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## USER GUIDE



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**Manual abstract:**

O.C. TEL: +886 3 5770270 Fax: +886 3 5780764 March 2012 Pub. @@@(SMC) is believed to be accurate and reliable. @@@@SMC reserves the right to change specifications at any time without notice. Copyright © 2012 by SMC Networks, Inc. No. 1 Creation Road III, Hsinchu Science Park, 30077, Taiwan, R.O.C.

All rights reserved Trademarks: SMC is a registered trademark; and Barricade, EZ Switch, TigerStack, TigerSwitch, and TigerAccess are trademarks of SMC Networks, Inc. Other product and company names are trademarks or registered trademarks of their respective holders. WARRANTY AND PRODUCT REGISTRATION To register SMC products and to review the detailed warranty statement, please refer to the Support Section of the SMC Website at <http://www.smc.com>.

4 COMPLIANCES FEDERAL COMMUNICATION COMMISSION INTERFERENCE STATEMENT This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. @@@@Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. FCC RADIATION EXPOSURE STATEMENT This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. @@@This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. FCC - PART 68 This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of this equipment is a label that contains, among other information, a product identifier in the 5 COMPLIANCES format US: 1KRDL09BSMC7800A. If requested, this number must be provided to the telephone company. This equipment uses the following USOC jacks: RJ-11. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those entire devices ring when your telephone number is called. In most, but not all areas, the sum of the REN of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to you line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area. If your equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily.

If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service. If you experience trouble with this telephone equipment, please contact please contact our company at the numbers shown on back of this manual for information on obtaining service or repairs. The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning. This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Notice: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface.

The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5. REN (RINGER EQUIVALENT NUMBERS) STATEMENT ATTACHMENT LIMITATIONS STATEMENT Notice: This equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). This is confirmed by marking the equipment with the Industry Canada certification number. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company.

The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. 6 COMPLIANCES Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together.

This precaution may be particularly important in rural areas. Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate. CE MARK DECLARATION OF CONFORMANCE FOR EMI AND SAFETY (EEC)

SMC contact for these products in Europe is: SMC Networks Europe, C/Fructuós Gelabert 6-8, 2o, 2a, Edificio Conata II, 08970 - Sant Joan Despí, Barcelona, Spain. This is a class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures. NATIONAL RESTRICTIONS This device is intended for home and office use in all EU countries (and other countries following the EU directive 1999/5/EC) without any limitation except for the countries mentioned below: Country Bulgaria France Restriction None Outdoor use limited to 10 mW e.i.r.p. within the band 2454-2483.

5 MHz None None Implemented Reason/Remark General authorization required for outdoor use and public service Military Radiolocation use. Refarming of the 2.4 GHz band has been ongoing in recent years to allow current relaxed regulation. Full implementation planned 2012 If used outside of own premises, general authorization is required General authorization required for network and service supply(not for spectrum) This subsection does not apply for the geographical area within a radius of 20 km from the centre of NyÅlesund Only for indoor applications italy Luxembourg Norway Russian Federation None

NOTE: Do not use the product outdoors in France.



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**7 COMPLIANCES EUROPE - EU DECLARATION OF CONFORMITY** This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC: EN 60950-1:2006 + A1: 2009 + A1: 2010 + A12: 2011 Safety of Information Technology Equipment. EN 300 328 V1.7.1: 2006-10 Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive. EN 301 489-17 V1.8.1/2008-04 EN 301 489-17 V2.1.1/2009-05 Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2.

4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment. EN 55022: 2006 + A1: 2007 Limits and methods of measurement of radio disturbance characteristics of information technology equipment. EN 55024: 1998 + A1: 2001 + A2: 2003 Information technology equipment immunity characteristics limits and methods of measurement. EN 62311: 2008 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz). This device is a 2.

4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies. In Italy the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to telecommunications and/or network services. This device may not be used for setting up outdoor radio links in France and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 - 2483.5 MHz. For detailed information the end-user should contact the national spectrum authority in France. **8 COMPLIANCES** This equipment may be operated in: The official CE certificate of conformity can be downloaded by selecting the relevant model/ part number from [www.smc.com](http://www.smc.com) -> support -> download. Bulgarian Czech Cesky Danish Dansk Dutch Nederlands , SMC Networks , 1999/5/EC. Manufacturer tímto prohlašuje, že tento Radio LAN device je ve shod se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.

Undertegnede Manufacturer erklærer herved, at følgende udstyr Radio LAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF Hierbij verklaart Manufacturer dat het toestel Radio LAN device in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG Bij deze Manufacturer dat deze Radio LAN device voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC. English Estonian Eesti Finnish Suomi French Français German Deutsch Hereby, Manufacturer, declares that this Radio LAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. Käesolevaga kinnitab Manufacturer seadme Radio LAN device vastavust direktiivi 1999/ 5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele. Valmistaja Manufacturer vakuuttaa täten että Radio LAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen. Par la présente Manufacturer déclare que l'appareil Radio LAN device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE Hiermit erklärt Manufacturer, dass sich dieser/diese/dieses Radio LAN device in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMW attentivement les informations suivantes avant d'utiliser votre appareil. Respectez toutes les précautions afin de protéger l'appareil des risques et dégâts provoqués par un incendie et l'alimentation électrique : Utilisez exclusivement l'adaptateur d'alimentation fourni avec cet appareil. Faites attention à la puissance de charge de la prise de courant ou des rallonges électriques Si detecta algún daño, reemplácelos inmediatamente. Deje un espacio adecuado para que se disipe el calor y evitar así cualquier daño en el dispositivo causado por sobrecalentamiento. Los orificios de ventilación del dispositivo están diseñados para disipar el calor y garantizar que dicho dispositivo funciona con normalidad.

No tape estos orificios de ventilación. No coloque este dispositivo cerca de un lugar donde haya una fuente de calor o temperaturas elevadas. Evite exponer el dispositivo a la luz solar directa. No coloque este dispositivo junto a un lugar húmedo o mojado. No derrame ningún fluido sobre el dispositivo.

Por favor, siga cuidadosamente las instrucciones que figuran en el manual/guía de instalación rápida para conectar el dispositivo a su PC o a cualquier otro producto electrónico. Cualquier conexión no válida podría causar riesgo de descarga o de incendio. No coloque este dispositivo en una superficie o soporte inestable. **12 COMPLIANCES PRECAUÇÕES DE SEGURANÇA** Leia atentamente as seguintes informações antes de utilizar o dispositivo. Respeite as seguintes indicações de segurança para proteger o dispositivo contra riscos e danos causados por fogo e energia elétrica: Utilize o transformador incluído na embalagem do dispositivo.

Respeite a potência da tomada elétrica e das extensões. Uma tomada elétrica sobrecarregada ou cabos e fichas danificadas podem causar choques elétricos ou fogo. Verifique regularmente os cabos de alimentação. Caso algum se encontre danificado, substitua-o imediatamente. É necessário deixar algum espaço livre em volta do dispositivo para dissipação de calor, de forma a evitar danos causados pelo sobreaquecimento do dispositivo. Os orifícios de ventilação do dispositivo foram concebidos para dissipar o calor e assegurar que o mesmo funciona normalmente. Não bloqueie esses orifícios de ventilação.

Não coloque este dispositivo junto a fontes de calor ou em locais com temperaturas elevadas.



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This section includes these chapters: "Introduction" on page 26 "Installing the Router" on page 30 25 1 INTRODUCTION The Barricade ADSL Gateway Router (SMC7904WBRAS-N2 v2) is an ADSL2/2+ modem contained in a compact unit. The router enables multiple wired and wireless users to securely access the Internet through a single-user account with the ADSL service provider. The router provides four 10/100 Mbps Ethernet ports for connection to end users, an IEEE 802.11b/g/n wireless interface, and one ADSL line for connection to the Internet service provider. FEATURES AND BENEFITS The features of the ADSL Gateway Router include: Full-rate ADSL router, support for Router and Bridge modes ITU G.

992.3(ADSL2) and ITU G.992.5(ADSL2+) ITU G.992.1 (G.dmt) Annex A and ITU G.992.2 (G.lite) ANSI T1.

413 Issue 2 Provides 24 Mbps downstream and 1 Mbps upstream Maximum transmission range: 5.4 Kilometers Four Ethernet ports, 10/100 Mbps Auto-MDI/MDIX 802.11n 2.4 GHz radio supporting four SSID interfaces Friendly web-based user interface for configuration Configurable as a DHCP server on your network Compatible with all standard Internet applications Industry standard and interoperable DSL interface Simple web-based status page displays a snapshot of your configuration, and links to the configuration pages. Downloadable flash software upgrades Support of up to 8 Permanent Virtual Circuits (PVC) Support of up to 8 PPPoE sessions 26 CHAPTER 1 \ Introduction Description of Hardware DESCRIPTION OF HARDWARE This ADSL Gateway

Router is a high bit-rate Digital Subscriber Line (DSL) modem that can connect to an ADSL Internet service provider.

This unit provides the following ports on the rear panel: One RJ-11 port for connection to your ADSL service provider's incoming line. Four RJ-45 ports for connection to PCs, or to a 10/100BASE-TX Ethernet Local Area Network switch. The ports operate at 10/100 Mbps, half/full duplex. It supports automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections. (See "10/ 100BASE-TX Pin Assignments" on page 148.

) The following two figures show the components of the Gateway: Figure 1: Top Panel 27 CHAPTER 1 \ Introduction Description of Hardware Figure 2: Rear Panel WAN Port WLAN On/Off WPS Button Ethernet Ports Reset Button Power Socket and On/Off Switch Figure 3: Front Panel LEDs The ADSL Gateway Router includes key system and port indicators that simplify installation and network troubleshooting. The LEDs, which are located on the top of the unit for easy viewing, are described in the following table. Table 1: LED Display Indicators LED Power Status On Green On Red Off DSL On Green Fast Blinking Green Slow Blinking Green Internet On Green Description The router is being supplied with power. The router is running its self-test or the self-test has failed. The router is not receiving power. The DSL Line port has a link with the service provider. A DSL link is being established with the service provider. No DSL signal detected. The Internet connection is in its normal routing mode (for example, PPP dial-up is successful), but no data is being transmitted. Internet data is being transmitted in routing mode.

The Internet connection has failed after successful synchronization in routing mode (for example, PPP dialup has failed). The device is in bridge mode. Blinking Green On Red Off 28 CHAPTER 1 \ Introduction Description of Hardware Table 1: LED Display Indicators (Continued) LED LAN (1-4) Status On Green Blinking Green Off WLAN On Green Blinking Green Off WPS On Green Off Description Ethernet port has a valid link with attached device. Data is being transmitted or received on the port. Ethernet port has no link with an attached device. The Wi-Fi radio is enabled. Data is being transmitted through the WLAN interface. The Wi-Fi radio is disabled. WPS is activated and the router is waiting for negotiation with wireless clients. WPS is not activated.

POWER CONNECTOR The ADSL Gateway Router must be powered with its supplied power adapter. Failure to do so results in voiding of any warranty supplied with the product. The power adapter automatically adjusts to any voltage between 100~240 volts at 50 or 60 Hz, and supplies 12 volts DC power to the unit. No voltage range settings are required. POWER BUTTON The ADSL Gateway Router has a power button.

When the AC power adapter is attached and connected to a power source, the power button must be depressed to power on the unit. WLAN BUTTON Turns the ADSL Gateway Router's Wi-Fi radio on or off. The WLAN LED on the front panel indicates when the Wi-Fi radio is enabled. WPS BUTTON Push this button to start WPS authentication of a wireless device. After a device is successfully added to the network by WPS, the WPS LED will remain on for about 5 minutes and then turn off.

RESET BUTTON This button is used to restore the factory default configuration. If you press and hold down the button for 8 seconds or more, any configuration changes you may have made are removed, and the factory default configuration is restored to the unit. 29 2 INSTALLING THE ROUTER Before installing the ADSL Gateway Router, verify that you have all the items listed in "Package Contents." If any items are missing or damaged, contact your local distributor. Also, be sure you have all the necessary tools and cabling before installing the router. PACKAGE CONTENTS After unpacking the ADSL

Gateway Router, check the contents of the box to be sure that you have received the following components: Barricade ADSL Gateway Router, SMC7904WBRAS-N2 v2 RJ-45 Category 5 network cable RJ-11 telephone cable ADSL splitter AC power adapter Quick Installation Guide Documentation CD SMC warranty information card Please inform your dealer if there are any incorrect, missing, or damaged parts. If possible, retain the carton, including the original packing materials in case there is a need to return the unit for repair. SYSTEM REQUIREMENTS Before you start installing the router, make sure you can provide the right operating environment. See the following installation requirements: A PC or Macintosh with a 10/100 Mbps Ethernet adapter card installed. Or, a Windows PC with an available USB port.

For Internet access, the computer must be configured for TCP/IP. 30 CHAPTER 2 \ Installing the Router Cable Connections Power requirements: 12 VDC using the included AC power adapter. Make sure that a properly grounded power outlet is within 1.8 m (6 ft) of the router. The router should be located in a cool dry place, with at least 5 cm (2 in.) of space on all sides for ventilation. Place the router out of direct sunlight, and away from heat sources or areas with a high amount of electromagnetic interference. The temperature and humidity should be within the ranges listed in the specifications.



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**CABLE CONNECTIONS** The ADSL Gateway Router needs to be connected to the DSL telephone line from the service provider, and to a computer or LAN switch. Figure 4: Connecting the Router Telephone Wall Jack AC Power Outlet Splitter Standard Telephone Cable AC Power Adapter Category 5 UTP Cable Telephone Computer To install the router, follow these steps: 1.

Using standard telephone cable, connect the Line port on the included ADSL splitter to the RJ-11 telephone wall jack providing the ADSL service. 2. Using standard telephone cable, connect the Modem port on the included ADSL splitter to the RJ-11 Line port on the ADSL Gateway Router. 31 CHAPTER 2 \ Installing the Router Powering On 3. The Phone port on the ADSL splitter can be connected to a standard telephone set using telephone cable.

4. Connect one end of the included Ethernet cable to an Ethernet port on the ADSL Gateway Router, and the other end to a PC's RJ-45 network port. Alternatively, you can connect an Ethernet port to a LAN switch. CAUTION: Do not plug a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform to FCC standards.

NOTE: When connecting to any network device (such as a PC, hub or switch), you can use either straight-through or crossover cabling. (Refer to "Cables and Pinouts" on page 147 for a description of cable types.) NOTE: Make sure the twisted-pair Ethernet cable connected to the router's Ethernet port does not exceed 100 meters (328 feet). POWERING ON Plug the power adapter cord into the DC 12V power socket on the router, and then plug the power adapter directly into a power outlet. Check the LED marked "Power" on the top of the unit to be sure it is on. If the Power indicator does not light up, refer to "Troubleshooting" on page 141. If the router is properly configured, it will take about 30 seconds to establish a connection with the ADSL service provider after powering up. During this time the Link indicator will blink during synchronization. After the ADSL connection has been established, the Link indicator will stay on. CONFIGURING THE TCP/IP PROTOCOLS To connect the router to a computer through its Ethernet port, the computer must have an Ethernet network adapter card installed, and be configured for the TCP/IP protocol.

Your service provider will configure TCP/IP for client computers automatically using a networking technology known as Dynamic Host Configuration Protocol (DHCP). Carry out the following steps to check that the computer's Ethernet port is correctly configured for DHCP. WINDOWS 95/98/NT 1. Click "Start/Settings/Control Panel." 2. Click the "Network" icon. 3. For Windows NT, click the "Protocols" tab. 32 CHAPTER 2 \ Installing the Router Configuring the TCP/IP Protocols 4. Select "TCP/IP" from the list of network protocols; this may include details of adapters installed in your computer. 5. Click "Properties." 6. Check the option "Obtain an IP Address." WINDOWS 2000 1.

Click "Start/Settings/Network/Dial-up Connections." 2. Click "Local Area Connections." 3. Select "TCP/IP" from the list of network protocols. 4. Click on "Properties." 5. Select the option "Obtain an IP Address." WINDOWS XP 1. Click "Start/Control Panel/Network Connections." 2. Right-click the "Local Area Connection" icon for the adapter you want to configure. 3. Highlight "Internet Protocol (TCP/IP).

" 4. Click on "Properties." 5. Select the option "Obtain an IP address automatically" and "Obtain DNS server address automatically." WINDOWS VISTA 1. Click Start/Control Panel. 2. Double-click "Network and Sharing Center." 3. Click "View status.

" 4. Click "Properties." If the "User Account Control" window appears, click "Continue." 5. Highlight "Internet Protocol Version 6 (TCP/IPv6)" or "Internet Protocol Version 4 (TCP/IPv4)," and click "Properties.

" 6. Select the option "Obtain an IP address automatically" and "Obtain DNS server address automatically." MAC OS 1. Pull down the Apple Menu. Click "Control Panels" and select "TCP/IP.

" 2. In the TCP/IP dialog box, verify that "Ethernet" is selected in the "Connect Via:" field. 33 CHAPTER 2 \ Installing the Router Configuring the TCP/IP Protocols 3. If "Using DHCP Server" is already selected in the "Configure" field, your computer is already configured for DHCP. Otherwise, select "Using DHCP Server" in the "Configure" field and close the window. 4. Another box will appear asking whether you want to save your TCP/IP settings. Click "Save." 5. Your service provider will now be able to automatically assign an IP address to your computer.

34 SECTION II WEB CONFIGURATION This section describes the basic settings required to access the web management interface and provides details on configuring the Gateway. This section includes these chapters: "System Configuration" on page 36 "Device Information" on page 45 "WLAN Configuration" on page 54 "LAN Settings" on page 72 "WAN Settings" on page 81 "Services" on page 88 "Advanced" on page 115 "Diagnostics" on page 125 "Administration Settings" on page 132 35 3 SYSTEM CONFIGURATION USING THE WEB INTERFACE The router provides a web-based management interface for configuring device features and viewing statistics to monitor network activity. This interface can be accessed by any computer on the network using a standard web browser (such as Internet Explorer 5.0, Netscape 6.2, Mozilla Firefox 2.0, or above). To make an initial connection to the management interface, connect a PC to one of the router's LAN ports. Set your PC with a static address within the same subnet as that used by the router (that is,

192.168.2.

x with the subnet mask 255.255.255.0). To access the configuration menu, follow these steps: 1.

Use your web browser to connect to the management interface using the default IP address of 192.168.2.1. Figure 5: Web Login 2.

Log in to the router's management interface using this account: Login ID: admin Password: smcadmin 36 CHAPTER 3 \ System Configuration Using the Web Interface NOTE: It is strongly recommended to change the default password the first time you access the web interface. For information on changing the password, see "Password Setup" on page 135. HOME PAGE When your web browser connects with the router's web agent, the home page is displayed as shown below. Basic information can be viewed using the Status menu.



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To carry out detailed configuration tasks, use the other menu items. Figure 6: Home Page The main menu is displayed on the left side of the screen. Click on any of these items to open the sub-menu list. The information in this chapter is organized to reflect the structure of the web management screens for easy reference. The configuration pages include the options listed in the table below. For details on configuring each feature, refer to the corresponding page number.

Table 2: Configuration Menu Menu Wizard Status System LAN WLAN WAN Shows hardware/software version numbers, DSL connection status, and Internet connection settings Shows the LAN IP and DHCP server settings Shows wireless interface settings Shows WAN interface functional status (including connection mode single or multiple service, IGMP), and connection status Shows the port mapping settings 45 46 47 48 Description Starts the setup wizard Page 40 Port Mapping Statistics 49 37 CHAPTER 3 | System Configuration Using the Web Interface Table 2: Configuration Menu (Continued) Menu Statistics DSL Statistics ARP Wireless Basic Settings Advanced Settings Security Access Control WPS MBSSID WDS LAN Interface LAN Interface IPv6 LAN Config DHCP Config DHCP Mode Static IP WAN Interface Channel Config ATM Settings ADSL Settings Services DNS DNS Server IPv6 DNS Dynamic DNS Access Control List ACL Config IP/Port Filtering NAT/NAPT Virtual Server NAT Exclude IP NAT Forwarding NAT ALG and PassThrough NAT Port Trigger Configures the virtual server forwarding table Configures excluded IPs on the WAN interface Configures forwarding for access to local servers Configures NAT passthrough for specific application protocols Restricts Internet access for specific ports 97 99 99 100 101 Configures ACLs for LAN or WAN interfaces Configures IP filtering settings 92 95 Configures DNS server settings Configures IPv6 DNS server settings Configures DDNS settings 89 89 90 Configures the DSL channel settings Configures DSL ATM settings Configures ADSL settings 82 84 86 Sets DHCP server and DHCP relay settings Configures static DHCP assignments 76 80 Configures the LAN management interface, including IP address, and IGMP snooping on LAN side Configures IPv6 LAN settings 73 74 Configures basic wireless settings Configures advanced wireless settings Configures wireless security settings Configures wireless access control settings Configures WPS security Enables multiple SSID interfaces Configures Wireless Distribution System settings 55 57 59 64 65 66 68 Description Shows the network traffic statistics Shows the ADSL line statistics Shows entries in the ARP table Page 50 51 52 38 CHAPTER 3 | System Configuration Using the Web Interface Table 2: Configuration Menu (Continued) Menu FTP ALG Configuration NAT IP Mapping IP QoS MAC Filtering DMZ URL Block Software Forbidden DoS Setting IGMP Proxy RIP ARP Binding Advance Bridge Setting Log Setting Routing UPnP SNMP System Time Others Port Mapping Diagnostic Diag-Test Ping Ping6 Traceroute ADSL Admin Commit/Reboot Backup/Restore Password Setup Upgrade Firmware Configure TR-069 Reboots the unit and/or restores factory defaults Backs up or restores configuration settings Changes the web access passwords Upgrades the unit's software version Configures parameters for establishing a connection between the router and an auto-configuration server 133 134 135 136 137 Runs diagnostic tests for the ADSL link Sends Ping echo requests to other devices Sends IPv6 Ping echo requests to other devices Checks routes to other devices Runs ADSL diagnostic tone tests 126 127 127 128 130 Configures aging time and Spanning Tree settings Configures system log settings Configures static routing Enables UPnP for the WAN interface Configures SNMP settings Configures NTP time server settings Configures Half Bridge settings Maps LAN ports to WAN interfaces 116 117 118 120 121 122 123 124 Description Configures FTP server and client ports Configures IP address mapping for NAT Configures IP-based QoS settings Configures MAC address filtering Configures DMZ settings Sets URL key words to block Blocks Internet access for specific software Configures denial-of-service settings Configures IGMP Proxy settings for multicast traffic Configures Routing Information Protocol settings Configures Address Resolution Protocol binding Page 102 102 103 105 106 107 108 109 111 113 114 39 CHAPTER 3 | System Configuration Setup Wizard SETUP WIZARD The Wizard is designed to help you configure the basic settings required to get the ADSL Gateway Router up and running. Click "Wizard" in the main menu to get started. STEP 1 - GETTING After reading the wizard welcome message, click Next to continue. STARTED Figure 7: Wizard Step 1 - Getting Started STEP 2 - TIME ZONE Configure a Network Time Protocol (NTP) server to poll for time updates. To synchronize the router with an NTP server, specify the IP address of a public time server, select your local time zone, and click Next. Figure 8: Wizard Step 2 - Time Zone Configuration The following items are displayed on this page: Status Enables or disables time synchronization with external servers. 40 CHAPTER 3 | System Configuration Setup Wizard Server IP Specifies the IP address of a public NTP time server on the Internet. Interval Specifies the time interval for polling the NTP server. Time Zone A drop-down box provides access to predefined time zones. Each choice indicates it's offset from GMT and lists at least one major city or commonly known zone name covered by the time zone.

STEP 3 - ADSL The third page of the wizard configures the ADSL country settings, Internet SETTINGS service provider, protocol, connection type and username and password. Figure 9: Wizard Step 3 - ADSL Settings The following items are displayed on the first page of the Wizard: Country -- Choose your country of operation from the drop down menu. If your country is not listed, contact your service provider for detailed settings. Internet Service Provider -- The chosen country will determine the list of available Internet Service Providers. Choose the service provider with which you have a contract. Protocol -- The protocol used will be specified by your service provider. Choose from the following options: PPPoE -- Point-to-Point Protocol over Ethernet (PPPoE). PPPoA -- Point-to-Point Protocol over Asynchronous Transfer Mode (PPPoA). 41 CHAPTER 3 | System Configuration Setup Wizard 1483 MER : DHCP -- 1483 MER is an RFC standard MAC Encapsulated Routing protocol. 1483 MER : Static IP -- 1483 MER is an RFC standard MAC Encapsulated Routing protocol.

1483 Bridged -- The Bridged RFC 1483 Encapsulated Traffic over ATM feature allows you to send bridged RFC 1483 encapsulated packets over ATM switched virtual circuits (SVCs). 1483 Routed -- Allows you to send routed RFC 1483 encapsulated packets over ATM switched virtual circuits (SVCs).



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*IPoA -- Dynamic IP over ATM (IPoA). Connection Type -- Your connection type will also be specified by your service provider. Choose from the following options: VC-Mux -- Virtual circuit multiplexing (VC-Mux). LLC -- Logical Link Control (LLC). VPI -- The ATM Virtual Path Identifier. (Range: 0-255) VCI -- The ATM Virtual Channel Identifier. (Range: 32-65535) Username -- Enter the username provided by your service provider. Password -- Enter the password provided by your service provider.*

*Confirm Password -- Re-enter your password. 42 CHAPTER 3 | System Configuration Setup Wizard STEP 4 - WIRELESS The fourth page of the wizard configures wireless settings for the ADSL SETTINGS router. Figure 10: Wizard Step 4 - Wireless Settings The following items are displayed on the first page of the Wizard: WLAN Interface -- Enables/disables the wireless 802.11b/g/n interface. Band -- Selects the operating band and mode. The router supports the 2.4 GHz band and can operate in any combination of 802.11b, g, or n modes. SSID -- Specifies an SSID (service set identifier) which must be the same as that on all wireless clients that wish to associate with the unit. Encryption -- Specifies the security used to protect your wireless network. (Default: None) None: Allows any wireless client within range to associate with the ADSL/Router. WEP: Provides a basic level of security using static shared keys that are distributed to all clients. Be sure to configure at least one static key. Alternatively, enable 802.1X authentication to dynamically create and distribute keys from a RADIUS server.*

*WPA(TKIP/AES): Wi-Fi Protected Access (WPA) using either a static pre-shared key, or 802.1X authentication through a RADIUS server. The encryption used is either TKIP or AES. 43 CHAPTER 3 | System Configuration Setup Wizard WPA2(TKIP/AES): WPA2 using either a static pre-shared key, or 802.1X authentication through a RADIUS server.*

*The encryption used is either TKIP or AES. WPA2 Mixed: WPA and WPA2 using either a static pre-shared key, or 802.1X authentication through a RADIUS server. Either TKIP or AES encryption is used depending on the client. STEP 4 - The final step in the setup wizard saves the configuration changes. Click CONFIGURATION Finish to complete the wizard, then click Save. SAVING Figure 11: Wizard Step 3 - Configuration Saving 44 4 DEVICE INFORMATION The Status pages display information on hardware/software versions, LAN and WAN connection status, statistics, and the ARP table. SYSTEM STATUS The System Status page displays the hardware and software versions, and the WAN connection status and speed. Click Status, System. Figure 12: System Status The following items are displayed on this page: SYSTEM: Alias Name An alias for the ADSL Router, enabling the device to be uniquely identified on the network.*

*Uptime The length of time in minutes that the unit has been powered on. Software Version The current version of firmware running on the unit. DSP Version The current hardware version of the digital signal processor (DSP). DSL: Operational Status Displays the status of the DSL connection. 45 CHAPTER 4 | Device Information LAN Status Upstream Speed The current upload speed of the DSL connection. Downstream Speed The current download speed of the DSL connection. LAN STATUS The ADSL Router LAN window displays basic LAN port settings including DHCP information. Figure 13: Status - LAN The following items are displayed on this page: LAN STATUS Displays the basic information of the LAN port. IP Address -- Displays an IP address for local area connection to the ADSL Router. Subnet Mask -- Displays the local subnet mask.*

*DHCP Server -- Displays whether the DHCP server has been enabled or not. MAC Address -- Displays the physical layer address of the LAN port. DHCP CLIENT TABLE Displays information on the DHCP configuration and lease time. Name -- Displays the name of the client device. IP Address -- Displays the DHCP Client IP address.*

*MAC Address -- Displays the physical layer address of the DHCP Client. 46 CHAPTER 4 | Device Information WLAN Status Expiry(s) -- Displays the duration of the lease time. Type -- Indicates if the entry is dynamic or static. WLAN STATUS The WLAN Status window displays basic wireless interface settings. Figure 14: Status - WLAN The following items are displayed on this page: Wireless Configuration -- Indicates wireless interfaces that are enabled. The router supports four multiple SSID interfaces: Root, and VAP0-VAP3. Wireless Client List -- Lists all wireless clients associated to the router. Wireless Access Control List -- Displays current wireless access control list settings. 47 CHAPTER 4 | Device Information WAN Status WAN STATUS The ADSL Router WAN window displays basic IPv4 and IPv6 WAN port settings. Figure 15: Status - WAN The following items are displayed on this page: Interface -- Displays the interface identifier. VPI/VCI -- Displays the ATM channel identifiers. Encapsulation -- Displays the encapsulation type chosen, either LLC to VX-Mux. Default Route -- Displays if a default route has been enabled. Protocol -- Displays the protocol used for transmission of data packets IP Address -- Displays the local IP address of the WAN port. Default Gateway -- Displays the network route, or gateway used by the unit when no other known route exists for a given IP packet's destination address.*

*Status -- Specifies the status of the interface. DNS Servers -- Specifies the IP addresses of DNS servers. 48 CHAPTER 4 | Device Information Port Mapping PORT MAPPING The Port Mapping status shows the mapping of WAN and LAN interfaces to specific groups. Figure 16: Status - Port Mapping The following items are displayed on this page: Status -- Indicates if port mapping is enabled or disabled. Select -- Indicates the group identification. Interfaces -- Specifies the WAN and LAN interfaces in the group. Status -- Indicates if the group mapping is enabled. 49 CHAPTER 4 | Device Information Traffic Statistics TRAFFIC STATISTICS The ADSL Router Traffic Statistics - Interfaces window displays received and transmitted packet statistics for all interfaces on the ADSL Router. Figure 17: Status - Traffic Statistics The following items are displayed on this page: Interface -- Displays the interface on which traffic is being monitored. Rx Packet -- Displays the total number of packets received by the specified interface. Rx Error -- Displays the total number of packet errors received by the specified interface, if any. Rx Drop -- Displays the total number of received packets dropped by the specified interface. Tx Packet -- Displays the total number of packets transmitted by the specified interface.*



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*Tx Error -- Displays the total number of packet errors occurred during transmission by the specified interface. Tx Drop -- Displays the total number of packets transmitted but dropped by the specified interface.*

*Refresh -- Updates the statistical table for all interfaces. 50 CHAPTER 4 \ Device Information DSL Statistics DSL STATISTICS The ADSL Router DSL Statistics window displays received and transmitted packet statistics for all interfaces on the ADSL Router. Figure 18: Status - DSL Statistics The following items are displayed on this page: ADSL Status -- Displays the ADSL connection status ("activating", "up" or null). ADSL Mode -- Displays the connection mode for the ADSL Router, which is fixed at ADSL2+. Upstream -- Displays the actual payload carried on the upstream channels.*

*Downstream -- Displays the actual payload carried on the downstream channels. Attenuation Downstream/Upstream (db) -- Displays the amount of attenuation in signal strength due to conductive losses in transmission medium. Attenuation affects the propagation of waves and signals in electrical circuits, expressed in decibels (dB). 51 CHAPTER 4 \ Device Information ARP Table SNR Margin Downstream/Upstream (db) -- Displays the current signal-to-noise margin expressed in decibels (dB). SNR is the ratio of signal power to the noise power corrupting the signal. Vendor ID The vendor name of the digital signal processor (DSP). DSP Version The current hardware version of the digital signal processor (DSP). CRC Errors -- Displays the CRC (cyclic redundancy check) - a type of function that takes as input a data stream of any length, and produces as output a value of a certain space, commonly a 32-bit integer. Upstream/Downstream BER The rate at which bits in the data stream that have been altered by noise. Up/Down Output Power -- Displays the upstream/downstream power level employed for ADSL port filtering.*

*ES -- Displays the total error seconds, the number of second intervals during which there was one or more CRC anomalies, or one or more Loss of Signal (LOS) or Loss of Framing (LOF) defects. SES -- Displays the total severely errored seconds. The number of second intervals containing 18 or more CRC-8 anomalies, one or more Loss of Signal (LOS) defects, one or more Severely Errored Frame (SEF) defects, or one or more Loss of Power (LPR) defects. UAS -- Displays the total unavailable errored seconds, the number of seconds during which the ADSL transceiver is powered up but not available. ADSL Retrain -- Retrains the DSL line. ARP TABLE The ARP page displays IP address to MAC address mapping entries determined by the Address Resolution Protocol. Figure 19: Status - ARP Table 52 CHAPTER 4 \ Device Information ARP Table The following items are displayed on this page: IP Address -- IP address of a local entry in the cache. MAC Address -- MAC address mapped to the corresponding IP address. Refresh -- Sends a request to update the current parameters. 53 5 WLAN CONFIGURATION This chapter describes wireless configuration on the ADSL Router.*

*The unit contains an onboard IEEE 802.11b/g/n access point (AP), which provides wireless data communications between the router and wireless devices. WLAN Configuration contains the following sections: "WLAN Basic Settings" on page 55 "Advanced Settings" on page 57 "Wireless Security Setup" on page 59 "Access Control" on page 64 "Wi-Fi Protected Setup (WPS)" on page 65 "MBSSID" on page 66 "WDS" on page 68 54 CHAPTER 5 \ WLAN Configuration WLAN Basic Settings WLAN BASIC SETTINGS The unit's access point can function in one of three modes, mixed 802.11b/g, 802.11b only, or*

*802.11g only. Also note that 802.11g is backward compatible with 802.11b at slower data rates. Note that the unit supports two virtual access point (VAP) interfaces.*

*Figure 20: WLAN Basic Settings The following items are displayed on this page: Disable Wireless LAN Interface -- Disables the Wireless LAN interface. (Default: Enabled) Band -- Defines the radio mode. (Default: 2.4Ghz (B+G)) Mode -- The unit can function as an access point alone, allowing connection to wireless clients, or both access point and WDS (wireless distribution system), allowing WDS transparent bridging between APs. (Default: AP+WDS) SSID -- The service set identifier for the access point. (Default: SMC) Channel Width -- The router provides a channel bandwidth of 40 MHz by default giving an 802.11g connection speed of 108 Mbps (sometimes referred to as Turbo Mode) and a 802.11n connection speed of up to 150 Mbps. Setting the HT Channel Bandwidth to 20 MHz slows connection speed for 802.11g and 802.*

*11n to 54 Mbps and 74 55 CHAPTER 5 \ WLAN Configuration WLAN Basic Settings Mbps respectively and ensures backward compliance for slower 802.11b devices. (Default: 40MHz) Control Sideband -- Specifies if the extension channel should be in the Upper or Lower sideband. When a 40MHz channel bandwidth has been set, the extension channel option will be enabled in the upper or lower sideband. The extension channel allows you to get extra bandwidth. Channel Number -- The radio channel that the ADSL Router uses to communicate with wireless clients. When multiple access points are deployed in the same area, set the channel on neighboring access points at least five channels apart to avoid interference with each other. For example, you can deploy up to three access points in the same area using channels 1, 6, 11. Note that wireless clients automatically set the channel to the same as that used by the ADSL Router to which it is linked. (Default: Auto; Range: 1-11) Radio Power (percent) -- Adjusts the power of the radio signals transmitted from the access point.*

*The higher the transmission power, the farther the transmission range. Power selection is not just a trade off between coverage area and maximum supported clients. You also have to ensure that high-power signals do not interfere with the operation of other radio devices in the service area. (Default: 100%; Range: 100%, 80%, 50%, 25%, 10%) Associated Clients -- Opens a window that displays information on current connected wireless clients. 56 CHAPTER 5 \ WLAN Configuration Advanced Settings ADVANCED SETTINGS The advanced radio configuration settings are described in the page that follows.*

*Figure 21: Wireless Security Setup - Advanced Settings The following items are displayed on this page: Authentication Type -- Sets the basic authentication method. Fragment Threshold -- Configures the minimum packet size that can be fragmented when passing through the wireless interface. Fragmentation of the PDUs (Package Data Unit) can increase the reliability of transmissions because it increases the probability of a successful transmission due to smaller frame size.*



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If there is significant interference present, or collisions due to high network utilization, try setting the fragment size to send smaller fragments. This will speed up the retransmission of smaller frames.

However, it is more efficient to set the fragment size larger if very little or no interference is present because it requires overhead to send multiple frames.

(Range: 256-2346 bytes; Default: 2346 bytes) **RTS Threshold** -- Sets the packet size threshold at which a Request to Send (RTS) signal must be sent to a receiving station prior to the sending station starting communications. The wireless interface sends RTS frames to a receiving station to negotiate the sending of a data frame. After receiving an RTS frame, the station sends a CTS (clear to send) frame to notify the sending station that it can start sending data. **Beacon Interval** -- The rate at which beacon signals are transmitted from the wireless interface. The beacon signals allow wireless clients to

CHAPTER 5 | WLAN Configuration Advanced Settings maintain contact with the ADSL Router. They may also carry powermanagement information. (Range: 20-1000 TUs; Default: 100 TUs) **DTIM Interval** -- The rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions. Known also as the Delivery Traffic Indication Map (DTIM) interval, it indicates how often the MAC layer forwards broadcast/multicast traffic, which is necessary to wake up stations that are using Power Save mode. The default value of one beacon indicates that the access point will save all broadcast/multicast frames for the Basic Service Set (BSS) and forward them after every beacon.

Using smaller DTIM intervals delivers broadcast/multicast frames in a more timely manner, causing stations in Power Save mode to wake up more often and drain power faster. Using higher DTIM values reduces the power used by stations in Power Save mode, but delays the transmission of broadcast/multicast frames. (Range: 1-255 beacons; Default: 1 beacon) **Data Rate** -- The maximum data rate at which the wireless interface transmits multicast and broadcast packets. (Options: Auto, 1, 2, 5.5, 11, 6, 9, 18, 24, 36, 48, 54 Mbps; Default: Auto) **Preamble Type** -- Sets the length of the signal preamble that is used at the start of a data transmission. (Default: Long) **Long Preamble**: Sets the preamble to long (192 microseconds). Using a long preamble ensures the wireless interface can support all 802.11b and 802.11g clients. **Short Preamble**: Sets the preamble according to the capability of clients that are currently associated. Uses a short preamble (96 microseconds) if all associated clients can support it, otherwise a long preamble is used. The wireless interface can increase data throughput when using a short preamble, but will only use a short preamble if it determines that all associated clients support it. **Broadcast SSID** -- Enables/disables the wireless interface to broadcast an SSID (service set identifier) to uniquely identify it on the network. **Aggregation** -- This option enables Mac Service Data Unit (MSDU) aggregation. (Default: Enabled) **Short GI** -- The guard interval between symbols helps receivers overcome the effects of multipath delays.

You can enable a short interval to increase throughput. (Default: Enabled) 58 CHAPTER 5 | WLAN Configuration Wireless Security Setup **WIRELESS SECURITY SETUP** Describes the wireless security settings for each VAP, including association mode, encryption, and authentication. Figure 22: Wireless Security Setup - None **COMMON WIRELESS** The following items are displayed all pages of the Wireless Security Setup: **PARAMETERS SSID TYPE** -- Selects the VAP to apply security settings to. (Options: Root, VAP0-VAP3) **Encryption** -- Selects the encryption type to deploy on the specified VAP. The options are: None: No security.

**WEP**: WEP is used as the multicast encryption cipher. You should select WEP only when both WPA and WEP clients are supported. **WPA(TKIP/AES)**: WPA employs a combination of several technologies to provide an enhanced security solution for 802.11 wireless networks. TKIP or AES is used as the multicast encryption cipher. **WPA2(TKIP/AES)**: WPA2 WPA was introduced as an interim solution for the vulnerability of WEP pending the ratification of the IEEE 802.11i wireless security standard. In effect, the WPA security features are a subset of the 802.11i standard. WPA2 includes the now ratified 802.

11i standard, but also offers backward compatibility with WPA. Therefore, WPA2 includes the same 802.11 59 CHAPTER 5 | WLAN Configuration Wireless Security Setup and PSK modes of operation. TKIP or AES is used as the multicast encryption cipher. **WPA2(Mixed)**: Clients using WPA or WPA2 are accepted for authentication. TKIP or AES is used as the multicast encryption cipher. The following figures illustrate the various options available with each security setting: Figure 23: Wireless Security Setup - None **WEP SECURITY** The following page describes the WEP security setup on the ADSL Router.

Figure 24: Wireless Security Setup - WEP 60 CHAPTER 5 | WLAN Configuration Wireless Security Setup The following items are displayed on this page: **Set WEP Key** -- Configures the WEP key setup. This is displayed in the screen below. Use 802.

**1x Authentication** -- Enables/disables 802.1x authentication. When enabled the above screen displays. **WEP 64bits/128bits** -- Selects between 64 bit and 128 bit keys. **RADIUS SERVER Port** -- Specifies the port number used to communicate with the RADIUS server.

**IP Address** -- Specifies the IP address used to communicate with the RADIUS server. **Password** -- Specifies the key necessary for RADIUS server authentication. **WEP KEY SETUP** The following page describes the WEP key setup. Figure 25: Wireless Security Setup - WEP Key Setup The following items are displayed on this page: **SSID Type** -- Selects the VAP to configure the WEP security settings to. 61 CHAPTER 5 | WLAN Configuration Wireless Security Setup **Authentication Type** -- Selects the authentication type to use.

Options are: **Open System**: If you don't set up any other security mechanism on the access point, the network has no protection and is open to all users. This is the default setting. **Shared Key**: Sets the access point to use WEP shared keys. If this option is selected, you must configure at least one key on the access point and all clients. **Auto**: Automatically selects the best authentication type to use. **Key Length** -- Selects between 64 bit and 128 bit keys. **Key Format** -- Selects the preferred method of entering WEP encryption keys on the unit: **Alphanumeric**: Enter keys as 5 alphanumeric characters for 64 bit keys, 13 alphanumeric characters for 128 bit keys. This is the default setting. **Hexadecimal**: Enter keys as 10 hexadecimal digits (0-9 and A-F) for 64 bit keys, or 26 hexadecimal digits for 128 bit keys.



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