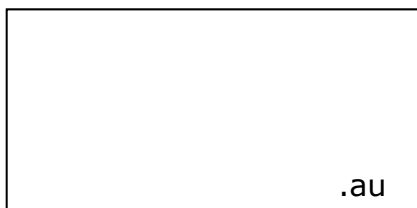




DuxLink
Point to Point Transparent Bridge
Configuration Guide
v3.2a



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Introduction

Thank you for purchasing your DuxLink Transparent Point to Point (p2p) Bridge Kit from DuxTel!

Out-of-the-box, your DuxLink kits are ready for immediate deployment – just install, connect and power-up for a true transparent point to point bridge that is technically similar to an invisible ethernet cable strung between two points up to 15Km away!

This configuration document is designed to assist the network administrator with deployment and initial setup of the DuxLink Systems, and provide a guide to general configuration and administration tasks.

Comprehensive documentation for the built-in RouterOS software can be found from the vendor web site at:

<http://wiki.mikrotik.com>



Kit Contents

A complete Point to Point link comprises two DuxLink systems, labelled **A End** and **B End** each including:

- DuxLink Antenna/Enclosure
- Mounting Hardware (bracket, clamp, nuts/washers)
- 12Watt Power Supply
- PoE Adapter
-

Deployment Planning

The **A End** device can be thought of as the *master* unit – the master provides the active beacon for the **B End** (or slave) to discover and connect. Although it is not technically important which of the two sites you should deploy the A or B devices, usually the B end is deployed to what is considered the *remote* end of the link.

The reasoning is that in the case of some problem occurring with the link, for example interference or other signal loss, an SSID scan can be performed from the B End device to determine whether the A End beacon is present, whereas the reverse can not be done (i.e. the B End device does not transmit any beacon that can be detected by the A End system (or any other device)

DuxLink systems operate in the 5GHz class license spectrum, and capable of operating in both 5.4 and 5.8 GHz bands.

Keep in mind that Class License spectrum has been made available for any operator for data carriage purposes, and therefore consideration should be taken regarding any other microwave radio equipment operating in the vicinity of your deployment. Other equipment installed nearby can affect the performance and reliability of your systems,



and YOU can cause an adverse effect on an existing service in use by someone else - *Please be considerate of other operators when planning and deploying your radio equipment!*

Mounting Location

When choosing a mounting point for your DuxLink kits, be aware of other equipment operating in the same vicinity.

Generally, you should try to avoid:

- Mounting antennas/enclosures within 1m of other radio equipment.
- Avoid mounting close to passive antenna systems (e.g. television, UHF radio etc)
- Running power/data cables close to existing data and power cables – especially RF sensitive TV antenna cables!

Suitable mounting points *should* be:

- Relatively close to the service point.
Cable length from service point to DuxLink unit should be less than 50m where possible, and no more than 100m in total.
- Direct line of sight to the remote DuxLink system
Unless the distance between the two DuxLink units is less than a few hundred meters, you must be able to physically see the other device (e.g. using binoculars) to ensure a stable link.

Accessing the device configuration interface

The DuxLink system is based on Mikrotik RouterBoard components, running the popular Mikrotik RouterOS



operating system. RouterOS can be accessed and managed using a web interface, telnet/ssh shell or WinBox configuration tool.

The Winbox tool is a very powerful and intuitive tool that makes any configuration task simple and fast!

To begin:

Step 1: Connect to the device using WinBox

- a. Download the mikrotik Winbox configuration tool at:
<http://www.mikrotik.com/download.html>, or
<http://www.duxtel.com.au/mikrotik/winbox.exe>
- b. Connect power to the router using the power supply provided
- c. Connect your computer to the router via standard Ethernet cable to port ether2
- d. Run WinBox program
- e. Click on "... " button adjacent to 'connect'
- f. Click on a router entry that appears in the select list
- g. Enter username "admin"
- h. The default password for DuxLink is *duxtel*
- i. Click 'Connect'

Step 2: Change the System Password

- a. Connect to the router using Winbox as per Step 1
- b. Click on "System" in the main menu, and select "Password"
- c. Enter the original password (i.e. blank if it is the first login) and enter your new password twice

Step 3: (optional) Upgrade RouterOS

The routerOS version loaded on your DuxLink kit is known and tested to be stable and highly effective in this application. From time to time, however, you may want to upgrade the routerOS to a newer version in order to access new and advanced features that may not have been available at the time of delivery.

Note: it is recommended to download a copy of the current RouterOS release and store on disk for all future deployments so that you have a consistent RouterOS platform across all sites.

To upgrade routerOS:

- a. Download routerOS file from www.mikrotik.com/download.html
- b. Choose "RB400" for "system Type" and "All versions" for "software Type"
- c. Click on "Combined Package" link
- d. Save the file to a convenient location on your PC desktop or disk location
- e. Connect to the router as per Step 1 above
- f. Click on "Files" in the main menu
- g. Drag the file downloaded at 3c into the 'files' window in the Winbox tool
- h. Click "System" then "reboot"
- i. Allow the router to restart

Managing Wireless Settings

Although your DuxLink Kit will work out-of-the-box with no additional configuration changes required, it is

recommended that you consider the following customisation tasks.

Step 4: Change the Wireless SSID

As with any 802.11a/b/g/n network, the SSID is broadcast by the A End device to identify the system for the remote device/s to connect. By default, the SSID is also detectable by any other 802.11 based wireless device in the vicinity of your A End system.

The default configured SSID is *DuxLink*. You can change this value as follows:

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Wireless' in the main menu and select the 'Interfaces' tab
- c. Double-click on the 'wlan1' interface, and select the 'wireless' tab
- d. Change the value of the field labelled SSID
- e. (optionally) On the A End device, enable the checkbox labelled 'Hide SSID' if you wish to hide the SSID from other operators (note that the SSID will also be hidden from your B End device!)

Step 4: Select the Wireless Channel

WARNING: YOU MUST only operate your DuxLink device within the frequency channels permitted by ACMA Regulations. Operating Wireless systems outside of the allowed frequency band is illegal and you may be liable to prosecution.

Allowed frequencies for outdoor point to point wireless systems are:

2412MHz to 2472MHz



5470 to 5600 MHz
5670 to 5275 MHz
5725 to 5850 MHz

Please select your operation frequency carefully and with consideration to other operators in your area.

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Wireless' in the main menu and select the 'Interfaces' tab
- c. Click on the 'Scan' button to view a list of other 802.11a/n devices operating in the vicinity.
- d. Click on the 'Freq. Usage' button to display a simple Frequency Usage Histogram to determine the levels of other 5GHz background noise in the vicinity – this activity includes other 602.11a/n systems as well as other transmitters operating in the 5GHz band
- e. Select the frequency band with the lowest background noise using the selection field labelled 'Frequency' – **NOTE WARNING ABOVE!**

Step 5: Enable/Disable Encryption

When wireless link security is not important, you can sometimes improve total throughput by disabling encryption across the wireless link as follows:

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Wireless' in the main menu and select the 'Interfaces' tab
- c. For the field labelled 'Security Profile':
 - Choose *secured* to enable encryption
 - Choose *default* to disable encryption

Step 6: Change the Encryption Key/Level



By default, DuxLink ships with WPA encryption enabled across the wireless link. To ensure optimal security, it is recommended to change the default encryption key as follows:

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Wireless' in the main WinBox menu, then select the 'Security Profiles' tab
- c. Double-click on the security profile named 'Secured' and choose the 'General' tab
- d. Enable the desired Encryption methods as desired, and enter your secure encryption passwords in the relevant field/s
- e. REPEAT THE PROCESS FOR THE REMOTE END DuxLink DEVICE

Monitoring and Diagnostics

During operation, you can use the WinBox configuration tool to monitor the link performance and to conduct diagnostics.

Step 7: Monitor Link Performance

Use the Wireless Registration monitor to observe the remote signal strength and link and connection (air) rate:

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Wireless' in the main WinBox menu, then select the 'Interfaces' tab
- c. When a remote device is connected you will see the letter 'R' (running) in the left hand column beside the wlan1 interface
- d. Select the 'Registration' tab to observe the connection statistics:



- Radio name and mac address helps to identify the remote device. For DuxLink kits, these values should always reflect the remote end DuxLink device details.
- Uptime indicates how long the remote device has been connected without retry or link re-negotiation ('drop-out')
- Last Activity indicates the elapsed period since payload data traffic was sent/received on this link
- Signal strength indicates (measured in dBm) the signal level received by this device. Optimal values are between -35dBm (best) and -86 dBm (marginal)
- Tx/Rx rate indicates the carrier rate (air rate) of the link. Note that this does not provide any estimate of the maximum possible data throughput on this link.

Step 8: Monitor Link Traffic

You can also monitor actual traffic throughput in real time using the winbox tool:

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Wireless' in the main WinBox menu, then select the 'Traffic' tab
- c. Traffic tab shows the actual data rate transmitted across the network in 1 second update intervals

Step 8: Test Link Throughput

At any time, you can test the maximum data throughput capacity of the link using the btest tool built in to RouterOS:

- a. Log in to the DuxLink system using the WinBox tool as per Step 1 above.
- b. Click on 'Tools' in the main WinBox menu, then select the 'bandwidth Test'
- c. Enter the IP Address of the remote device (you can select the LAN IP address (if assigned) or the private wlan address (192.168.88.1 for A End, 192.168.88.2 B End) for this test
- d. Enter the admin username and password fro the remote device.
- e. Select the test to perform (udp/tcp, etc)
- f. Click *Start* to observe the traffic capacity

Note that running this test while the link is in use will affect performance of other applications competing for bandwidth!

Obtaining Technical Support

Comprehensive documentation for the built-in RouterOS software can be found from the vendor web site at:

<http://wiki.mikrotik.com>

If you require additional assistance in deploying and managing your DuxMaster Gateway for the first time, you may contact DuxTel Technical support for assistance.

support@duxtel.com.au

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