2 Router Installs

Document Overview:

This document attempts to outline possible solutions to situations where the customer has an existing network, or this is a router built into the internet providers' modem. Multiple routers can be a challenge to integrate, and this document will cover several ways of handling the problem.
Please be aware that while Elan wants you to achieve a working solution, Elan Technical Support cannot provide technical support for third-party network devices or when integrating existing third-party networks with Elan.
This document is intended to provide a basic outline and tips for handling this situation, and is not intended to be an all-encompassing guide or solution to every networking setup. Make sure that you have all the information available before integrating or changing an existing customer network to integrate Elan.
In all cases, if you do not understand the situation or have the ability to handle integrating existing networks with Elan it is recommended that you either engage the services of a networking professional or have your customer engage the services of a networking professional.

NOTE: This document details using the Elan/HomeLogic DI-624 and WBR-2310 Routers, and does not contain accurate information for the new NWA18 network assembly.

Required Tools:

You will need the following:

1. Existing router IP address and login information for existing router(s).
2. Knowledge of any static devices on existing network.
3. Knowledge of any specific networking needs provided by the existing network if you plan on making significant changes.
4. Configuration manual or other knowledge base for reconfiguration of existing router. If no documentation exists locally, contact the ISP or search the internet for more information prior to continuing. Start with the router manufacturer's website.
5. A computer set to DHCP ("Obtain IP address automatically").

Some good places to start looking for third party information and manuals:

Manufacturer Websites: Try google or your favorite search engine to look for the website of the router manufacturer. The support area is often the best place to get router documentation. Some common links:

NETGEAR -	http://www.netgear.com/	Linksys -	http://www.linksys.com
D-Link -	http://www.dlink.com/	Belkin -	http://www.belkin.com/
SMC-	http://www.smc.com	Actiontec -	http://www.actiontec.com/
2wire -	http://www.2wire.com/	Buffalo -	http://www.buffalotech.com/

Port Forward- Provides step by step instructions on how to setup port forwarding in most routers:

http://www.portforward.com

Default Router Passwords Database- Contains the default passwords for many third party routers:

http://www.routerpasswords.com/

DSL Reports- The forums on DSL Reports/Broadband Reports can be an excellent resource.
http://www.dslreports.com/forums/all

Introduction:

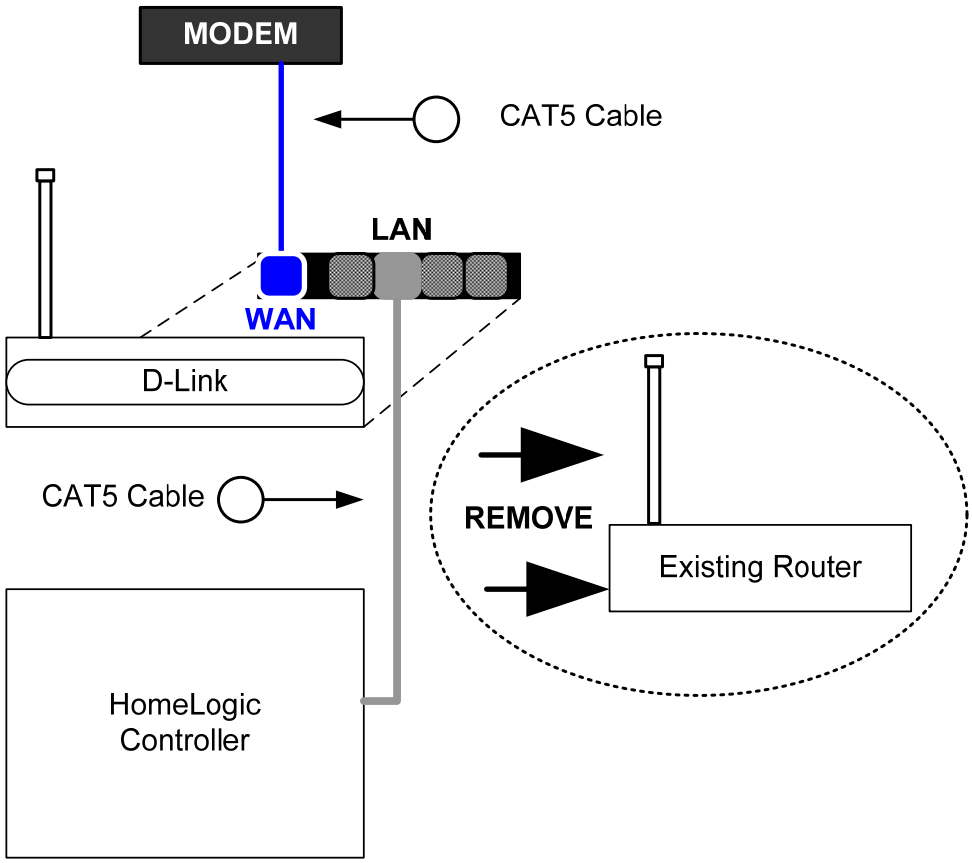
There are multiple ways to handle two router installs, and there is not one "right" way to do it. There is a variety of networking options, situations and needs that cannot all be covered by one response. Below are five ways Elan recommends that will handle *most* situations. Options 1, 2 & 3 involve removing one router from the equation, either by physical removal (1&2) or turning one router into a bridge (3) by disabling its router/firewall capabilities. Removing a router from the equation may not be easy or possible when confronted with a DSL or Fiber Router/Modem. For those situations, see options 3, 4 & 5.

Overview of Options 1, 2 & 3: For the sake of simplicity, it is often easiest to remove one router from the install and create a single unified network. This prevents a lot of hassle where multiple networks or subnets can cause computers and other IP devices to not see each other.

1. Remove one router from the install:

When deciding which router to leave in the install, we recommend leaving the Elan D-Link router in the install as this is the router Elan supports and is familiar with. If you decide to leave the existing 3rd-party router in the install, bear in mind that Elan will not be able to support you on its functions, setup or troubleshooting. Moreover, the Elan D-Link router will be preconfigured with most, if not all, of the settings you need to effect the change. Below is a list of settings that you will need to double-check and/or alter to integrate an existing network with the Elan sold D-Link. This option may be used in conjunction with option 2.

Wiring Diagram:



Wiring Configuration:

Remove all connections from the 1st router and remake connections on the 2nd router/D-Link. Typically the internet modem will be plugged into the WAN port, and network devices such as your computer, the Elan Controller, or any switches will be connected to the LAN ports. Connect to a LAN port on the old router directly with your computer if you need to reference settings as you reconfigure the 2nd router.

Router Configuration:

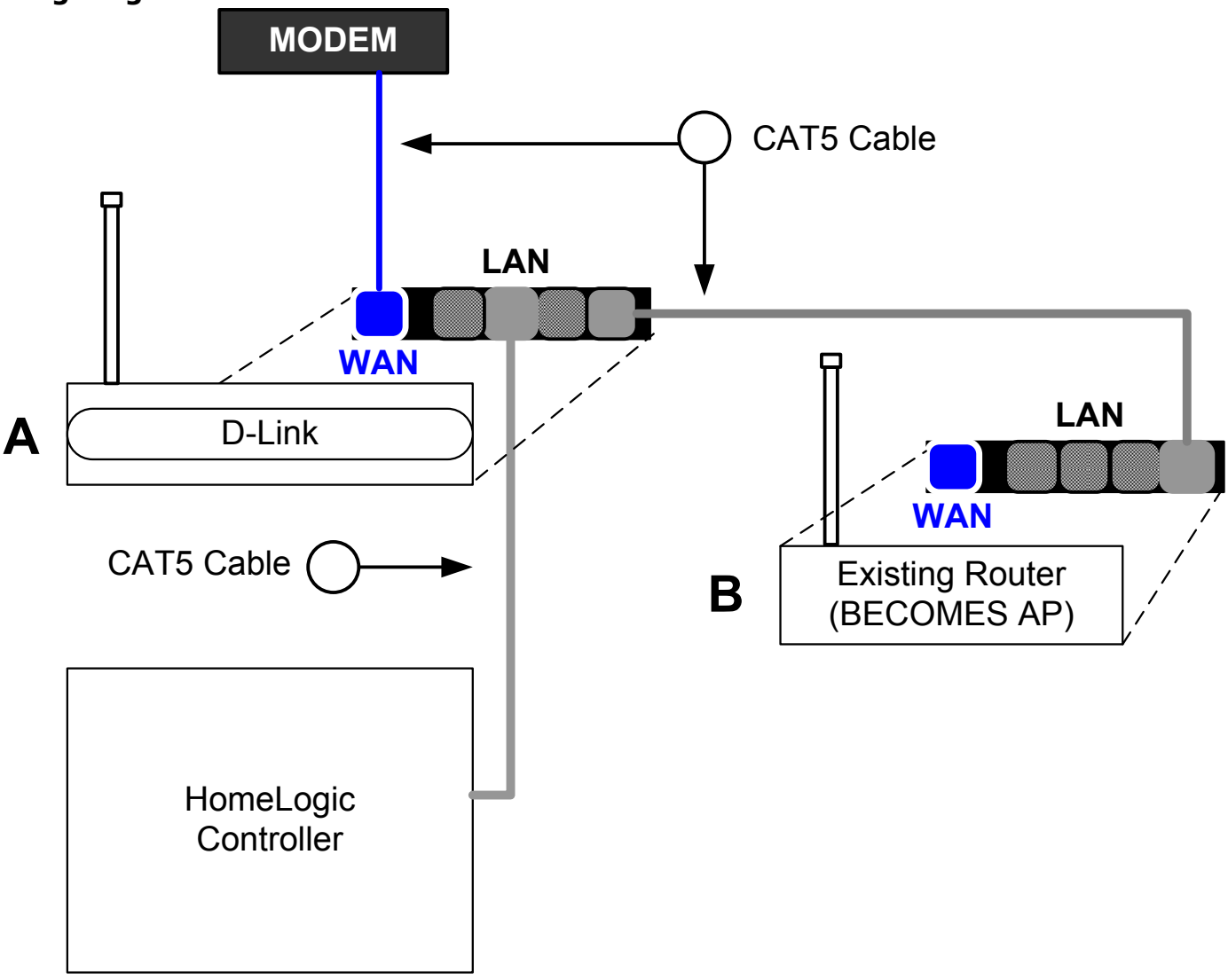
1. **Internet type**: if the customer is using a cable modem, the D-Link comes preconfigured with the WAN port set to Dynamic IP, which is usually the correct setting for a cable modem. If they are using DSL, the setting could be static IP or PPoE. Consult the ISP or the router you are taking offline for the correct settings. These settings are configured in the router under SETUP > INTERNET for the WBR-2310, or HOME > WAN for the DI-624.
2. **LAN Settings: DHCP Range**. If the customer has existing static devices, ensure they will not conflict with any IP devices you are integrating with Elan. Also ensure that any static devices they may have do not fall into the default DHCP range of 150-250. If they do, you may want to either change the static IP of their device to work with the new DHCP range or alter the DHCP range of the router. Remember that all static devices should be set to IP's OUTSIDE of the DHCP range to prevent multiple devices occupying the same IP address. Additionally, ensure any existing static devices will fall into the correct subnet: the Elan router ships with the LAN on 192.168.0.X range, if existing devices are on 192.168.1.X for example, they may not be able to talk to other devices. To alter settings on the individual device, consult with the homeowner or seek documentation online. To alter the DHCP range, choose SETUP > NETWORK SETTINGS and adjust the DHCP SERVER area on the WBR-2310. On the DI-624, use HOME > DHCP to alter the settings.
3. **Wireless LAN**: Wireless settings should already be configured correctly in the D-Link, however if you are setting up another router there are some guidelines you should follow. In the D-Link, access wireless settings from Setup>Wireless Settings (WBR-2310) or Home>Wireless(DI-624).
    - **Wireless radio** should be **On** if you want to connect devices wirelessly.
    - **SSID:** Typically you will want to set a SSID that is unique to the router (default: HomeLogic) and allow/enable the SSID to be broadcast (**don't** enable "hidden wireless" on the WBR-2310).
    - **Wireless channel** is usually fine set to "Auto Scan", but if you have to set a particular channel then 2, 6, or 11 are good choices.
    - **Wireless mode** may be set to Mixed, to enable connections of mixed A/B/G/N types. On the D-Link, this is the default unless you check "802.11g Only Mode".
    - **Special Modes:** If there is a Super G, MIMO, or Turbo mode you will want to disable this, as these technologies typically result in slowdowns/problems when used with wireless adapters that don't support the same technology. "Extended Range" modes should also be disabled.
    - **Security:** By default, the D-Link does not come with any wireless security configured. It is recommended that you enable at least WEP security. In the D-Link routers, enable security by locating Security or Wireless Security Mode dropdown. Select the desired security mode and enter in your desired security key and other security settings.
    - You will need to let the customer know the new SSID to connect to and any security settings you may have configured on the D-Link.
4. **Port Forwarding**: Verify if the customer needs any additional ports forwarded to devices or equipment on their existing network. It may be easiest to find this in the existing router, or you may consult with your homeowner to obtain this information. Setup port forwarding for a single port in the WBR-2310 under ADVANCED > VIRTUAL SERVER. For a range of contiguous ports use ADVANCED > PORT FORWARDING. In the DI-624, use ADVANCED > VIRTUAL SERVER to setup port forwarding. See page 11 for screenshots.

2. DISABLE ROUTER FUNCTIONALITY IN ONE ROUTER AND USE IT AS AN AP:

There may be times when a customer has an existing router that you want to take out of the loop without physically removing, or isn't needed anymore but can be used for additional switch ports and/or as an Access Point. In this method, we will use one router (doesn't matter which) as the boss (router A) and the 2nd router as a switch/AP (router B). You will need configuration notes from a manual, the ISP, or the internet for the router to accomplish this method. Some routers may have a button that will accomplish the steps we outline in one press, but there still may need to be configuration changes beyond clicking that one button, so be sure to double-check settings afterwards. Below is a guide to make the changes manually; also use this as a reference to verify changes if your router has a magic "AP Mode" button. To make/verify these changes, you will likely need to have a Cat-5 cable going from your computer directly into one of the LAN ports on the router.

Though the diagram shows using the Elan D-Link as the main router (router A), the following guide is written nonspecifically, as in this instance either router can be converted to a switch/AP. This guide can be used in conjunction with option 1, and you may wish to read option 1 as a guide on configuring router A if you have not already done so.

Wiring Diagram:



Wiring Configuration:

Connect the internet modem to the WAN port on router A. Connect a Cat-5 cable from a LAN port on the router A to a LAN port on the router B.

Router Configuration:

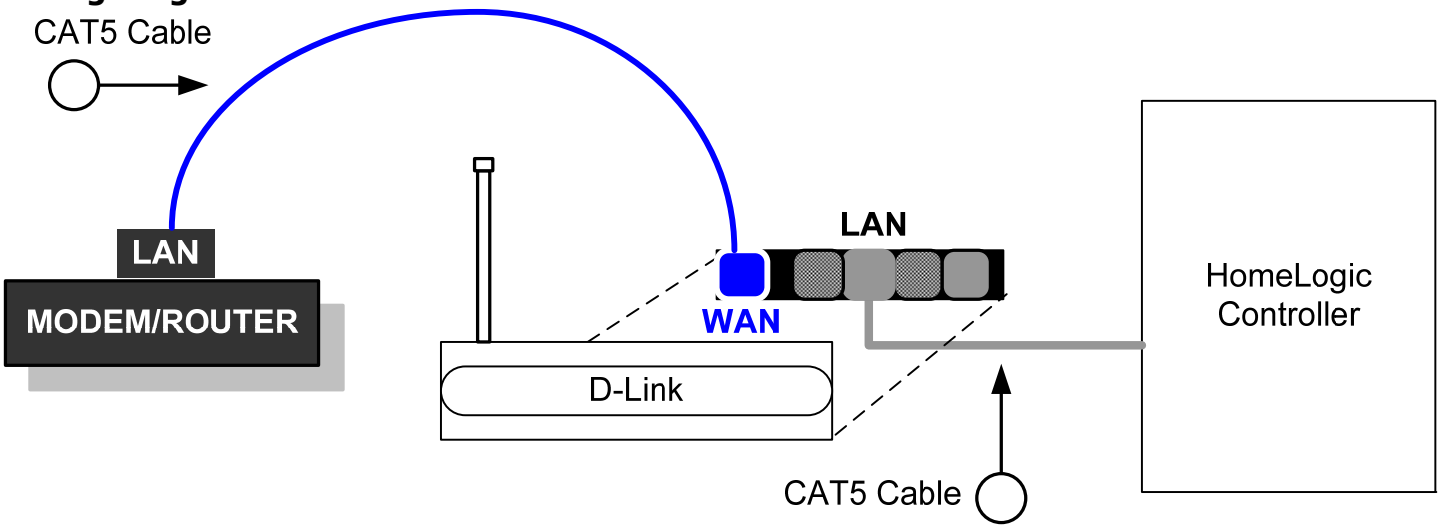
1. **Turn off the DHCP server**. We are letting router A become the boss on the network, and to do this we need to turn off the DHCP server in router B, which will prevent router B from handing out any IP addresses: we strictly can't have two DHCP servers on the same network. This setting might be under LAN or network setup/settings, and will likely be under a heading labeled DHCP Server, or DHCP Settings.
    - Additionally, if your router has a setting to turn NAT on or off, set this to OFF. Note that the NAT setting may be under advanced settings or may not be an accessible setting on all routers.
2. **Disable the Firewall.** If it is possible to turn off the firewall, you may wish to disable this as it will not be used—nothing will be connected to the WAN port.
3. **Configure Wireless settings** (optional). If this device has wireless functionality, you will want to configure the wireless security settings. Set these values as desired for your network. It also may be desirable to set AP's to a different wireless channel than the main router to limit interference. Wireless SSID should be enabled, and each router should have a unique SSID so you can properly associate wireless tablets with the nearest AP.
4. **Change the IP.** As an AP, router B needs to have a static IP address on the correct network. If the A router in the install is from Elan, by default the Elan router will be set to 192.168.0.1, with a dynamic (DHCP) range of 150-250. Elan recommends setting AP's to static IP's starting at 192.168.0.10, and we can set the router being bridged following this convention. If you are not using an Elan router, or are using an Elan router that follows an atypical convention, you may set router B to any LAN IP that is unused and outside your DHCP range.
    - Set router B's LAN IP to a static IP that is available on the router A's network. Refer to documentation for your third-party router for specifics, but this is typically set under Networking or LAN setup.
    - Make sure the IP is not within the DHCP range of the router A (default: 150-250).
    - Make sure no other devices already exist at this IP address.
    - Suggested LAN IP for the router B: 192.168.0.10

3. Turn the 1st router (Router/Modem) into a bridge:

Occasionally, the internet service provides a Router/Modem that will allow you to disable the router functionality and turn it into a bridge. Turning the router into a bridge effectively disables all router/firewall functionality, and roughly turns the router/modem into a modem. **A bridged Router/Modem is being used to simply to pass thru the Internet connection to the 2nd router, which is doing all the routing/firewall duties.**
You will need configuration notes from a manual, the ISP, or the internet for the router to accomplish this method. To make/verify these changes, you will likely need to have a Cat-5 cable going from your computer directly into one of the LAN ports on the router.

Please note that some Router/Modem hybrids suffer from a lack of documentation and primitive interfaces. Unfortunately, many of these hybrid models may have interfaces designed against allowing any significant changes. If there is an "Advanced" or "Expert" portion of the router configuration this is likely where you need to get to make changes. **If you cannot make the router into a bridge, try option 4/5 below.**

Wiring Diagram:



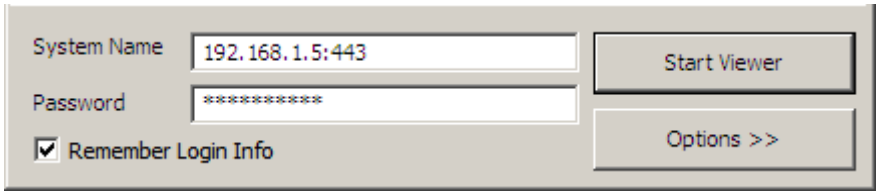
Wiring Configuration:
Connect the internet to the WAN port on the 1st router. Connect a LAN port from the 1st router to a WAN port on the 2nd router.

Router Configuration:

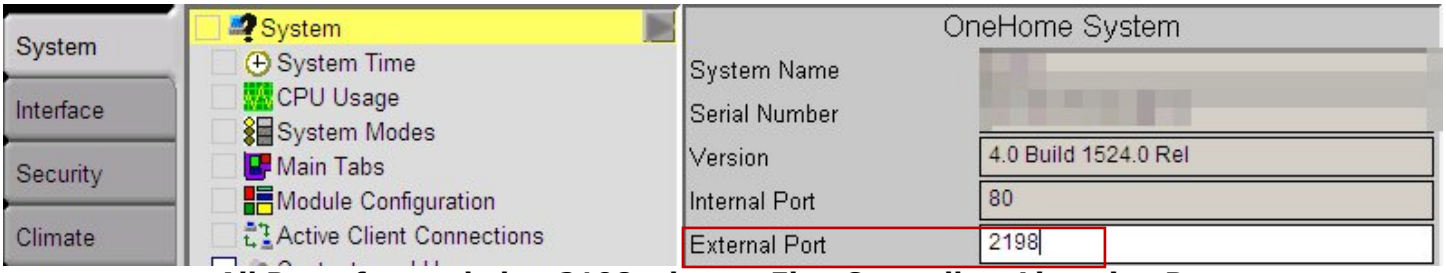
1. **Check the Internet/WAN settings.** You may need this information when setting up the Internet/WAN settings on the 2nd router. Look for PPPoE, Dynamic, Static etc. and copy down these settings. If there is a password and it is obfuscated (*****) consult your Home-Owner or the ISP documentation for this information.
2. **Enable Bridge Mode.** This may be one step or several steps depending on your router. We strongly suggest speaking with technical support for the ISP, locating support documentation from the router/modem manufacturer, or searching the internet for notes on all the steps of enabling this mode on your particular hardware.
3. **Turn off the Firewall.** Look in advanced, security, firewall settings or similar to find settings for the firewall and disable it if possible. You may also wish to disable anything you find labeled NAT Firewall or SPI Firewall. *This may be done automatically when you enable bridge mode.*
4. **Verify WAN/Internet Connection type in the 2nd router.** You may need to enter a PPPoE password or set to static type. Refer to the ISP or your notes from Step 1 for configuration details.
5. **(Optional)Configure LAN settings** such as DHCP Server, Wireless type/security, and Port Forwarding in the 2nd router. If you are using an Elan router, these steps should be set correctly by default. If you are not, see Option 1 for configuration details.

Overview of Options 4& 5: Sometimes it is not possible to turn a Router/Modem into a bridge, or remove it from the network, or your customer may have an existing Router/Network that you do not want to disturb. In this instance, it is possible to leave the router installed and have the Elan network "nested" behind the existing router.

Please note that if your customer plans on connecting to their Elan system with a computer connected to the 1st network via **g!** Connect, they will effectively be logging in remotely; meaning if they lose internet connection they may not be able to connect to their Elan Controller. In this instance, they may optionally switch their network connection to the 2nd router (D-Link) to connect to their Elan system. Another workaround for savvier users would be to enter the external IP of the second router with port number in g! Connect in place of the System Name, such as follows. (You will create a static WAN/external IP for the 2nd router in the steps below).

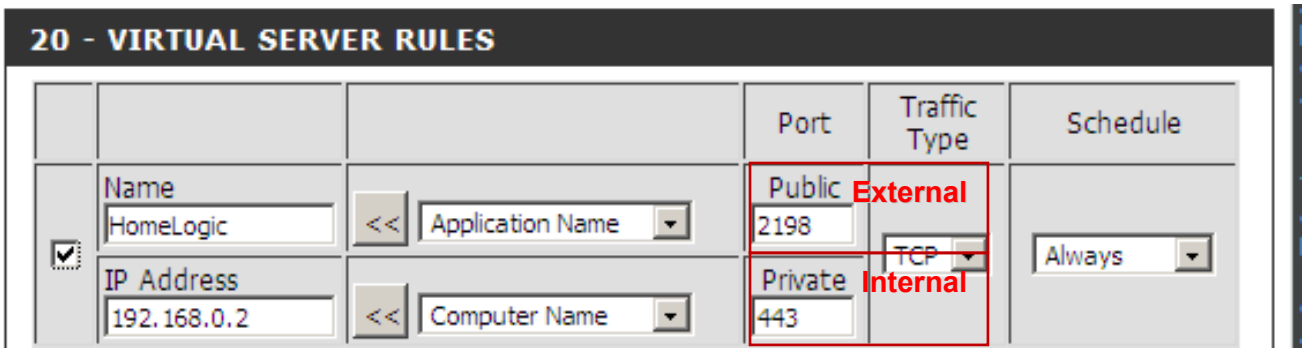


Port 443 in use (FiOS)*: It is known that some of Verizon's FiOS routers use port 443 for internal usage, and cannot be made to forward port 443. In these instances, it may be required that you forward a different port, such as port 2198 to the Elan Controller. If you are going to proceed in this manner, you may wish to change all port forwards to 2198, and login to the System tab of Configurator to change the external listening port on the Elan Controller (shown below).



All Ports forwarded to 2198; change Elan Controllers Listening Port

Alternatively, you may set port forwarding on the 1st router/router modem for 2198, and then set the 2nd router's port forwarding with an external port of 2198 and an internal port of 443 and leave Configurator alone.



2nd Router Forwards 2198 to 443

***Note: HC Controllers use 2198 by default, and this step is not needed.**

4. PORT FORWARDING 1ST ROUTER TO 2ND, LAN TO WAN:

In this situation, the existing router/network is left intact and the Elan router is added as a separate network. The WAN Port of the 2nd router is set to a static IP on the 1st router, and the 1st router is configured to forward ports to the 2nd router. The 2nd router can then perform the correct port forwarding to the Elan Controller. In this install, it is assumed that the two routers are each on their own subnet, i.e. Router/Modem IP is 192.168.**1**.1, D-Link/Router 2 is set to 192.168.**0**.1.You will need configuration notes from a manual, the ISP, or the internet for the router to accomplish this. To make/verify these changes, you will need to have a Cat-5 cable going from your computer directly into one of the LAN ports on the routers.

Note: If you cannot find out how to forward ports, or Port Forwarding isn't supported or working, you may be able to place the 2nd router into the 1st routers DMZ as an alternative. See Option 5 below for details.

5. PLACE THE 2ND ROUTER IN THE 1ST ROUTERS DMZ:

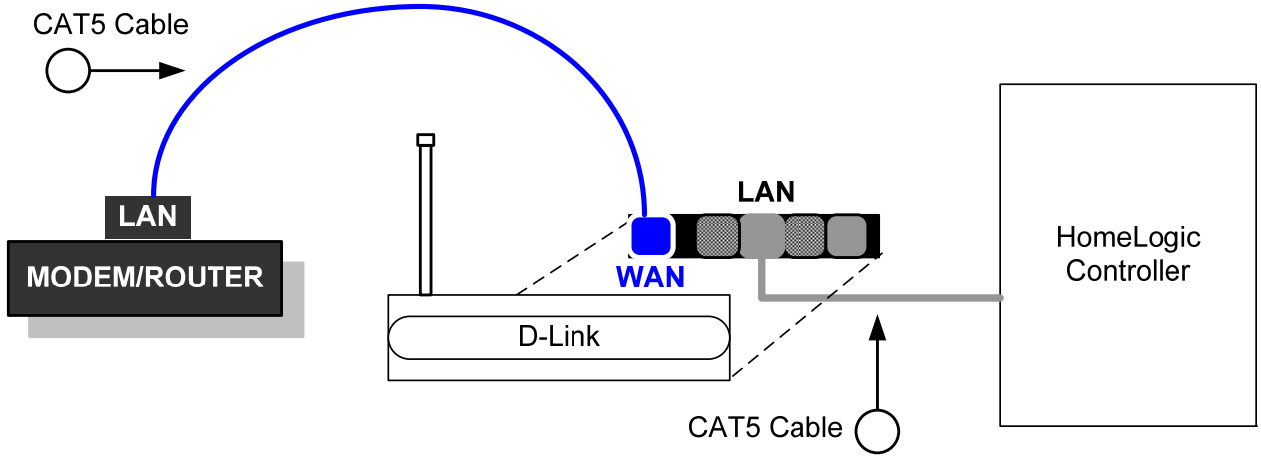
Sometimes port forwarding is not possible with an ISP provided Router/Modem, and it may be possible to place the 2nd router in the 1st routers DMZ. In this situation, the existing router/network is left intact and the Elan router is added as a separate network. The WAN Port of the 2nd router is set to a static IP on the 1st router, and the 1st router is configured with the 2nd Router in its DMZ. The 2nd router can then perform the correct port forwarding to the Elan Controller. In this install, it is assumed that the two routers are each on their own subnet, i.e. Router/Modem IP is 192.168.**1**.1, D-Link/Router 2 is set to 192.168.**0**.1. You will need configuration notes from a manual, the ISP, or the internet for the router to accomplish this. To make/verify these changes, you will need to have a Cat-5 cable going from your computer directly into one of the LAN ports on the routers.

A Note on DMZ (DeMilitarized Zone):

Placing a device in the DMZ effectively removes all protection from it. Placing the 2nd router in the 1st router's DMZ is acceptable because devices behind the 2nd router will still be protected by the 2nd router.

****NEVER** place the **g! Controller** directly into a DMZ as it will be unprotected. ******

Wiring Diagram (Options 4&5):



Wiring Configuration (Options 4&5):

Leave existing connections on the 1st router as is, and run an additional CAT-5 from a LAN port on the 1st router to the WAN port on the Elan (D-Link) router. Connect all other network devices that are to be used with Elan to LAN ports on the 2nd router.

Settings in 1st Router (Options 4&5):

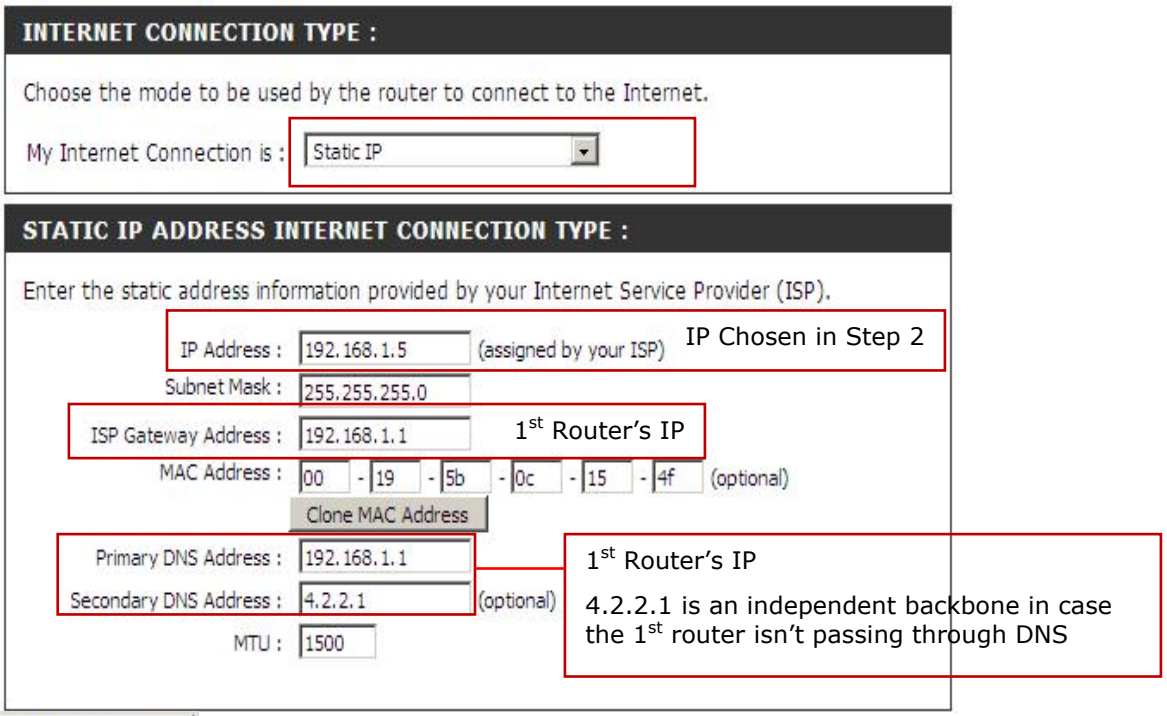
1. **DHCP Settings**. Locate the LAN or Network setup for the router and look for the DHCP settings. Some routers are configured to have full DHCP ranges by default which could inhibit setting up a Static IP for the 2nd router. In most instances we will not need to make any changes here and are just interested in this range. However, if the router has the entire IP range available to DHCP (2-254), you will want to alter the DHCP range. Typically a home network is set to allow 50-150 DHCP clients and this is more than enough for most installations. Write down or remember the range.
    - **Note**: You may optionally disable DHCP on the 1st router if you will be connecting **ALL** devices (including devices not associated with Elan like customer PC's, printers etc.) behind the HL router. If the device has wireless and you disable DHCP, it is recommended you also disable wireless to prevent accidental connections to a network that won't issue IP addresses.
    - **DHCP Reservations**: If the router/modem supports "DHCP Reservations", you may set the 2nd routers WAN to Dynamic and create a reservation for it in the 1st router as an alternative to using a static IP. Note that this method is less desirable than using a Static IP.
    - **DHCP Non-editable**: If you encounter a modem/router that where the DHCP range isn't editable, and there are no available address for static addressing, setting a Static IP within the range is not recommended, as any address in the DHCP range could be given out--causing an IP conflict. Using such router/modems should only be done as a last resort, as port forwarding or DMZ routing through this device will not be reliable.
2. **Choose a Static IP**. To setup a static IP for the 2nd routers WAN port, we need to choose an IP outside the DHCP range of the 1st router which is not being used by any other devices. Check with your homeowner for information on any static devices they may have on their network. If you cannot find this information out, pick an IP outside the DHCP range, for example 192.168.1.5, and ping it.
    - To Ping, choose Start>Run and type in CMD. This will open the command prompt (black "DOS" box). Type in "ping 192.168.1.5" without the quotes. If there is no response it is probable this IP is open and free to use. If there is a response, try another IP until you find one that is free. You may also use an IP Scanner such as Angry IP Scanner to help with this step.
3. **Setup Port Forwarding or DMZ as described below:**
    - **Option 4 : Setup Port Forwarding**. Using manufacturer documentation or portforward.com, setup port forwarding to the static IP you chose in the last step. Portforward.com contains screenshots and step by step instructions and is a good guideline to follow. Find your router model and choose any application to follow the guides, remembering to substitute names and ports as below.
        - Name the rules something you'll remember, like Elan or HL.
        - Forward ports 443 and 5001 to the 2nd routers static IP you chose in the last step.
        - Configure port 443 for TCP traffic, and port 5001 for BOTH TCP and UDP traffic. If there is not a "Both" option, setup a separate TCP and UDP rule for port 5001. If you are Port Forwarding to a MultiBrick, forward ports 443 (TCP) and 2199 (TCP) instead.
    - **Option 5: Place the 2nd Routers Static IP in the DMZ**. Using manuals or materials from the internet for assistance set the static IP you chose for the WAN port of the 2nd router in the DMZ of 1st router. Recall that all items in DMZ are unprotected, so incoming traffic from all IP addresses and on all ports will be received by devices in the DMZ. This will allow ports 443 and 5001/2199 to be forwarded correctly by the router in the DMZ to the Elan Controller while other traffic is filtered out normally by the routers firewall.

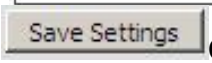
Options 4&5-- Settings in 2nd router (Elan D-Link Router):

1. **WAN Settings**. Configure the WAN settings on your router to a Static IP. See screen shots below:

- **On the WBR-2310 Manually configure the Internet Settings (WAN)** 

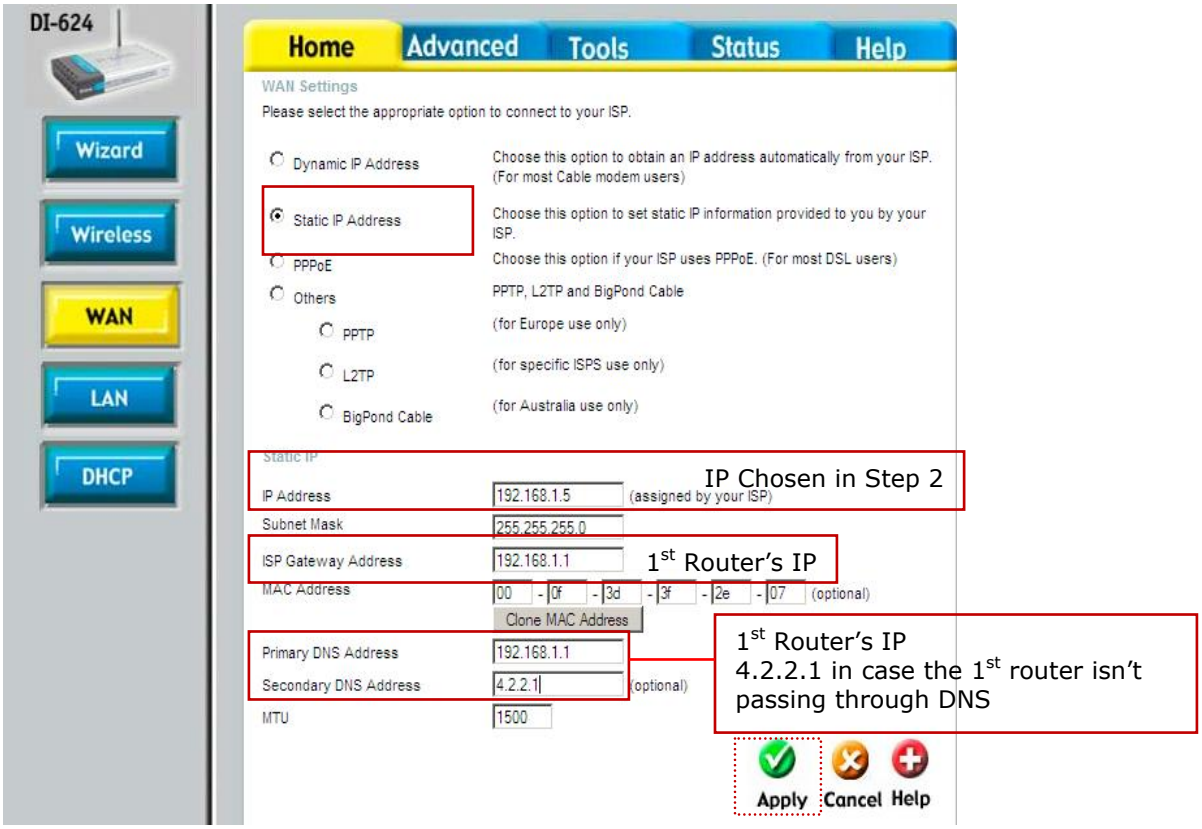
- **Configure as shown**



- 

Choose Save Settings at the top.

- **On the DI-624 router:**



Apply when finished.

2. **Port Forwarding**. Port forwarding to the Elan Controller should already be configured. The ports forwarded in the 1st router are sending data received on ports 443 and 5001 to the Elan router, or the DMZ will be allowing full access through to the 2nd router. When received by the Elan router, ports 443 and 5001 are forwarded to the Elan Controller. If you have reset your router or port forwarding, see the screen shots below for setup.
    - **Settings for the WBR-2310:**

    - **Settings for the DI-624:**