

HomeWorks 16.0+ Networking Guide

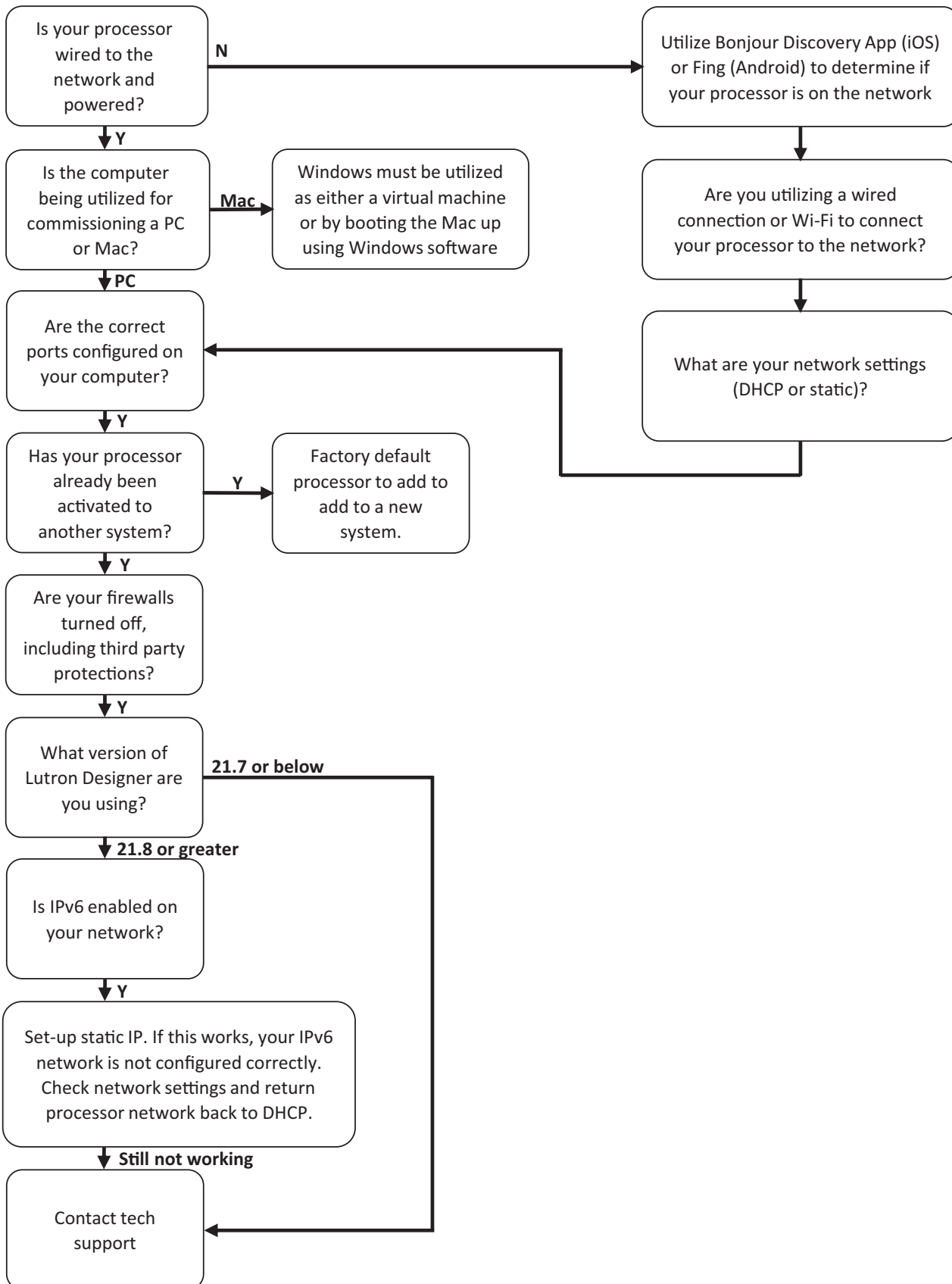
This document will act as a guide for establishing communication with a HomeWorks system and will describe various ways to overcome the network and computer challenges that you may encounter.

Table of Contents

1.0 Interactive Processor Activation Troubleshooting Workflow	2
2.0 Connecting to HomeWorks QSX Processors.	3
2.1 Firewall/Routing Requirements	4
2.1.1 Required for System Startup and Programming	4
2.1.2 Required for System Runtime	4
2.1.3 Optional Features and Functions	4
2.1.4 Mobile App, Internet and Cloud Connectivity Features	5
2.2 Activating Processors in Lutron Designer	6
2.2.1 Activating Processors in Lutron Designer	6
3.0 Best Practices	8
3.1 Firewalls and Security Programs	8
3.1.1 Check Inbound Firewall Rules.	8
3.1.2 Allow Lutron Programs through the Firewall	11
3.1.3 Using a Work or Home Network Connection to the System	14
3.1.4 Force TCP Software-to-Processor Communication	15
3.1.4.1 Changing to TCP Communication in HomeWorks	15
3.1.5 Disable Firewall Temporarily.	16
3.1.6 Network Hops with HomeWorks QSX Processors	16
3.2 Using Wi-Fi with Lutron Programming Software	17
3.3 Multiple Network Adapters	17
3.4 VPN Connections	17
4.0 Troubleshooting.	18
4.1 Activation Tab Pop-Up Messages	18
4.1.1 Unable to Communicate with the Device	18
4.1.2 Processor Heard is Different from the One Selected in the Project	18
4.1.3 The Processor is Configured for a Static IP Address but does not have an IP Address Specified	18
4.1.4 The Certificate Used for Establishing Communication with Processor is Missing from your Machine	19
4.1.5 Cannot Activate the Processor because you Project Contains a Mixture of Processors Using DHCP and Static IP	19
4.1.6 Status While Activating a Processor Shows “Not Responding”	19
4.1.7 Unable to Find Processor on Network	20
4.2 Transfer Tab Pop-Up Messages	20
4.2.1 The Current Subsystem does not Contain any Activated Processors to Allow for a Transfer	20
4.2.2 Communication to One or More Processors Failed	20
4.2.3 The Following Processors Cannot Communicate with Each Other. If you Continue with Transfer, the System may not Work as Expected.	21
4.2.4 Some Processors Cannot Communicate with Each Other. If you Continue with Transfer, the System may not Work as Expected	21
4.2.5 The Security of the System Network Communication can be Improved, but the Improvement cannot be Applied Automatically due to Processor Settings	21
4.2.6 Some Processors are not in the Same Subsystem. Would you like to Continue to Transfer or Cancel the Transfer and Fix the Issue?	22
4.2.7 Some Processors are not in the Same Subnet. Would you like to Continue to Transfer or Cancel the Transfer and Fix the Issue?	22
4.2.8 To Improve the Security of the System Network Communication	22
4.2.9 Unable to Apply Changes because Processors are Configured with a Mixture of DHCP and Static IP	23
4.2.10 Basic Troubleshooting did not Resolve the Issue	23
4.3 Using a Direct Connection to a Lutron Processor	24
4.3.1 Direct Connection using Static IP Address	25
4.3.2 Direct Connection using Link Local Addressing	25
4.3.3 Setting a Static IP Address on the Windows Machine	25
4.4 Running Windows OS on Mac (Not Recommended).	28
4.4.1 Parallels and VMware Fusion	28
4.5 Glossary	31
4.6 Additional Information	32

1.0 Interactive Processor Activation Troubleshooting Workflow

The below roadmap will walk you through common processor activation troubleshooting steps. Click on each step to learn more.



2.0 Connecting to HomeWorks QSX Processors

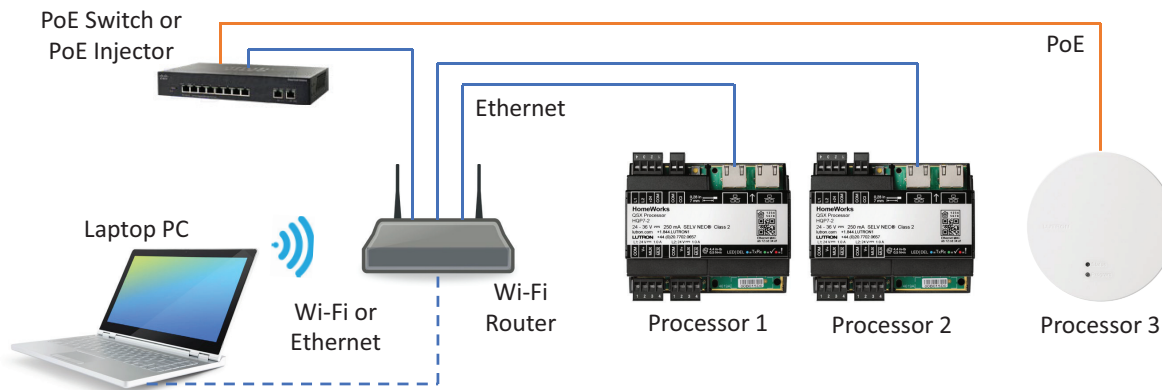
Requirements

1. Windows machine running Lutron Designer software version 16.0 or later
2. HomeWorks QSX processor(s)
3. Wired/Wi-Fi router or network switch to place the processors and PC onto the same network
4. Power over Ethernet supply if a Dual-Radio wireless processor or Clear Connect Gateway–Type X is present

During system commissioning, the Lutron Designer software will first try to make a connection with the processor(s) through the local area network (LAN). It is typically necessary to perform commissioning using a connection through a router, either wired or Wi-Fi, due to the number of processors that can be on a single system (up to 16 total). Using a router helps to minimize changes to settings on the commissioning machine. A wired LAN connection is always recommended for the highest level of reliability.

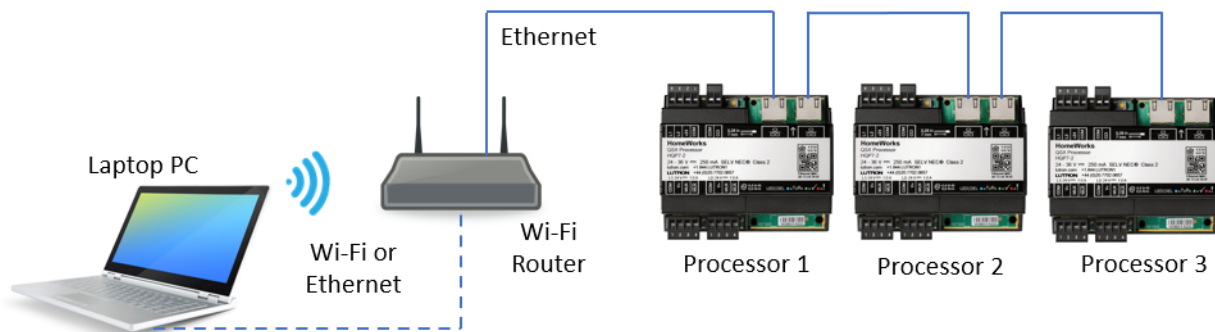
Lutron Designer 16.0+ works with HQP7-x processors and gateways. There is no compatibility with HQP6 processors.

Figure 1: PC to Processor(s): Wired or Wi-Fi Connection (Never Ethernet and Wi-Fi at the same time)



In systems with many processors, switch/router ports can be conserved by daisy-chaining processors off one port. Up to 4 processors can be wired in this manner. Refer to section 3.1.6 for more information on Ethernet hopping of multiple processors from a single switch/router port.

Figure 2: PC to Processor(s): Wired or Wi-Fi Connection w/ Daisy-Chaining (Never Ethernet and Wi-Fi at the same time)



Note: Processors that are powered via a PoE injector cannot be daisy chained. If a wireless processor is at the end of a daisy chain, the wireless processor must be preceded by a PoE injector supplying power to it.

2.0 Connecting to HomeWorks QSX Processors (*continued*)

2.1 Firewall/Routing Requirements

2.1.1 Required for System Startup and Programming

These ports are used for system startup and database transfer to processors and gateways. After the system has been started up, these ports may be closed if desired. If changes to the system are needing to be made, these ports will need to be re-opened to allow upload of programming changes to the system.

Source	Destination	Port	Protocol	Description
Windows Machine Running Lutron Designer	224.0.0.251	5353	UDP IPv4 Multicast	mDNS is utilized for processor discovery and initial configuration
All HomeWorks QSX Processors and Clear Connect-Type X Wireless Gateways	224.0.0.251	5353	UDP IPv4 Multicast	This is the mDNS discovery response sent from the processor/gateway back to the HomeWorks QSX configuration software
Windows Machine Running Lutron Designer	All HomeWorks QSX Processors and Type X Gateways	8083 8081	TCP IPv4/IPv6	These ports are used to configure processors
Windows Machine Running Lutron Designer	All HomeWorks QSX Processors and Type X Gateways	22	TCP IPv4	Used for database transfer, support file generation and diagnostics
Windows Machine Running Lutron Designer	sqltofb.lutron.com Firmwareupdates.lutron.com	443	TCP IPv4/IPv6	Allows Lutron software to obtain the latest processor firmware
Windows Machine Running Lutron Designer	All HomeWorks QSX Processors and Clear Connect – Type X Wireless Gateways	51023	TCP IPv4/IPv6	Unicast communication between design software and processors

2.1.2 Required for System Runtime

These ports are required for system runtime and must remain open for system functionality.

Source	Destination	Port	Protocol	Description
All HomeWorks QSX Processors and Clear Connect – Type X Wireless Gateways	Multicast Address of the HomeWorks QSX system (239.0.38.1 – 239.0.8.xx) ²	2056-3055	UDP IPv4 Multicast	Used to share events and status of lights between HomeWorks QSX processors and gateways. Only needed if system is configured for inter-processor communication via multicast
All HomeWorks QSX Processors and Clear Connect – Type X Wireless Gateways	All HomeWorks QSX Processors and Clear Connect – Type X Wireless Gateways	443	TCP IPv4/IPv6	Used to share events and status of lights between HomeWorks QSX processors and gateways

2.1.3 Optional Features and Functions

Source	Destination	Port	Protocol	Description
AV Integration System IP	IP Address of QSE-CI-NWK	23	TCP IPv4	For integration systems which utilize Telnet, an NWK is the only means for Telnet integration to Athena
AV Integration System IP	IP Address of the HomeWorks QSX Processor	8083 8081	TCP IPv4/IPv6	For third-party external integration with a processor via TLS

2.0 Connecting to HomeWorks QSX Processors (*continued*)

2.1 Firewall/Routing Requirements (*continued*)

2.1.4 Mobile App, Internet and Cloud Connectivity Features

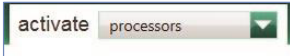
These ports are used for various cloud and Internet connectivity functions.

Source	Destination	Port	Protocol	Description
Mobile Device on Local Processor Network	224.0.0.251	5353	UDP IPv4 Multicast	mDNS is utilized for processor discovery during setup and system pairing
Mobile Device on Local Processor Network	All HomeWorks QSX Processors and Type-X Gateways	8083 8081	TCP IPv4/IPv6	Lutron mobile app authentication and configuration
Mobile Device on Local Processor Network	All HomeWorks QSX Processors and Type-X Gateways	22	TCP IPv4	SSH is used for support file generation and diagnostics
All HomeWorks QSX Processors and Type X Gateways	iot.amazonaws.com	8883	TCP IPv4/IPv6	Lutron Cloud connectivity for mobile app runtime on network other than processor network. The destination address can be dynamic based on region. For example, it could look like: a32jcyk7azp7b5-ats.iot.us-east-1.amazonaws.com
All HomeWorks QSX Processors and Type X Gateways	firmwareupdates.lutron.com	443	TCP IPv4/IPv6	Used for automatic firmware upgrades, may resolve to one or more s3.amazonaws.com addresses
All HomeWorks QSX Processors and Type X Gateways	device-login.lutron	443	TCP IPv4/IPv6	Device registration and secure processor remote access
All HomeWorks QSX Processors and Type X Gateways	8.8.4.4 208.67.220.220 209.244.0.3 209.244.0.4 8.8.8.8 208.67.222.222	ICMP	ICMP	Processor Internet connectivity check
All HomeWorks QSX Processors and Type X Gateways	Google	80	TCP IPv4/IPv6	Processor Internet connectivity check
All HomeWorks QSX Processors and Type X Gateways	Customer Specified DNS Server	53	UDP IPv4	DNS resolution is required for cloud connectivity and NTP time sync
All HomeWorks QSX Processors and Type X Gateways	0.pool.ntp.org 1.pool.ntp.org 2.pool.ntp.org 3.pool.ntp.org 0.north-america.pool.ntp.org time.iot.lutron.io	123	UDP IPv4	NTP is used for automatic time sync which allows time-based events to trigger accurately
All HomeWorks QSX Processors and Type X Gateways	iot.lutron.io	443	TCP IPv4/IPv6	Connectivity for Cloud based functionality

2.0 Connecting to HomeWorks QSX Processors (*continued*)

2.2 Activating Processors in Lutron Designer

Connect the system with the Lutron Designer application to the same LAN as the processor(s) and open the Lutron Designer software. Navigate to the Activate tab and choose the option Activate > Processors.



On the right side of the activation screen, a row for each processor in your database design will appear with a link to activate the processor on the far right. Prior to activation, it is necessary to properly configure all network settings. It is recommended to configure all processors to use DHCP.

Name	Serial #	MAC Address	DHCP	IP Address	Subnet Mask	Gateway	Status (LAN Only)	Action
... Home Processor 1 Enclosure Device 001			<input checked="" type="checkbox"/>	DHCP	DHCP	DHCP	-	Activate
... Home Processor 2 Enclosure Device 001			<input checked="" type="checkbox"/>	DHCP	DHCP	DHCP	-	Activate

Activating processors will send the configuration from the project to the processor on the network. This includes network information and all other configuration settings.

Advanced Settings

System Number: 2 System Address: 239.0.38.1

System Communication

Address: Port: 51023

Ability to add Remote address restricted. Please choose from available options.

Available NIC Addresses

Ethernet 3 (192.168.1.131) Refresh

2.2.1 Activating Processors in Lutron Designer

Un-activated processors discovered on the network will display on the left side of the Activation screen. Each processor will display its Lutron device serial number, MAC address, current IP address, current firmware version, firmware status, and network status. The serial number and MAC address of each processor can be found on the unit label on the front of the processor. The current IP address for a processor discovered for the first time is one that likely originated from the DHCP server of the local router. DHCP is the default mode of each processor.

Name	Serial #	MAC Address	DI
... Home Processor 1 Enclosure Device 001			
... Home Processor 2 Enclosure Device 001			

Activating processors will send the configuration from the project to the processor on the network.

Advanced Settings

System Communication

Available NIC Addresses

HomeWorks 1 Link Processor
 Serial Number: 040BDD8B
 MAC Address: 80:f5:b5:a4:4b:e0
 IP Address: 192.168.1.44
 Firmware Version: 22.08.09f000
 Firmware Status: NoUpdate
 Network Status: InternetWorking

3.0 Best Practices

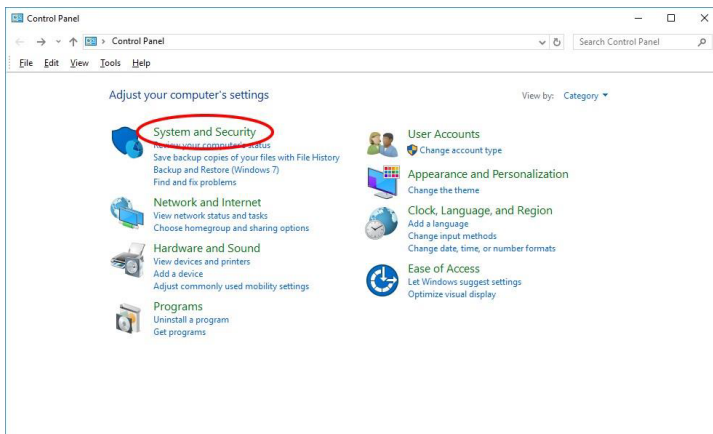
3.1 Firewalls and Security Programs

Often the difficulty of establishing communication between the PC and the processor(s) has to do with a program or programs that are restricting the Lutron Designer software from sending the necessary communications to the processor. The PC is using these software features to protect itself and the user from security issues such as viruses. There are two things that you can do to mitigate connection issues when confronted by these PC features.

3.1.1 Check Inbound Firewall Rules

Depending on the operating system, the process to see the current firewall status and allow programs through the firewall may be different. The below screenshots were captured using Windows 10. From the Start menu, search for and open Control Panel. Click on System and Security.

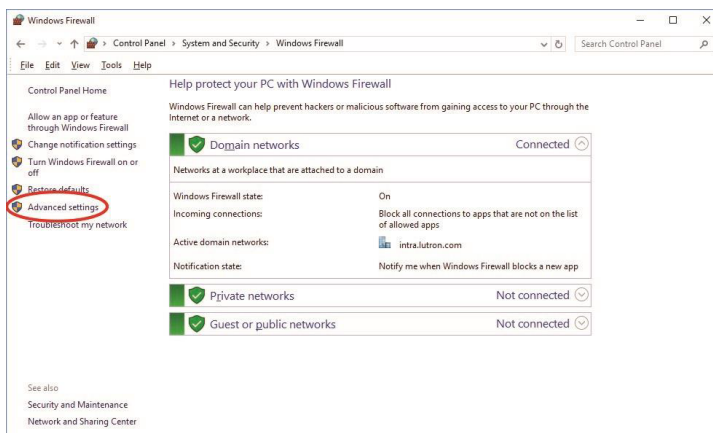
Note: Even with all firewalls disabled, it has been observed that firewall rules can still block Lutron software and cause it to not operate.



Here you can check on the Windows Firewall status or allow programs through the Windows Firewall. Click Windows Firewall.



This screen will show the status of each of the Windows firewalls on the machine. In the left pane, click Advanced settings.



3.0 Best Practices *(continued)*

3.1 Firewalls and Security Programs *(continued)*

3.1.1 Check Inbound Firewall Rules *(continued)*

From here more details are given as to the status of each firewall as well as options to manage the firewalls. In the left pane, click Inbound Rules.



All the inbound firewall rules are listed here. HomeWorks Designer software rules are listed with the name "Lutron Designer". For the version of software that is having trouble communicating, go to the Lutron Designer rows and find and expand the column names Program to reveal the version number of software to which the rules correspond.

Inbound Rules							
Name	Profile	Enabled	Action	Override	Program		Local Ad
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 13.3.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 13.3.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 14.0.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 14.0.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 14.1.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 14.3.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 14.3.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 8.4.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 8.4.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 9.0.0\lutron.gulli...	Any	
Lutron Designer	All	Yes	Allow	No	C:\program files (x86)\lutron\homeworks qs 9.0.0\lutron.gulli...	Any	
RadioRA2	All	Yes	Allow	No	C:\program files (x86)\lutron\radiora 2 10.0\essentialsinclusive...	Any	
RadioRA2	All	Yes	Allow	No	C:\program files (x86)\lutron\radiora 2 10.0\essentialsinclusive...	Any	
RadioRA2	All	Yes	Allow	No	C:\program files (x86)\lutron\radiora 2 11.0\essentialsinclusive...	Any	
RadioRA2	All	Yes	Allow	No	C:\program files (x86)\lutron\radiora 2 11.0\essentialsinclusive...	Any	

Check the following firewall rule settings for the version of software which is having problems:

- There should be two rules per version of software (they may not be listed next to each other)
- One rule should have the protocol set as UDP
- The other rule should have the protocol set as TCP
- The rules are enabled
- The actions are set to Allow
- The profile is set to All

If the rules are completely missing, proceed to Section 3.1.2. If changes to the rules are needed, close the Lutron software and refer to the steps below.

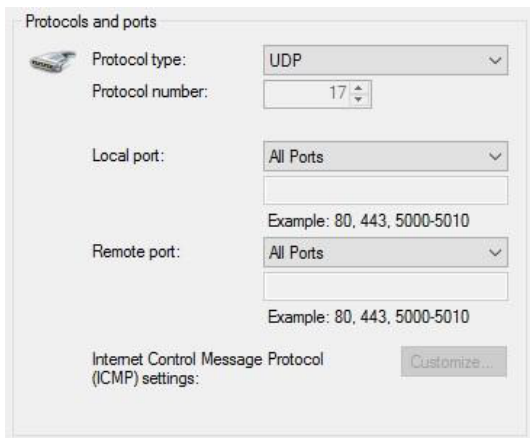
Inbound Rules							
Name	Profile	Enabled	Action	Program		Protocol	Local Port
Lutron Designer	All	Yes	Allow	C:\program files (x86)\lutron\homeworks qs 13.3.0\lutron.gulli...		UDP	Any
Lutron Designer	All	Yes	Allow	C:\program files (x86)\lutron\homeworks qs 13.3.0\lutron.gulli...		TCP	Any
Lutron Designer	All	Yes	Allow	C:\program files (x86)\lutron\homeworks qs 14.0.0\lutron.gulli...		UDP	Any

If the rule is not enabled, right-click the rule and click Enable Rule. If any of the other items differ, then right-click the problem rule and select Properties. The option to change a rule to TCP vs UDP is in the Protocols and Ports tab.

3.0 Best Practices *(continued)*

3.1 Firewalls and Security Programs *(continued)*

3.1.1 Check Inbound Firewall Rules *(continued)*



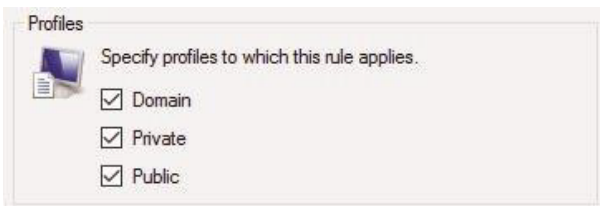
The screenshot shows the 'Protocols and ports' tab in the Windows Firewall rule configuration window. It includes fields for 'Protocol type' (set to UDP), 'Protocol number' (17), 'Local port' (All Ports), and 'Remote port' (All Ports). There are also example port ranges and an 'Internet Control Message Protocol (ICMP) settings' section with a 'Customize...' button.

The option to Allow the rule is in the **General** tab.



The screenshot shows the 'Action' tab in the Windows Firewall rule configuration window. It features three radio button options: 'Allow the connection' (selected), 'Allow the connection if it is secure', and 'Block the connection'. There is also a 'Customize...' button.

The option to set the profile is under the **Advanced** tab. To get "All" the profiles (Domain, Private, and Public) must be selected (checked).



The screenshot shows the 'Profiles' tab in the Windows Firewall rule configuration window. It includes a section titled 'Specify profiles to which this rule applies' with three checked checkboxes: 'Domain', 'Private', and 'Public'.

After saving the changes to the firewall, restart the Lutron software.

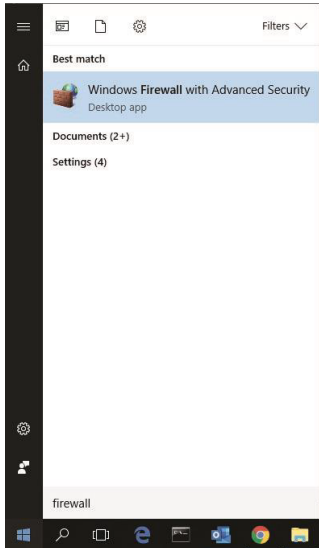
3.0 Best Practices *(continued)*

3.1 Firewalls and Security Programs *(continued)*

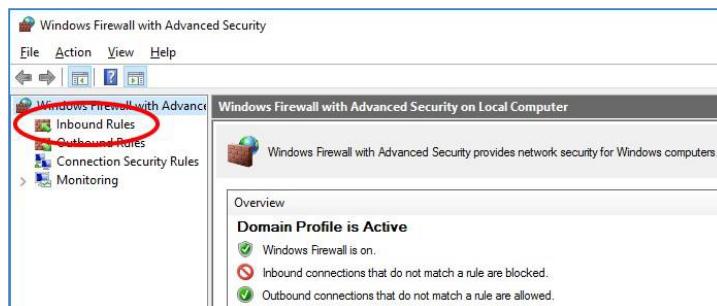
3.1.2 Allow Lutron Programs through the Firewall

Firewall rules for Lutron software are created during the installation process of the software. In cases where the firewall dialog is closed, the rule may be missing from the Windows Firewall inbound rules list. This section covers checking the firewall to make sure the rules are present, and if they are missing, how to add rules to the firewall.

From the Start menu, search for firewall and click **Windows Firewall and Advanced Security**.



In the pane on the left, click **Inbound Rules**.



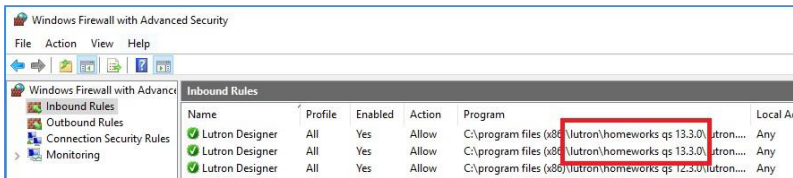
All the inbound firewall rules are listed here. HomeWorks software rules are listed with the name "Lutron Designer". For the version of software that is having trouble communicating, go to the Lutron Designer rows and find and expand the column named Program to reveal the version number of software to which the rules correspond.

3.0 Best Practices *(continued)*

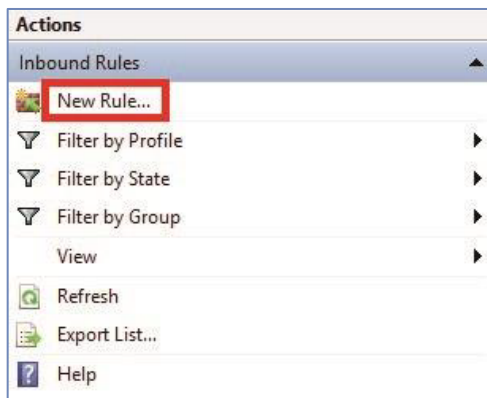
3.1 Firewalls and Security Programs *(continued)*

3.1.2 Allow Lutron Programs through the Firewall *(continued)*

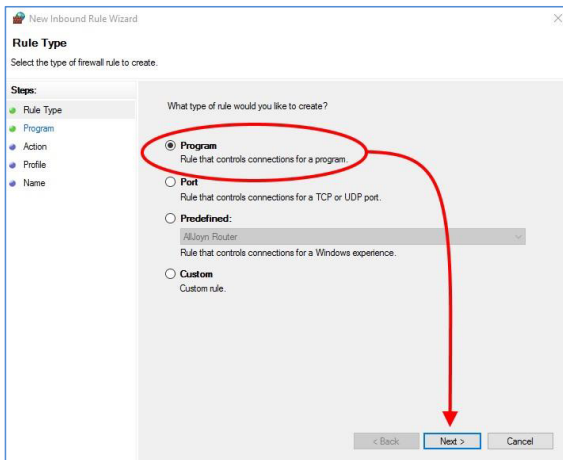
In the **Program** column, check to make sure the version of software you are having issue with appears in the list two times. The two firewall rules may not be in order.



In the event that the firewall rules are missing, click **New Rule...** in the Actions pane on the right side of the window.



Ensure Program is selected and click **Next >**.



3.0 Best Practices *(continued)*

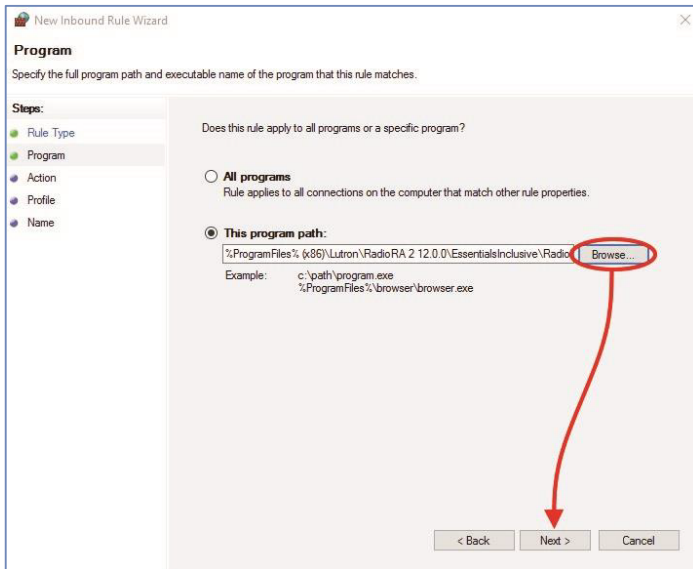
3.1 Firewalls and Security Programs *(continued)*

3.1.2 Allow Lutron Programs through the Firewall *(continued)*

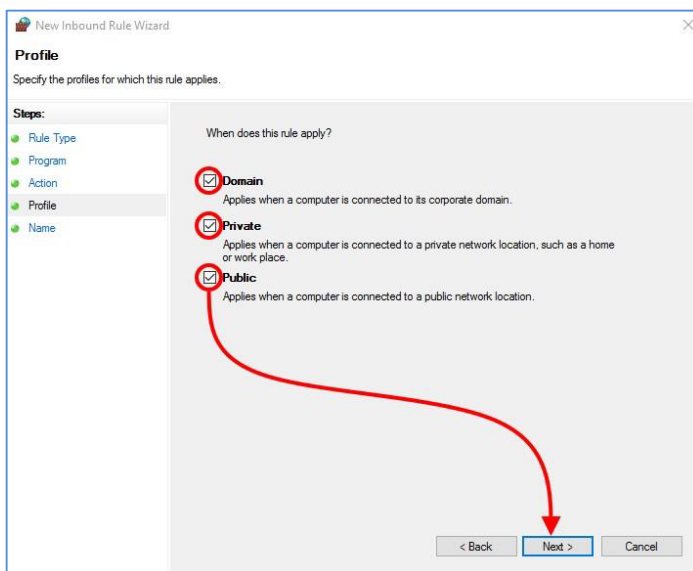
Click **Browse...** and navigate to "C:\Program Files (x86)\Lutron" and select the software you want to create a rule for, and then click **Next >**.

Select the file path:

"C:\Program Files (x86)\Lutron\HomeWorks QSX <version number>\Lutron.Gulliver.QuantumRest.exe"



Ensure Allow the connection is selected and click **Next >**. Ensure Domain, Private, and Public are all selected. Click **Next >**



For ease of finding this rule in the future, enter a name for the rule which matches the naming convention we use for other HomeWorks rules. Then click **Finish**.

- Use "Lutron Designer" when naming a HomeWorks QSX rule.

3.0 Best Practices *(continued)*

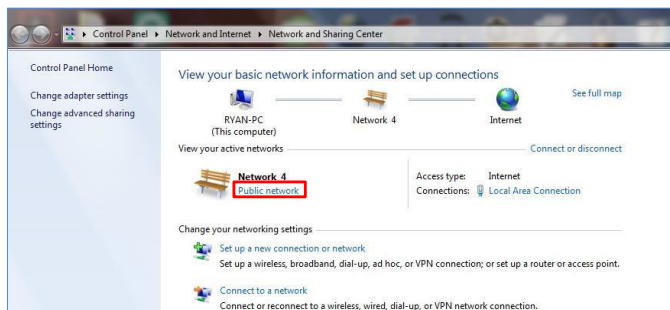
3.1 Firewalls and Security Programs *(continued)*

3.1.3 Using a Work or Home Network Connection to the System

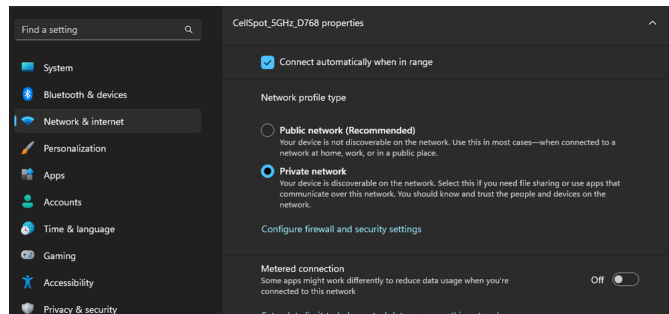
One potential source of firewall issues may result from the default configuration of the type of network that the Windows machine is connected to. Windows machines can be inadvertently set to identify every network as Public, by default. Public networks will typically have the greatest threat for issues such as viruses and demand the greatest level of security protection. As a result, the firewall will be in a state where it is most active and may cause interruptions when connecting to Lutron processors, typically during the first connection to the processors.

The network type can be changed to Work or Home to avoid issues. This can be done by first going to the Network and Sharing Center in the Control Panel.

Underneath the network name, click on the link that says **Public network**.

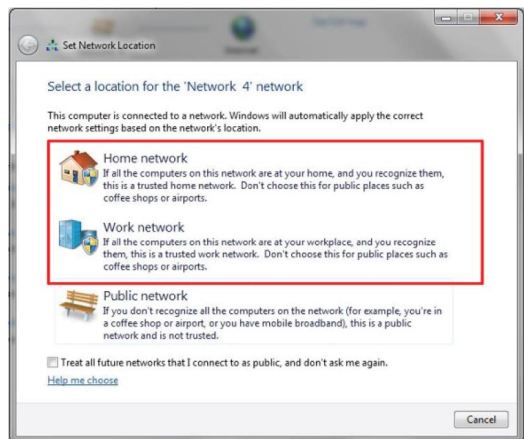


Windows 10



Windows 11

In the network type window that opens, select either Work or Home for the network type.

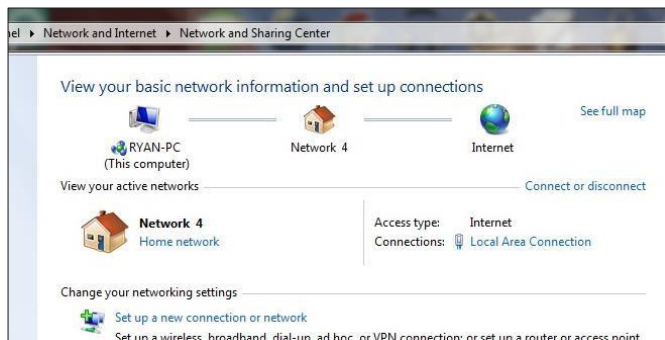


3.0 Best Practices *(continued)*

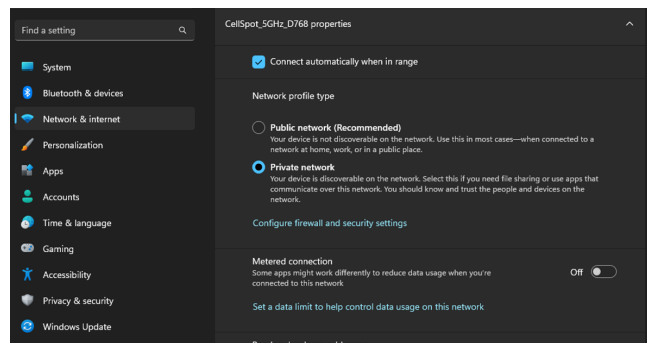
3.1 Firewalls and Security Programs *(continued)*

3.1.3 Using a Work or Home Network Connection to the System *(continued)*

Verify that the type of network has changed and proceed with attempting to connect to the Lutron system again. Changing to Home or Work will enable more through the firewall as the network will be more trusted than Public.



Windows 10



Windows 11

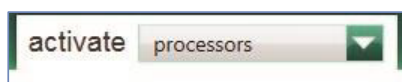
Note that some PCs may not allow changing this setting if managed by a corporate domain. Contact your corporate IT administrator for assistance.

3.1.4 Force TCP Software-to-Processor Communication

Firewalls can sometimes block the broadcast and multicast communication between the programming software and the processor(s). The HomeWorks programming software allows the programmer to force the software to utilize TCP communication instead of multicast which can also help get around firewall blockage. Note that there may be issues switching over to the TCP communication mode if the processors have not already been activated via multicast. Please also note that this will only change the communication method for software-to-processor communication. Communication between processors will remain multicast.

3.1.4.1 Changing to TCP Communication in HomeWorks

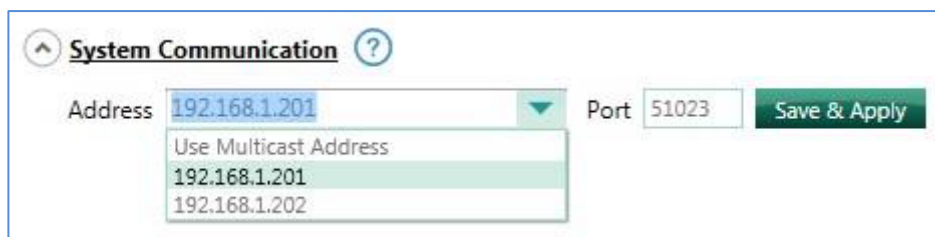
In order to force the HomeWorks QSX software to use TCP communication, first go to the activate tab and select the option for processors.



Proceed to activate the processors to the database. Be sure to uncheck the option for DHCP and set static IP addresses.

Name	Serial #	DHCP	IP Address	Subnet Mask	Gateway
Lower Level ▶ Equipment Room ▶ Processor Panel ▶ Processor 1		<input type="checkbox"/>	192.168.1.201	255.255.255.0	192.168.1.1
Lower Level ▶ Equipment Room ▶ Processor Panel ▶ Processor 2		<input type="checkbox"/>	192.168.1.202	255.255.255.0	192.168.1.1

Below the table listing the system processors and network setting information are three drop-down menus. Expand the one titled System Communication. Using the drop-down menu change the selection from Use Multicast Address to one of the static IP addresses of one of the processors in the system. Click on **Save & Apply**.



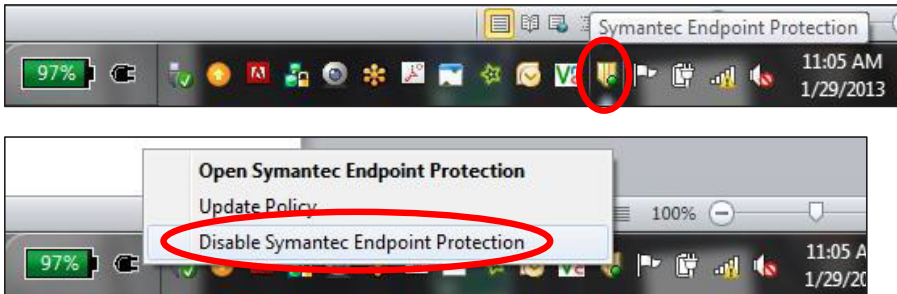
3.0 Best Practices *(continued)*

3.1 Firewalls and Security Programs *(continued)*

3.1.5 Disable Firewall Temporarily

If there is a special security program or firewall running on the PC, it may be necessary to disable those features while programming the Lutron system. Firewalls and security programs protect your PC from threats such as viruses. When a Lutron system tries to find the processor for the first time on a job, it utilizes a UDP (User Datagram Protocol) Broadcast to find all processors on the network. Since broadcast commands are not directed at specific devices (all devices on the network hear the command) security programs can often block this to prevent security breaches if intended devices answer back, potentially gaining access to your PC through the host software program.

The below images reflect the disabling of one such security program from the system tray. This security program is called Symantec and by right clicking on the shield, a disable option appears.

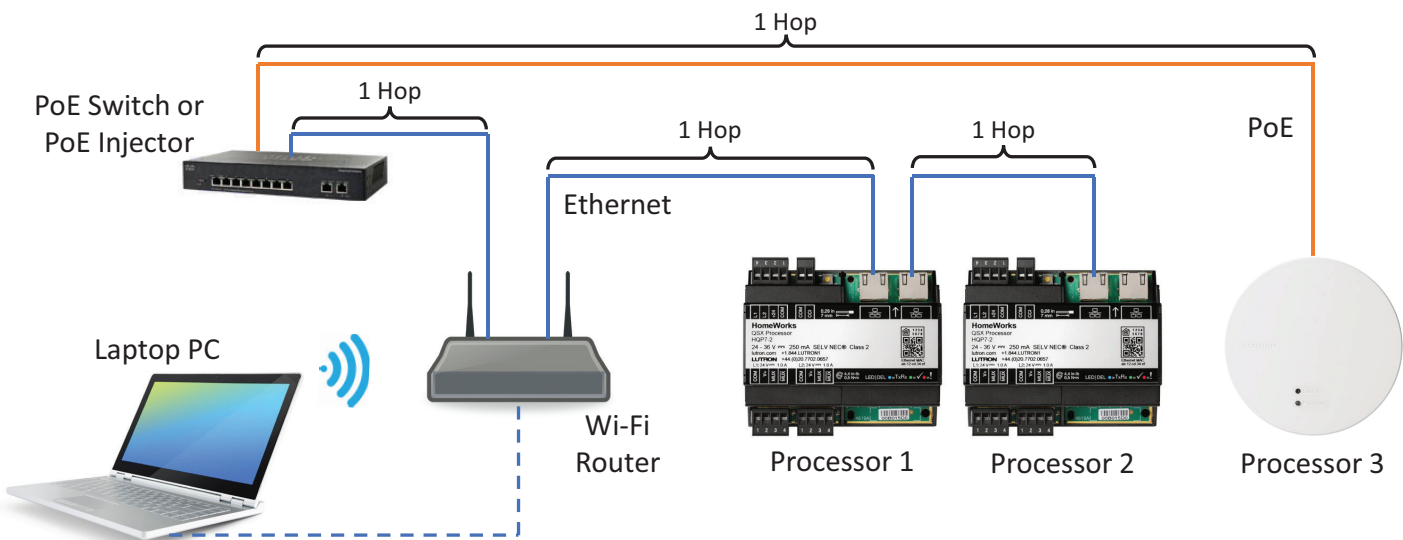


In this case, the security program manages the Windows Firewall so disabling the security program subsequently disables the Windows Firewall. If there is no separate security program, or if the security program is not directly linked to the PC firewall, it may be necessary to disable the firewall or, at the very least, allow the Lutron programming software through the firewall.

After the work to the Lutron system has been completed, re-enable your firewall and security programs to ensure that your PC is protected. Disabling the firewall and security programs should only be used as a quick and temporary solution. Long term, it would be wise to allow the Lutron software programs through the firewall so that you can be adequately protected from threats while maintaining the ability to establish communication with the system processors.

3.1.6 Network Hops with HomeWorks QSX Processors

For optimal system performance, no more than five Ethernet hops should exist between any two processors or any processor and the PC in the HomeWorks system. An Ethernet hop is best described as a connection between two devices (router, switch, processor, or PC). In the following example, there is only one Ethernet hop between processor 1 and processor 2, but there are four Ethernet hops between processor 2 and processor 3.



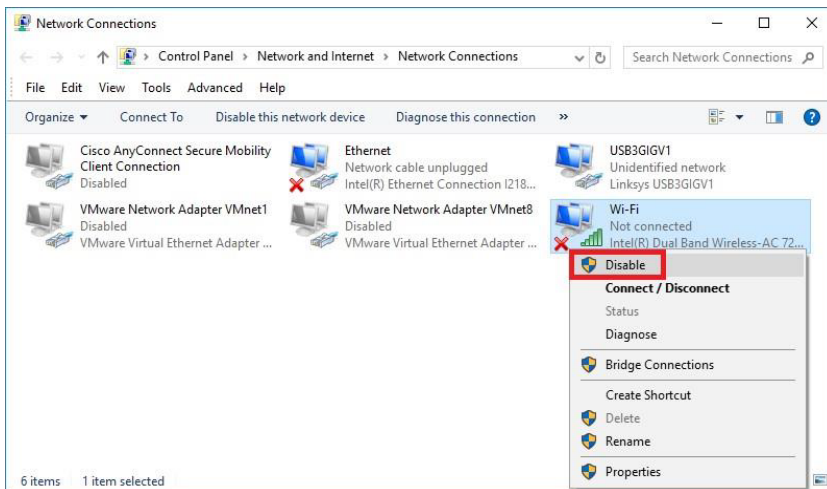
3.0 Best Practices *(continued)*

3.2 Using Wi-Fi with Lutron Programming Software

Utilization of Wi-Fi during certain processes of the Lutron system commissioning process allows for the convenience of not having to physically wire into the network while on the job site. While using Wi-Fi is convenient, it can also be problematic for a number of reasons such as inconsistent connectivity and also another layer of security built into the router which may not allow some products of information to go from your laptop, through the network and to the processor.

3.3 Multiple Network Adapters

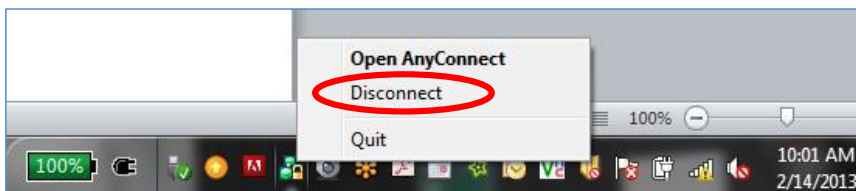
It is recommended that you use a wired LAN connection. When using a wired LAN connection from your PC to the network and/or processor(s) it is good practice to disable the Wi-Fi Network Adapter on the PC. Having the wireless adapter enabled while using the local wired connection will often cause issues trying to connect to the Lutron system. Completely disabling the adapter removes all possibilities for accidental wireless network connections.



Once you have completed working with the Lutron system, and wish to restore Wi-Fi capabilities, remember to enable the Wi-Fi Network Adapter.

3.4 VPN Connections

An open VPN connection used for the purposes of receiving emails, for example, may limit communications between the PC programming tool and the Lutron system over a local network. When trying to communicate with the Lutron system, it will be prudent to disconnect from the VPN connection. The image below shows the Disconnect option for the Cisco AnyConnect VPN connection.

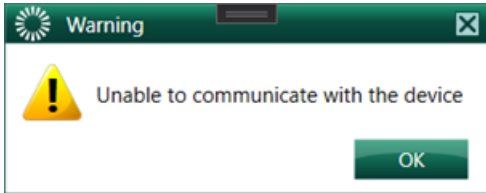


4.0 Troubleshooting

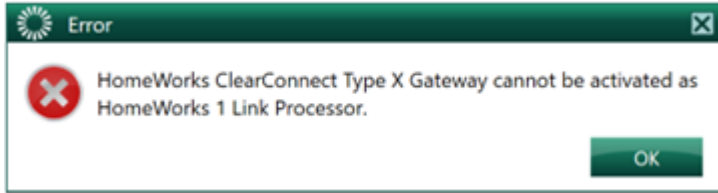
4.1 Activation Tab Pop-Up Messages

The below tables display all possible error codes that can be encountered when attempting to activate processors on a network along with potential remedies/solutions.

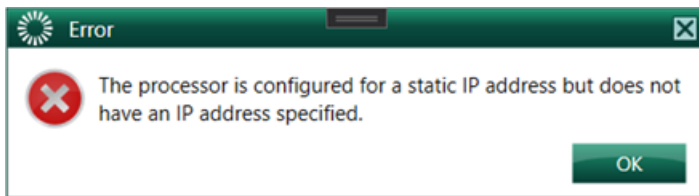
4.1.1 Unable to Communicate with the Device

Screenshot	 A warning dialog box with a green header and a yellow warning icon. The text reads "Unable to communicate with the device" and has an "OK" button.
Remedy/Solution	<ol style="list-style-type: none"> 1. Check that the processor(s) are powered on and connected to the network. 2. Check that the processor(s) are responding. This can be verified by checking that a processor's status shows "Good" in the Status column.

4.1.2 Processor Heard is Different from the One Selected in the Project

Screenshot	 An error dialog box with a green header and a red "X" icon. The text reads "HomeWorks ClearConnect Type X Gateway cannot be activated as HomeWorks 1 Link Processor." and has an "OK" button.
Remedy/Solution	<ol style="list-style-type: none"> 1. Lutron Designer will not allow activation to the incorrect processor type. For example, if a one-link processor is added in the Design tab and Lutron Designer only discovers a Clear Connect-Type X Gateway on the network, Lutron Designer will not allow you to activate the one link processor. 2. Verify that the correct processor was added in the Design > Equipment tab. 3. Verify that the correct processor is being selected to activate in the Activate > Processors tab.


4.1.3 The Processor is Configured for a Static IP Address but does not have an IP Address Specified

Screenshot	 An error dialog box with a green header and a red "X" icon. The text reads "The processor is configured for a static IP address but does not have an IP address specified." and has an "OK" button.
Remedy/Solution	<ol style="list-style-type: none"> 1. Verify that DHCP is disabled in Lutron Designer. 2. Verify that an IP address has been entered into Lutron Designer.

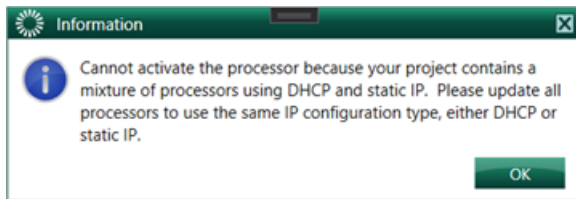
4.0 Troubleshooting *(continued)*

4.1 Activation Tab Pop-Up Messages *(continued)*

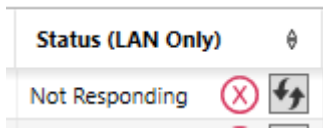
4.1.4 The Certificate Used for Establishing Communication with Processor is Missing from your Machine

Screenshot	 <p>A dialog box titled "Missing Certificates Warning" with a green header bar. The text inside reads: "The certificate used for establishing communication with processor is missing from your machine. Please click the below button to open the instruction guide for manually installing the certificate." Below the text is a green button labeled "Click Here".</p>
Remedy/Solution	<ol style="list-style-type: none"> 1. Uninstall Lutron Designer from computer. 2. Reinstall Lutron Designer. 3. If the uninstall does not resolve the issue, download the support file by navigating to Help > Support > Create Support File. 4. Call Lutron Tech Support.

4.1.5 Cannot Activate the Processor because you Project Contains a Mixture of Processors Using DHCP and Static IP

Screenshot	 <p>An "Information" dialog box with a green header bar. It contains an information icon and the text: "Cannot activate the processor because your project contains a mixture of processors using DHCP and static IP. Please update all processors to use the same IP configuration type, either DHCP or static IP." There is an "OK" button at the bottom right.</p>
Remedy/Solution	<p>For a multi-processor system, processors must all have the same network configuration, DHCP (preferred) or static IP. During activation, Lutron Designer will not allow you to activate processors using different network configurations.</p>

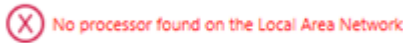
4.1.6 Status While Activating a Processor Shows "Not Responding"

Screenshot	 <p>A dialog box titled "Status (LAN Only)" with a green header bar. It shows a status indicator that says "Not Responding" in red text, followed by a red 'X' icon and a refresh/circular arrow icon.</p>
Remedy/Solution	<ol style="list-style-type: none"> 1. Check that the processor(s) are powered on and connected to the network. 2. Allow exception for the software through the firewall or turn off the firewall. See Section 3.1.2 / 3.1.5 3. Turn off any active VPN connections. See Section 3.4. 4. If using a wired LAN connection, disconnect from any Wi-Fi networks. Vice versa for when using Wi-Fi. See Section 3.3. 5. For Macs running Parallels or VM, ensure that you are using a bridged network connection. See Section 4.4.1. 6. Re-try Activate > Processors.

4.0 Troubleshooting *(continued)*

4.1 Activation Tab Pop-Up Messages *(continued)*

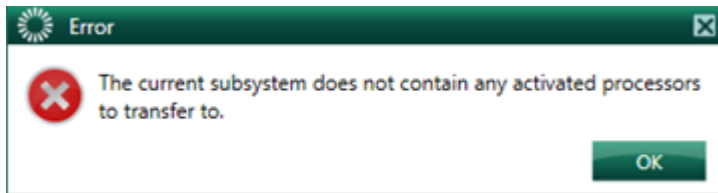
4.1.7 Unable to Find Processor on Network

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Check that the processor(s) are powered on and connected to the network. 2. Allow exception for the software through the firewall or turn off the firewall. See Sections 3.1.2 / 3.1.5 3. Turn off any active VPN connections. See Section 3.4. 4. If using a wired LAN connection, disconnect from any Wi-Fi networks. Vice versa for when using Wi-Fi. See Section 3.3. 5. For Macs running Parallels or VM, ensure that you are using a bridged network connection. See Section 4.4.1. 6. Re-try Activate > Processors.

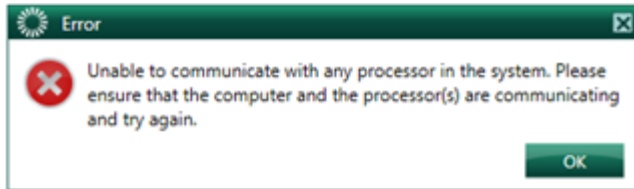
4.2 Transfer Tab Pop-Up Messages

The below tables display all possible error codes that can be encountered when attempting to transfer to processors on a network along with potential remedies / solutions.

4.2.1 The Current Subsystem does not Contain any Activated Processors to Allow for a Transfer

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Verify that processors have been added to the database in Design > Equipment 2. Verify that the processors have activated using Activate > Processors

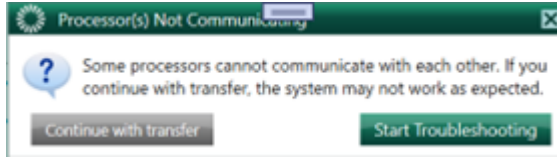
4.2.2 Communication to One or More Processors Failed

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Check that the processor(s) are powered on and connected to the network. 2. Allow exception for the software through the firewall or turn off the firewall. See Section 3.1.2 / 3.1.5 3. Turn off any active VPN connections. See Section 3.4. 4. If using a wired LAN connection, disconnect from any Wi-Fi networks. Vice versa for when using Wi-Fi. See Section 3.3. 5. For Macs running Parallels or VM, ensure that you are using a bridged network connection. See Section 4.4.1. 6. Re-try Activate > Processors.

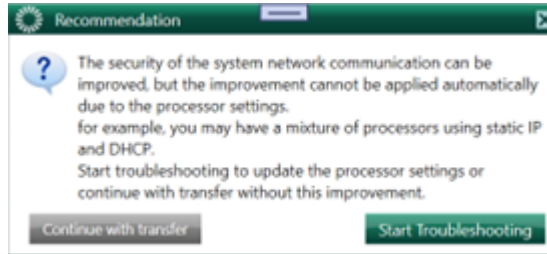
4.0 Troubleshooting (*continued*)

4.2 Transfer Tab Pop-Up Messages (*continued*)


4.2.3 The Following Processors Cannot Communicate with Each Other. If you Continue with Transfer, the System may not Work as Expected

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Start troubleshooting to attempt to automatically resolve the issue 2. If the issue cannot be resolved during troubleshooting, the user will be prompted with another pop-up, see Section 4.2.10 with the root cause for the issue.

4.2.4 Some Processors Cannot Communicate with Each Other. If you Continue with Transfer, the System may not Work as Expected

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Start troubleshooting to attempt to automatically resolve the issue. 2. If the issue cannot be resolved during troubleshooting, the user will be prompted with another pop-up, see Section 4.2.10, with the root cause for the issue.

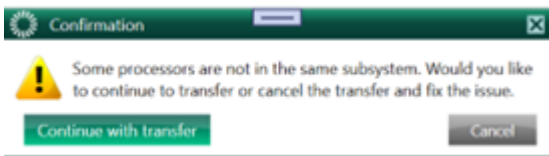
4.2.5 The Security of the System Network Communication can be Improved, but the Improvement cannot be Applied Automatically due to Processor Settings

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Start troubleshooting to attempt to automatically resolve the issue. 2. If the issue cannot be resolved during troubleshooting, the user will be prompted with another pop-up, see Section 4.2.10, with the root cause for the issue.

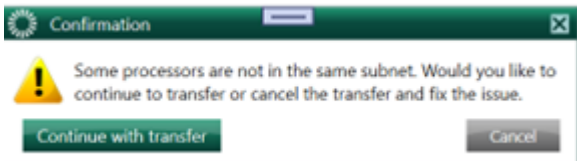
4.0 Troubleshooting *(continued)*

4.2 Transfer Tab Pop-Up Messages *(continued)*

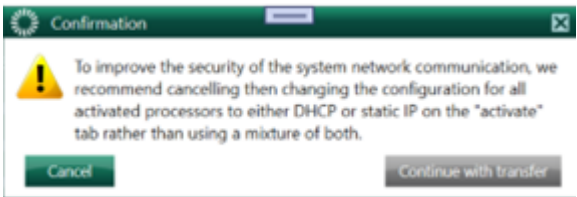
4.2.6 Some Processors are not in the Same Subsystem. Would you like to Continue to Transfer or Cancel the Transfer and Fix the Issue?

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. User should cancel the transfer and make sure that all processors are activated within the same subsystem. 2. Attempt to transfer again.

4.2.7 Some Processors are not in the Same Subnet. Would you like to Continue to Transfer or Cancel the Transfer and Fix the Issue?

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. User should cancel the transfer and make sure that all processors are activated within the same subnet. 2. Attempt to transfer again.

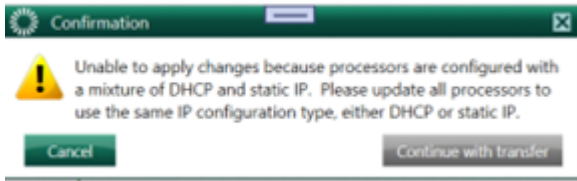
4.2.8 To Improve the Security of the System Network Communication...

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Select Cancel. 2. Return to the Activation tab and ensure that all processors are either using DHCP or static IP. 3. Attempt to transfer again.

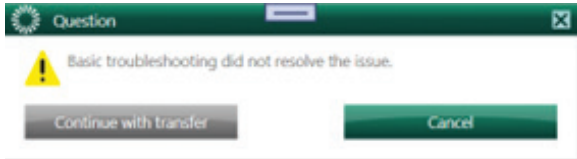
4.0 Troubleshooting (*continued*)

4.2 Transfer Tab Pop-Up Messages (*continued*)

4.2.9 Unable to Apply Changes because Processors are Configured with a Mixture of DHCP and Static IP

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Select Cancel. 2. Return to the Activation tab and ensure that all processors are either using DHCP or static IP. 3. Attempt to transfer again.

4.2.10 Basic Troubleshooting did not Resolve the Issue

Screenshot	
Remedy/Solution	<ol style="list-style-type: none"> 1. Deactivate and reactivate processor(s). 2. Note: ALL processors must be deactivated <u>BEFORE</u> any processors are reactivated. Otherwise, the issue will not be fixed. 3. Attempt to transfer again.

4.0 Troubleshooting (*continued*)

4.3 Using a Direct Connection to a Lutron Processor

During the troubleshooting process, it may become important to attempt a direct connection from the Windows computer to the Lutron processor. This can be useful as the removal of all potential network issues causing components between the Windows computer and Lutron processor. This helps to narrow down the troubleshooting and get closer to a root cause by minimizing the scope of the network.

In a direct connection, the only components now on the LAN are the Lutron processor and Windows computer. A direct connection is not valid for connecting to Clear Connect Gateway–Type X.

Figure 3: PC to HomeWorks QSX Processor: Direct Connection

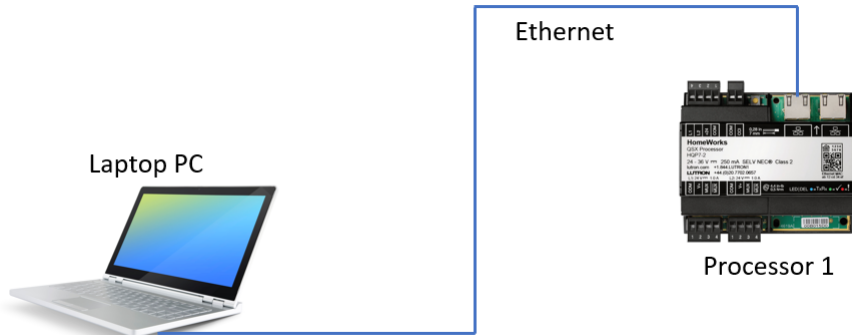


Figure 4: PC to HomeWorks QSX Wireless Processor: Direct Connection

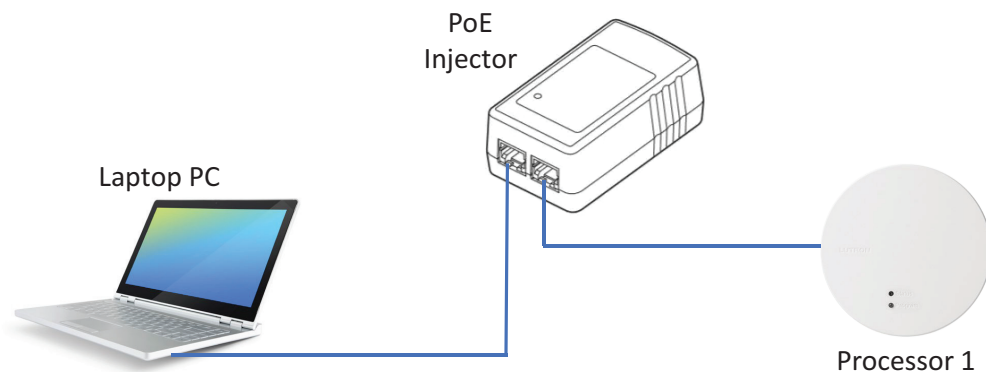
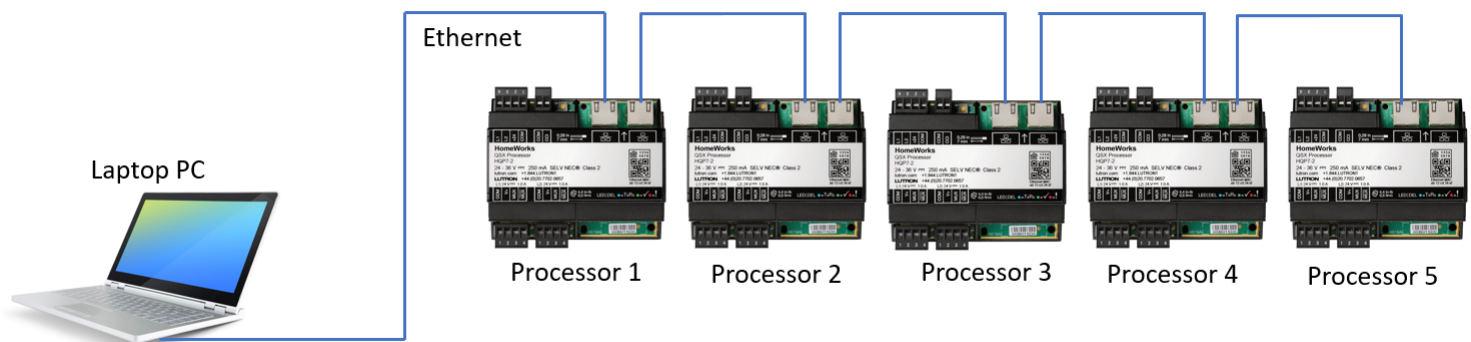


Figure 5: PC to Multiple HomeWorks QSX Processors: Direct Connection



4.0 Troubleshooting (*continued*)

4.3 Using a Direct Connection to a Lutron Processor (*continued*)

4.3.1 Direct Connection using Static IP Address

Start by configuring a static IP address on Windows by using the Network and Sharing Center. Refer to Section 4.3.3 for directions on how to set a static IP in Windows.

If a Mac is being used with VM Ware or Parallels software, refer to Section 4.4.1 for information on how to configure both the Windows and Mac OS for static IP addresses.

Once the computer running the Lutron Designer software is setup with a static IP address, open the programming software and open the database for the residence.

If the system is a HomeWorks system, proceed to Section 3.1.4.1 to configure a static IP address on the HomeWorks processor and to then attempt to discover the processor on the network.

4.3.2 Direct Connection using Link Local Addressing

A link local address is an address that the computer and Lutron processor will negotiate after a couple of minutes of a direct connection once both devices have determined that there is no DHCP server on the network to assign each device an address. This is an alternative approach to using a static IP and is beneficial for those who may have trouble configuring their Windows machine with a static IP address.

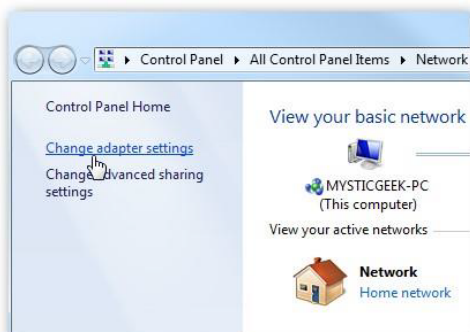
Connect the Lutron processor to the Windows machine in one of the methods shown in Section 4.3. Wait approximately 2 minutes for the two devices to negotiate the link local addresses upon discovering that there was no DHCP server on the network.

Proceed to open the Lutron Designer software and attempt to locate the processors using Activate > Processors.

4.3.3 Setting a Static IP Address on the Windows Machine

Setting a static IP address on Windows is done using the Network and Sharing Center which is a subset of the Control Panel. While the process to get to the Network and Sharing Center varies slightly between Windows 7.8 and 10, the program itself looks similar. It is recommended to use the search function in Windows to find the Network and Sharing Center.

From the Network and Sharing Center, click on Change adapter settings.

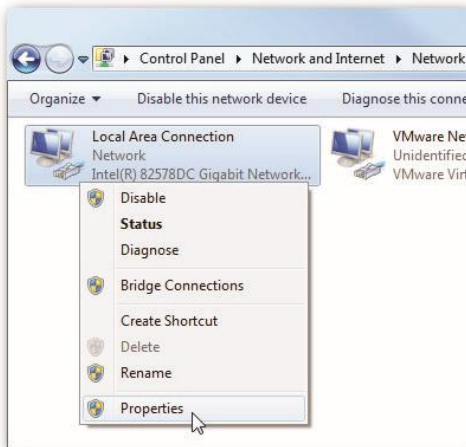


4.0 Troubleshooting (*continued*)

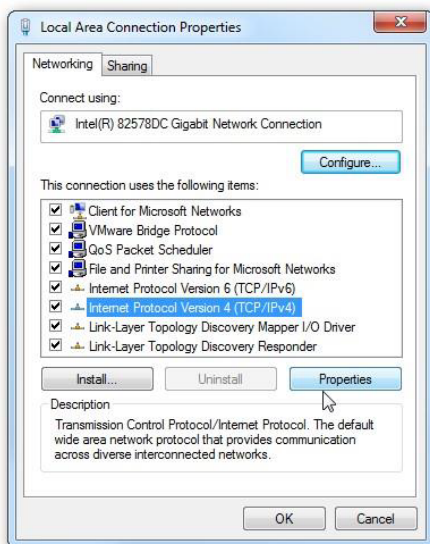
4.3 Using a Direct Connection to a Lutron Processor (*continued*)

4.3.3 Setting a Static IP Address on the Windows Machine (*continued*)

Right-click on the network adapter being used (Wi-Fi or Local Area Connection) and select Properties.

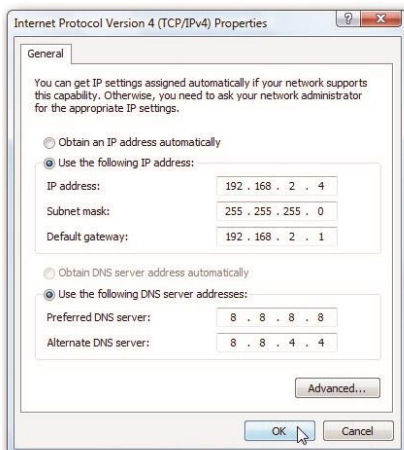


Highlight Internet Protocol Version 4 (TCP/IPv4) then click the Properties button.



Now change the IP, Subnet Mask and Default Gateway addresses by selecting the option to Use the following IP address.

Click OK to finish.

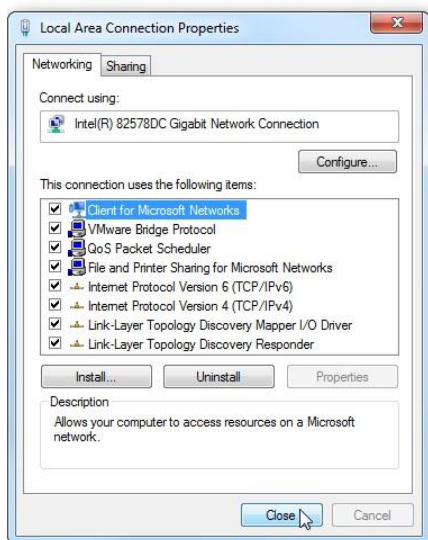


4.0 Troubleshooting (*continued*)

4.3 Using a Direct Connection to a Lutron Processor (*continued*)

4.3.3 Setting a Static IP Address on the Windows Machine (*continued*)

Close out of the Network Connection Properties screen before the changes go into effect.



4.0 Troubleshooting (continued)

4.4 Running Windows OS on Mac (Not Recommended)

Lutron programming software is designed to run on Windows operating systems. In order to run the programming software on Mac hardware, Windows must be utilized as either a virtual machine (ex. Parallels or Fusion) or by booting the Mac up using only the Windows software (Bootcamp). Bootcamp setup is the same as setting up a Windows machine to connect to a Lutron processor. As a result of increased complexity, the following focuses on using virtual machine connections.

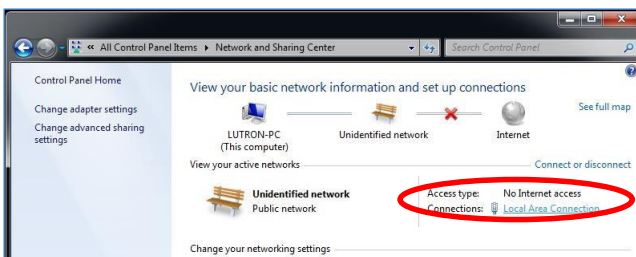
4.4.1 Parallels and VMware Fusion

Parallels and VMware Fusion software for simultaneous or parallel operation of two operating systems: Windows and Mac OS. From a networking standpoint, the two operating systems each appear as a device on the network when using a bridged connection. On one side you have the actual Mac hardware running the Mac OS. On the other, you have a virtual machine emulating the Windows OS. As a result of this setup, initial connection to the Lutron processor(s) requires a few settings to be implemented to ensure a successful connection. The example below is using a wired connection into the LAN.

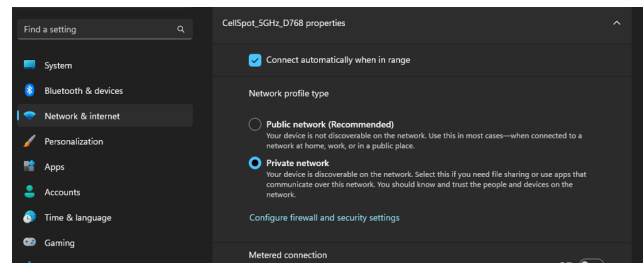
Proper setup can be accomplished in three simple steps. First, go to the Windows OS desktop and set a static IP address. To do this, first go to Control Panel. Click on Network and Sharing Center. If you do not see this option, change the View By option to Large or Small Icons.



In the Network and Sharing Center window, click on Local Area Connection (or sometimes called Ethernet).

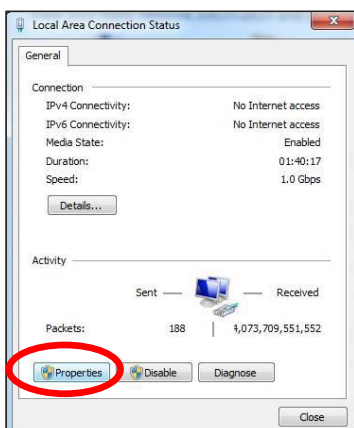


Windows 10



Windows 11

On the Local Area Connection Status window, select the option for Properties.

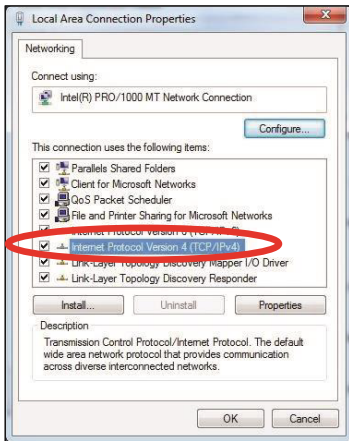


4.0 Troubleshooting *(continued)*

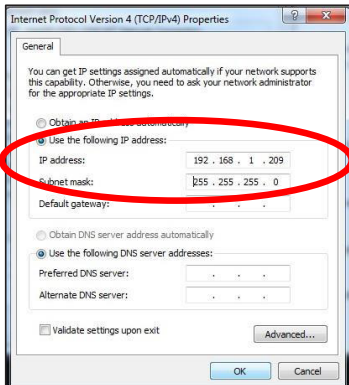
4.4 Running Windows OS on Mac (Not Recommended) *(continued)*

4.4.1 Parallels and VMware Fusion *(continued)*

Next, select Internet Protocol Version 4 and click on Properties.



Set up the IP address and subnet mask as a static IP address. Make sure that this address is outside of the DHCP range of the DHCP server on the LAN router and does not conflict with any other address on the LAN.



Next, go to the Mac OS side and set a static IP address using the Settings menu. This IP address must be different than the address being used by the Windows OS. This is because there are two machines running on the network (despite the fact that it is the same Mac hardware). First, go to System Preferences.



Select Network from the System Preferences window.

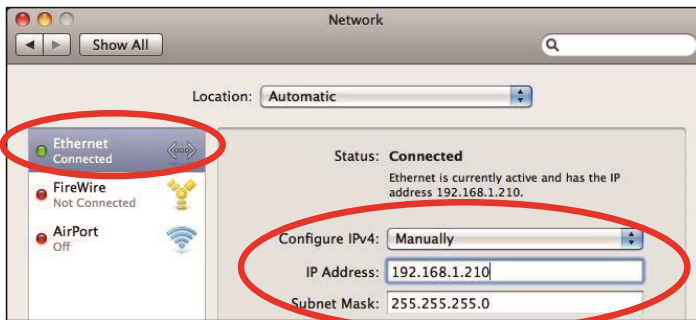


4.0 Troubleshooting (*continued*)

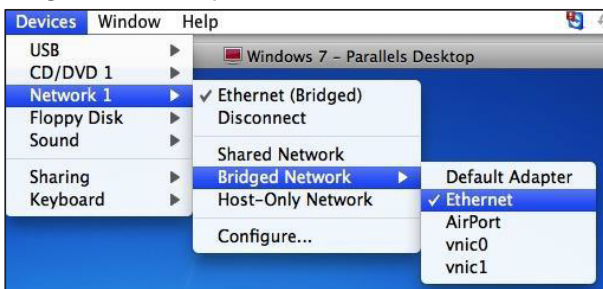
4.4 Running Windows OS on Mac (Not Recommended) (*continued*)

4.4.1 Parallels and VMware Fusion (*continued*)

In the Network setting window, set the IP address for the Mac LAN adapter to a different address than all other network devices, including the Windows virtual machine, and click on Apply to save the settings.



The last step is to set the network type to Bridged. To do this in Parallels, go to the Windows Desktop view and go to the **Devices** menu in the upper left (you may need to bring your mouse pointer to the upper left corner for the menu task bar to appear). In the **Devices** menu, select the **Network** sub menu, and then select **Bridged Network**. Select **Ethernet** as the bridged network option.



To do this in the VMware Fusion, go to the Windows Desktop view and go to the Virtual Machine menu in the upper left (you may need to bring your mouse pointer to the upper left corner for the menu bar to appear). In the **Virtual Machine** menu, select **Network** sub menu, and then select **Bridged**.



Note: If you are not using a wired Ethernet connection, your bridged network selection may not be called Ethernet. Examples would be a USB to Ethernet converter or using Wi-Fi (Airport).

4.0 Troubleshooting (*continued*)

4.5 Glossary

- **DHCP:** Options are Enabled (checked) or Disabled (unchecked)
 - **Enabled:** The processor IP address will be automatically assigned by the DHCP server of the router on the network
 - **Option 1:** Used for simple plug and play networks without integration or app control
 - **Option 2:** Set to DHCP Enabled when a DHCP Reserved address is set on the DHCP server of the router for the HomeWorks processor(s)
 - **Disabled:** A static IP address will be assigned using the IP address field in the activate processors screen
 - Used when integrating the HomeWorks system with a control system or using a Lutron mobile application for control
 - Recommended to set the static IP address of each processor above the DHCP range of the router (common addresses start at 192.168.x.200 and above)
 - Each processor must have a unique address
- **Gateway:** A router address used for the transmission of packets outside of the network. Should be on the same subnet as the devices on the network which will be transmitting the data
- **IP Address:** The unique IP address of the processor on the network, the field will be active for editing on when DHCP is set to disabled (unchecked)
- **MAC Address:** The unique MAC address for the processor, found on the product label on the front of each processor
- **Name:** Displays the area tree breakdown of each processor
- **Preferred DNS Server:** The preferred or primary domain name system address used for mapping host names to IP address
- **#:** A number which identifies each processor in the database. Processor #1 takes on the role of the “master processor.”
- **Secondary DNS Server:** An alternate domain name system address used when the preferred or primary one times out after an unsuccessful connection
- **Serial Number:** The unique Lutron serial number for the processor, found on the product label on the front of each processor
- **Subnet Mask:** A number screen which the router uses to decide which portions of an address to consider before routing information within the network
 - A common residential LAN subnet mask is 255.255.255.0 which indicates that the first three address octets are the same for all devices on the network and the fourth octet is the field which is used to identify the unique addresses on the network
- **System Address:** Multicast address used for inter-processor communication; this address typically remains unchanged
 - In scenarios where multiple, independent systems are inside the same building, the network can be setup such that each system is on its own smaller LAN, incapable of seeing the other systems through the network
 - Each system on the same network must have a unique system address.
- **System Communications:** Changes how the software on the commissioning machine communicates with the processors in the system
 - **Use Multicast Address:** The software will communicate to the processors in the system using multicast traffic
 - Compatible with most unmanaged networks
 - **<IP Address>:** The software will communicate to the processor IP address specified in the system using TCP traffic
 - Most often used with managed networks which do not support multicast traffic
 - This setting only changes software-to-processor communication to TCP. Inter-processor communication will remain multicast
 - This option is only available when DHCP is disabled
- **Restrict Communications with Processor to Local LAN only (Requires transfer to take effect):** A security feature which disallows all off-network connections system. Mobile app access will not be impacted by this setting.

4.0 Troubleshooting (*continued*)

4.6 Additional Information

For more information on setting up a virtual private network, and/or domain name service refer to Application Note #231 (P/N 048231) at www.lutron.com.

For more information on setting up multiple independent systems in the same building, please see Application Note #688 (P/N 048688) at www.lutron.com.

After completing configuration of all the necessary settings for each processor, activate each processor by clicking on them one by one using the list of un-activated processors on the left side of the screen and then click on the word Activate on the far right of the screen for each individual processor. The status field should say "Good ✓." Be sure to activate the correct processor to the placeholder in the software. Incorrect processor activation will lead to the inability to activate devices to the system.

Lutron, HomeWorks, and Clear Connect are trademarks or registered trademarks of Lutron Electronics Co., Inc. in the US and/or other countries.

Mac and macOS are trademarks of Apple Inc., registered in the U.S. and other countries.

All other product names, logos, and brands are property of their respective owners.

Lutron Contact Numbers

WORLD HEADQUARTERS USA

Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299
TEL: +1.610.282.3800
FAX: +1.610.282.1243

support@lutron.com
www.lutron.com/support

**North & South America
Customer Assistance**
USA, Canada, Caribbean:
1.844.LUTRON1 (1.844.588.7661)
Mexico:
+1.888.235.2910
Central/South America:
+1.610.282.6701

UK AND EUROPE:

Lutron EA Limited
125 Finsbury Pavement
4th floor, London EC2A 1NQ
United Kingdom
TEL: +44.(0)20.7702.0657
FAX: +44.(0)20.7480.6899
FREEPHONE (UK): 0800.282.107
Technical Support: +44.(0)20.7680.4481
lutronlondon@lutron.com

ASIA:

Lutron GL Ltd.
390 Havelock Road
#07-04 King's Centre
Singapore 169662
TEL: +65.6220.4666
FAX: +65.6220.4333
Technical Support: 800.120.4491
lutronsea@lutron.com

Asia Technical Hotlines

Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Indonesia: 001.803.011.3994
Japan: +81.3.5575.8411
Macau: 0800.401
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other Countries: +65.6220.4666