

# How to use a DD-WRT router to provide wifi access to an Broadband Mesh Network

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How to connect two different router (wired connected) to use a mesh net router as primary router with DHCP and DNS services and a DD-WRT router as a WiFi Access Point to bridge to the mesh network. All WiFi clients will use the same DHCP server and will have access to shared resources on the mesh network.

**Our goal:** connect one DD-WRT router and one Broadband Mesh Node to share the same DHCP server for all the clients, allowing every client access to shared resources on the Mesh network.

- Connection between routers is wired.
- The Mesh Router has DHCP enabled.
- Clients can be on the same subnet.
- All clients can see one another in the network.
- All clients can access to shared resource (like Printer, HD USB, NAS,...).
- Minimal changes to the Mesh Router configuration

# Configure the Mesh Node Router

The screenshot shows the 'Basic Setup' page of a Mesh Node Router configuration interface. At the top, there are navigation tabs: 'Node Status', 'Basic Setup' (highlighted), 'Port Forwarding, DHCP, and Services', and 'Administration'. Below the tabs are buttons: 'Help', 'Save Changes' (with a red arrow #4 pointing to it), 'Reset Values', 'Default Values', and 'Reboot' (with a red arrow #5 pointing to it). The main configuration area is divided into three sections: 'WiFi', 'LAN', and 'WAN'. In the 'LAN' section, 'LAN Mode' is set to '13 host Direct' (with a red arrow #2 pointing to it), 'IP Address' is '10.187.83.177' (with a red arrow #1 pointing to it), 'Netmask' is '255.255.255.240', and 'DHCP Server' is checked (with a red arrow #3 pointing to it). The 'DHCP Start' is 178 and 'DHCP End' is 190. The 'WiFi' section shows 'Protocol' as 'Static', 'IP Address' as '10.139.181.59', 'Netmask' as '255.0.0.0', 'SSID' as 'BroadbandHamnet', 'Mode' as 'Ad-Hoc', and 'Channel' as '1'. The 'WAN' section shows 'Protocol' as 'DHCP', 'DNS 1' as '8.8.8.8', 'DNS 2' as '8.8.4.4', and 'Mesh Gateway' as unchecked. There is also an 'Active Settings' section with 'Rx Antenna' as 'Diversity', 'Tx Antenna' as 'Diversity', 'Tx Power' as '19 dBm', and 'Distance' as '0'. An 'Apply' button is at the bottom of the 'Active Settings' section.

WiFi	LAN	WAN
Protocol: Static	LAN Mode: 13 host Direct	Protocol: DHCP
IP Address: 10.139.181.59	IP Address: 10.187.83.177	DNS 1: 8.8.8.8
Netmask: 255.0.0.0	Netmask: 255.255.255.240	DNS 2: 8.8.4.4
SSID: BroadbandHamnet	DHCP Server: <input checked="" type="checkbox"/>	Mesh Gateway: <input type="checkbox"/>
Mode: Ad-Hoc	DHCP Start: 178	
Channel: 1	DHCP End: 190	
Active Settings		
Rx Antenna: Diversity		
Tx Antenna: Diversity		
Tx Power: 19 dBm		
Distance: 0		
Apply		

Figure 1

1. In the Main Router determine what the Lan IP address and Netmask are.
  - a. #1 in Figure 1.
2. Change the Lan Mode to 13 host Direct
  - a. #2 in Figure 1.
3. Make certain that DHCP Server is checked
  - a. #3 in Figure 1.
4. Save these changes
  - a. #4 in Figure 1
5. Reboot the Mesh Node Router
  - a. #5 in Figure 1

# Configure the DD-WRT Router

1. Restore DD-WRT factory defaults with a Hard Reset (30-30-30)
2. Connect the DD-WRT Router to a computer via LAN cable.
3. Access the router configuration using an internet browser (Default: <http://192.168.1.1>)
  - o the default username is **root** and the default password is **admin**

The screenshot shows the DD-WRT control panel with the following sections and highlighted items:

- WAN Setup**
  - WAN Connection Type: Automatic Configuration - DHCP (Arrow 1)
  - STP: ☐ Enable ☒ Disable
- Optional Settings**
  - Router Name: nb7o-mesh-wifi-access (Arrow 2)
  - Host Name: (Arrow 3)
  - Domain Name: (Arrow 3)
  - MTU: Auto (Arrow 3)
- Network Setup**
  - Router IP**
    - Local IP Address: 10.187.83.178 (Arrow 4)
    - Subnet Mask: 255.255.255.240 (Arrow 5)
    - Gateway: 10.187.83.177 (Arrow 6)
    - Local DNS: 10.187.83.177 (Arrow 6)
  - Network Address Server Settings (DHCP)**
    - DHCP Type: DHCP Forwarder (Arrow 7)
    - DHCP Server: 10.187.83.177 (Arrow 8)
- Time Settings**
  - NTP Client: ☒ Enable ☐ Disable
  - Time Zone: UTC+01:00
  - Summer Time (DST): last Sun Mar - last Sun Oct
  - Server IP/Name: (empty)
- Buttons** (Arrow 9): Save, Apply Settings, Cancel Changes

**Help** section on the right:

- Automatic Configuration - DHCP:** This setting is most commonly used by Cable operators.
- Host Name:** Enter the host name provided by your ISP.
- Domain Name:** Enter the domain name provided by your ISP.
- Local IP Address:** This is the address of the router.
- Subnet Mask:** This is the subnet mask of the router.
- DHCP Server:** Allows the router to manage your IP addresses.
- Start IP Address:** The address you would like to start with.
- Maximum DHCP Users:** You may limit the number of addresses your router hands out. 0 means only predefined static leases will be handed out.
- Time Settings:** Choose the time zone you are in and Summer Time (DST) period. The router can use local time or UTC time.

Figure 2

1. In Setup -> Basic Setup tab:
  - a. Confirm Connection Type is Automatic Configuration – DHCP
    - i. #1 in Figure 2

- b. Enter a name for the Router
  - i. #2 in Figure 2
- c. Leave hostname and Domain Name Blank
  - i. #3 in Figure 2
- d. Set a static Router IP
  - i. Local IP Address: xxx.xxx.xxx.xxx
    1. #4 in Figure 2
      - a. (Mesh Node's IP address plus 1)
      - b. E.G. if Mesh Node router's IP is 10.187.83.177 then the DD-WRT router IP would be 10.187.83.178
    - ii. Subnet Mask: 255.255.255.240 (same as netmask in Mesh Node)
      1. #4 in Figure 2
    - iii. Gateway: xxx.xxx.xxx.xxx (Mesh Node IP address)
      1. #5 in Figure 2
    - iv. Local DNS: xxx.xxx.xxx.xxx (Mesh Node IP address)
      1. #6 in Figure 2
- e. Network Address Server Settings (DHCP)
  - i. DHCP type: DHCP forwarder
    1. #7 in Figure 2
  - ii. DHCP Server: xxx.xxx.xxx.xxx (Mesh Node IP address)
    1. #8 in Figure 2
- f. Save these changes
  - i. #9 in Figure 2

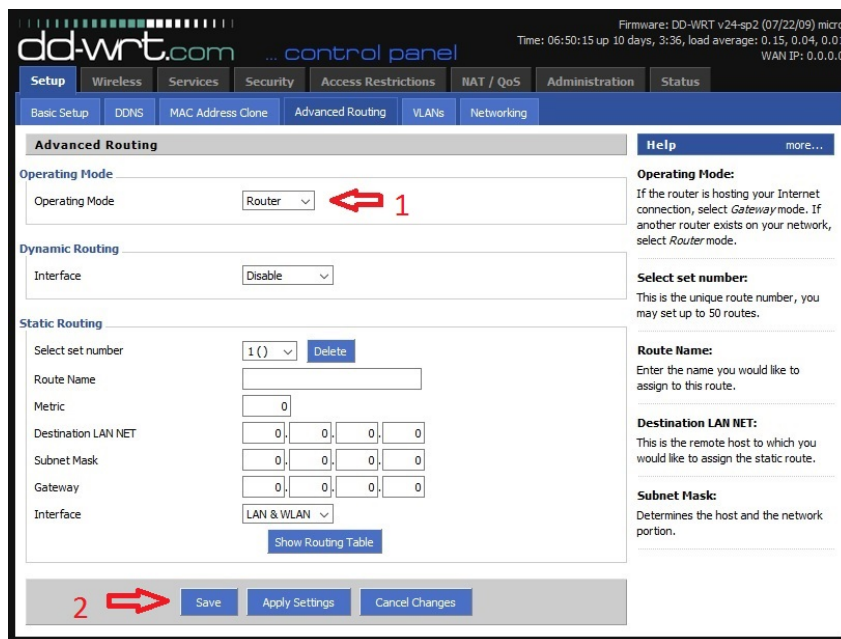


Figure 3

2. In Setup -> Advanced Routing tab:
  - a. Operation Mode: Router
    - i. #1 in Figure 3
  - b. Save this change

i. #2 in Figure 3

dd-wrt.com ... control panel

Firmware: DD-WRT v24-sp2 (07/22/09) micro  
Time: 00:06:45 up 9 days, 20:53, load average: 0.04, 0.04, 0.00  
WAN IP: 0.0.0.0

Setup **Wireless** Services Security Access Restrictions NAT / QoS Administration Status

Basic Settings Radius Wireless Security MAC Filter Advanced Settings WDS

**Wireless Physical Interface wlo**

Physical Interface wlo - SSID [NB70-Mesh] HWAddr [00:1C:10:C5:D1:ED]

Wireless Mode: AP (1)

Wireless Network Mode: Mixed

Wireless Network Name (SSID): NB70-Mesh (2)

Wireless Channel: 6 - 2.437 GHz (3)

Wireless SSID Broadcast: ☒ Enable ☐ Disable

Sensitivity Range (ACK Timing): 2000 (Default: 2000 meters)

Network Configuration: ☐ Unbridged ☒ Bridged

**Virtual Interfaces**

Add

4 Save Apply Settings Cancel Changes

**Help** more...

**Wireless Network Mode:**  
If you wish to exclude Wireless-G clients, choose *B-Only* mode. If you would like to disable wireless access, choose *Disable*.  
**Note :** when changing wireless mode, some advanced parameters are susceptible to be modified ("Afterburner", "Basic Rate" or "Frame Burst").

**Sensitivity Range:**  
Adjusts the ack timing. 0 disables ack timing completely for broadcom firmwares. On Atheros based firmwares it will turn into auto ack timing mode

Figure 4

3. In Wireless -> Basic Settings tab:
  - a. Wireless Mode: AP
    - i. #1 in Figure 4
  - b. Wireless Network Name (SSID): enter an SSID that will advertise the presence of the WiFi router to users
    - i. #2 in Figure 4
  - c. Wireless Channel: select an appropriate channel for the location of the router. Do not use Channel one or two as those channels will be busy with the Mesh Nodes talking to each other.
    - i. #3 in Figure 4
  - d. Save these changes
    - i. #4 in Figure 4

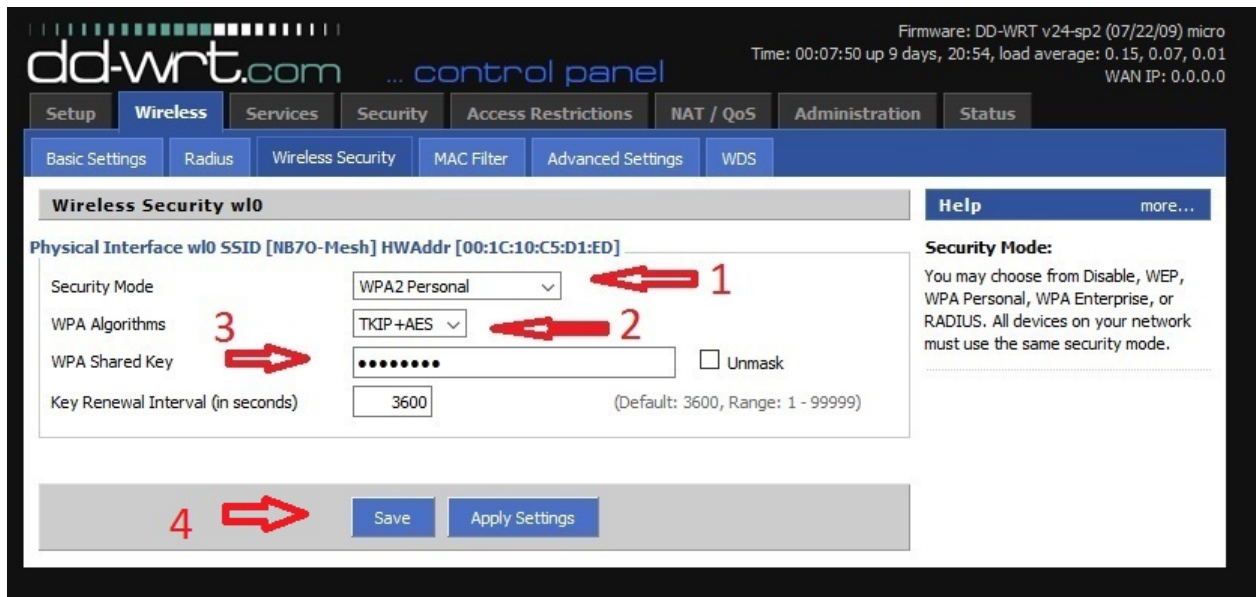


Figure 5

4. In Wireless -> Wireless Security tab:
  - a. Security Mode: WPA2 Personal (*recommended*)
    - i. #1 in Figure 5
  - b. WPA algorithms: TKIP+AES (*recommended*)
    - i. #2 in Figure 5
  - c. WPA Shared Key: enter a password that you can remember
    - i. #3 in Figure 5
  - d. Save these changes
    - i. #4 in Figure 5

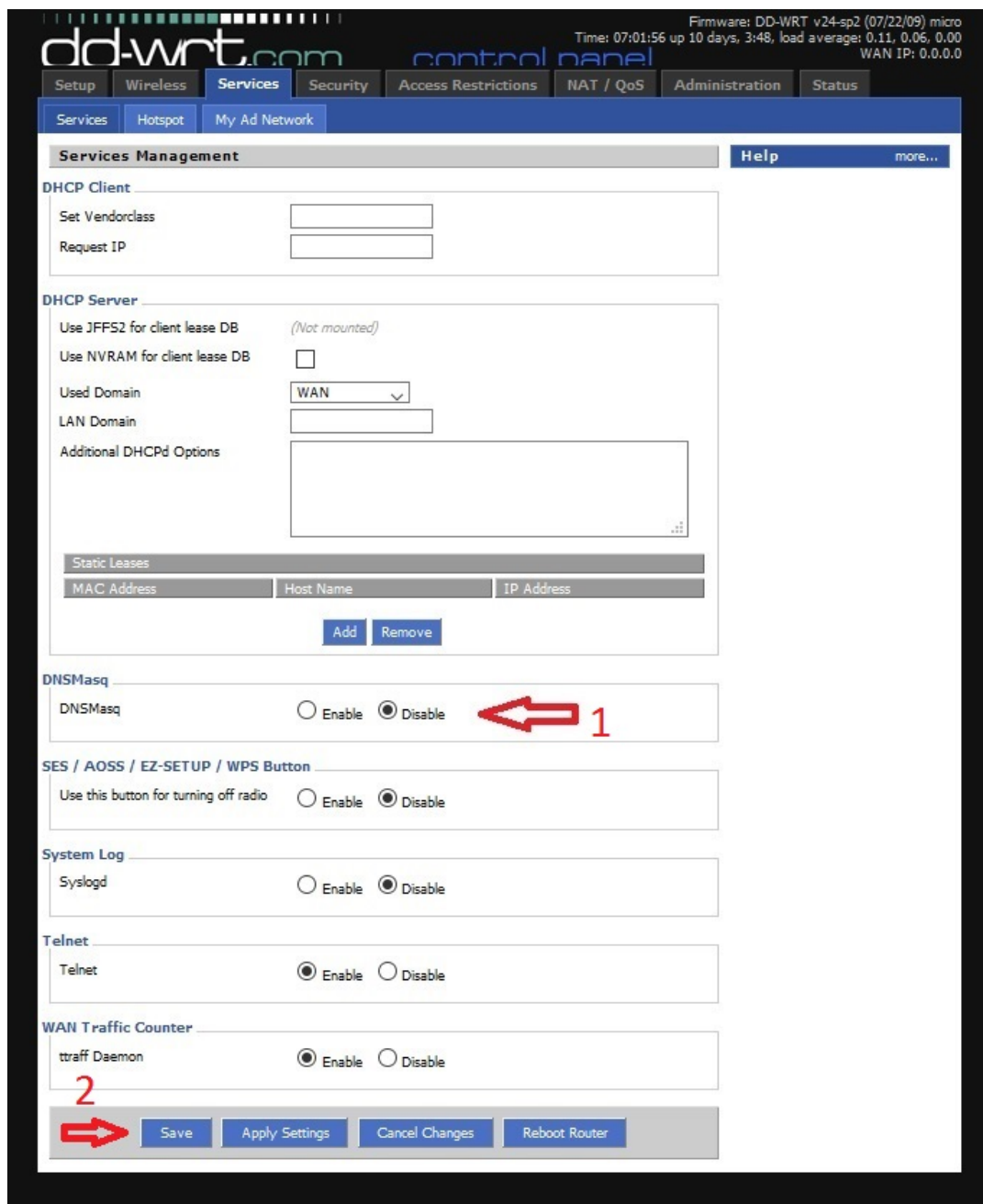


Figure 6

5. In Services -> Services tab:
  - a. DNMasq: disabled
    - i. # 1 in Figure 6
  - b. Local DNS: disabled
    - i. Not shown in Figure 6 – Not available in this version DD-WRT
  - c. Save these changes
    - i. #2 in Figure 6



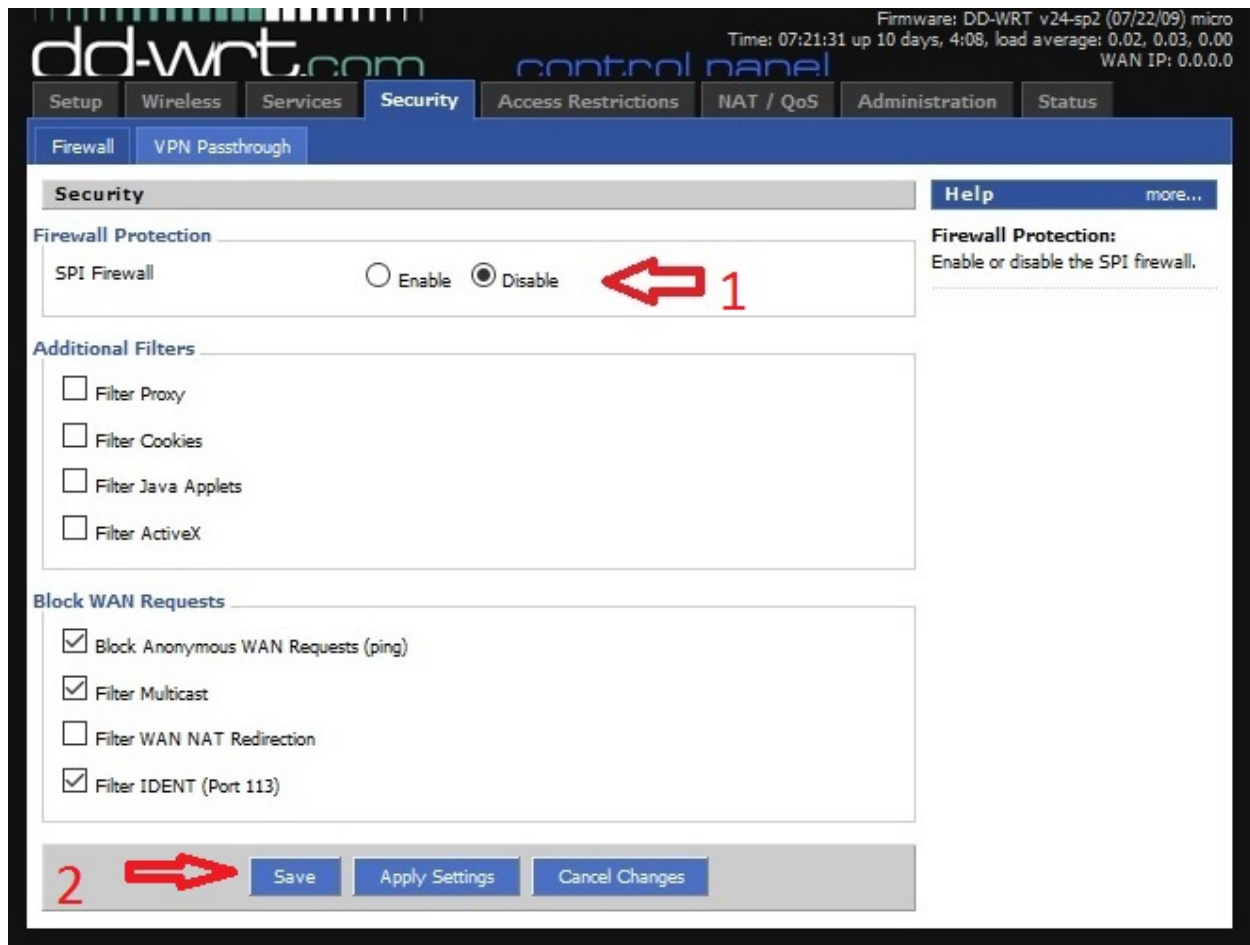


Figure 7

6. In Security -> Firewall tab:
  - a. SPI Firewall: disabled
    - i. # 1 in Figure 7
  - b. Save this change
    - i. #2 in Figure 7



dd-wrt.com

... control panel

Firmware: DD-WRT v24-sp2 (07/22/09) micro

Time: 00:11:11 up 9 days, 20:57, load average: 0.11, 0.07, 0.01

WAN IP: 0.0.0.0

Setup

Wireless

Services

Security

Access Restrictions

NAT / QoS

Administration

Status

Basic Settings

Radius

Wireless Security

MAC Filter

Advanced Settings

WDS

Advanced Wireless Settings

Help more...

Advanced Settings

Authentication Type

☒ Auto
☐ Shared Key

(Default: Auto)

Basic Rate

Default

(Default: Default)

Transmission Fixed Rate

Auto

(Default: Auto)

CTS Protection Mode

☒ Auto
☐ Disable

(Default: Auto)

Frame Burst

☐ Enable
☒ Disable

Beacon Interval

100

(Default: 100ms, Range: 10 - 65535)

DTIM Interval

1

(Default: 1, Range: 1 - 255)

Fragmentation Threshold

2346

(Default: 2346, Range: 256 - 2346)

RTS Threshold

2347

(Default: 2347, Range: 0 - 2347)

Max Associated Clients

128

(Default: 128, Range: 1 - 256)

AP Isolation

☐ Enable
☒ Disable

(Default: Disable)

TX Antenna

Auto

(Default: Auto)

RX Antenna

Auto

(Default: Auto)

Preamble

Long

(Default: Long)

Shortslot Override

Auto

(Default: Auto)

TX Power

200

(Default: 71, Range: 1 - 251mW)

Afterburner

Disable

(Default: Disable)

Bluetooth Coexistence Mode

Disable

(Default: Disable)

Wireless GUI Access

☒ Enable
☐ Disable

(Default: Enable)

Authentication Type:

You may choose from Auto or Shared Key. Shared key authentication is more secure, but all devices on your network must also support Shared Key authentication.

Radio Time Restrictions:

Click any hour to enable or disable the radio signal (green indicates allowed Wireless access, and red indicates blocked Wireless access)

Radio Time Restrictions

Radio Scheduling

☐ Enable
☒ Disable

(Default: Disable)

Wireless Multimedia Support Settings

WMM Support

☒ Enable
☐ Disable

(Default: Enable)

No-Acknowledgement

☐ Enable
☒ Disable

(Default: Disable)

EDCA AP Parameters (AP to Client)

CWmin

CWmax

AIFSN

TXOP(b)

TXOP(a/g)

Admin Forced

1

2

Figure 8

7. In Wireless – Advanced Settings
  - a. Adjust the Tx Power to a level that will meet your needs.
    - i. #1 in Figure 8
      1. I regularly run 200 mW's without any problems with the router overheating
  - b. Save this change
    - i. #2 in Figure 8

- c. Close the Browser
8. Reboot the DD-WRT router by cycling the power.
9. Plug a computer network cable into one of the four DD-WRT router's "LAN" port on the back side of the DD-WRT Router
10. Plug the other end of the computer network cable into any of the four "LAN" ports on the back side of the "Mesh Node" Router.
11. Log into the DD-WRT Wifi connection using the advertised SSID and AP password.



Figure 9


12. Figure 9 shows that my laptop is connected to the DD-WRT WIFI with an SSID of NB7O-Mesh (also refer to Figure 4)

[Node Status](#)
[Basic Setup](#)

Port Forwarding  
 DHCP, and Services

[Administration](#)

[Help](#)



### DHCP Address Reservations

Hostname	IP Address	MAC Address	
Kevin-PC	10.187.83.181	bc:77:37:31:6d:f7	<input type="button" value="Del"/>
<input type="text"/>	- IP Address -	<input type="text"/>	<input type="button" value="Add"/>

### Advertised Services

Name	Link	URL	
Web_Serv	<input checked="" type="checkbox"/>	http://Kevin-PC:80/index.htm	<input type="button" value="Del"/>
Hamchat	<input checked="" type="checkbox"/>	http://NB7O-AP3:8080/cgi-bin/ha	<input type="button" value="Del"/>
<input type="text"/>	<input type="checkbox"/>	://NB7O-AP3:/	<input type="button" value="Add"/>

### Current DHCP Leases

MSI	10.187.83.184	dc:53:60:48:85:96	<input type="button" value="Add"/>
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Figure 10

13. Figure 10 shows that my laptop has been assigned an IP address from the DHCP server that is in the Mesh Node
  - a. #1 in Figure 10
14. Figure 10 also shows another PC, named Kevin-PC, that has a DHCP address reserved for it. Even though this second laptop is attached to the mesh node it is not listed in the DHCP lease list because it has an IP reserved for it.
  - a. #2 in Figure 10
15. Kevin-PC is a web, and other facilities, server. The web server is an advertised Service under the Mesh Node
  - a. #3 in Figure 10.

By using a DD-WRT router as a WiFi access point for a Broadband Mesh Network you will have the added power that will provide more range of coverage, better security, and an easier method to manage your wifi access point. Additionally, you do not need to use one of the few versions of WRT54G or Ubiquiti Routers as your access point. You can use one of the many routers that can be inexpensively purchased and flashed with the DD-WRT firmware.

Seven three and have fun with your Broadband Mesh Network

Kevin Hedgepeth/NB7O