



DWR-500 Wireless Mesh Router Quick Installation Guide

Version 1.0

Safety Warnings

DWR-500 must be installed by trained professional installation technician. Read all warning information below before installation.



GENERAL SAFETY WARNINGS

Beware of electrical power lines!

Ensure there is no high voltage electronic field or exposed power lines in the area where DWR-500 is installed.

Lightning Activity Warning

Do not connect or disconnect any cables to DWR-500 during periods of lightning activity. Surge protectors should be installed to prevent potential damage from surges caused by lightning.

Explosive Device Proximity Warning

Do not operate wireless network device close to explosive merchandise or environment. Electronic components emit electrical charges which can be a potential danger in the vicinity of any explosive medium, product or devices. For example, gas stations.

Antenna Placement Warning

Beware of power lines or electrical circuits near antenna installation site. Take extreme caution when installing antennas. Do not come into contact with power lines or electrical circuits as they can cause serious injury or death.

Grounding Warning

Always ground the equipment before power up. The required resistance must be less than 5 ohm between the ground termination points to grounding tier.

Power Socket Installation Warning

Power socket installation should be performed by a trained technician. If the main power supply is not available, please engage a trained technician to install the socket. Should power cord reassembly be required, it should be done by a trained technician to comply with local requirements.

Solar Radiation and high Temperature Protection

Solar radiation will cause the working temperature of DWR-500 to rise. Always take note the DWR-500 operating temperature range. When the DWR-500 is setup outdoors, please install the solar shade provided to protect the equipment. Warranty is void for outdoor installation of DWR-500 without solar shade setup. Please contact our authorized technical support engineers for more detailed information.

RF Device Protection

Before powering up DWR-500, radio ports MUST be connected to valid load (eg. Antenna). Powering up with unloaded radio ports is not recommended. Improper operation with power can cause damage of RF modules. D-Link will not take any responsibility for such damage.

DWR-500 Quick Installation Guide

This Quick Installation Guide provides step by step instructions for installing and setting up the DWR-500. Content includes methods to access the DWR-500, and basic configurations.

Scope of This Document

This is a quick start reference to orientate a first time user on the basic setup, installation and configuration of the DWR-500.

Further Reading

More detailed configuration instructions can be found in the DWR series web based configuration guide and DWR series CLI configuration guide.

Before You Begin

Open the shipping carton and carefully unpack its contents. The packing list is as shown below. Please ensure all items are present and undamaged. If any of the items is found missing or damaged, please contact your local D-Link representative as soon as possible.

Package Contents

<u>ITEM</u>	<u>QUANTITY</u>
DWR-500	1
Solar Shade	1
Installation Bracket	1
Power Cable	1
Screws and nuts for solar shade and bracket	10
Quick Installation Guide	1
CD-ROM	1
License	1

Hardware Introduction

Figure 1 shows the connectors on the DWR-500 Wireless Mesh Router.



Figure 1 DWR-500 and the location of the connectors

For safe installation and operation, it is recommended to take note of the following and the DWR-500 operational range in:

- Visually inspect the power cord and ensure it is secured fully to the AC Power Input.
- Verify there is proper heat dissipation and adequate ventilation
- Do not place heavy objects on the DWR-500

Installing the Solar Shade

As the DWR-500 is usually installed outdoors, the solar shade is provided for weather protection. It is highly recommended that the solar shade be used for outdoor installations.

Locate the parts from the package as shown in Figure 2.



Solar shade disperses heat from sunlight and prevent DWR-500 from overheating.

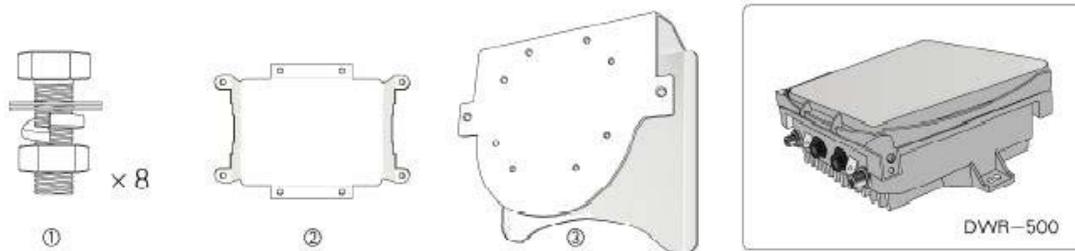


Figure 2 Eight Screws (item 1), installation bracket (item 2), solar shade (item 3) and DWR-500

With the screws provided, place the installation bracket (item 2) onto the solar shade (item 3). Secure the installation bracket with the screws and nuts as shown in Figure 3.



Figure 3 Tighten the nuts to secure the installation bracket

There are 2 ways to secure the installation bracket. This is dependent on the direction of the mast. If the mast is horizontal, secure the installation bracket (item 2) as shown on the left in Figure 4. If the mast is vertical, secure the installation bracket (item 2) as shown on the right in Figure 4.

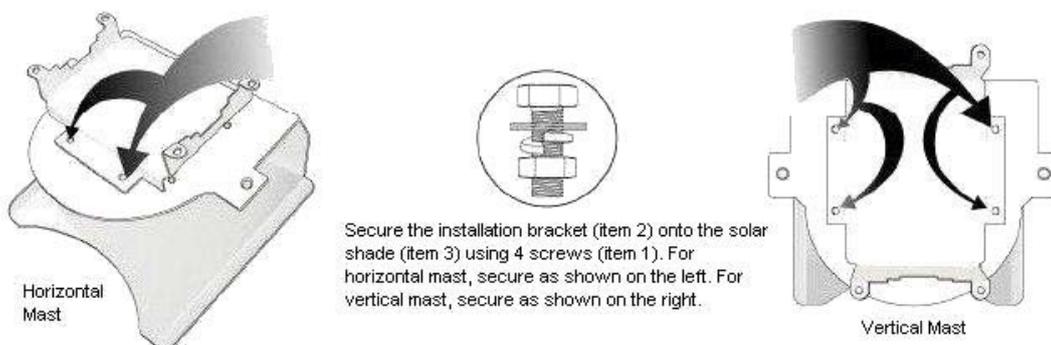


Figure 4 Secure the solar shade mast mount to solar shade

Remove the protectors from the top of the DWR-500 and slide the DWR-500 into the solar shade as shown in Figure 5.



Figure 5 Remove the protectors and slide DWR-500 into the solar shade.

Secure the DWR-500 onto the solar shade at the side with the screws provided as seen in Figure 6.

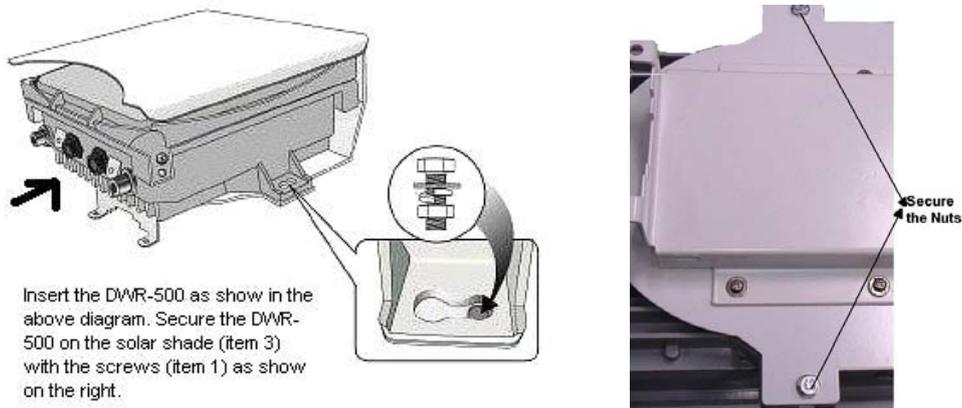


Figure 6. Secure DWR-500 onto the Solar Shade

Secure the screws at the top of the DWR-500 to the solar shade as shown in the left and center diagrams of Figure 7. The diagram on the right of Figure 7 shows the DWR-500 setup with solar shade and installation bracket.

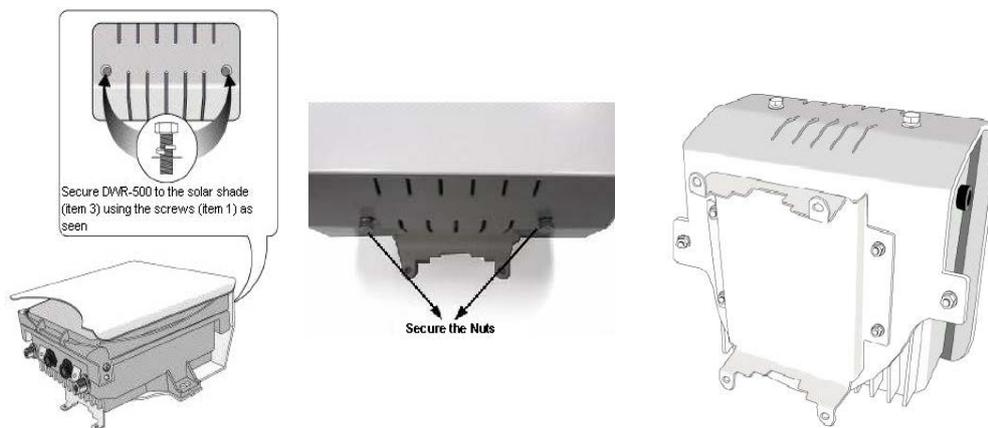


Figure 7. Secure DWR-500 to the solar shade at the top

Securing the DWR-500 on Mast

This section covers the installation of the DWR-500 onto a vertical mast in a typical environment. Slide the two anchor ear through the installation bracket as shown in Figure 8. Secure the DWR-500 onto the mast, aligning the installation bracket to the mast and tightening the anchor ears around it.



Figure 8. Slide the anchor ear through installation bracket and mount on vertical pole

Installing the DWR-500 on Wall

The DWR-500 can also be mounted onto a wall instead of a pole, by following these instructions. First, place the installation bracket against the wall to mark out the four positions to drill for the bolts. Proceed to drill into the four marked positions and screw in the expansion bolts. Mount the DWR-500 and the installation bracket onto the expansion bolts. Fasten the nuts to secure the DWR-500 to the wall as shown in Figure 9.



Figure 9. Wall mounted DWR-500

Grounding the DWR-500



DWR-500 must be grounded before power up. Grounding wire resistance must be less than 5 ohm.

The DWR-500 must be grounded to prevent electrostatic damage. The grounding terminal is at the side of the DWR-500. The grounding cable is to be attached to the grounding terminal on the DWR-500. First, secure the exposed end of the grounding cable to the copper ring by running the exposed wire through the copper ring and ensuring it is tightly wound. Next, on the DWR-500 grounding terminal, loosen the screw and place the copper ring through the grounding terminal, then refasten the screw. Connect the other end of the grounding cable to a grounding bar. Oil both the exposed ends of the grounding cable. Once the grounding installation is completed, it should appear as shown in Figure 10.



Figure 10. Grounding DWR-500.

Connecting the DWR-500 to Ethernet

At least one DWR-500 should be connected to the wired network to function as the gateway for traffic between the wired network and the wireless mesh network. Locate the nine pin Ethernet cable and uncap the connector protector on the DWR-500. Connect the nine pin Ethernet cable and turn it clockwise to secure it to the DWR-500 Ethernet port, then use PVC insulating tape to weather proof and secure the Ethernet cable to the port, as shown in the Figure 11.



Figure 11. Connect Ethernet cable to Ethernet port

Connecting the Power Cable to DWR-500



Installation of power source must be done by trained electrician.



DWR-500 must be grounded before power up.

The antennas should be setup before connecting the power source to DWR-500. Please refer to the respective antenna installation guide for further instructions. The power terminal is located on the left side of the DWR-500. Connect the power cable and turn it clockwise to fasten it to the power terminal, as shown in Figure 12. Use PVC insulating tape to weather proof and secure the power cable to the power terminal. Finally, secure the power cable, grounding cable, and the Ethernet cable to the mast using cable tie.



Figure 12. Connect the power cable to DWR-500

Administrating the DWR-500

IP Based Access

The DWR-500's default IP address is 192.168.0.1, with a subnet mask of 255.255.255.0 on Fast Ethernet port 0. To access the DWR-500 administration, set the connecting computer has a static IP address in the same subnet.

DWR-500 Web Management Interface is a graphical interface accessible from most internet browsers. Basic requirement needed to access the web-based GUI:

- Internet Explorer 5.5 and above with Javascript enabled or Mozilla Firefox
- Optimal Resolution : 1024 X 768 and above

Access the web-based GUI, open a browser and enter the URL: <http://192.168.0.1:9080>

Supply the following login details as shown in Table 1.

Web Based Account	root
Web Based Password	dlink ¹

Table 1. Web Login details

Once the login information is authenticated, DWR-500 needs to setup the frequency range for the country it needs to operate in the country code² selector as shown in Figure 14. The country code will only be selected ONLY at the first time the device is booted.



Figure 13. Web based login pop up

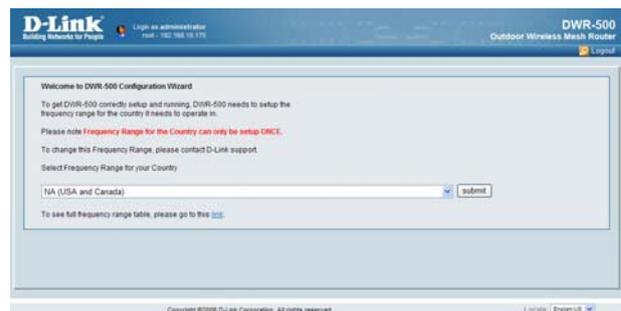


Figure 14. Country Code selector

¹ Please note that the root account in CLI (Terminal Account) is different from the root account in the WMI (Web Based Account), thus both of these two root accounts has their own password.

² Please select the country code carefully. The country code can NOT be changed after it is selected.

After the country code is selected, Frequency Range selection does not take effect until the router is rebooted, as shown in Figure 15.



Figure 15. Country Code selected

After router rebooted completely, the user-friendly and intuitive web based administrative GUI will be displayed, as shown in Figure 16, and ready for setting up the DWR-500.



Figure 16. Web based administrative GUI

Command Line Interface Access

Command Line Interface is the most comprehensive tool to configure the DWR-500.

The Command Line Interface can be access via Console port or Fast Ethernet Port 0. To connect to the console port of the DWR-500, a console cable, and a terminal simulation program such as the Hyper Terminal will be required.

Configure your terminal to the following settings as shown in Table 2. The login details are in Table 3.

Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

Table 2 Terminal setting



Figure 17. Connect console cable to DWR-500

The Command Line Interface of DWR-500 may be access via SSH³ at default IP address of Fast Ethernet port 0 (192.168.0.1). Supply the login details as shown in Table 3.

Terminal Account	root
Terminal Password	dlink

Table 3. Terminal Login details

```
DWR-500 login: root
Password: dlink

Hello, Welcome to D-Link CLI
Copyright 2006 D-Link Corporation

DWR-500> enable
DWR-500#
```

Figure 18. Terminal login session

Note: For more information of about CLI configuration, please refer to DWR Series Wireless Mesh Router CLI Configuration Guide.

³ For security reason, the Telnet service on DWR-500 is disabled by default.

DWR-500 Basic Configuration

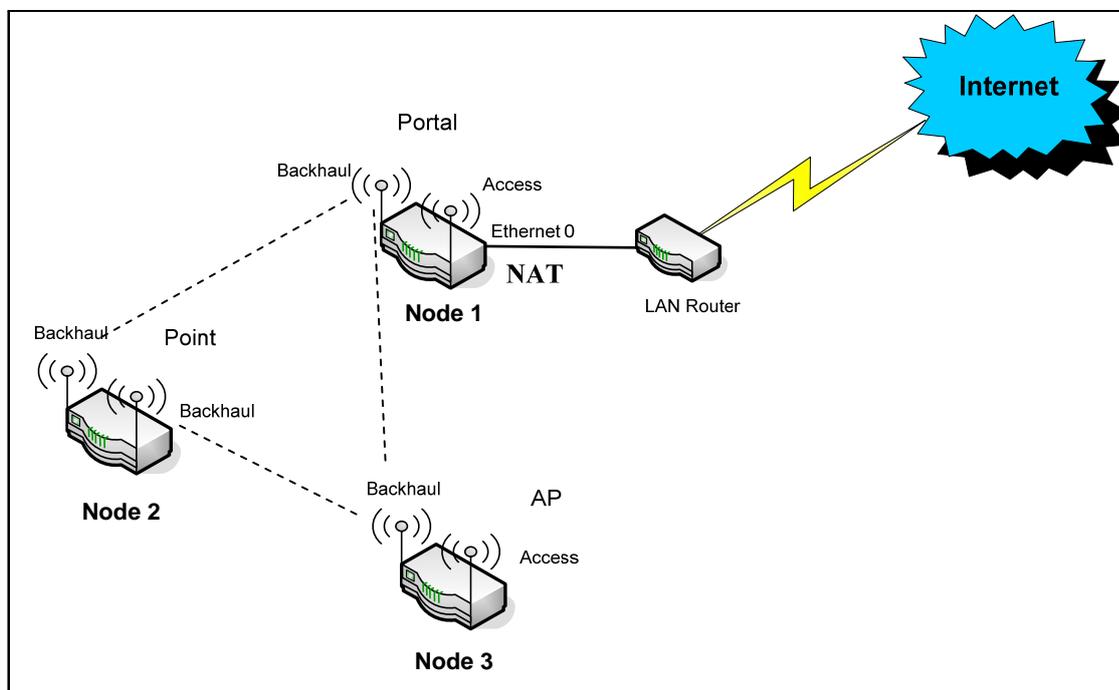


Figure 19. Layout diagram for the example

This network contains three DWR series routers (or nodes, as referred to hereon). Node 1 is referred to as a portal node because it has a direct, wired connection to the internet. It also contains two wireless connections formed by its two 802.11a/b/g radios. The first radio is configured in access mode, which means it services as one or more virtual access points (AP) for end-user devices that might be around this node. The other radio forms backhaul connections to the two other DWR series nodes, node 2 and node 3. The backhaul connections allow node 1 to send and receive network traffic to and from these other nodes, giving these other nodes an indirect connection to the internet.

Unlike node 1, node 2 does not serve any client devices but only forwards traffic to and from other nodes. As such, both of its radios are configured in backhaul mode. Such a relay-only node is known as a point node.

Node 3 is similar to node 1 in that it has one backhaul radio and one access radio, which means it is also capable of connecting to other DWR series routers and servicing client devices. However because it is not directly connected to a wired network, it is called an AP node.

The basic configuration settings required are shown in Table 4.

Name and Type	Portal	Point	AP
Node ID ⁴	1	2	3
Router ID ⁵	192.168.10.1	192.168.10.2	192.168.10.3
Ethernet-port IP/Mask ⁶	206.10.5.2/24	192.168.2.2/24	192.168.3.3/24
Ethernet Gateway ⁷	206.10.5.1	N/A	N/A
SSID for AP ⁸	D-Link	Not set	D-Link
DNS servers ⁹	206.10.10.12, 206.10.10.13	Not set	206.10.10.12, 206.10.10.13
Roaming (Dtrix) ¹⁰	Enabled	Disabled	Enabled
NAT ¹¹	Enabled	Disabled	Disabled

Table 4. Sample configuration used in the following example

Using the Quick Setup Wizard

To start configuring the DWR-500, access the web-based GUI. In the left navigation bar, click on “Quick Setup” to access the Quick Setup Wizard as seen in Figure 20.

The Quick Setup Wizard will prompt through a basic set of questions to setup DWR-500. After entering the selections, click the “Next” button to proceed. Use the “Back” button to return to the previous step. Click the “Finish” button at the end of the configuration steps will complete the configuration.

The screenshot shows the 'Quick Start Wizard' interface. The title is 'Step 1: Basic Settings'. There are two main sections: 'Node ID' and 'Select role'. The 'Node ID' section has a text input field and a '<1-255>' label. The 'Select role' section has a dropdown menu with 'AP' selected. Below the dropdown, there are three lines of explanatory text: 'AP: provide access coverage', 'Point: provide backbone connections in the network', and 'Portal: provide connection to the wired network and access coverage'. At the bottom right of the form area is a 'Next' button.

Figure 20. Quick Setup to configure DWR-500

⁴ Node ID can be any integer 1 and 255, and must be unique within a single mesh network.

⁵ Router ID is an IPv4 loopback address that identifies the router, and is usually the best way to connect to the administration functions of an operational router; must be unique within a single mesh network.

⁶ This is the IP address and network mask of the Ethernet port 0 on the DWR-500.

⁷ This is the IP address of the gateway router that the Ethernet port 0 is connected to.

⁸ SSID is the alphanumeric identifier of a wireless AP which clients use to connect.

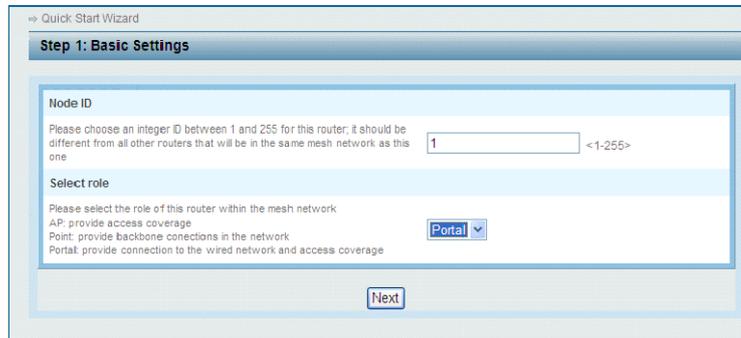
⁹ DNS server information is needed for the clients to connect to the internet; this information is passed to the client when the client uses the DHCP protocol to obtain an IP address from the AP on the DWR-500.

¹⁰ Dtrix-roaming is a service provided by the DWR-500 that allows wireless clients to move from the coverage area of one AP to another without experiencing any disruption in service. For details, refer to respective guides available in the CD-ROM.

Example Configuration 1: Portal node

Step 1

Based on Table 4, portal node is assigned as 1. Select the role of this node as Portal.



Quick Start Wizard

Step 1: Basic Settings

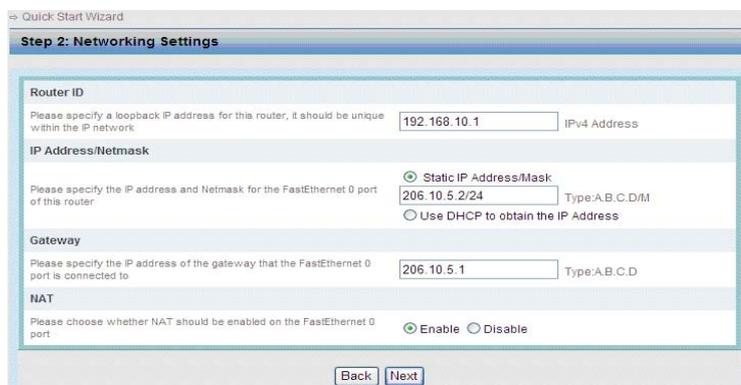
Node ID
Please choose an integer ID between 1 and 255 for this router; it should be different from all other routers that will be in the same mesh network as this one. <1-255>

Select role
Please select the role of this router within the mesh network.
AP: provide access coverage
Point: provide backbone connections in the network.
Portal: provide connection to the wired network and access coverage

Figure 21. Step 1 setting up Portal Node.

Step 2

Enter the Router ID, IP Address/Mask of Fast Ethernet 0 Port, and IP address of Gateway and enable NAT as per the Table 4.



Quick Start Wizard

Step 2: Networking Settings

Router ID
Please specify a loopback IP address for this router; it should be unique within the IP network. IPv4 Address

IP Address/Netmask
Please specify the IP address and Netmask for the FastEthernet 0 port of this router.
 Static IP Address/Mask: Type:A.B.C.D/M
 Use DHCP to obtain the IP Address

Gateway
Please specify the IP address of the gateway that the FastEthernet 0 port is connected to. Type:A.B.C.D

NAT
Please choose whether NAT should be enabled on the FastEthernet 0 port.
 Enable Disable

Figure 22. Step 2 Setting up router details for Portal Node.

Step 3

Enter the SSID and the DNS information and the Portal Node setup is complete. Hit the "Finish" button to complete the setup.



Quick Start Wizard

Step 3: Wireless Settings

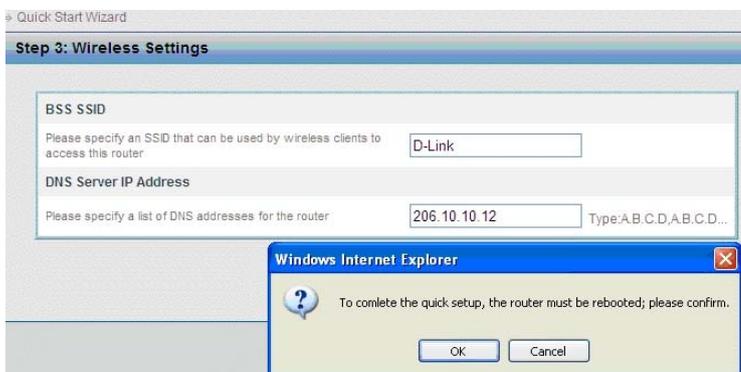
BSS SSID
Please specify an SSID that can be used by wireless clients to access this router.

DNS Server IP Address
Please specify a list of DNS addresses for the router. Type:A.B.C.D,A.B.C.D...

Figure 23. Step 3 Complete Portal Node Setup.

Step 4

After confirming the setup, the router will reboot and start functioning as a portal node.



Quick Start Wizard

Step 3: Wireless Settings

BSS SSID
Please specify an SSID that can be used by wireless clients to access this router.

DNS Server IP Address
Please specify a list of DNS addresses for the router. Type:A.B.C.D,A.B.C.D...

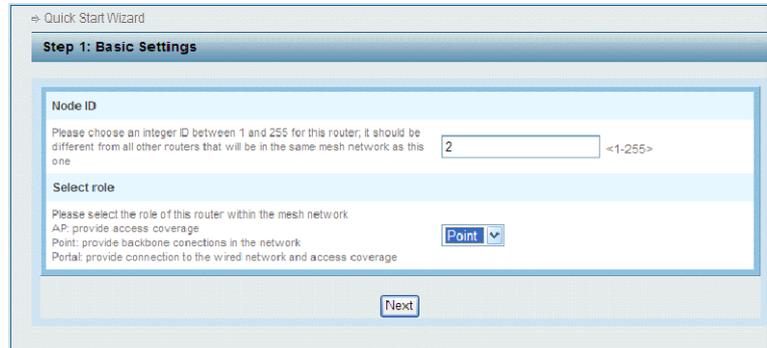
Windows Internet Explorer
To complete the quick setup, the router must be rebooted; please confirm.

Figure 24. Reboot and Portal Node Setup Complete.

Example Configuration 2: Point node

Step 1

Based on Table 4, point node is assigned as 2. Select the role of this node as Point.



Quick Start Wizard

Step 1: Basic Settings

Node ID
Please choose an integer ID between 1 and 255 for this router; it should be different from all other routers that will be in the same mesh network as this one. <-1-255>

Select role
Please select the role of this router within the mesh network.
AP: provide access coverage
Point: provide backbone connections in the network
Portal: provide connection to the wired network and access coverage

Figure 25. Step 1 Setting up a Point Node.

Step 2

Enter the Router ID, IP Address/Mask of Fast Ethernet 0 Port as per the Table 4.



Quick Start Wizard

Step 2: Networking Settings

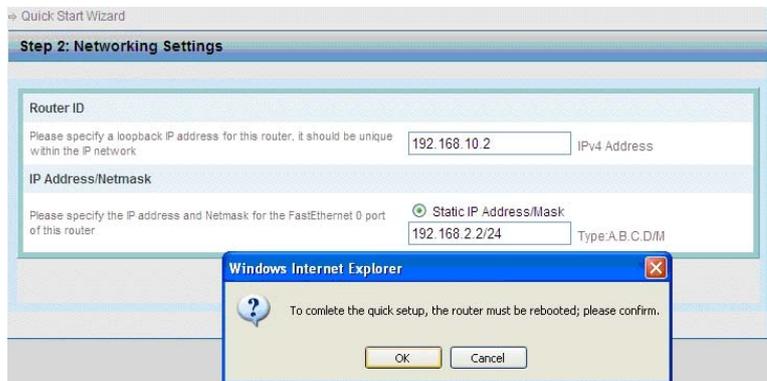
Router ID
Please specify a loopback IP address for this router, it should be unique within the IP network. IPv4 Address

IP Address/Netmask
Please specify the IP address and Netmask for the FastEthernet 0 port of this router. Static IP Address/Mask
 Type:A.B.C.D/M

Figure 26. Step 2 Setting up router details for Point Node.

Step 3

Hit the “Finish” button to complete the setup. The router will reboot and start functioning as a point node.



Quick Start Wizard

Step 2: Networking Settings

Router ID
Please specify a loopback IP address for this router, it should be unique within the IP network. IPv4 Address

IP Address/Netmask
Please specify the IP address and Netmask for the FastEthernet 0 port of this router. Static IP Address/Mask
 Type:A.B.C.D/M

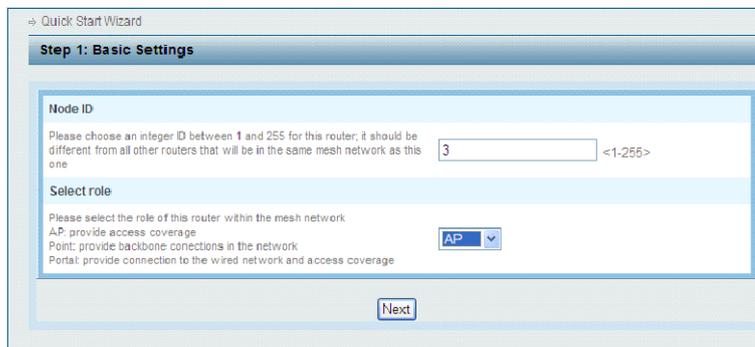
Windows Internet Explorer
To complete the quick setup, the router must be rebooted; please confirm.

Figure 27. Step 3 Complete Portal Node Setup.

Example Configuration 3: AP node

Step 1

Based on Table 4, AP node is assigned as 3. Select the role of this node as AP.

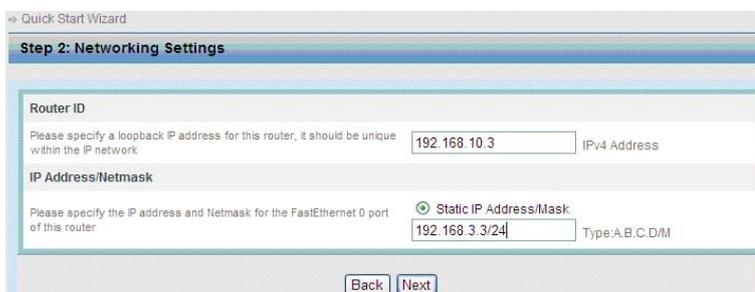


The screenshot shows the 'Quick Start Wizard' interface for 'Step 1: Basic Settings'. It contains two main sections: 'Node ID' and 'Select role'. In the 'Node ID' section, a text box contains the number '3' and a range indicator '<1-255>'. In the 'Select role' section, there is a dropdown menu with 'AP' selected. Below these sections is a 'Next' button.

Figure 28. Step 1 Setting up a AP Node.

Step 2

Enter the Router ID, IP Address/Mask of Fast Ethernet 0 Port as per the Table 4



The screenshot shows the 'Quick Start Wizard' interface for 'Step 2: Networking Settings'. It contains two main sections: 'Router ID' and 'IP Address/Netmask'. In the 'Router ID' section, a text box contains '192.168.10.3' and is labeled 'IPv4 Address'. In the 'IP Address/Netmask' section, there is a radio button for 'Static IP Address/Mask' which is selected, and a text box contains '192.168.3.3/24' with a label 'Type:A.B.C.D/M'. Below these sections are 'Back' and 'Next' buttons.

Figure 29. Step 2 Setting up router details for Point Node.

Step 3

Enter the SSID and the DNS Server IP. Hit the "Finish" button to complete the setup. The router will reboot and start functioning as a point node.



The screenshot shows the 'Quick Start Wizard' interface for 'Step 3: Wireless Settings'. It contains two main sections: 'BSS SSID' and 'DNS Server IP Address'. In the 'BSS SSID' section, a text box contains 'D-Link'. In the 'DNS Server IP Address' section, a text box contains '206.10.10.12' and is labeled 'Type:A.B.C.D.A.B.C.D...'. Below these sections are 'Back' and 'Finish' buttons.

Figure 30. Step 3 Complete Portal Node Setup.

Once the setup is completed, each of the DWR-500 will automatically discover other nodes and form a wireless mesh network. The portal node should have an Ethernet connection. Both the portal and AP will then be able to service clients and access the Internet through the portal.

Note: *The above setup does not require users to manually setup any link-level configuration because it uses DWR series' radio management to automatically discover other nodes and form the network. This feature makes it easy to set up wireless mesh networks; however, it does not allow a fine-grained control of the wireless links, nor does it guarantee the formulation of a fully-connected and converged network every time the routers boots up. If full control of the wireless links and stable convergence of the network is desired, please refer to the respective configuration guides.*