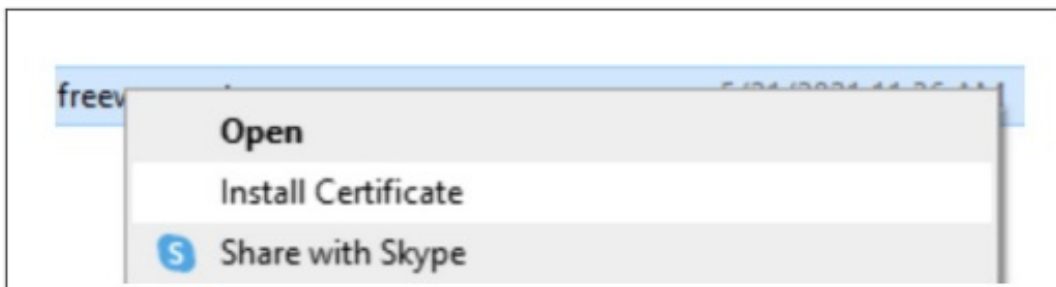
Certificate Installation

Because the Fusion configuration site uses the secure https:// URL, one must first install the Fusion security certificate. This is located on the device and can be downloaded directly in a browser:

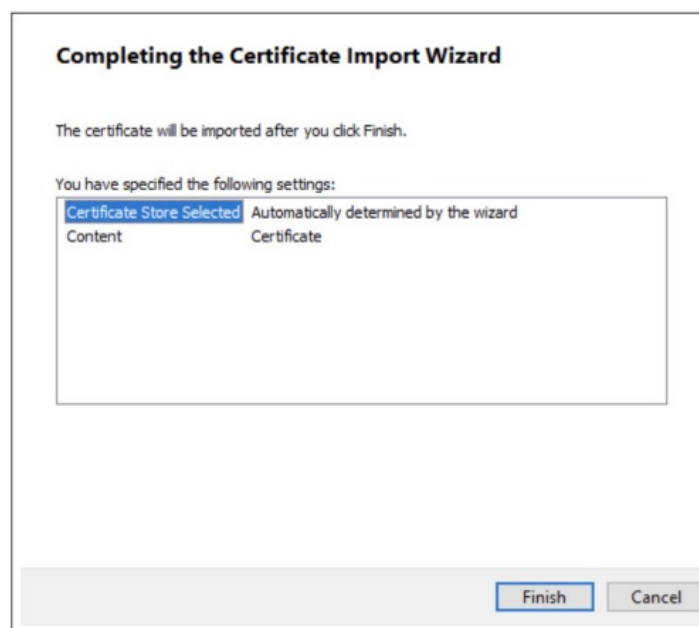
1. Navigate to <https://192.168.1.150/freewave.crt>
2. The browser should automatically begin downloading the certificate from the Fusion device



3. Once the certificate has downloaded, open the Downloads folder, right click on the freewave.crt file, and select "Install Certificate"



4. The certificate will now be installed, click through the install wizard with the default selections on each screen, then click "Finish". The certificate is now installed and your browser will now recognize the Fusion device.



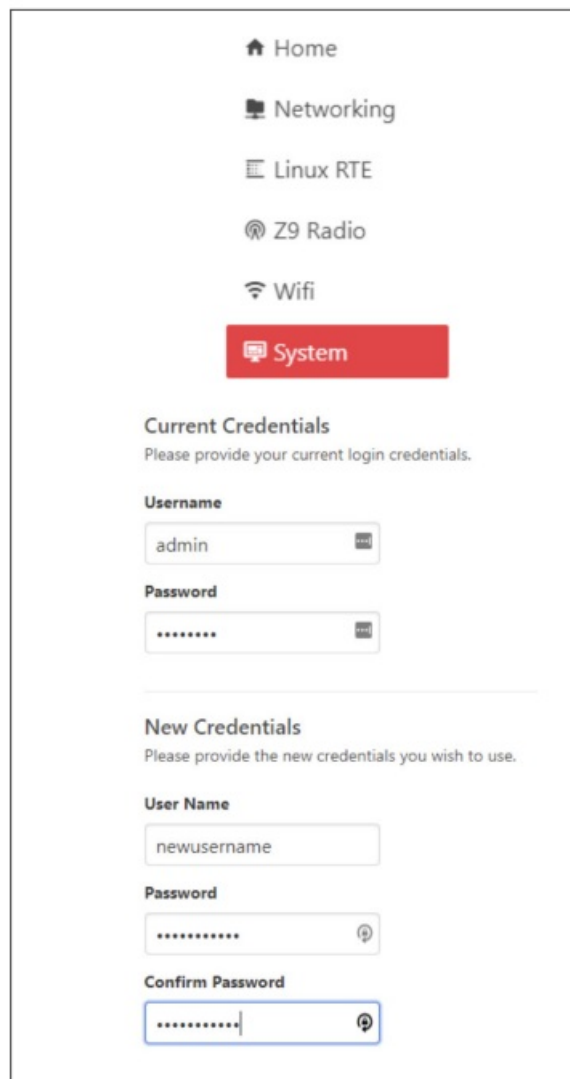
Web Setup

1. Open a browser (Chrome or Firefox) and navigate to the IP 192.168.1.150 This is the default IP of the Fusion device
2. You should now be at the Login screen. Login with the credentials: username:admin and password:password



The image shows the FreeWave login interface. At the top is the 'FREEWAVE' logo with three red dots above the 'W'. Below the logo are two input fields: 'Username' with the text 'admin' and 'Password' with masked characters '.....'. Each field has a small icon on the right. Below the fields is a dark blue 'Login' button.

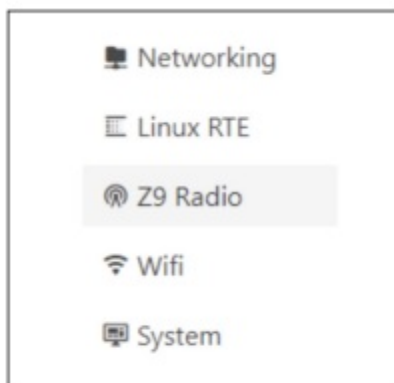
3. You should now have access to configure the device
4. When signing in for the first time, we recommend that you change the credentials to something only known to you (note, this is optional, but recommended if the system will be used in non-test conditions). To change your credentials now, navigate to the System tab and update your credentials there.



The image shows the 'System' configuration page in the FreeWave interface. At the top is a vertical menu with icons and labels: 'Home', 'Networking', 'Linux RTE', 'Z9 Radio', 'Wifi', and 'System' (which is highlighted in a red box). Below the menu, the 'Current Credentials' section is titled 'Current Credentials' with the instruction 'Please provide your current login credentials.' It contains 'Username' (admin) and 'Password' (masked) fields. Below this is the 'New Credentials' section, titled 'New Credentials' with the instruction 'Please provide the new credentials you wish to use.' It contains three fields: 'User Name' (newusername), 'Password' (masked), and 'Confirm Password' (masked).

Configure the Z9

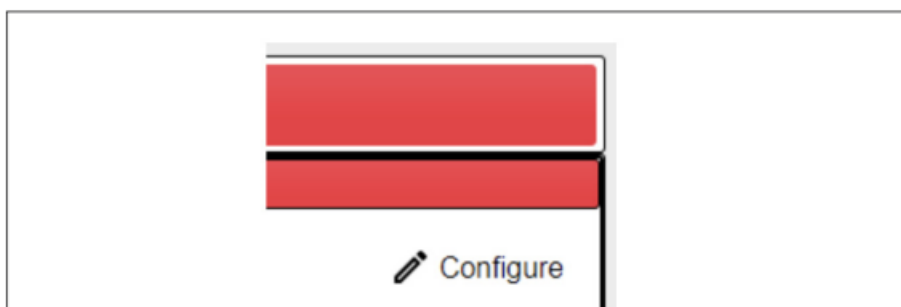
- Now it is time to configure the Z9 radio on the Fusion device. In the configuration area, click the “Z9 Radio” tab to navigate to the Z9 configuration page You may be asked for your user credentials again.
- These are the same credentials used to login to the original configuration area.



- Once in the Z9 configuration area, navigate to the “Radio Settings” tab on the top left of the scree



Once in the radio settings tab, click “Configure” on the right side of the screen:



You should now see the radio configuration settings. At this point, you should now configure the Z9 settings such that the Fusion device is an Endpoint on your ZumLink network. An example setup is pictured below. If you are unfamiliar with how to configure a ZumLink endpoint, please visit

<https://www.freewave.com/gettingstartedwithzum/>

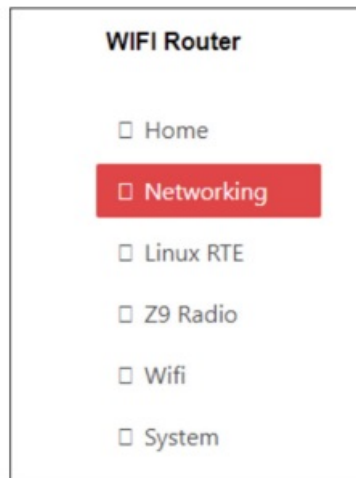
Radio Settings	
Radio Mode	Endpoint
RF Data Rate	RATE_4M
TX Power	15dbm
Network ID	500
Node ID	5309
Radio Hopping Mode	Hopping_On
LNA Bypass	0
Max Link Distance In Miles	20
Frequency Masks	

Once the above values are entered, click the Update button on the bottom left of the configuration screen. If the Z9 is successfully configured as an endpoint, the “CD” LED on the front panel of the device should change from solid red to solid green.

Configure the Networking module

If, in the Determine the IP of your Network Gateway phase, it was determined that the IP of your network Gateway is 192.168.1.1, then your system should be configured and ready to use, and you should skip to the “Utilizing the Fusion Wi-Fi Bridge” section of this guide. If not, continue following the steps below.

9. Navigate to the Network configuration page on the Fusion configuration tool. If you’re still on the Z9 configuration, use the “Wi-Fi Router” link at the top to get back to the main screen, then click “Networking” on the left of the configuration tool:



Once on the Networking configuration page, edit the network settings to work on you network as follows:

- Change the IP address such that the first three num-ber fields match that of your home network. For ex-ample, if your home network is 192.168.1.X, change the first three values to 192, 168, and 1. Set the last number to a value that is unique to your network. “150” is likely an open address if you have a stan-dard-size home network. Likewise, if your network is 10.0.0.X, set the first three values to 10, 0, and 0, with the fourth number being unique to your network (once again, “99” is a safe bet). Note: Advanced net-works may have a special subnet mask. If you believe this to be the case on your network, contact the net-work administrator for the subnet values to use.
- Next, change your “Default Gateway” values to match the “Default Gateway” of your system, the IP found in step 4:

A screenshot of a web form for network configuration. It contains two sets of input fields, separated by the word "OR". The first set has labels "IP Address:", "Subnet Mask:", and "Default Gateway:" followed by four input boxes each. The values entered are 192, 168, 1, 150 for IP; 255, 255, 255, 0 for Subnet Mask; and 192, 168, 1, 1 for Default Gateway. The second set has the same labels and input boxes with values 10, 0, 0, 150 for IP; 255, 255, 255, 0 for Subnet Mask; and 10, 0, 0, 1 for Default Gateway.

- Click “Save Settings” at the bottom of the page.

Utilizing the Fusion Wi-Fi Bridge

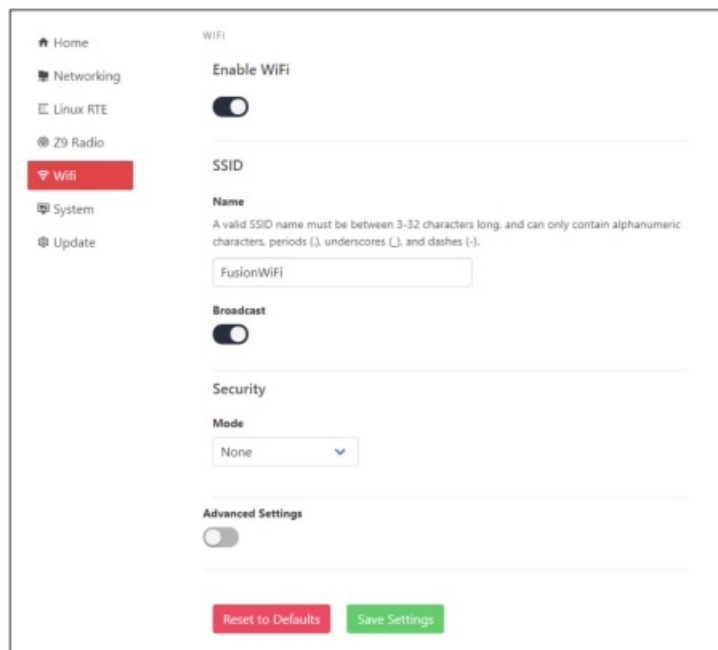
You should now be able to use the Fusion as a Wi-Fi bridge on the ZumLink network. Click on your Wi-Fi interfaces icon on the Start bar, and “FusionWiFi” should be available.

This is currently an open, non-password-protected Wi-Fi access point. You can now connect to this device as you would with a regular Wi-Fi router. Fusion will direct your Wi-Fi traffic over the ZumLink network to the ZumLink Gateway, and then on to the internet.

Wi-Fi Configuration

The final step is to configure the Fusion’s Wi-Fi parameters such as security, passwords, broadcast, SSID, etc

Navigate to the Wi-Fi section of the configuration page:



Use this page to choose an SSID name, set security to Open, WPA, or WPA2, and set a password for the Wi-Fi network. The Fusion Wi-Fi Bridge is now be configured and ready to use with Wi-Fi devices. The configuration will remain static through power cycles, so when the device is powered up, it will automatically start the Wi-Fi AP, connect to the ZumLink network, and be ready to connect Wi-Fi devices to the network!

The system we have created in this guide has a single endpoint, in larger systems with many endpoints, the Wi-Fi user will now be connected to the on-premises network, connecting the Wi-Fi device to any other Endpoint connections, such as SCADA equipment and on-premises gateways!

Support/Further Reading

This is just the beginning of what is capable with FreeWave Fusion and ZumLink devices. With the multi-radio configurability of Fusion, users will be able to create complex networks build with a mixed variety of radio and network types according to their need.

- For the latest on FreeWave Fusion, please visit <https://www.freewave.com/products/fusion/>
- For more on the features of the ZumLink products, please visit <https://www.freewave.com/gettingstartedwithzum/>
- To purchase, or to find out how FreeWave can solve your network challenges, please visit <https://www.freewave.com/how-to-buy/>

- For questions and support with the Fusion device, please visit <https://support.freewave.com/>

Documents / Resources



[FREEWAVE Fusion WiFi Connectivity and Dual-Radio Gateway Bridge](#) [pdf] User Guide
Fusion, WiFi Connectivity and Dual-Radio Gateway Bridge, Fusion WiFi Connectivity and Dual-Radio Gateway Bridge