Open Source User Guide

Open source Wireless-G Router – WGR614L

!!!! Opening The Router Housing or Putting In Any Customer Software on The Router Will Void The Warranty On Your Router!!!!

Hardware Specification

Chipsets: Broadcom 5354

Total memory: 16MB SDRAM, 2 MB Flash

Memory usage of the latest router firmware: 3.2MB

Software Distribution Contents

Contents of the distribution

- src/linux/linux
  This directory contains a full copy of our Linux kernel sources. The bulk of the kernel is based on linux-2.4.20 as modified for MIPS CPU's and maintained at linux-mips.org. We are currently using a snapshot from the oss tree as of 2003-02-03. The main areas of changes are
  - o   the low level MTD support (prefixed with bcm947xx in drivers/mtd)
  - o   BCM47xx/BCM535x specific codes in arch/mips/brcm-boards/bcm947xx

- src/et
  Sources for the 10/100 Ethernet driver.

- src/cfe
  Source for the boot loader "cfe". This code has been developed by Broadcom. It is a replacement for "pmon". It is more compact, contains greater functionality and is more efficient than "pmon".

- src/router
  User level code for HNBU's reference WAN Agnostic Residential Gateway. It includes code written by HNBU plus the following:
  - o   busybox-0.60.0 from opensource.lineo.com
  - o   ppp-2.4.1-pppoe2 from www.shoshin.uwaterloo.ca/~mostrous
  - o   with significant modifications by HNBU
  - o   udhcp-0.9.5 from opensource.lineo.com

- src/rts
  Sources for utilities.

- src/ses
  Sources/objects for the SES.
- src/shared and src/include
  Common code and include files used by all of the above.

- src/wl
  Sources/objects for the WLAN driver.

- Image
  Contains a binary image for the combined kernel and root file system processed with gzip and trx that can be burned directly into flash on to WGR614L board. Also contains binary images for pmon, rnd cfe with additional text files for the supported boards. Either cfe or pmon can be used in with the approriate text file to create an image that can be burned into flash on any of the supported BCM947xx/BCM9534x board.

Making a Console debug Interface for WGR614L

You will need a console board to connect the WGR614L board to the serial port of a host PC. There are many readily available kits based on TI MAX3221 that can be used to connect to the console port.

You may also choose to use the FTDI-232R-3v3 USB TO TTL console board/cable for a USB connection to the PC/Laptop. This will need a Windows driver for the FTDI chipset.

Connect the console board to the 1x6 pin header (JP1) on the PCB.

JP1 Pin Layout
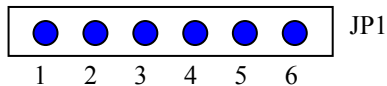
- Connector type : 1x6 pin-header with 2.54 mm pitch
- Pin definition : (pin1: 3.3VDC), (pin2 : RXD), (pin 5: TXD), (Pin 6 : GND),
- Signal : TXD and RXD only support LVTTL level. No handshake signal.
- 3.3V DC power supply : 10 mA
- Baud : 115200 bps/8 data-bit/one stop bit/no parity check/no flow control

How to Build

The following section of the document highlights the steps and procedures that are required to download the source code, install the toolchain, compile and link the existing source code and develop the user applications for the WGR614L Router. FC5 was used for development throughout this guide.

The WGR614L firmware had been built successfully on the following Linux OS platform
- Fedora 2
- Fedora 5
The Firmware source code will possibly build on Many other platforms but it has been tested yet.

1. Download the source codes from http://kbserver.netgear.com/kb_web_files/open_src.asp.
   a. Download both the Toolchain and Source files namely WGR614v8_toolchain_src.tar.bz2 and WGR614v8-v1.1.1_1.0.20NA_src.tar.bz2
   Note: v1.1.1_1.0.20 is the firmware version number. NA means the source code is for firmware released North American region. Apply the correct file name where appropriate, if you download a different version.

2. Follow the instructions in WGR614L-V1.1.1_1.0.20NA_build_instructions.txt file for building the firmware.
3. You can use the generated firmware image to be uploaded using either the firmware upgrade page in the Web based GUI or you may use the debug console board's boot loader prompt to download the firmware. For details please refer to the CFE boot loader commands.

Device Recovery procedure

You will need to use the serial console and tftpd to recover a bricked.

Following Device Recover Procedure does not work on WGR614L router. The following section will be changed once we know how to enable this feature.

Lastly, if the uploaded firmware crashes the router, follow the steps highlighted below for device recovery.
1. Power off the unit
2. Press and hold the RESET button at the rear panel
3. Power on to reboot the unit
4. Monitor the Test LED, and keep holding the RESET button until the Test LED changes from blinking to steady ON
5. (which means the boot loader has entered the TFTP recovery mode)
6. Connect the PC (configured with static IP address 192.168.1.x) to the LAN port of the unit.
7. Transmit the working firmware image file to the unit (the firmware can be downloaded from Netgear support website):
8. For Windows PC, enter the DOS command:
   a. tftp -i 192.168.1.1 PUT kernel_image.chk
9. For a Linux PC, use the command:
   a. tftp -m binary 192.168.1.1 -c put kernel_image.chk
10. where the "192.168.1.1" is the unit's LAN IP address and "kernel_image.chk" is the firmware image file to transmit.
11. Monitor the Test LED. When it starts blinking, the recovery procedure is complete
12. Power cycle to reboot WGR614L
13. (*Repeat the above steps if the procedure is interrupted or failed)