

Fusion3

EDGE 3D Printer

OPERATION:

NETWORKING (ETHERNET & WIFI)

Revision 5/2/2023

USING EDGE ON YOUR LOCAL NETWORK

How to configure EDGE for your wired or wireless networks, how to use EDGE over your network, configuration instructions for your IT dept, and how to use EDGE's advanced networking features.

This document supersedes the individual networking documents for wired and wireless networking.

ETHERNET CONFIGURATION & TROUBLESHOOTING

Both the STANDARD and SECURE variants of EDGE have built-in wired (ethernet) networking. This can be configured in two ways:

- As a normal ethernet connection: EDGE is connected to a router, which assigns an IP address & other network parameters to allow communication with the rest of the network.
- As a direct connection between a computer and EDGE, without the need for a router or other network gear.

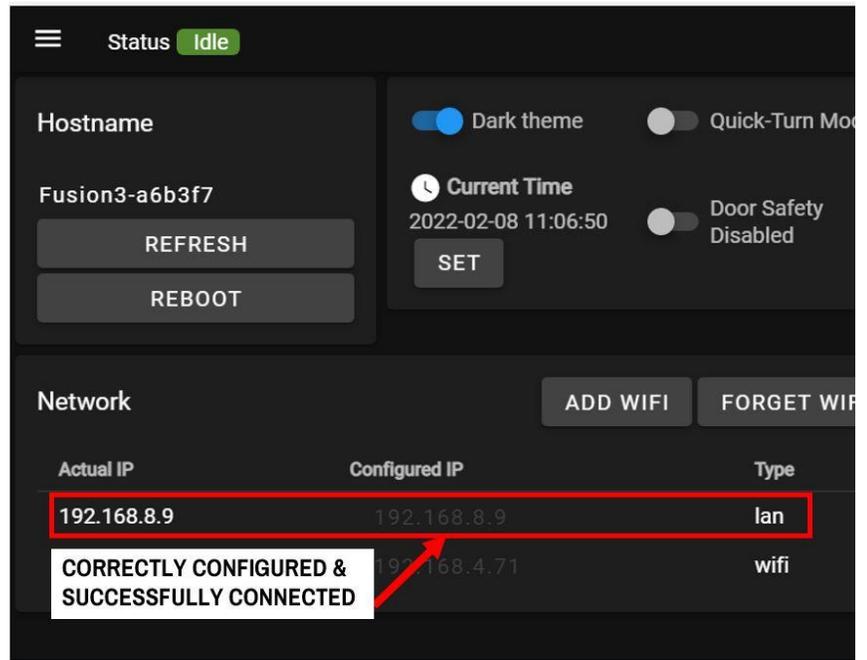
Connecting to a Standard Wired Network

1. Connect a standard ethernet cable to the ethernet port on the back of the printer. This is located near the power port.
2. Make sure the other end of the cable is connected to your network (a wall port, router, or other network gear).

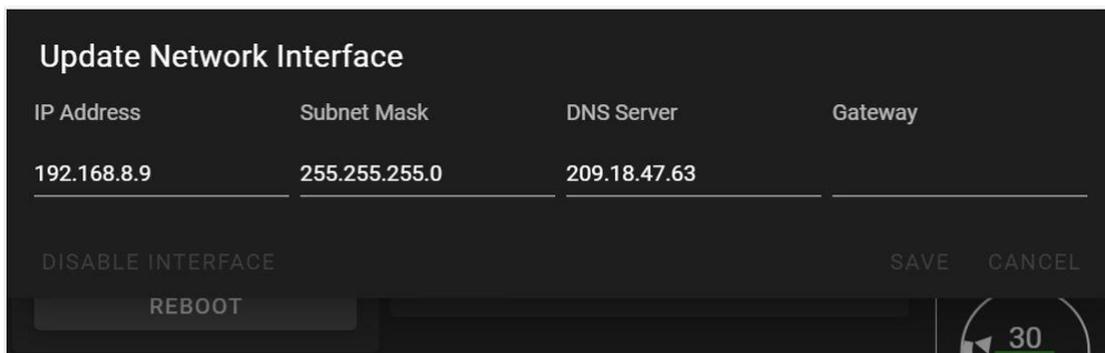


3. In **most situations** / networks with DHCP enabled, your network will automatically recognize EDGE, and assign an IP address and other network parameters.
4. Verify that you have a working connection:

- a. Go to *Menu > Settings >* and look at the network list at the bottom of the page. You should see an entry with the following characteristics:
 - i. "Actual IP" and "Configured IP" are the same
 - ii. "Type" will say "lan"



5. If you need to adjust any network settings, press on the "Configured IP" address. A dialog box will pop up. Here you can adjust gateway, netmask, DNS server, etc.



NOTE: We recommend NOT adjusting any of these settings unless you have a specific need based on your network's configuration. If your network is complex enough to require changes here, please consult your network admin or IT department for assistance.

Direct Connection to a Computer (Advanced Users Only)

1. Connect an ethernet cable to the port on the printer, and your computer's ethernet port. You can use a standard (non-crossover) cable.
2. Manually configure an IP address for the printer on the *Menu > Settings >* page.

- a. Manually set an IP address and a subnet. You can leave the rest of the settings blank.
 - b. For example: IP = 192.168.9.1; subnet = 255.255.0.0
3. In your computer's network settings, manually configure your ethernet connection to have the same subnet and an IP address in the same range.
- a. For example: IP = 192.169.9.2; subnet = 255.255.0.0
 - b. If you do not know how to adjust your computer's network settings we recommend not using Direct Connection mode.

Ethernet Connection Troubleshooting

Networks can be incredibly complicated and can vary dramatically from location-to-location; a complete dissertation on how to fix every possible network issue is beyond the scope of this document. Here are some possible solutions to the most common issues. If you don't see your issue listed, contact our Customer Support group at:

- support@fusion3design.com
- <https://www.fusion3design.com/contact-support/>

For locations with complex networks and in-house IT teams, you will also want to work closely with them to resolve any network issues encountered. These are often locations with complex networks and network policies that may require changing some default settings in order to put EDGE on the network in accordance with their policies.

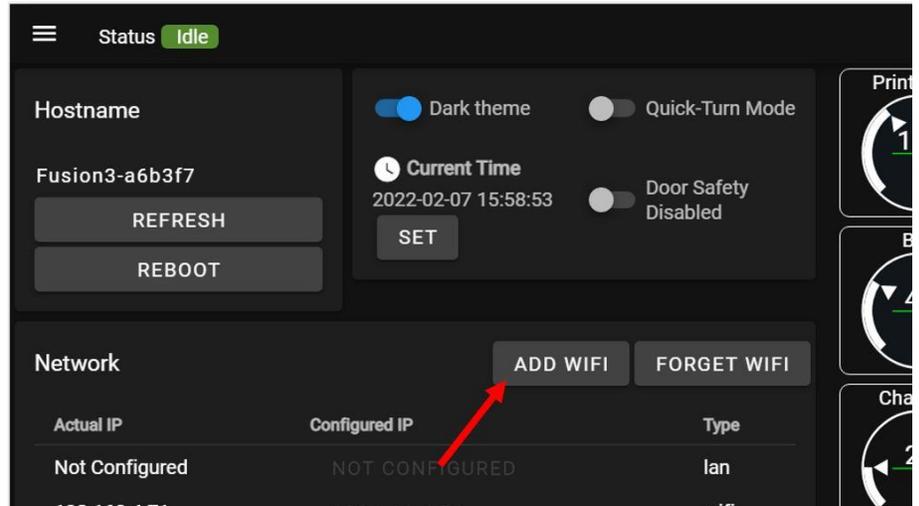
If you see an IP address (or other setting) you know isn't valid:

For instance, if the printer keeps insisting on using an IP address you know is wrong. Enter all zeros for **all** the parameters (IP address, subnet, gateway, etc) and click "save" to reset the information for the network.

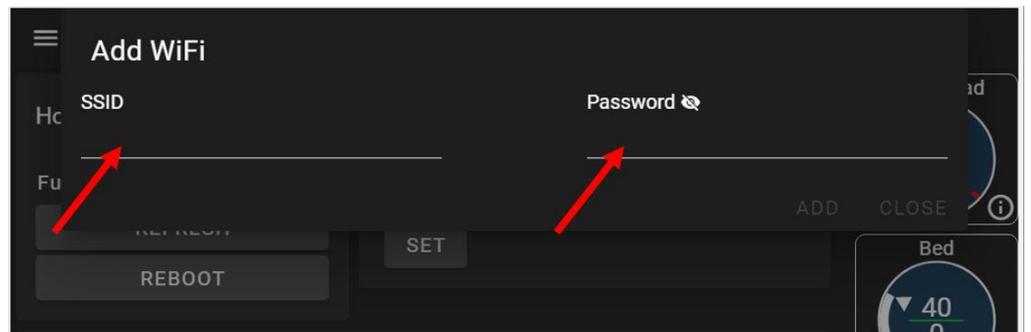
WIFI CONFIGURATION & TROUBLESHOOTING (STANDARD ONLY)

The STANDARD variant of EDGE has wireless networking built in. The SECURE variant has no radios at all.

1. On the onboard LCD, go to *Menu > Settings >*
2. Press the "ADD WiFi" button



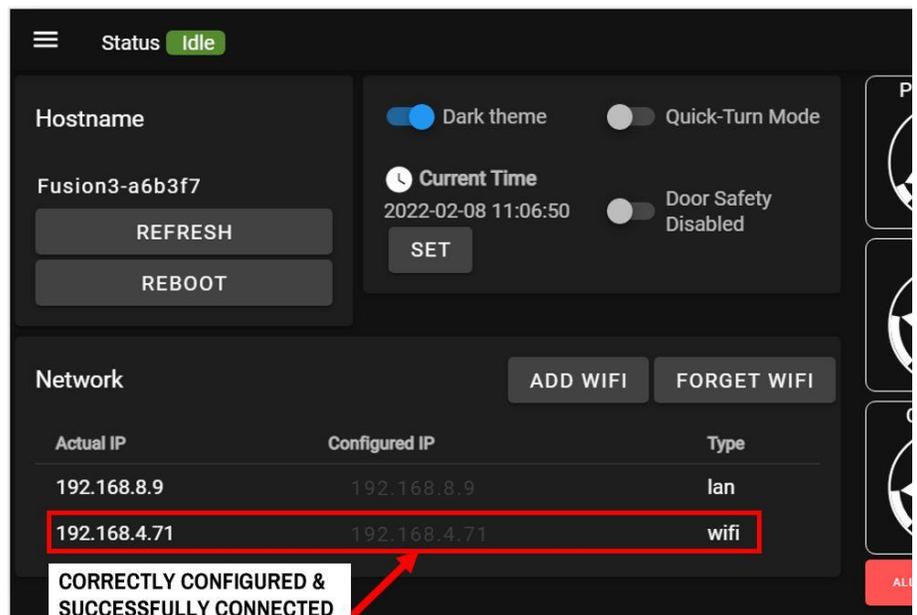
3. Enter your network's SSID and password in the dialog boxes. You can "un-hide" the password by clicking the eye icon, to make typing it in easier.



NOTE: Your WiFi network password must be at least 8 characters in length in order to work with EDGE. EDGE will not work with WiFi networks without passwords.

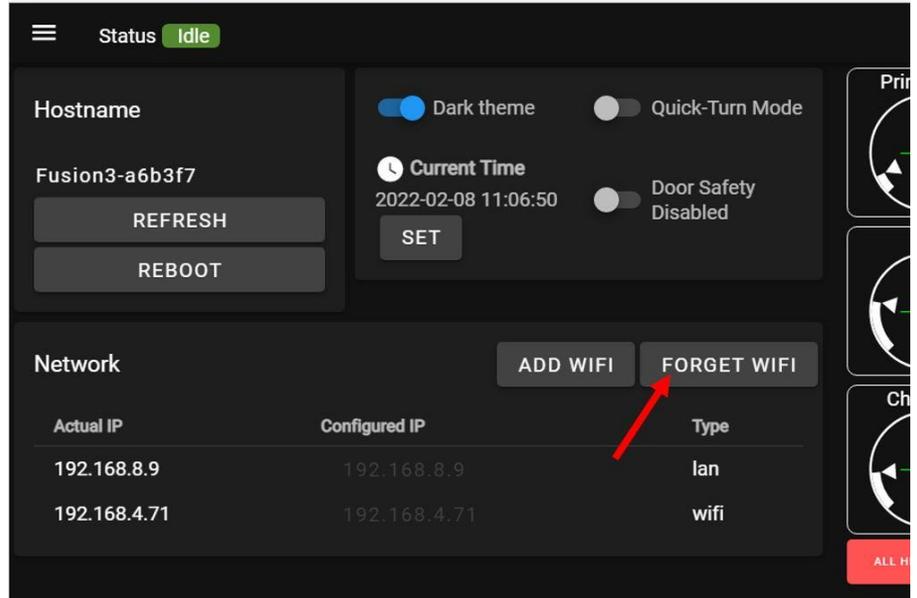
4. Press the "ADD" button. The printer will think for a few moments, then the interface will refresh.

5. If the printer is able to join the network, you'll see a network entry appear in the table at the bottom of the screen.
6. If the network entry doesn't show a "configured IP" that matches the "actual IP", that means it was not able to connect to the network. Click the "Forget Wifi" button, delete the network entry you just added, and try again from step 2.

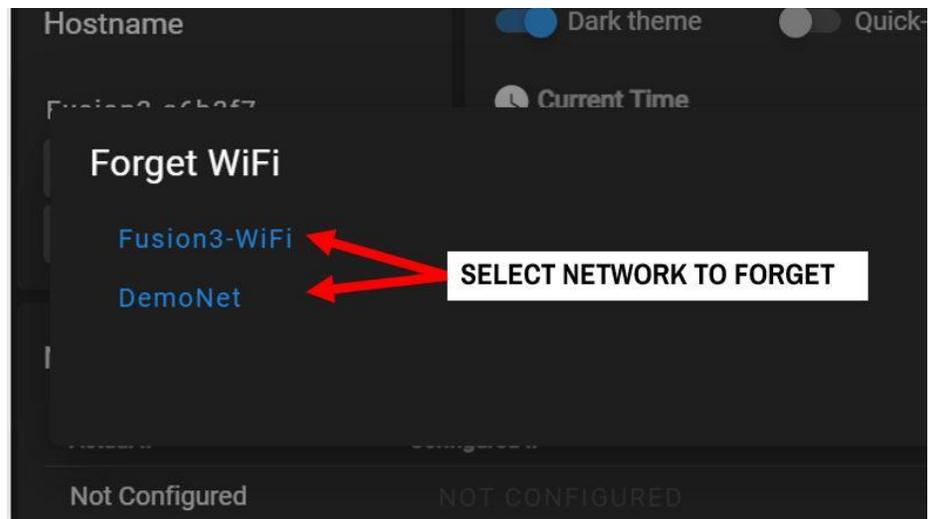


Removing A Wireless Network

1. On the onboard control panel, go to *Menu > Settings >*
2. Press the "FORGET WIFI" button.



3. Select the network you wish to forget from the list.
4. NOTE: All networks you've entered on the device will appear here, even if the printer is not currently connected to them, or if the connection failed.



Troubleshooting Wireless Networking

Wireless networking can encounter a myriad of problems. Here are some possible solutions to the most common issues. If you don't see your issue listed, contact our Customer Support team at:

- support@fusion3design.com
- <https://www.fusion3design.com/contact-support/>

If you do not see an entry appear in the network table, try the following:

1. Power cycle the printer completely off and then back on. Check for an entry in the network table once the printer boots up completely.
2. If you still don't see a network entry, try deleting your network ("Forget Wifi" button) and re-adding the network.

If you see a (valid) IP address in the network table, but can't connect with your computer:

Usually this is caused by your computer and the printer ending up on different subnets that cannot talk to each other. Resolving this usually requires the intervention of your network admin or IT department. You can occasionally fix this by deleting the network and re-adding it, and hoping for a different subnet, but this is hit-and-miss.

This could also be caused by a network policy blocking certain communications on your network. In most cases if your network is complex enough for this, your best course of action is to consult your network admin / IT department. See below for more information.

If you see an IP address that you know or suspect is not valid:

This is normally caused by some unique characteristic of your network that is beyond our scope to fix. We've also seen this caused by misbehaving WiFi bridges or range extenders. Like other issues listed, this can sometimes be fixed by a power cycle.

If the entry for the network is "stuck" with settings you know are not correct:

For instance, if the printer keeps insisting on using an IP address you know is wrong. Enter all zeros for **all** the parameters (IP address, subnet, gateway, etc) and click "save" to reset the information for the network. You can also delete the network and enter it again.

Advanced Topic: Configuring a Static IP Address on Wifi

In our experience, most local network DHCP systems rarely change a device's IP address once it's set, so please do not feel like you must set a static IP just to keep the printer on a consistent IP.

NOTE: We can provide instructions on configuring a static IP on EDGE; however the complete set up requires coordination with your local network's DHCP server and IP address ranges, which is beyond the scope of this document. Please consult your network admin/IT department.

By default, wifi on EDGE is set up to look for a DHCP address from your network. If you need to configure a static IP address, follow the procedure below.

On the *Utilities > Console*, enter the following command:

M587 S"yournetworkssid" P"yournetworkpassword" I[your desired static ip] J[your network's subnet mask]

Example: M587 S"DemoNet" P"password" I192.168.1.187 J255.255.255.0

Next, go to the *Settings* page and press the "REBOOT" button to reboot the single board computer so it applies your new network settings.

To Revert to a DHCP Address:

Enter the same M587 command with the S and P parameters filled out. Enter 0 for the I and J parameters.

CONFIGURATION INSTRUCTIONS FOR YOUR IT DEPARTMENT

If you have a large corporate network and/or an IT department that needs to/wants to configure EDGE for your network, refer them to this section.

EDGE IS NOT A MANAGED PRINTER. Please do not attempt to configure it like you would a conventional (2D) paper printer.

EDGE accesses your local network just like a normal PC.

Users access EDGE over your local network with a conventional web browser. The printer hosts its own web page on port 80 / port 443. Please make sure your network does not block those ports internally.

DHCP vs Static IP

While it's possible to configure EDGE with a static IP address on your network, we recommend against it. In most cases, DHCP-provided addresses remain consistent for long periods of time. So unless your network is specifically configured to have short DHCP leases, and the end user is complaining that the printer's IP changes all the time, a DHCP-provided address is the way to go.

For information on how to configure a static IP, please see the relevant sections in the wired or wireless networking sections.

Remote Support Capabilities

EDGE has built-in remote support capabilities. In order to use these capabilities:

- EDGE must be connected to a network with internet access.
- The following ports must be unblocked on your firewall:
 - 21115
 - 21116
 - 21117
 - 21118
 - 21119

The remote support tool is rustdesk-based. The user remains in full control of accepting or denying the remote connection at all times. There is no way for Fusion3 personnel or a remote attacker to log into the printer unless a user is physically present at the machine to allow the connection.

"Phoning Home"

EDGE does not "phone home" or share data with Fusion3 or anyone else.

USING EDGE OVER YOUR LOCAL NETWORK

1. Open a web browser on an internet-capable device (PC, tablet, phone, etc) on the SAME network EDGE is on.
2. In the address bar, type in the IP address that EDGE displays in its network list, under "actual IP". Press enter.
3. EDGE will deliver a web page that shows you roughly the same user interface as you see on the onboard LCD. From this interface, you can upload prints, start, pause, stop prints, and do everything you can do on the onboard LCD.

NETWORKING FAQ

Can I configure EDGE as a managed printer or manage it similarly to a networked 2D printer?

No; EDGE works completely differently. Users must interact with it using the hosted web page on the network.

Can multiple devices connect to the EDGE at the same time?

Yes, however care should be taken that multiple users are not trying to actually use the printer at the same time (eg trying to start prints).

Does EDGE need to be connected to a network to function?

No, it's perfectly happy to run without a network connection. HOWEVER, in order to use our remote-support tool and perform certain updates to the printer, you will need it on your network. We strongly recommend using EDGE over your local network.

How will I know I've successfully connected EDGE to my network?

It will display a valid IP address in the network list ("configured IP" column), and you'll be able to connect to EDGE's hosted web page using the IP address on another networked device.

Is there a way to prevent network connection with EDGE?

Yes. Simply leave the ethernet cable unplugged and don't connect it to a wireless network. EDGE will not try to connect to a network without your instructions to do so.

The network interface can be disabled in software by sending "M552 S0" on the console.

Does EDGE "phone home" and share my data when it has a network connection?

No. We understand most of our customers are businesses who want to maintain strict control over their data. We specifically designed EDGE to never phone home or share data with anyone (including us) without a human in the loop.

I want EDGE to be accessible via the internet outside my building. How do I do this?

You can use the built-in remote support tool, or see our separate document "long prints & remote access".

Can you upload gcode directly from your slicer through this network connection?

No. You must save it to your hard drive first and then upload it via the network interface.

Can I power the printer off via the network?

No, EDGE's power switch is a physical switch not a "soft button" as is common on lower power consumer devices.