Static IP address configuration

Introduction

Normally all addresses will be allocated on the router's local network, via a DHCP server built into the router. This is enabled by default and in the vast majority of cases works fine.

There are instances where there is a requirement to configure a local PC etc with a static IP address, particularly where port forwarding has been setup.

If you suspect a problem with the DHCP server (maybe because you didn't get a valid IP address e.g. one that starts 169.x.x.x), you can test this by temporarily setting up a static IP address.

Static IP addressing is often confused with DHCP permanent leases, where the router appears to be able to convert a DHCP allocated address into a static address. This can be done on both the D-Link & Huawei routers, ***but is NOT the same as static IP addressing***. The router has limitations on the number of devices that can have these permanent leases, whereas the number of true static IP addresses are only limited by the number of hosts allowed on a subnet (typically 253 plus the router). If the DHCP server fails in a router, then these permanent leases will not work, true static IP addresses will continue to work OK during this failure.

A static IP address needs to be configured on the PC, or device itself and then excluded from the DHCP server IP address range. However, it is not just the IP address that needs to be configured on the PC etc, there are normally four entries that must be made, although some special devices may require some other parameters as well. The essential details are:-

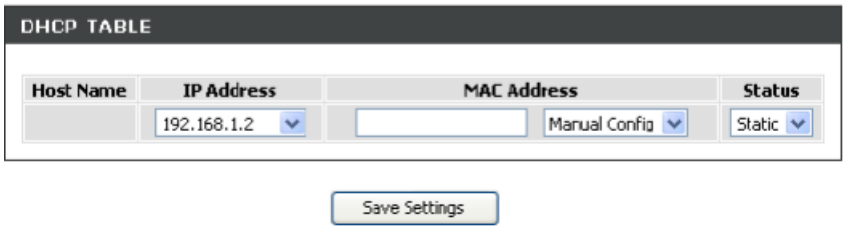
1. IP address – this is the address to be used by the PC, e.g. 192.168.1.50
2. Subnet mask – normally 255.255.255.0
3. Default gateway – IP address of router – normally 192.168.1.1
4. DNS Server(s) – typically 192.168.1.1

Other sections in this document

Static IP address configuration

Static Addresses (permanent leases) on D-Link routers

Most D-Link routers have a DHCP table at the bottom of the “LAN Setup” page:-



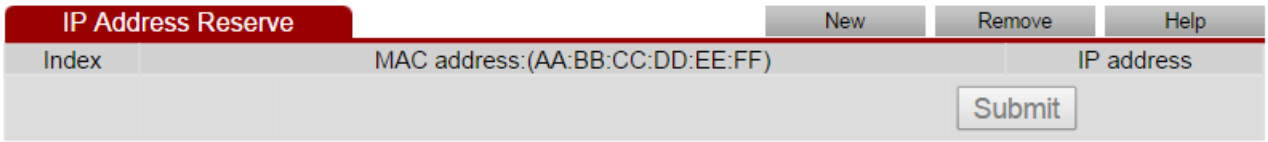
D-Link say that any IP address seen in this table that has been assigned dynamically by DHCP can be converted into a static address, providing its MAC address is also display correctly.

This is ***NOT*** static IP addressing, but creating a permanent lease within the DHCP server for that device's MAC address. What this means is, when the PC connects to the router's Wi-Fi, or wired network, it still requests an IP address via DHCP. However, due to the permanent lease, the server will always allocate the same IP address information. Therefore it will **not** work, if the DHCP server fails for some reason.

This is not the case with true static addressing as outlined previously. If the DHCP server fails, these devices continue to work as normal.

DHCP IP Address Reservations (permanent leases) on Huawei routers

Just like the earlier section on static IP addresses (permanent leases) D-Link routers, the DHCP IP Address reservations section is ***NOT*** static IP addressing, but creating a permanent lease within the DHCP server for that device's MAC address.



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This is not the case with true static addressing as outlined previously. If the DHCP server fails, these devices continue to work as normal.

Static IP address configuration

Planning

Before setting up a static IP address, consideration must be made about what addresses can be used. In the normal environment the router will be 192.168.1.1, which leaves this address range for this subnet as:-

192.168.1.2 to 192.168.1.254

Whatever address chosen to be used as a static address must be excluded from the IP address range of the DHCP server, otherwise it will also hand out this address to another device. This will lead to a situation of duplicate IP addresses on the same ethernet network. This must be avoided at all costs, because it will have serious implications on the devices wrongly “sharing” this duplicate address. In addition all devices on the local network trying to communicate with such a device is likely to fail or be delayed.

It is easiest to choose an IP address at the end of the range shown above, because most DHCP servers built into domestic broadband routers cannot exclude some addresses in the middle of their range.

Therefore maybe choose a DHCP IP address range from:-

192.168.1.2 to 192.168.1.240.

Then allocate static IP addresses from:-

192.168.1.241 to 192.168.1.254

This way addresses from 192.168.1.241 to 192.168.1.254 are safely excluded from being allocated by the DHCP server.

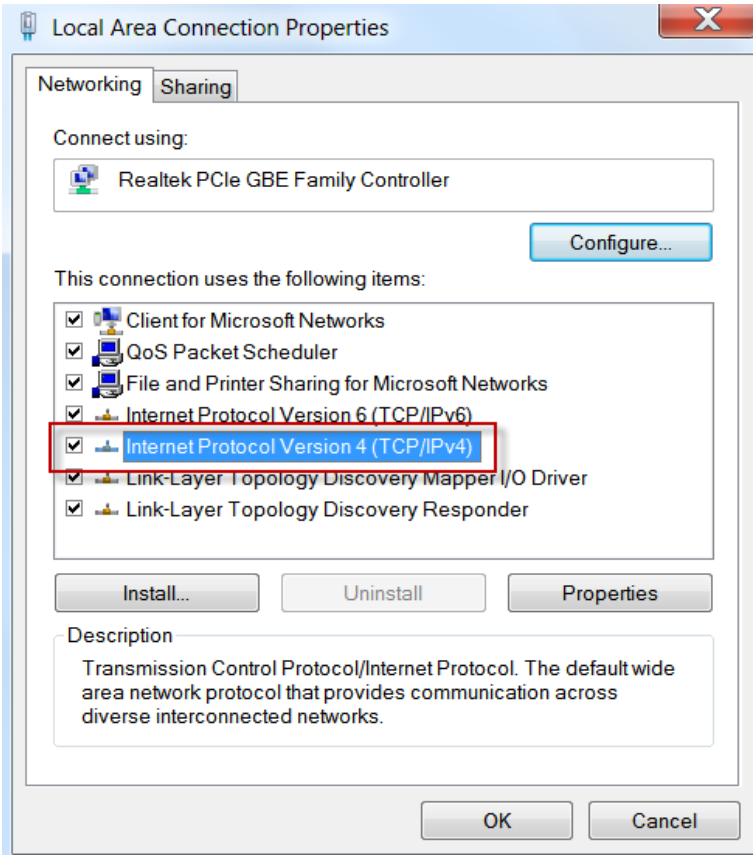
The configuration examples that follow are based on this range.

Static IP address configuration

Windows PC static IP address configuration

From Windows 7, right click on the network icon in the “Notification Area” & select the “Network and Sharing Center”. The “Network and Sharing Center”, can also be reached from Control Panel. Older versions of Windows use the “Network” applet in Control Panel.

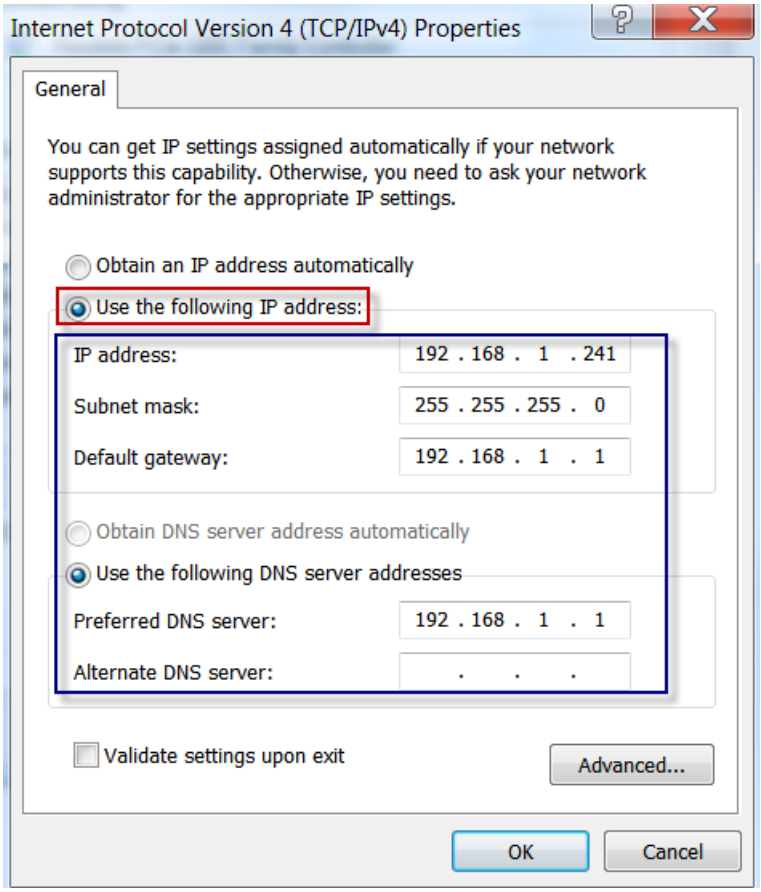
From the “Network and Sharing Center”, click on “Change Adapter Settings” on the left. Select the appropriate adapter, right click it & select “Properties”. This will display the screen below, from there select Internet Protocol Version 4 (TCP/IPV4), make sure that you do not accidentally set an Ipv6 address. Next click the “Properties” button:-



Static IP address configuration

In the screen below, select “Use the following IP address” and in the blue area shown below, setup the relevant address details, as covered earlier.

In the example used in this document, the DHCP server can hand out addresses from 192.168.1.2 to 192.168.1.240. This makes 192.168.1.241 the first available static IP address. Do not forget to add the other parameters shown here:-



Once done click OK until all windows are closed.

Windows Phone

I cannot confirm this as I have no access to such a phone, but from internet research it would seem that Windows Phone V8 & 8.1 do not support static IP addressing.

Static IP address configuration

iPhone, iPad & MacBook Static IP address configuration

On the iPad etc, tap on the “Settings” icon:-

Then tap on “General” and “Wi-Fi” and look for the network name you are connected to.

Next tap the blue arrow next to it. This will display the wireless TCP/IP configuration settings. Click on the “Static” tab below:-

Static IP address configuration

This will allow the static IP address information to be configured:-

Static IP address configuration

Android Static IP address configuration

Android 2.x

Go into “Settings” > “Wireless & Networks” and ensure that you are already connected to the desired network. Then press the Menu key & choose “Advanced”. In the IP Settings section, tick “Use static IP”.

Then tap the arrows against:-

IP addressing

Gateway

Netmask - use the normal dotted decimal format 255.255.255.0

DNS 1

DNS 2

Enter the required information

Android 3.x

Open Settings

Touch Wireless & networks on the left

Touch Wi-Fi settings

Find the network you wish to connect to and long press it (touch and hold).

Touch Modify Network

Touch the IP Settings drop down and change from DHCP to Static

Enter the settings for your network.

Android 4.0

Open Settings

Under the Wireless & networks heading on the left, Touch Wi-Fi

Find the network you wish to connect to and long press it (touch and hold).

Touch Modify Network

Touch the Show Advanced Settings check box in the lower left corner of the dialog box. If the Show Advanced Settings option is not displayed, you may need to go back a step and Touch Forget Network, and then, when you reset up the network, you will see the Show Advanced Settings option

Touch the IP Settings drop down and change from DHCP to Static

Enter the settings for your network

Static IP address configuration

Android 4.1 & later

Tap Settings > “Wi-Fi”

Touch & hold the desired wireless network

Tap “Modify network configuration”

Tick “Show advanced options”

Scroll down to “IP Settings” & change the drop down to Static

Then enter all of the IP addressing information.

Note the subnet mask has to be entered in the “Network Prefix length”. It is not entered in its 255.255.255.0, but in CIDR (Classless Inter Domain Routing) notation. This is the number of bits in the mask set to binary 1. For 255.255.255.0 enter 24 in this box. This equates in binary to:-

11111111.11111111.11111111.00000000

Static IP address configuration

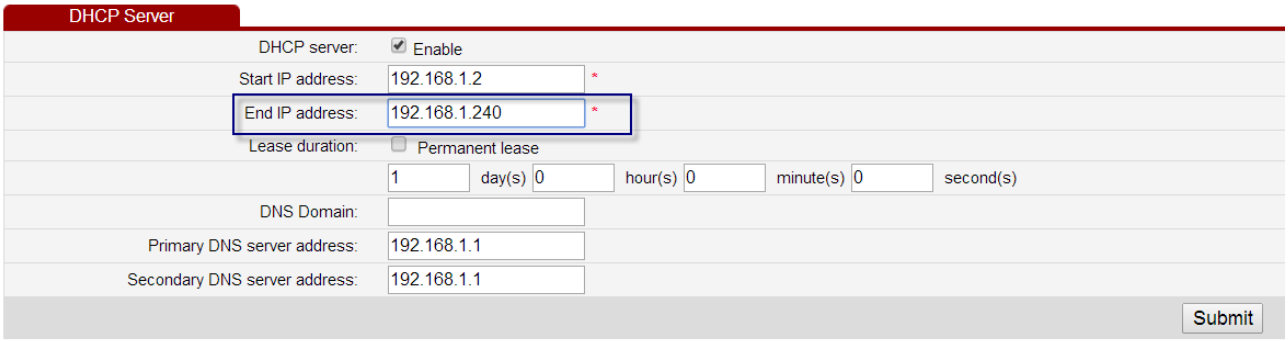
Exclude IP addresses from DHCP server on Huawei HG routers

Log onto the router and click on the “Advanced” mode tab on the left.

From there go into:-

Basic > Lan

Then click on the DHCP tab at the top. In there look at the “DHCP Server” section & change the “End IP address to 192.168.1.240 and click “Submit”:-



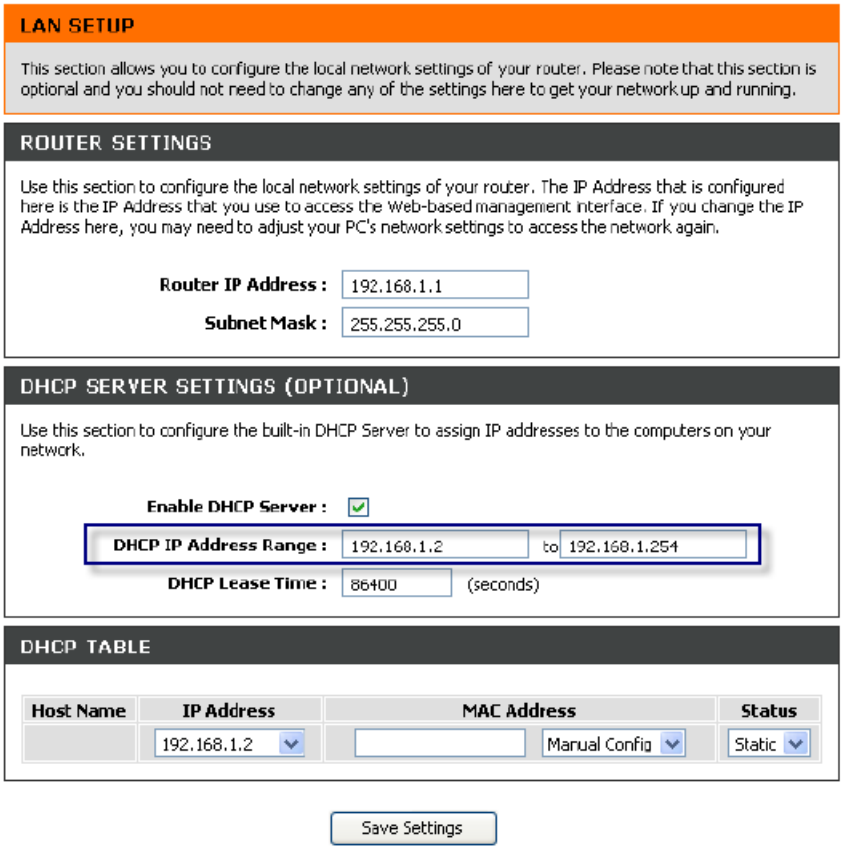
Please see the earlier notes on Huawei routers & IP address Reservations.

Static IP address configuration

Exclude IP addresses from DHCP server on D-Link DSL routers

Log onto the router and click on the “Setup” tab across the top, and then “LAN Setup” on the left.

In the “DHCP IP Address Range” section set the “to” address to 192.168.1.240. Click the “Save Settings” button at the bottom:-



Please see the earlier notes about static IP addresses on D-Link routers.

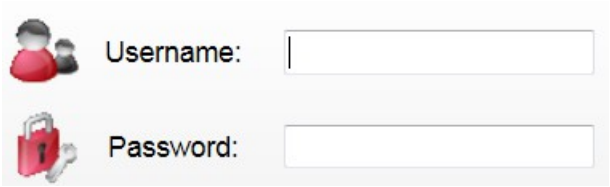
Static IP address configuration

Router log on

To check most of the settings in this document, you will need to log in to your router's web management system. To do this open a web browser (e.g. Internet Explorer, Mozilla Firefox, or Google Chrome) and in the address bar enter this address:-

(http://192.168.1.1)

The router will respond with a username/password prompt:-



enter the details:-

username: admin
password: admin (or your own password if different)