

MINX0003 Network Setup Guide

1. Introduction

This guide describes the advanced networking setup features of MINX. MINX is factory configured for use with a local area network that offers DHCP (Dynamic Host Configuration Protocol). On DHCP networks, the DHCP server provides each device with appropriate network settings (ex IP Address). Users with DHCP served networks should proceed to the **MINX0003 User Guide**. If a MINX unit's unique MINX ID has been lost, consult section 7 of this guide.

For non-DHCP networks or direct computer-to-MINX connections, MINX will need to be configured using a dedicated Windows PC or Apple computer running macOS/OSX.

2. Computer Connection / POE

MINX will be setup using a connection to a dedicated computer. First, disconnect the computer from all other computer networks by disabling the computer's Wi-Fi radio and disconnecting any other Ethernet connections. Power on the computer and log in as normal.

MINX will be powered through POE (Power Over Ethernet, IEEE 802.3), using the included POE Injector. The POE injector will add the necessary POE voltage onto the Ethernet cable attached to MINX. Connect the Injector's "LAN"/"Data In" port to the computer using any Ethernet cable (customer supplied) and the Injector's "POE"/"Data & Power Out" port to MINX's Ethernet connector using the provide Ethernet cable. Plug the Injector into a 120V circuit. Note that special "Cross-Over" cables are NOT required for this operation. When MINX is receiving power, the red LED in the middle of the case will blink.



3. Computer Network Setup

By factory default, MINX uses the Zero-Configuration Link-Local standards (ZLL) to determine its networking parameters. With ZLL enabled, MINX will self assign an IPv4 address in the range 169.254.1.1 to 169.254.254.255 and a Subnet mask of 255.255.0.0. If MINX has previously been setup and the networking address mode switched from ZLL/DCHP to Static IP Addressing mode, proceed to section 7 to determine what network settings the computer will require to communicate with MINX.

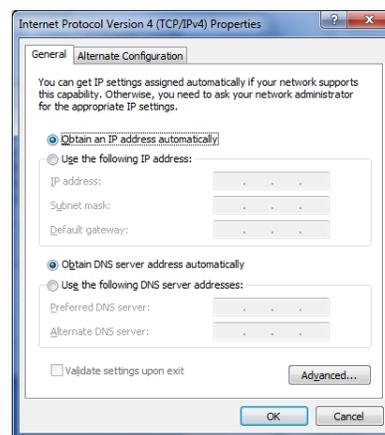
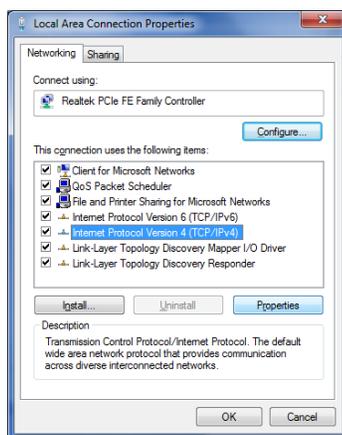
The connected computer will now be enabled to choose a compatible IP address. The following procedures differ based on the computers Operating System. For Windows based computer, proceed to section 3.1. For macOS/OSX, proceed to section 3.2.

3.1. Windows PC

Set Ethernet LAN Adapter settings to DHCP/Obtain an IP Address Automatically:

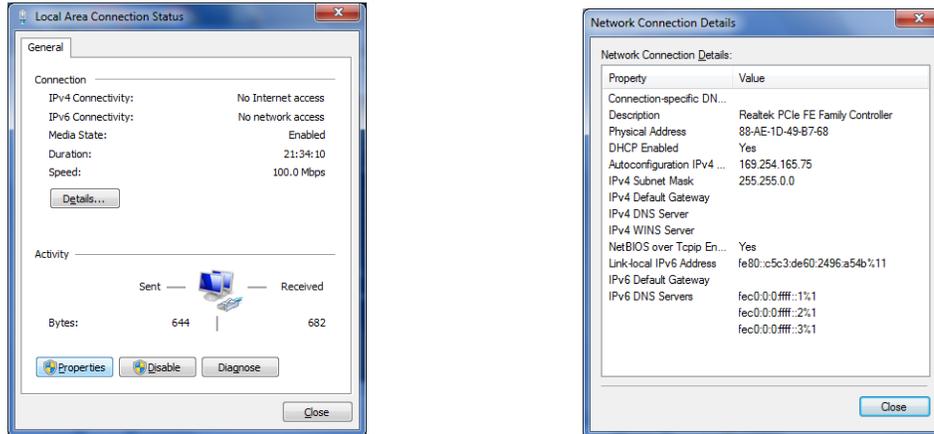
- Windows10: Taskbar Search-> type *View Network Connections* and select *View Network Connections* from the list.
- Windows8.1: Start Button->type *View Network Connections* and select *View Network Connections* from the list.
- Windows7: Start Button->select Control Panel, In the Control Panel search box, type *View Network Connections* and select *View Network Connections* from the list.

From the list of network connections, hover the mouse over the Local Area Connection, right-click and choose Properties from the context menu. From the Local Area Connection Properties Window, select Internet Protocol Version 4 (TCP/IPv4), and click the Properties button. From the Internet Protocol Version 4 Window, select radio button 'Obtain IP Address Automatically'.



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Press OK on both windows to return to the list of network connections. Again hover of Local Area Connection, right-click and choose Status from the context menu. From the Local Area Connection Status window click Details button. From the Network Connections Details window confirm Auto Configuration IPv4 has an address in the range 169.254.1.1 to 169.254.254.255 and an IPv4 Subnet Mask of 255.255.0.0. Press Close on both windows.

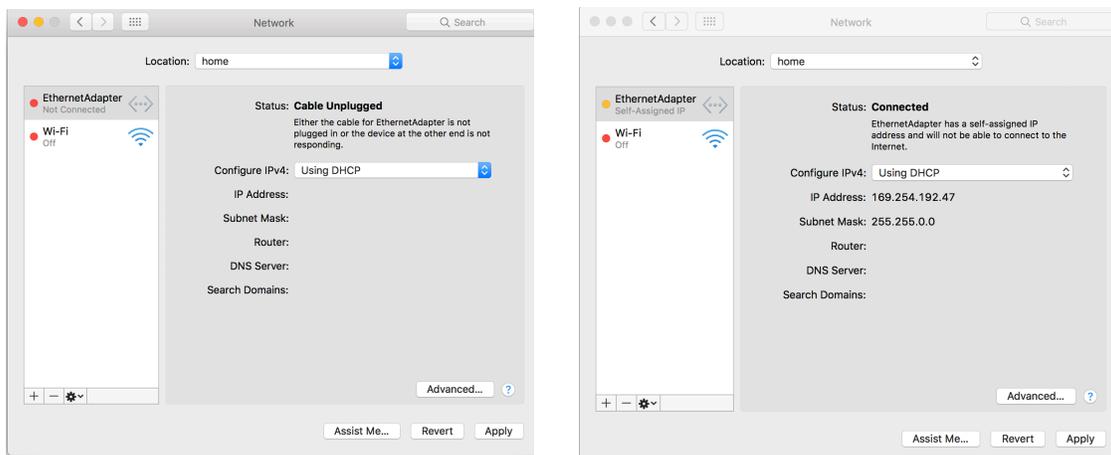


If the IP address is in the range, proceed to section 4. If the IP address is not in the range, consult your IT department.

3.2. macOS/OSX

Launch Systems_Preferences->Network, Select the network interface for the computer's Ethernet Adapter and set Configure IPv4 parameter to 'Use DHCP'. The operating system will automatically switch to a self-assigned ZLL address about 10seconds after connecting the Ethernet cable to MINX. This can be confirmed by seeing the IP Address showing a number in the range 169.254.1.1 to 169.254.254.255 and a Subnet mask of 255.255.0.0.

If the IP address is in the range, proceed to section 4. If the IP address is not in the range, consult your IT department.



4. Connection and MINX Name Confirmation

MINX will advertise its *name* to the networked computer, using its current MINX_ID. MINX is compliant with the mDNS/Bonjour and NetBIOS standards. This advertised *name* allows web browsers to connect to MINX with a human readable 'Address'.

From the factory, all MINX units share the MINX_ID: '*minxdefault*'. During MINX's first setup, a user will have assigned the MINX unit a unique MINX_ID.

The below table shows how to find the MINX unit's 'Address', knowing the MINX_ID and the operating system of the connected computer. If the status of the MINX unit's MINX_ID is unknown, first attempt to use the factory default and if unsuccessful, proceed to section 7 of this guide.

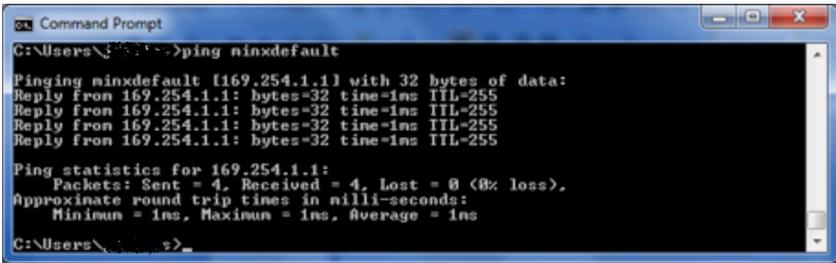
MINX State	Operating System	Advertised Name
Factory Default	Windows PC	<i>minxdefault</i>
	macOS/OSX, iOS, Linux	<i>minxdefault.local</i>
After First Setup: Programmed name = 'MINX_ID'	Windows PC	MINX_ID
	macOS/OSX, iOS, Linux	MINX_ID + <i>.local</i>

In order to confirm the network connection between the computer and the MINX, the computer will be asked to locate the MINX unit using its advertised *name*. This performed running the 'ping' command or program.

The following procedures differ based on the computers Operating System. For Windows based computer, proceed to section 4.1. For macOS/OSX, proceed to section 4.2.

4.1. Windows PC

Open Startup menu; type *Command* or *cmd* into the search box; select Command Prompt or cmd.exe from the offered list. A text window will appear; Enter the command "*Ping minxdefault*" or "*ping MINX_ID*", if the MINX unit has been previously setup.



```

C:\Users\j...>ping minxdefault
Pinging minxdefault [169.254.1.1] with 32 bytes of data:
Reply from 169.254.1.1: bytes=32 time=1ms TTL=255

Ping statistics for 169.254.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\j...>

```

A reply from any address that begins with 169.254, confirms network settings have been successfully set on both MINX and the PC, and that the MINX_ID is correctly known. Proceed to section 5.

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If result of ping is “Ping request could not find host *MINX_ID*”, double check:

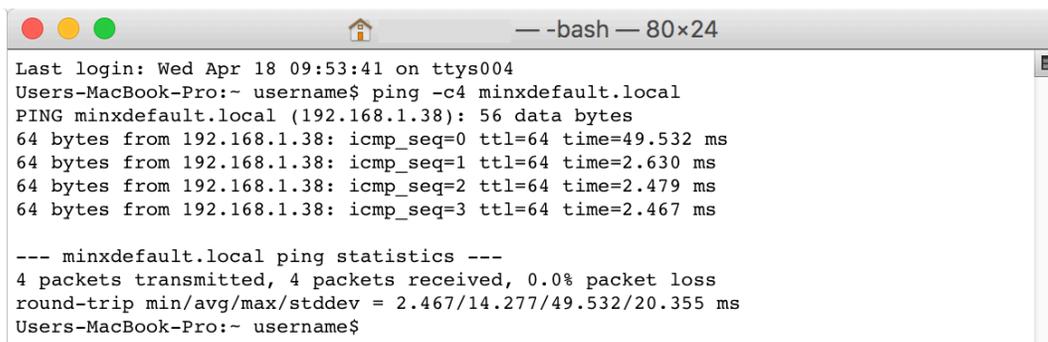
- MINX and the computer are connected together
- MINX has power from the POE Injector and MINX red led is blinking
- Computer’s Ethernet setting set to ‘Obtain IP Address Automatically’
- Computer’s Wi-Fi is disabled and all other Ethernet connections are removed
- Ping command is typed accurately

If result of ping is still unsuccessful:

- Reboot computer and retry above procedure
- Lastly, Proceed to section 7

4.2. macOS/OSX

Open a terminal window (Launchpad->Other->Terminal). A window opens with a text box; enter the command “*Ping -c4 minxdefault.local*” or “*Ping -c4 MINX_ID.local*”, if the MINX unit has been previously setup.



```
-- -bash -- 80x24
Last login: Wed Apr 18 09:53:41 on ttys004
Users-MacBook-Pro:~ username$ ping -c4 minxdefault.local
PING minxdefault.local (192.168.1.38): 56 data bytes
64 bytes from 192.168.1.38: icmp_seq=0 ttl=64 time=49.532 ms
64 bytes from 192.168.1.38: icmp_seq=1 ttl=64 time=2.630 ms
64 bytes from 192.168.1.38: icmp_seq=2 ttl=64 time=2.479 ms
64 bytes from 192.168.1.38: icmp_seq=3 ttl=64 time=2.467 ms

--- minxdefault.local ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 2.467/14.277/49.532/20.355 ms
Users-MacBook-Pro:~ username$
```

A reply from any address that begins with 169.254, confirms network settings have been successfully set on both MINX and the PC, and that the MINX_ID is correctly known. Proceed to section 5.

If result of ping is “*ping: cannot resolve MINX_ID.local: Unknown host*”, double-check:

- MINX and the computer are connected together
- MINX has power from the POE Injector and MINX red led is blinking
- Computer’s Ethernet setting set to ‘Use DHCP’
- Computer’s Wi-Fi is disabled and all other Ethernet connections are removed
- Ping command is typed accurately

If result of ping is still unsuccessful:

- Reboot computer and retry above procedure
- Lastly, Proceed to section 7

5. Browser Navigation

MINX will advertise its *http service* to the networked computer, using its current MINX_ID. MINX is compliant with the mDNS/Bonjour and NetBIOS standards. This advertised service allows web browsers to connect to MINX with a human readable 'Web Address'.

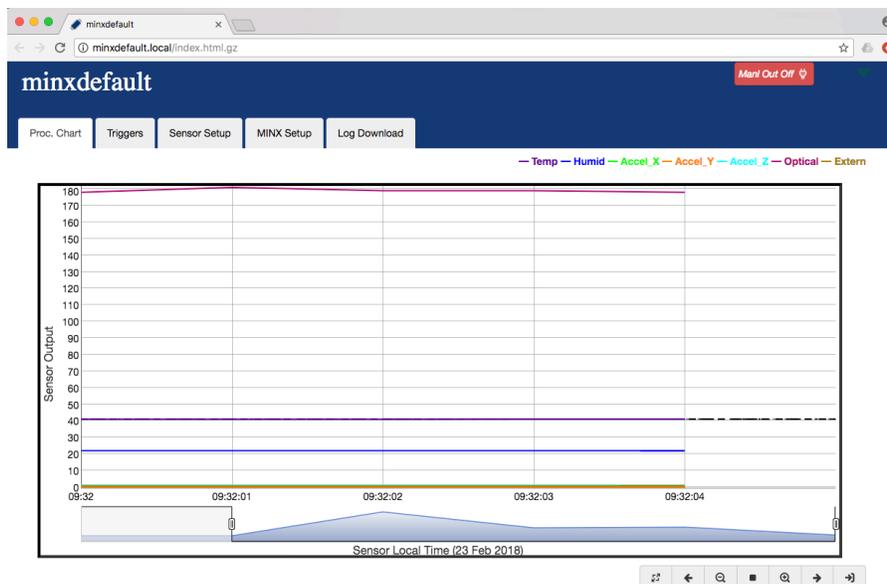
From the factory, all MINX units share the MINX_ID: *'minxdefault'*. During MINX's first setup, a user will have assigned the MINX unit a unique MINX_ID.

The below table shows how to find the MINX unit's 'Web Address', knowing the MINX_ID and the operating system of the connected computer. If the status of the MINX unit's MINX_ID is unknown, first attempt to use the factory default and if unsuccessful, proceed to section 7 of this guide.

MINX State	Operating System	Web Address
Factory Default	Windows PC	http://minxdefault
	macOS/OSX, iOS, Linux	http://minxdefault.local
After First Setup: Programmed name = 'MINX_ID'	Windows PC	http:// + MINX_ID
	macOS/OSX, iOS, Linux	http:// + MINX_ID + .local

The MINX unit generates and serves a dynamic webpage that allows users to setup the unit and access the unit's data. Access MINX's webpage from the attached computer by launching any standard Web browser (ex: Chrome, Safari, Internet Explorer, etc.).

Enter the MINX unit's Web Address into the browser's address input box.



5.1. MINX Webpage Interface

The MINX webpage contains several navigation **Tabs**, accessed by clicking on the Tab. Some Tabs also include collapsible **Panels**, recognizable by their grey horizontal bars. Clicking on the Panel bar will hide/unhide the panels information

Each Tab and/or Panel contains various **Controls** (InputBoxes, CheckBoxes, RadioButtons, and Buttons) used to configure MINX or access its data. The following sections refer to location of webpage features and Controls by referring to the Tab and Panel that contain said item.

The following sections reference these controls with the following format
Tab_Title ->Panel_Title: Control_Name



5.2. Initial Setup

Each MINX must be given a unique *name*. This name is the MINX_ID and will be used when navigating to the MINX webpage using a web browser. If this is the first time this MINX unit has been installed, follow the below instructions to update the MINX_ID. If the MINX unit already has an acceptable unique name, proceed to section 6.

On the MINX webpage, click on the MINX Setup Tab, then click on the grey bar labeled General Setup. Enter a unique name in the InputBox labeled MINX_ID. It is recommended to choose a name that is easy to remember and identifies the machine or process to be monitored. MINX ID is limited to 15 characters and may

only include letters, numbers, and '-' (dashes). After hitting Enter, the browser uses a pop-up to confirm the name. After the confirmation, the MINX unit will reset its network connection and advertise its webpage under this new name.

For Windows PC, macOS/OSX, iOS, and Linux computers, the computer's web browser MUST be navigated to this new name.

MINX State	Operating System	Web Address
Programmed name = 'MINX_ID'	Windows PC	http:// + MINX_ID
	macOS/OSX, iOS, Linux	http:// + MINX_ID + .local

This new Web Address will be used for all further communications with the MINX unit. After navigating to the new webpage, consider creating a shortcut or bookmark in the browser. If the name is forgotten, consult section 7 of this guide.

For Chromebook and Android OS, or other operating systems that do not support mDNS, navigating web browser by name to local services is not supported. In these cases, only navigation by IP Address (ex. <http://169.254.1.1>) will function. It may be desirable to assign a fixed IP address to ensure consistent web navigation.

6. Network Options

Depending on the desired network setup, proceed to one of the below topics:

6.1. Dedicated computer to MINX connection

MINX can be operated from a dedicated computer. Simply connect MINX and the computer, using the computer network settings from the previous section, and navigate the computer's web browser using the chosen MINX_ID.

MINX State	Operating System	Web Address
Programmed name = 'MINX_ID'	Windows PC	http:// + MINX_ID
	macOS/OSX, iOS, Linux	http:// + MINX_ID + .local

In this configuration, MINX does not have access to the Internet, in which case certain features cannot function (Email Alerts; Internet Time Updates). Refer to the **MINX 0003 User Guide** for operational instructions.

6.2. Static Network Settings

For using MINX on networks without a DHCP server or when otherwise necessary, MINX's network settings can be manually configured to so-called 'static settings'. Only use static settings if directed by your IT department or network administrator. Use of static network settings is not recommended.

For network communications it is critical that the network settings be correct. Failure to use correct settings will prevent communication between MINX and the network. Assigning MINX static network settings in use by other equipment may

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prevent that equipment from communicating with the network. Consult your IT department for guidance on selecting static network settings (IP Address, Subnet mask, Router Address, and DNS Address).

On the MINX webpage, click on the MINX Setup Tab, then click on the grey bar labeled Network Setup. The following controls are found on this page:

MINX_Setup->Network_Setup: IP Addressing Mode

Checking the IP Addressing Mode: Static RadioButton. When Static RadioButton is checked, additional Network settings InputBoxes appear.

MINX_Setup->Network_Setup: Static IPv4 Address

Enter the desired IPv4 Address provided by your IT department.

MINX_Setup->Network_Setup: Static Subnet Mask

Enter the desired Subnet Mask provided by your IT department.

MINX_Setup->Network_Setup: Static Router Address

Enter the Router Address provided by your IT department.

MINX_Setup->Network_Setup: Static DNS Address

Enter the DNS Server Address provided by your IT department.

MINX_Setup->Network_Setup: Store and Reset Network Button

Press the Reset button to activate. A pop-box will ask for confirmation to proceed.

After confirmation MINX will reset its network to activate the network settings. The computer's current web browser connection to MINX will be lost due to incompatibility of the computer's network settings and the newly configured MINX static network settings. Reset the computer's network configuration as directed by your IT department or network administrator.

Disconnect MINX from the setup computer and install MINX to the network compatible with the chosen Static settings. Refer to the *MINX 0003 User Guide* for operational instructions.

Any computer on the network can reach MINX by navigate the computer's web browser using the chosen MINX_ID.

MINX State	Operating System	Web Address
Programmed name = 'MINX_ID'	Windows PC	http:// + MINX_ID
	macOS/OSX, iOS, Linux	http:// + MINX_ID + .local

Alternately, MINX can be accessed by navigating web browsers to the chose Static IP Address assigned above ("<http://X.X.X.X>").

7. Recovering Lost MINX ID / Navigation by IP Address

Occasionally, operators may forget the chosen MINX_ID or have other networking connection problems that prevent a web browser for connecting to a MINX unit. There exist several methods to recover the MINX_ID and network settings needed to create a compatible connection from a computer.

7.1. Inspect netwStat.txt

Minx logs its current network connection state to a file on the SD Card 10 seconds after first network connection and 10 seconds after the card is inserted each time. The contents of the file can be used to find the MINX_ID and/or resolve connection issues.

Disconnect (and remove power) and then re-connect MINX to the desired network or computer using the instructions from section 2 of this Guide or those in the **MINX0003 User Guide**. Using a blunt instrument, press the MINX control Button (the red LED on the MINX case) one time to stop SD card logging. Eject the SD Card. Insert the SD Card into any computer with a compatible SD Card reader (a micro SD to SD adapter may be necessary). Direct the computer's file browser to the SD Card and locate the file named netwStat.txt. Using any text program open the netwStat.txt file located on the SD card:

```

___Network Status for minxdefault ___
Time: 18/04/2018, 10:56:24
MAC Address: 54:10:ec:87:db:78
IPv4 Address: 192.168.1.38
Mask: 255.255.255.0
MINX ID: MINXDEFAULT
DHCP/ZCLL Is : Enabled
DHCP Is : Active
    
```

As illustrated in the above example, the netwStat.txt file lists the MINX unit's MINX_ID, current IP Address, current Subnet Mask, and DHCP/ZCLL mode setting.

If the DHCP/ZCLL mode is "Enabled", and the DHCP status is "Active", then the IP address, and Subnet mask have been assigned by the network's DHCP server. Ensure operator's computer is properly connected to same network. Navigate web browser to the MINX unit using the IP address found in the netwStat.txt file, , <http://x.x.x.x>. If successful, navigate the web browser using the MINX_ID found in the netwStat.txt file.

MINX State	Operating System	Web Address
Programmed name = 'MINX_ID'	Windows PC	http:// + MINX_ID
	macOS/OSX, iOS, Linux	http:// + MINX_ID + .local

If the DHCP/ZCLL mode is "Enabled", and the DHCP status is "NotActive", then MINX

could not communicate with the Network’s DHCP server to receive the necessary information about the network, nor could MINX reach a computer to establish a peer-to-peer connection. Typically this condition is due to a disconnected Ethernet cable between the MINX unit and the computer or network. Double check connections and power to computers, routers, switches, and servers.

If the ZLL/DHCP setting is “Disabled”, then the MINX unit is in “Static Settings” network mode and the IP Address and Subnet Mask are fixed to the values show in the file. In this case MINX can only communicate on a network or with a computer having compatible settings. To connect the MINX unit directly to a computer, refer to section 2. Then force the computer’s IP address and Subnet mask to values compatibles with those found in the netwStat.txt file. As an example, for MINX IP 10.1.1.250 and Subnet Mask 255.255.255.0, then compatible computer settings would be Subnet Mask 255.255.255.0 and IP 10.1.1.10. Consult your IT department or network administrator for help if necessary. Navigate web browser to the MINX unit using the IP address found in the netwStat.txt file, <http://x.x.x.x>. If successful, navigate the web browser using the MINX_ID found in the netwStat.txt file.

MINX State	Operating System	Web Address
Programmed name = 'MINX_ID'	Windows PC	http:// + MINX_ID
	macOS/OSX, iOS, Linux	http:// + MINX_ID + .local

Once a successful web browser connection is established, update the network settings as necessary per section 6.

7.2. Ping to Network Broadcast Address

A MINX unit that has successfully connector to a network can respond to a ‘ping’ to that network’s broadcast address. The response includes the MINX unit’s IP address. Other network devices will similarly respond with their IP addresses. For each responding device, a user can check if the device is the MINX desired by attempting to navigate a web browser to the IP address <http://x.x.x.x>. If a MINX webpage loads, then the MINX_ID and other settings can be inspected.

To determine a network’s Broadcast Address, using a computer connected to the network, gather that computer’s IP Address and Subnet Mask. Consult your IT department or network administrator for help if necessary. For each field of the subnet mask that is 255, copy the IP address. For each field of the subnet mask that is 0, insert the value 255. As an example, for IP 10.1.1.23 and Subnet Mask 255.255.255.0, the network’s Broadcast Address is 10.1.1.255.

From a computer attached to the network in question, run ping command as described in section 4, but using the determined Broadcast Address (e.g. ‘ping -c1 10.1.1.255’). For each responding device, attempt to navigate a web browser to the given IP address <http://x.x.x.x>, until the MINX unit is found.

7.3. mDNS(Bonjour) & NetBIOS Lookup

MINX will advertise its *http service* to the network, using its current MINX_ID using mDNS/Bonjour and NetBIOS standards. Computers on the network keep a list of the advertised services and these lists can be inspected.

7.3.1. macOS/OSX

Open a terminal window (Launchpad->Other->Terminal). Enter the command “*dns-sd -B _http local*”, which lists each device on the network advertising an http service. For each device listed, find *device_name(s)* listed under column Instance Name. Use ctrl-C or CMD-C to terminate dns-sd command.

```

Last login: Wed Apr 18 09:54:19 on ttys004
Users-MacBook-Pro:~ user$ dns-sd -B _http local
Browsing for _http._tcp.local
DATE: ---Wed 18 Apr 2018---
12:04:31.511 ...STARTING...
Timestamp   A/R   Flags  if Domain                Service Type           Instance Name
12:04:31.512 Add    3      5 local.                _http._tcp.           minxdefault
12:04:31.512 Add    3      5 local.                _http._tcp.           gdocntl
12:04:31.512 Add    2      5 local.                _http._tcp.           Brother HL-3140CW series
    
```

For each device_name listed, navigate browser to Web Address

Operating System	Web Address
macOS/OSX, iOS, Linux	http:// + device_name + .local

The IP address of any device_name can be found by entering the command “*ping-c4 device_name.local*”, where device_name is replaced by the name listed under Instance Name. Navigate web browser to the MINX unit using the IP address found in the <http://x.x.x.x>

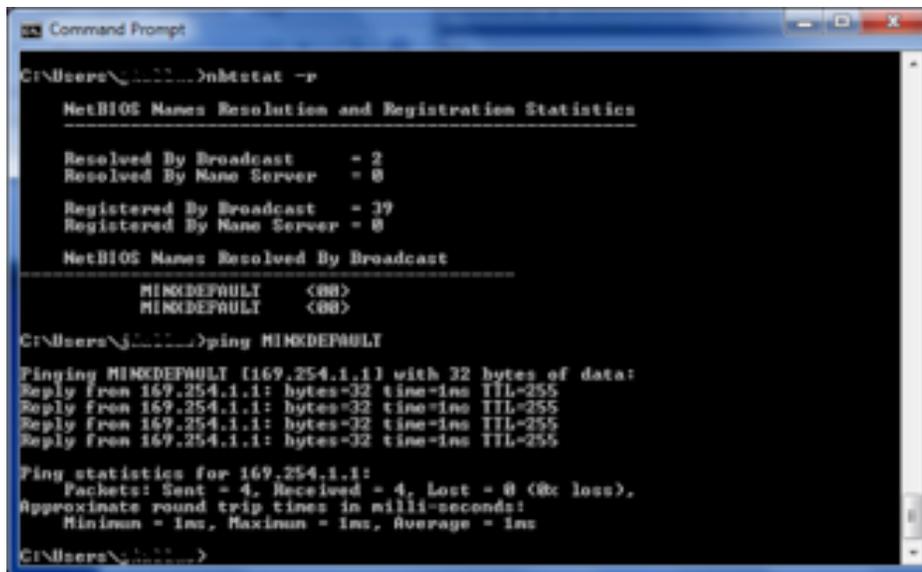
7.3.2. Windows PC

Open Startup menu; type *Command* or *cmd* into the search box; select Command Prompt or cmd.exe from the offered list. Enter the command “*nbstat -r*” to see a list of network devices advertising themselves. For each device listed under ‘Net BIOS Names Resolved’, navigate the browser using the Web Address

Operating System	Web Address
Windows PC	http:// + device_name

The IP address of any device can be found by entering the command “*ping device_name*”, where device_name is replaced by the name listed under Resolved Names. Navigate web browser to the MINX unit using the IP address found in the <http://x.x.x.x>

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```
Command Prompt
C:\Users\j...>nbststat -p

NetBIOS Names Resolution and Registration Statistics

Resolved By Broadcast      = 2
Resolved By Name Server   = 0

Registered By Broadcast   = 39
Registered By Name Server = 0

NetBIOS Names Resolved By Broadcast
-----
MINXDEFAULT <00>
MINXDEFAULT <00>

C:\Users\j...>ping MINXDEFAULT

Pinging MINXDEFAULT [169.254.1.1] with 32 bytes of data:
Reply from 169.254.1.1: bytes=32 time=1ms TTL=255

Ping statistics for 169.254.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\j...>
```