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You can read the recommendations in the user guide, the technical guide or the installation guide for ZYXEL NBG5715. You'll find the answers to all your questions on the ZYXEL NBG5715 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

**User manual ZYXEL NBG5715**  
**User guide ZYXEL NBG5715**  
**Operating instructions ZYXEL NBG5715**  
**Instructions for use ZYXEL NBG5715**  
**Instruction manual ZYXEL NBG5715**

## NBG5715

*Simultaneous Dual-Band Wireless N Media Router*

### User's Guide



#### Default Login Details

LAN IP Address	http://192.168.1.1
Password	1234

Firmware Version 1.0  
Edition 1, 04/2012

[www.zyxel.com](http://www.zyxel.com)

# ZyXEL

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**Manual abstract:**

1 Overview This chapter introduces the main features and applications of the NBG5715. The NBG5715 extends the range of your existing wired network without additional wiring, providing easy network access to mobile users. You can set up a wireless network with other IEEE 802.11a/b/g/n compatible devices. The NBG5715 is able to function both 2.4G and 5G network at the same time. A range of services such as a firewall and content filtering are also available for secure Internet computing. You can use media bandwidth management to efficiently manage traffic on your network. Bandwidth management features allow you to prioritize time-sensitive or highly important applications such as Voice over the Internet (VoIP). there are two USB 2.0 ports on the side panel of your NBG5715. you can connect USB (version 2.0 or lower) memory sticks, USB hard drives, or USB devices for file sharing. The NBG5715 automatically detects the USB devices. Two USB eject buttons are located above the USB ports.

Push the eject button of the corresponding USB port for 2 seconds. Make sure the USB LED is off before removing your USB device. This will remove your USB device safely, preventing file or data loss if it is being transmitted through the USB device. Figure 1 USB Ports and Eject Buttons Eject buttons USB ports NBG5715 User's Guide 15 Chapter 1 Introduction Note: For the USB function, it is strongly recommended to use version 2.0 or lower USB storage devices (such as memory sticks, USB hard drives) and/or USB devices (such as USB printers).

Other USB products are not guaranteed to function properly with the NBG5715. Note: Be sure to install the ZyXEL NetUSB™ Share Center Utility (for NetUSB functionality) from the included disc, or download the latest version from the zyxel.com website. See Chapter 3 on page 23 for more information. 1.2 Applications You can create the following networks using the NBG5715: • Wired. You can connect network devices via the Ethernet ports of the NBG5715 so that they can communicate with each other and access the Internet. • Wireless. Wireless clients can connect to the NBG5715 to access network resources. Create an instant network connection with another WPS-compatible device, sharing your network connection with it.

• NetUSB. The NBG5715 allows you to connect a USB device (such as printer, scanner, or portable hard disk) directly to the USB port and then share that device over the Internet. You can also connect a USB to the NBG5715, which can then share up to 3 additional USB devices with the rest of your personal home network. 1.3 Ways to Manage the NBG5715 Use any of the following methods to manage the NBG5715. • WPS (Wi-Fi Protected Setup). You can use the WPS button or the WPS section of the Web Configurator to set up a wireless network with your NBG5715. • Web Configurator. This is recommended for everyday management of the NBG5715 using a (supported) web browser. 1.4 Good Habits for Managing the NBG5715 Do the following things regularly to make the NBG5715 more secure and to manage the NBG5715 more effectively. • Change the password. Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters. □ Write down the password and put it in a safe place. 16 NBG5715 User's Guide Chapter 1 Introduction • Back up the configuration (and make sure you know how to restore it).

Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the NBG5715 to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the NBG5715. You could simply restore your last configuration. 1.5 LEDs Look at the LED lights on the front panel to determine the status of the NBG5715. Use the LED button at the side panel of the device to turn the LED lights on or off. If you have already pushed the LED button to the ON position but none of the LEDs are on, make sure the NBG5715 is receiving power and the power is turned on. Note: The Power LED will be on even if you push the LED button to the OFF position. This is for you to determine whether the NBG5715 is powered on. figure 2 LED Button LED button NBG5715 User's Guide 17 Chapter 1 Introduction Figure 3 Front Panel Power Internet WAN WPS Button WLAN 2.4G WLAN 5G USB 1-2 LAN 1-4 WPS The following table describes the LEDs and the WPS button. Table 1 Front panel LEDs and WPS button LED WPS Button STATUS DESCRIPTION Press this button for 1 second to set up a wireless connection via WiFi Protected Setup with another WPS-enabled client. You must press the WPS button on the client side within 120 seconds for a successful connection. See Chapter 2 on page 21 and Chapter 9 on page 57 for more information on WPS.

on Off The NBG5715 is receiving power and functioning properly. The NBG5715 is not receiving power. the NBG5715's WAN connection is ready. The NBG5715 is sending/receiving data through the WAN with a 1000Mbps transmission rate. The WAN connection is not ready, or has failed. the NBG5715 has an IP connection but no traffic. Your device has a WAN IP address (either static or assigned by a DHCP server), PPP negotiation was successfully completed (if used) and the connection is up. blinking Off The NBG5715 is sending or receiving IP traffic. The NBG5715 does not have an IP connection. The NBG5715 is ready, but is not sending/receiving data through the 5G wireless LAN. The NBG5715 is sending/receiving data through the 5G wireless LAN. The NBG5715 is negotiating a WPS connection with a wireless client. Off The wireless LAN is not ready or has failed. the NBG5715's LAN connection is ready. The NBG5715 is sending/receiving data through the LAN with a 1000Mbps transmission rate. The LAN connection is not ready, or has failed. the NBG5715 has a USB device installed. The NBG5715 is transmitting and/or receiving data from routers through an installed USB device. There is no USB device connected to the NBG5715. 7 cm Two Two 1 2 Select a position free of obstructions on a wall strong enough to hold the weight of the device.

Mark two holes on the wall at the appropriate distance apart for the screws. Be careful to avoid damaging pipes or cables located inside the wall when drilling holes for the screws. 3 If using screw anchors, drill two holes for the screw anchors into the wall. Push the anchors into the full depth of the holes, then insert the screws into the anchors. Do not insert the screws all the way in - leave a small gap of about 0.5 cm. If not using screw anchors, use a screwdriver to insert the screws into the wall. Do not insert the screws all the way in - leave a gap of about 0.5 cm. 4 Make sure the screws are fastened well enough to hold the weight of the NBG5715 with the connection cables.

Align the holes on the back of the NBG5715 with the screws on the wall. Hang the NBG5715 on the screws.

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5 NBG5715 User's Guide 19 Chapter 1 Introduction Figure 4 Wall Mounting Example 20 NBG5715 User's Guide C HAPT ER 2 The WPS Button 2. 1 Overview Your NBG5715 supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the WiFi Alliance. WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (a unique Personal Identification Number that allows one device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated.

Then, the two devices connect and set up a secure network by themselves. For more information on using WPS, see Chapter 9 on page 57. figure 5 The WPS Button NBG5715 User's Guide 21 Chapter 2 The WPS Button 22 NBG5715 User's Guide C HAPT ER 3 ZyXEL NetUSB Share Center Utility 3. 1 Overview

The ZyXEL NetUSB Share Center Utility allows you to work with the USB devices that are connected directly to the NBG5715 as if they are connected directly to your computer. This allows you to easily share USB-based devices such as printers, scanners, portable hard disks, MP3 players, faxes, and digital cameras (to name a few) with all the other people in your home or office as long as they are connected to the NBG5715 and have the ZyXEL NetUSB Share Center Utility installed.

Note: Be sure to install the ZyXEL NetUSB Share Center Utility (for NetUSB functionality) from the included disc, or download the latest version from the zyxel. 1 Quick Setup This section shows you how to get started using the ZyXEL NetUSB Share Center Utility. 1 2 Install the ZyXEL NetUSB Share Center Utility on each computer connected to the NBG5715. Connect a USB device to the USB port on the NBG5715. Note: If you are connecting multiple devices to the NBG5715, first connect a USB hub to the NBG5715 then connect your other USB devices to it.

3 Run the ZyXEL NetUSB Share Center Utility to display a list of all connected USB devices, then use it to connect your computer to them. 2 Installing ZyXEL NetUSB Share Center Utility Before you can access USB devices connected to the NBG5715, you must first install the ZyXEL NetUSB Share Center Utility on any computer on your LAN to which you want to allow access to these devices. Note: In order to properly use the utility with your NBG5715, ensure that the NBG5715 firmware is version v1. See Chapter 22 on page 162 for information on updating your device's firmware. To install the ZyXEL NetUSB Share Center Utility:

1 2 Insert the disc that came with your NBG5715 into your computer's disc drive. Run the Setup program by double-clicking it and then follow the on-screen instructions for installing it on your computer. NBG5715 User's Guide 23 Chapter 3 ZyXEL NetUSB Share Center Utility Note: The following operating systems are supported: Windows XP/Vista/7 (32 and 64-bit versions). 3 To open the ZyXEL NetUSB Share Center Utility, double-click its system tray icon. Figure 6 ZyXEL NetUSB Share Center Utility Main Window The following table describes the icons in this window. Table 3 ZyXEL NetUSB Share Center Utility Main Window Icons

ICON DESCRIPTION Configure Server Click to open the NBG5715's built-in Web Configurator, which you can use to set up the NBG5715 (see Chapter 4 on page 29 for details).

Auto-Connect Printer Click this if you want to automatically connect to the printer each time your start your computer. Note: You must first install the appropriate print driver on each computer for which you intend to use this feature. See the documentation that came with your printer for instructions on how to do this. Connect Select a USB device and then click this button to connect to it. Your computer can connect to as many USB devices as are connected to the NBG5715. Disconnect Select a device to which your computer is connected and then click this button to disconnect from it. 24 NBG5715 User's Guide Chapter 3 ZyXEL NetUSB Share Center Utility Table 3 ZyXEL NetUSB Share Center Utility Main Window Icons (continued) ICON DESCRIPTION Request to Connect Some USB devices may not allow automatic connections over the network. If so, select the device in question and click this button to issue a request to connect to it. Network Scanner Click this to open the scanner options on your computer for working with a scanner connected to the network.

Figure 7 ZyXEL NetUSB Share Center Utility Menus The following table describes the menus in this screen.

table 4 ZyXEL NetUSB Share Center Utility Main Screen Menus MENU System Tools ITEM Exit Configuration Auto-Connect Printer List DESCRIPTION This closes the ZyXEL NetUSB Share Center Utility. This opens the ZyXEL NetUSB Share Center Utility configuration window. This opens the list window that displays all of the printing devices connected to the NBG5715. This opens the about window, which provides information of the utility (Quick Start Guide). Your computer must be in the same subnet in order to access this website address.

NBG5715 User's Guide 29 Chapter 4 Introducing the Web Configurator Figure 10 Login screen The following table describes the labels in this screen. Table 7 Login screen LABEL Language Password DESCRIPTION Select the language you want to use to configure the Web Configurator. click Login. Type "1234" (default) as the password. This shows the current weather, either in celsius or fahrenheit, of the city you specify in Section 4.

This shows the time (hh:mm:ss) and date (yyyy:mm:dd) of the timezone you select in Section 4. The time is in 24-hour format, for example 15:00 is 3:00 PM. 2 Weather Edit You can change the temperature unit and select the location for which you want to know the weather. Click the icon to change the Weather display. Figure 11 Change Weather 30 NBG5715 User's Guide Chapter 4 Introducing the Web Configurator The following table describes the labels in this screen. Table 8 Change Weather LABEL o DESCRIPTION Choose which temperature unit you want the NBG5715 to display. Select the location for which you want to know the weather. If the city you want is not listed, choose one that is closest to it. Click this to apply the settings and refresh the date and time display. 3 Time/Date Edit One timezone can cover more than one country.

You can choose a particular country in which the NBG5715 is located and have the NBG5715 display and use the current time and date for its logs. Click the icon to change the Weather display. Figure 12 Change Password Screen The following table describes the labels in this screen. Table 9 Change Password Screen LABEL Change time zone Finish DESCRIPTION Select the specific country whose current time and date you want the NBG5715 to display.



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Click this to apply the settings and refresh the weather display. Note: You can also edit the timezone in Section 22. 3 Resetting the NBG5715 If you forget your password or IP address, or you cannot access the Web Configurator, you will need to use the RESET button at the back of the NBG5715 to reload the factory-default configuration file. This means that you will lose all configurations that you had previously saved, the password will be reset to "1234" and the IP address will be reset to "192. 1 How to Use the RESET Button 1 2 3 Make sure the power LED is on. Press the RESET button for longer than 1 second to restart/reboot the NBG5715.

Press the RESET button for longer than 5 seconds to set the NBG5715 back to its factory-default configurations. nBG5715 User's Guide 31 Chapter 4 Introducing the Web Configurator 32 NBG5715 User's Guide C HAPT ER 5 Monitor and Summary 5. 1 Overview This chapter discusses read-only information related to the device state of the NBG5715. To access the Monitor screens, go to Expert Mode after login, then click . You can also click the Details links in the Summary table of the Status screen to view the bandwidth consumed, packets sent/received as well as the status of clients connected to the NBG5715.

5. 2 What You Can Do in this Chapter • Use the Log screens to see the logs for the activity on the NBG5715 (Section 5. 3 on page 33). □ Use the DHCP Table screen to view information related to your DHCP status (Section 5. 4 on page 34).

□ Use the Packet Statistics screen to view port status, packet specific statistics, the "system up time" and so on (Section 5. 5 on page 35). □ Use the VPN Monitor screen to view the active VPN connections (Section 5. 4G wireless stations that are currently associated to the NBG5715 (Section 5. 3 The Log Screen The Web Configurator allows you to look at all of the NBG5715's logs in one location. 1 View Log Use the View Log screen to see the logged messages for the NBG5715. The log wraps around and deletes the old entries after it fills. Select what logs you want to see from the Display drop list. The log choices depend on your settings in the Log Settings screen. Figure 13 View Log You can configure which logs to display in the View Log screen.

Go to the Log Settings screen and select the logs you wish to display. You can configure the NBG5715's LAN as a DHCP server or disable it. When configured as a server, the NBG5715 provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on that network, or else the computer must be manually configured. Read-only information here relates to your DHCP status. The DHCP table shows current DHCP client information (including MAC Address, IP Address, and Expiration time) of all network clients using the NBG5715's DHCP server. 34 NBG5715 User's Guide Chapter 5 Monitor and Summary Figure 15 Summary: DHCP Table The following table describes the labels in this screen. Table 10 Summary: DHCP Table LABEL # Status Host Name IP Address MAC Address DESCRIPTION This is the index number of the host computer. This field displays whether the connection to the host computer is up (a yellow bulb) or down (a gray bulb). This field displays the computer host name.

This field displays the IP address relative to the # field listed above. This field shows the MAC address of the computer with the name in the Host Name field. Every Ethernet device has a unique MAC (Media Access Control) address which uniquely identifies a device. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. Reserve Apply Reset Select this if you want to reserve the IP address for this specific MAC address.

Click Apply to save your changes back to the NBG5715. Click Cancel to reload the previous configuration for this screen. Read-only information here includes port status, packet specific statistics and the "system up time". The Poll Interval(s) field is configurable and is used for refreshing the screen. Figure 16 Summary: Packet Statistics NBG5715 User's Guide 35 Chapter 5 Monitor and Summary The following table describes the labels in this screen.

table 11 Summary: Packet Statistics LABEL Port Status DESCRIPTION This is the NBG5715's port type. For the LAN ports, this displays the port speed and duplex setting or Down when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and Idle (line (ppp) idle), Dial (starting to trigger a call) and Drop (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays Down when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and Down when the WLAN is disabled. TxPkts RxPkts Collisions Tx B/s Rx B/s Up Time System Up Time Poll Interval(s) Set Interval Stop This is the number of transmitted packets on this port. This is the number of received packets on this port. This is the number of collisions on this port. This displays the transmission speed in bytes per second on this port. This displays the reception speed in bytes per second on this port.

This is the total time the NBG5715 has been for each session. This is the total time the NBG5715 has been on. Enter the time interval in seconds for refreshing statistics in this field. Click this button to apply the new poll interval you entered in the Poll Interval(s) field. This screen displays read-only information about the active VPN connections. Click the Refresh button to update the screen. A Security Association (SA) is the group of security settings related to a specific VPN tunnel. Figure 17 Summary: Security Associations 36 NBG5715 User's Guide Chapter 5 Monitor and Summary The following table describes the labels in this screen. Table 12 Summary: Security Associations LABEL Status Connection Name Remote Gateway Local Address Remote Address Refresh DESCRIPTION This field displays whether the VPN connection is up (a yellow bulb) or down (a gray bulb). This field displays the identification name for this VPN policy.

This is the static WAN IP address or URL of the remote IPsec router. This is the IP address of computer(s) on your local network behind your NBG5715. This is the IP address of computer(s) on the remote network behind the remote IPsec router. Click this button to update the screen's statistics immediately. View the wireless stations that are currently associated to the NBG5715 in the Association List.

Association means that a wireless client (for example, your network or computer with a wireless network card) has connected successfully to the AP (or wireless router) using the same SSID, channel and security settings. Figure 18 Summary: Wireless Association List The following table describes the labels in this screen. Table 13 Summary: Wireless Association List LABEL # MAC Address Association Time DESCRIPTION This is the index number of an associated wireless station.



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This field displays the MAC address of an associated wireless station. This field displays the time a wireless station first associated with the NBG5715's WLAN network.

nBG5715 User's Guide 37 Chapter 5 Monitor and Summary 38 NBG5715 User's Guide C HAPTER 6 NBG5715 Modes 6. 1 Overview This chapter introduces the different modes available on your NBG5715. First, the term "mode" refers to two things in this User's Guide. • Web Configurator mode. This refers to the Web Configurator interface you want to use for editing NBG5715 features. □ Router mode: This is the device mode of the NBG5715. Use this mode to connect the local network to another network, like the Internet. go to Section 8. 2 on page 51 to view the Status screen in this mode. 1 Web Configurator Modes This refers to the configuration interface of the Web Configurator, which has two modes: • Easy: The Web Configurator shows this mode by default.

Refer to Chapter 7 on page 41 for more information on the screens in this mode. This interface may be sufficient for users who just want to use the device. □ Expert: Advanced users can change to this mode to customize all the functions of the NBG5715. Click Expert Mode after logging into the Web Configurator. The User's Guide Chapter 4 on page 29 discusses the screens in this mode. You can configure several key features of the NBG5715 in this mode. This mode is useful to users who are not fully familiar with some features that are usually intended for network administrators. When you log in to the Web Configurator, the following screen opens. Figure 19 Easy Mode: Network Map Navigation Panel Network Map Go to Status Screen Control Panel Click Status to open the following screen. nBG5715 User's Guide 41 Chapter 7 Easy Mode Figure 20 Easy Mode: Status Screen Navigation Panel Go to Network Map Screen Status Screen Control Panel 7.

2 What You Can Do in this Chapter You can do the following in this mode: • Use this Navigation Panel to opt out of the Easy mode (Section 7. 3 on page 42). □ Use the Network Map screen to check if your NBG5715 can ping the gateway and whether it is connected to the Internet (Section 7. 4 on page 43). □ Use the Control Panel to configure and enable NBG5715 features, including wireless security, wireless scheduling and bandwidth management and so on (Section 7.

5 on page 44). □ Use the Status Screen to view read-only information about the NBG5715, including the WAN IP, MAC Address of the NBG5715 and the firmware version (Section 7. 3 Navigation Panel Use this navigation panel to opt out of the Easy mode. Figure 21 Control Panel The following table describes the labels in this screen. Table 14 Control Panel ITEM Home DESCRIPTION Click this to go to the Login page.

42 NBG5715 User's Guide Chapter 7 Easy Mode Table 14 Control Panel (continued) ITEM Expert Mode Logout DESCRIPTION Click this to change to Expert mode and customize features of the NBG5715. Click this to end the Web Configurator session. For Windows XP (Service Pack 2) users, you can see the network devices connected to the NBG5715 by downloading the LLTD (Link Layer Topology Discovery) patch from the Microsoft Website. Note: Don't worry if the Network Map does not display in your web browser. This feature may not be supported by your system. You can still configure the Control Panel (Section 7. 5 on page 44) in the Easy Mode and the NBG5715 features that you want to use in the Expert Mode. When you log into the Network Configurator, the Network Map is shown as follows. Figure 22 Network Map The line connecting the NBG5715 to the gateway becomes green when the NBG5715 is able to ping the gateway. It becomes red when the ping initiating from the NBG5715 does not get a response from the gateway.

The same rule applies to the line connecting the gateway to the Internet. You can also view the devices (represented by icons indicating the kind of network device) connected to the NBG5715, including those connecting wirelessly. Right-click on the NBG5715 icon to refresh the network map. Right click on the other icons to view information about the device. nBG5715 User's Guide 43 Chapter 7 Easy Mode 7. 5 Control Panel The features configurable in Easy Mode are shown in the Control Panel. Figure 23 Control Panel Switch ON to enable the feature. otherwise , switch OFF. If the feature is turned on, the green light flashes. If it is turned off, the red light flashes.

Additionally, click the feature to open a screen where you can edit its settings. The following table describes the labels in this screen. Table 15 Control Panel ITEM Game Engine DESCRIPTION Switch ON to maximize bandwidth for gaming traffic in your network. Power Saving Click this to schedule the wireless feature of the NBG5715. Disabling the wireless function helps lower the energy consumption of the NBG5715.

Content Filter Click this to restrict access to certain websites, based on keywords contained in URLs, to which you do not want users in your network to open. Bandwidth MGMT Click this to edit bandwidth management for predefined applications. Switch ON to have the NBG5715 management bandwidth for uplink and downlink traffic according to an application or service. Firewall Switch ON to ensure that your network is protected from Denial of Service (DoS) attacks. Wireless Security Click this to configure the wireless security, such as SSID, security mode and WPS key on your NBG5715.

1 Game Engine When this feature is enabled, the NBG5715 maximizes the bandwidth for gaming traffic that it forwards out through an interface. 44 NBG5715 User's Guide Chapter 7 Easy Mode Figure 24 Game Engine Note: When this is switched on, the Game Console tab in the Bandwidth Mgmt screen is automatically positioned on top. Turn this off if your network is not using gaming. 2 Power Saving Use this screen to set the day of the week and time of the day when your wireless LAN is turned on and off. wireless LAN scheduling is disabled by default. Disabling the wireless capability lowers the energy consumption of the of the NBG5715. Figure 25 Power Saving The following table describes the labels in this screen. Table 16 Power Saving LABEL Wireless Radio WLAN Status DESCRIPTION Choose whether you want to apply the power saving schedule to 2. 4G hz or 5G hz wireless radio. Select On or Off to specify whether the Wireless LAN is turned on or off (depending on what you selected in the WLAN Status field).

This field works in conjunction with the Day and For the following times fields. NBG5715 User's Guide 45 Chapter 7 Easy Mode Table 16 Power Saving (continued) LABEL Day DESCRIPTION Select Everyday or the specific days to turn the Wireless LAN on or off. If you select Everyday you can not select any specific days. This field works in conjunction with the For the following times field. Except for the following times (24-Hour Format) Select a begin time using the first set of hour and minute (min) drop down boxes and select an end time using the second set of hour and minute (min) drop down boxes.



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If you have chosen On earlier for the WLAN Status the Wireless LAN will turn on between the two times you enter in these fields. If you have chosen Off earlier for the WLAN Status the Wireless LAN will turn off between the two times you enter in these fields. Apply Reset Click Apply to save your changes back to the NBG5715. 3 Content Filter Use this screen to restrict access to certain websites, based on keywords contained in URLs, to which you do not want users in your network to open. Figure 26 Content Filter The following table describes the labels in this screen.

table 17 Content Filter LABEL Add DESCRIPTION Click Add after you have typed a keyword. Repeat this procedure to add other keywords. When you try to access a web page containing a keyword, you will get a message telling you that the content filter is blocking this request. Delete Apply Cancel Highlight a keyword in the text box and click Delete to remove it. The keyword disappears from the text box after you click Apply.

click Apply to save your changes. Click Cancel to close this screen without saving any changes. 4 Bandwidth MGMT Use this screen to set bandwidth allocation to pre-defined services and applications for bandwidth allocation. The NBG5715 uses bandwidth management for incoming and outgoing traffic.

Rank the services and applications by dragging them accordingly from High to Low and click Apply.

click Cancel to close the screen. Figure 27 Bandwidth MGMT Use your mouse to drag the items according to how you want to prioritize them. 5 Firewall Enable this feature to protect the network from Denial of Service (DoS) attacks. The NBG5715 blocks repetitive pings from the WAN that can otherwise cause systems to slow down or hang. Figure 28 Firewall Click OK to close this screen. 6 Wireless Security Use this screen to configure security for your the Wireless LAN. You can enter the SSID and select the wireless security mode in the following screen. Note: You can enable the Wireless function of your NBG5715 by first turning on the switch in the side panel. NBG5715 User's Guide 47 Chapter 7 Easy Mode Figure 29 Wireless Security The following table describes the general wireless LAN labels in this screen. Table 18 Wireless Security LABEL Wireless Radio Wireless Network Name (SSID) Security mode

DESCRIPTION Choose whether you want to apply the wireless security to 2.

4G hz or 5G hz wireless radio. (Service Set IDentity) The SSID identifies the Service Set with which a wireless station is associated. Wireless stations associating to the access point (AP) must have the same SSID. Enter a descriptive name (up to 32 keyboard characters) for the wireless LAN. Select WPA-PSK or WPA2-PSK to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as this device. After you select to use a security, additional options appears in this screen. Select No Security to allow any client to connect to this network without authentication. Wireless password This field appears when you choose wither WPA-PSK or WPA2-PSK as the security mode. Type a pre-shared key from 8 to 63 case-sensitive keyboard characters.

Verify password Apply Cancel WPS Type the password again to confirm. Click Apply to save your changes back to the NBG5715. click Cancel to close this screen. Click this to configure the WPS screen. You can transfer the wireless settings configured here (Wireless Security screen) to another wireless device that supports WPS.

7 WPS Use this screen to add a wireless station to the network using WPS. Click WPS in the Wireless Security to open the following screen. 48 NBG5715 User's Guide Chapter 7 Easy Mode Figure 30 Wireless Security: WPS The following table describes the labels in this screen. Table 19 Wireless Security: WPS LABEL Wireless Security WPS DESCRIPTION Click this to go back to the Wireless Security screen. Create a secure wireless network simply by pressing a button.

The NBG5715 scans for a WPS-enabled device within the range and performs wireless security information synchronization. Note: After you click the WPS button on this screen, you have to press a similar button in the wireless station utility within 2 minutes. To add the second wireless station, you have to press these buttons on both device and the wireless station again after the first 2 minutes. Register Create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the NBG5715's interface and pushing this button. Type the same PIN number generated in the wireless station's utility. Then click Register to associate to each other and perform the wireless security information synchronization. 6 Status Screen in Easy Mode In the Network Map screen, click Status to view read-only information about the NBG5715. NBG5715 User's Guide 49 Chapter 7 Easy Mode Figure 31 Status Screen in Easy Mode The following table describes the labels in this screen. Table 20 Status Screen in Easy Mode ITEM Name Time DESCRIPTION This is the name of the NBG5715 in the network. You can change this in the Maintenance > General screen in Section 22.

3 on page 159. This is the current system date and time. WAN IP MAC Address Firmware Version This is the IP address of the WAN port. This is the MAC address of the NBG5715. This shows the firmware version of the NBG5715. The firmware version format shows the trunk version, model code and release number. wireless\_2. 4G/5G Network Name (SSID) Security This shows the SSID of the wireless network. You can configure this in the Wireless Security screen (Section 7. This shows the wireless security used by the NBG5715.

Routers are used to connect the local network to another network (for example, the Internet). In the figure below, the NBG5715 connects the local network (LAN1 ~ LAN4) to the Internet. Figure 32 NBG5715 Network Modem Note: The Status screen is shown after changing to the Expert mode of the Web Configurator. It varies depending on the device mode of your NBG5715. NBG5715 User's Guide 51 Chapter 8 Router Mode Figure 33 Status: Router Mode The following table describes the icons shown in the Status screen.

Table 21 Status: Router Mode ICON DESCRIPTION Click this icon to logout of the web configurator. Click this icon to view copyright and a link for related product information. Select a number of seconds or None from the drop-down list box to refresh all screen statistics automatically at the end of every time interval or to not refresh the screen statistics. Click this button to refresh the status screen statistics. Click this icon to see the Status page.

The information in this screen depends on the device mode you select. Click this icon to see the Monitor navigation menu. Click this icon to see the Configuration navigation menu. Click this icon to see the Maintenance navigation menu. 52 NBG5715 User's Guide Chapter 8 Router Mode The following table describes the labels shown in the Status screen.



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table 22 Status Screen: Router Mode LABEL Device Information Host Name Model Number MAC Address Firmware Version WAN Information - IP Address - IP Subnet Mask - Default Gateway LAN Information - IP Address - IP Subnet Mask - DHCP WLAN\_2. 4G Information - SSID - Channel - Security WLAN\_5G Information - SSID - Channel - Security - Firewall System Status Item Data System Up Time Current Date/Time System Resource - CPU Usage This displays what percentage of the NBG5715's processing ability is currently used. When this percentage is close to 100%, the NBG5715 is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications (for example, using bandwidth management.) This shows what percentage of the heap memory the NBG5715 is using.

This column shows the type of data the NBG5715 is recording. This column shows the actual data recorded by the NBG5715. This is the total time the NBG5715 has been on. This field displays your NBG5715's present date and time. This shows a descriptive name used to identify the NBG5715 in the wireless LAN. This shows the channel number which the NBG5715 is currently using over the wireless LAN. This shows the level of wireless security the NBG5715 is using. This shows whether the firewall is enabled or not. This shows a descriptive name used to identify the NBG5715 in the wireless LAN. This shows the channel number which the NBG5715 is currently using over the wireless LAN.

This shows the level of wireless security the NBG5715 is using. This shows the LAN port's IP address. This shows the LAN port's subnet mask. This shows the LAN port's DHCP role - Server or Disable. This shows the WAN port's IP address.

This shows the WAN port's subnet mask. This shows the WAN port's gateway IP address. This is the System Name you enter in the Maintenance > General screen. it is for identification purposes. This is the model name of your device.

This shows the WAN Ethernet adapter MAC Address of your device. This is the firmware version and the date created. NBG5715 User's Guide 53 Chapter 8 Router Mode Table 22 Status Screen: Router Mode (continued) LABEL Status DESCRIPTION For the LAN and WAN ports, this field displays Down (line is down) or Up (line is up or connected). For the WLAN, it displays Up when the WLAN is enabled or Down when the WLAN is disabled. Rate For the LAN ports, this displays the port speed and duplex setting or N/A when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation. This field displays N/A when the line is disconnected. for the WLAN 2. 4G/5G, it displays the maximum transmission rate when the WLAN 2. Use this screen to view port status and packet specific statistics.

Use this screen to view the wireless stations that are currently associated to the NBG5715. Use this screen to view the wireless stations that are currently associated to the NBG5715. Use this screen to view the active VPN connections. 1 Navigation Panel Use the sub-menus on the navigation panel to configure NBG5715 features. Figure 34 Navigation Panel: Router Mode 54 NBG5715 User's Guide Chapter 8 Router Mode The following table describes the sub-menus. table 23 Navigation Panel: Router Mode LINK Status TAB FUNCTION This screen shows the NBG5715's general device, system and interface status information. Use this screen to access the summary statistics tables. 4G General MAC Filter Advanced QoS This screen allows you to configure ISP parameters, WAN IP address assignment, DNS servers and the WAN MAC address. Use this screen to configure other advanced properties. Use this screen to enable the 2.

4G wireless LAN network, configure its SSID, channel, and the wireless security level. Use the MAC filter screen to configure the NBG5715 to block access to devices or block the devices from accessing the NBG5715. This screen allows you to configure advanced wireless settings. use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services. use this screen to configure WPS. Use this screen to add a wireless station using WPS. Use this screen to schedule the times the Wireless LAN is enabled. Use this screen to enable the 5G wireless LAN network, configure its SSID, channel, and the wireless security level. Use the MAC filter screen to configure the NBG5715 to block access to devices or block the devices from accessing the NBG5715.

This screen allows you to configure advanced wireless settings. use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services. use this screen to configure WPS. Use this screen to add a wireless station using WPS. Use this screen to schedule the times the Wireless LAN is enabled. Use this screen to configure LAN IP address and subnet mask. Use this screen to have the NBG5715 apply IP alias to create LAN subnets. Use this screen to view the list of activities recorded by your NBG5715. Use this screen to view current DHCP client information.

Use this screen to view port status and packet specific statistics. Use this screen to view the active VPN connections. Use this screen to view the 2. 4G wireless stations that are currently associated to the NBG5715. Use this screen to view the 5G wireless stations that are currently associated to the NBG5715. WPS WPS Station Scheduling Wireless LAN 5G General MAC Filter Advanced QoS WPS WPS Station Scheduling LAN IP IP Alias NBG5715 User's Guide 55 Chapter 8 Router Mode Table 23 Navigation Panel: Router Mode (continued) LINK DHCP Server TAB General Advanced FUNCTION Use this screen to enable the NBG5715's DHCP server. Use this screen to assign IP addresses to specific individual computers based on their MAC addresses and to have DNS servers assigned by the DHCP server. Use this screen to view information related to your DHCP status. use this screen to enable NAT. Use this screen to configure forward incoming service requests to the server(s) on your local network.

Use this screen to change your NBG5715's port triggering settings. Client List NAT General Port Forwarding NAT Advanced Dynamic DNS Static Route Security Firewall General Services IPSec VPN General SA Monitor Management Bandwidth MGMT General Advance WWW Telnet UPnP MAINTENANCE General Password Time Firmware Upgrade Backup/ Restore Language General Password Setup Time Setting Firmware Upgrade Backup/ Restore Language UPnP Dynamic DNS Static Route Use this screen to activate/deactivate the firewall. This screen shows a summary of the firewall rules, and allows you to edit/add a firewall rule. Use this screen to display and manage the NBG5715's VPN rules (tunnels). Use this screen to display and manage active VPN connections.



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use this screen to enable bandwidth management. Use this screen to set the upstream bandwidth and edit a bandwidth management rule. Use this screen to configure through which interface(s) and from which IP address(es) users can use HTTP to manage the NBG5715. Use this screen to configure through which interface(s) and from which IP address(es) users can use Telnet to manage the NBG5715. Use this screen to enable UPnP on the NBG5715.

**Remote MGMT** Use this screen to view and change administrative settings such as system and domain names. Use this screen to change the password of your NBG5715. Use this screen to change your NBG5715's time and date. Use this screen to upload firmware to your NBG5715. Use this screen to backup and restore the configuration or reset the factory defaults to your NBG5715. This screen allows you to select the language you prefer. 56 NBG5715 User's Guide C HAPT ER 9 Tutorials 9. 1 Overview This chapter provides tutorials for setting up your NBG5715. □ Set Up a Wireless Network with WPS • Configure Wireless Security without WPS 9. 2 Set Up a Wireless Network with WPS This section gives you an example of how to set up wireless network using WPS.

This example uses the NBG5715 as the AP and NWD210N as the wireless client which connects to a notebook. wireless LAN 2. 4G is used as the wireless mode in this example. Note: The wireless client must be a WPS-aware device (for example, a WPS USB adapter or PCI card). There are two WPS methods for creating a secure connection. This tutorial shows you how to do both. □ Push Button Configuration (PBC) - create a secure wireless network simply by pressing a button. This is the easier method. □ PIN Configuration - create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the NBG5715's interface. This is the more secure method, since one device can authenticate the other.

1 Push Button Configuration (PBC) 1 Make sure that your NBG5715 is turned on. If not, you can enable wireless LAN by pressing the WLAN On/Off button on the device's side panel or in the Network > Wireless LAN 2. 4G screen. Make sure that the device is placed within range of your computer. Make sure that you have installed the wireless client (this example uses the NWD210N) driver and utility in your notebook.

In the wireless client utility, find the WPS settings. enable WPS and press the WPS button (Start or WPS button). Log into NBG5715's Web Configurator and press the Push Button in the Configuration > Network > Wireless LAN 2. 4G > WPS Station screen. 2 3 4 NBG5715 User's Guide 57 Chapter 9 Tutorials Note: Your NBG5715 has a WPS button located on its front panel, as well as a WPS button in its configuration utility.

Both buttons have exactly the same function; you can use one or the other. note: It doesn't matter which button is pressed first. You must press the second button within two minutes of pressing the first one. The NBG5715 sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG5715 securely. The following figure shows you an example to set up wireless network and security by pressing a button on both NBG5715 and wireless client (the NWD210N in this example). 2 PIN Configuration When you use the PIN configuration method, you need to use both NBG5715's configuration interface and the client's utilities. 1 Launch your wireless client's configuration utility. Go to the WPS settings and select the PIN method to get a PIN number.

Enter the PIN number to the PIN field in the Configuration > Network > Wireless LAN 2. 4G > WPS Station screen on the NBG5715. Click Start buttons (or button next to the PIN field) on both the wireless client utility screen and the NBG5715's WPS Station screen within two minutes. The NBG5715 authenticates the wireless client and sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG5715 securely. The following figure shows you the example to set up wireless network and security on NBG5715 and wireless client (ex. NWD210N in this example) by using PIN method. figure 36 Example WPS Process: PIN Method Wireless Client 2 3 Access Point WITHIN 2 MINUTES NBG5715 User's Guide 59 Chapter 9 Tutorials 9. 3 Configure Wireless Security without WPS This example shows you how to configure wireless security settings with the following parameters on your NBG5715.

wireless LAN Mode 2. 4G SSID Channel Security SSID\_Example3 6 WPA-PSK (Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey) Follow the steps below to configure the wireless settings on your NBG5715. The instructions require that your hardware is connected (see the Quick Start Guide) and you are logged into the Web Configurator through your LAN connection (see Section 4. Enter SSID\_Example3 as the SSID and select Channel-06 as the channel. Set security mode to WPA-PSK and enter ThisismyWPA-PSKpre-sharedkey in the Pre-Shared Key field.

4G wireless and wireless security settings under Device Information and check if the WLAN 2. 1 Configure Your Notebook Note: We use the ZyXEL M-302 wireless adapter utility screens as an example for the wireless client. The screens may vary for different models. Make sure that your notebook or computer's wireless adapter supports one of these standards. Wireless adapters come with software sometimes called a "utility" that you install on your computer.

See your wireless adapter's User's Guide for information on how to do that. After you've installed the utility, open it. If you cannot see your utility's icon on your screen, go to Start > Programs and click on your utility in the list of programs that appears. The utility displays a list of APs within range, as shown in the example screen below. 2 3 NBG5715 User's Guide 61 Chapter 9 Tutorials 4 Select SSID\_Example3 and click Connect. 5 Select WPA-PSK and type the security key in the following screen. 62 NBG5715 User's Guide Chapter 9 Tutorials 7 Check the status of your wireless connection in the screen below. If your wireless connection is weak or you have no connection, see the Troubleshooting section of this User's Guide. If your connection is successful, open your Internet browser and enter <http://www.zyxel.com>.

Com or the URL of any other web site in the address bar. If you are able to access the web site, your wireless connection is successfully configured. Use these screens to configure your NBG5715 for Internet access. A WAN (Wide Area Network) connection is an outside connection to another network or the Internet.

It connects your private networks such as a LAN (Local Area Network) and other networks, so that a computer in one location can communicate with computers in other locations. figure 37 LAN and WAN 10.



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2 What You Can Do in this Chapter • Use the Broadband screen to enter your ISP information and set how the computer acquires its IP, DNS and WAN MAC addresses (Section 10. 3 What You Need To Know The information in this section can help you configure the screens for your WAN connection, as well as enable/disable some advanced features of your NBG5715. 1 Configuring Your Internet Connection Encapsulation Method Encapsulation is used to include data from an upper layer protocol into a lower layer protocol. To set up a WAN connection to the Internet, you need to use the same encapsulation method used by your NBG5715 User's Guide 67 Chapter 10 WAN ISP (Internet Service Provider).

If your ISP offers a dial-up Internet connection using PPPoE (PPP over Ethernet) or PPTP (Point-to-Point Tunneling Protocol), they should also provide a username and password (and service name) for user authentication. WAN IP Address The WAN IP address is an IP address for the NBG5715, which makes it accessible from an outside network. It is used by the NBG5715 to communicate with other devices in other networks. It can be static (fixed) or dynamically assigned by the ISP each time the NBG5715 tries to access the Internet. If your ISP assigns you a static WAN IP address, they should also assign you the subnet mask and DNS server IP address(es) (and a gateway IP address if you use the Ethernet or ENET ENCAP encapsulation method).

DNS Server Address Assignment Use Domain Name System (DNS) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of www. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The NBG5715 can get the DNS server addresses in the following ways. 1 The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, manually enter them in the DNS server fields.

If your ISP dynamically assigns the DNS server IP addresses (along with the NBG5715's WAN IP address), set the DNS server fields to get the DNS server address from the ISP. 2 WAN MAC Address The MAC address screen allows users to configure the WAN port's MAC address by either using the factory default or cloning the MAC address from a computer on your LAN. Choose Factory Default to select the factory assigned default MAC Address. Otherwise, click Clone the computer's MAC address - IP Address and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to configuration file. It is recommended that you clone the MAC address prior to hooking up the WAN Port. 2 Multicast Traditionally, IP packets are transmitted in one of either two ways - Unicast (1 sender - 1 recipient) or Broadcast (1 sender - everybody on the network). Multicast delivers IP packets to a group of hosts on the network - not everybody and not just 1. Figure 38 Multicast Example In the multicast example above, systems A and D comprise one multicast group. In multicasting, the server only needs to send one data stream and this is delivered to systems A and D.

IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a multicast group - it is not used to carry user data. The NBG5715 supports both IGMP version 1 (IGMP-v1) and IGMP version 2 (IGMP-v2). At start up, the NBG5715 queries all directly connected networks to gather group membership. After that, the NBG5715 periodically updates this information. IP multicasting can be enabled/ disabled on the NBG5715 LAN and/or WAN interfaces in the Web Configurator (LAN; WAN). 4 The Broadband Screen Use this screen to change your NBG5715's Internet access settings. click Configuration > Network > WAN to open the Broadband screen. The screen differs according to the encapsulation you choose. NBG5715 User's Guide 69 Chapter 10 WAN Figure 39 Network > WAN > Broadband: ENET ENCAP The following table describes the labels in this screen. Table 24 Network > WAN > Broadband: ENET ENCAP LABEL Encapsulation Obtain an IP Address Automatically Static IP Address IP Address Subnet Mask Gateway IP Address First DNS Server Second DNS Server DESCRIPTION Choose the ENET ENCAP (Ethernet encapsulation) option when the WAN port is used as a regular Ethernet.

Select this option If your ISP did not assign you a fixed IP address. This is the default selection. Select this option If the ISP assigned a fixed IP address. Enter your WAN IP address in this field if you selected Static IP Address. Enter the Subnet Mask in this field.

Enter a Gateway IP Address (if your ISP gave you one) in this field. Select Obtained From ISP if your ISP dynamically assigns DNS server information (and the NBG5715's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select User-Defined if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right.

If you chose User-Defined, but leave the IP address set to 0. 0, User-Defined changes to None after you click Apply. If you set a second choice to User-Defined, and enter the same IP address, the second User-Defined changes to None after you click Apply. Select None if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it. ISP Parameters for Internet Access Apply Cancel Click Apply to save your changes back to the NBG5715. PPPoE is an IETF standard (RFC 2516) specifying how a personal computer (PC) interacts with a broadband modem (DSL, cable, wireless, etc. ) connection. The PPP over Ethernet option is for a dial-up connection using PPPoE. For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for example Radius).

One of the benefits of PPPoE is the ability to let you access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for individuals. Operationally, PPPoE saves significant effort for both you and the ISP or carrier, as it requires no specific configuration of the broadband modem at the customer site. By implementing PPPoE directly on the NBG5715 (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG5715 does that part of the task. Furthermore, with NAT, all of the LANs' computers will have access. This screen displays when you select PPPoE encapsulation. Figure 40 Network > WAN > Broadband: PPPoE NBG5715 User's Guide 71 Chapter 10 WAN The following table describes the labels in this screen. Table 25 Network > WAN > Broadband: PPPoE LABEL Encapsulation PPP Information PPP Username PPP Password PPP Auto Connect IDLE Timeout PPPoE Service Name Type the user name given to you by your ISP.



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Type the password associated with the user name above. Select this option if you do not want the connection to time out.

This value specifies the time in minutes that elapses before the router automatically disconnects from the PPPoE server. Enter the name of your PPPoE service here. DESCRIPTION Select PPPoE if you connect to your Internet via dial-up. ISP Parameters for Internet Access WAN IP Address Assignment Get automatically from ISP Use Fixed IP Address My WAN IP Address DNS Server First DNS Server Second DNS Server Select From ISP if your ISP dynamically assigns DNS server information (and the NBG5715's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns.

Select User-Defined if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose User-Defined, but leave the IP address set to 0. 0, User-Defined changes to None after you click Apply. If you set a second choice to User-Defined, and enter the same IP address, the second User-Defined changes to None after you click Apply.

Select None if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it. Apply Cancel Click Apply to save your changes back to the NBG5715. click Cancel to begin configuring this screen afresh. Select this option If your ISP did not assign you a fixed IP address. This is the default selection. Select this option If the ISP assigned a fixed IP address. Enter your WAN IP address in this field if you selected Use Fixed IP Address. You can use this screen to enable multicast. 72 NBG5715 User's Guide Chapter 10 WAN Figure 41 Network > WAN > Advanced Table 26 Network > WAN > Advance LABEL Multicast Setup DESCRIPTION Select IGMPv1/v2 to enable multicasting.

This applies to traffic routed from the WAN to the LAN. select None to disable this feature. This may cause incoming traffic to be dropped or sent to all connected network devices. Apply Cancel Click Apply to save your changes back to the NBG5715. 1 Overview This chapter discusses how to configure the wireless network settings in your NBG5715. The NBG5715 is able to function both 2. 4G and 5G network at the same time. You can have different wireless settings for 2. See the appendices for more detailed information about wireless networks. The following figure provides an example of a wireless network.

Figure 42 Example of a Wireless Network The wireless network is the part in the blue circle. In this wireless network, devices A and B are called wireless clients. The wireless clients use the access point (AP) to interact with other devices (such as the printer) or with the Internet. Your NBG5715 is the AP. 1 What You Can Do in this Chapter • Use the General screen to enable or disable wireless LAN, configure SSID, operating channel, and wireless security (Section 11. 4

2 on page 79). □ Use the MAC Filter screen to allow or deny wireless stations based on their MAC addresses from connecting to the NBG5715 (Section 11. 4 on page 85). □ Use the Advanced screen to allow intra-BSS networking and set the RTS/CTS Threshold (Section 11. 5 on page 86).

□ Use the QoS screen to ensure Quality of Service (QoS) in your wireless network (Section 11. 6 on page 87). □ Use the WPS screen to quickly set up a wireless network with strong security, without having to configure security settings manually (Section 11. 7 on page 87). □ Use the WPS Station screen to add a wireless station using WPS (Section 11. 8 on page 89). □ Use the Scheduling screen to set the times your wireless LAN is turned on and off (Section 11. 2 What You Should Know Every wireless network must follow these basic guidelines. □ Every wireless client in the same wireless network must use the same SSID. The SSID is the name of the wireless network.

it stands for Service Set IDentity. □ If two wireless networks overlap, they should use different channels. Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information. □ Every wireless client in the same wireless network must use security compatible with the AP. Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network. Wireless Security Overview The following sections introduce different types of wireless security you can set up in the wireless network.

SSID Normally, the AP acts like a beacon and regularly broadcasts the SSID in the area. You can hide the SSID instead, in which case the AP does not broadcast the SSID. In addition, you should change the default SSID to something that is difficult to guess.

This type of security is fairly weak, however, because there are ways for unauthorized devices to get the SSID. In addition, unauthorized devices can still see the information that is sent in the wireless network. MAC Address Filter Every wireless client has a unique identification number, called a MAC address. 1 A MAC address is usually written using twelve hexadecimal characters<sup>2</sup>; for example, 00A0C5000002 or 76 NBG5715 User's Guide Chapter 11 Wireless LAN 00:A0:C5:00:00:02. To get the MAC address for each wireless client, see the appropriate User's Guide or other documentation.

You can use the MAC address filter to tell the AP which wireless clients are allowed or not allowed to use the wireless network. If a wireless client is allowed to use the wireless network, it still has to have the correct settings (SSID, channel, and security). If a wireless client is not allowed to use the wireless network, it does not matter if it has the correct settings. This type of security does not protect the information that is sent in the wireless network. Furthermore, there are ways for unauthorized devices to get the MAC address of an authorized wireless client.

Then, they can use that MAC address to use the wireless network. User Authentication You can make every user log in to the wireless network before they can use it. This is called user authentication. However, every wireless client in the wireless network has to support IEEE 802. 1x to do this. For wireless networks, there are two typical places to store the user names and passwords for each user. □ In the AP: this feature is called a local user database or a local database.

□ In a RADIUS server: this is a server used in businesses more than in homes. If your AP does not provide a local user database and if you do not have a RADIUS server, you cannot set up user names and passwords for your users. Unauthorized devices can still see the information that is sent in the wireless network, even if they cannot use the wireless network.

Furthermore, there are ways for unauthorized wireless users to get a valid user name and password. Then, they can use that user name and password to use the wireless network. Local user databases also have an additional limitation that is explained in the next section.



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