

# Firmware Upgrade Procedures: Linksys WRT300N v2 fw 2.00.08

## 1. General Information

**Make:** Linksys

**Model:** WRT300N

**Hardware Version:** 2 (labeled on the bottom of the device in small font as “ver. 2.0”)

**Firmware Version:** 2.00.08

### MAC Address Info:

**WLAN MAC:** labeled on the bottom of the device.

**LAN MAC:** same as WLAN MAC.

**WAN MAC:** one higher than WLAN (and LAN) MAC.

### Defaults Settings/Configuration:

**Default LAN IP Address:** 192.168.1.1

**Web Interface Username:** (empty)

**Default Web Interface Password:** admin

**Additional Notes:** sometimes referred to as WRT300N (UK). Version 2 hardware has silver outer case (some other hardware versions have blue outer case).

## 2. Wired Upgrade Procedure

### Prerequisites:

- client computer with ethernet interface and firmware file
- ethernet cable
- device LAN IP address
- device web interface password
- if the device is running a CB firmware, under certain situations you may need to reference the CB User’s Manual to perform a firmware upgrade

**Limitations:** if the device is running a CB firmware, under certain situations you may need to reference the CB User’s Manual to perform a firmware upgrade.

**Firmware Filename:** wrt300n[X].bin (where [X] is an optional string)

### Instructions:

- Connect a wired (ethernet) client with DHCP enabled to a LAN port on the device with an ethernet cable. If you are not served an IP address by the device, you will need to determine the device LAN IP address (see next step) and manually assign

the wired client an IP address in the same subnet as the device LAN IP address. For example, if the device LAN IP address is 192.168.1.1, assign yourself an IP address of 192.168.1.11.

- Determine the <Device\_LAN\_IP\_Address>. If the device is running DHCP, the device LAN IP address is likely the default gateway of your connected client; otherwise, if the device LAN IP address is not the default LAN IP address listed above, the device LAN IP address can be retrieved in wireless sniffer capture data (e.g., kismet).
- Log on to the device's web interface by opening a web browser and pointing it to [http://<Device\\_LAN\\_IP\\_Address>](http://<Device_LAN_IP_Address>), where “<Device\_LAN\_IP\_Address>” is the device IP address determined from the previous step (i.e., not the literal string “<Device\_LAN\_IP\_Address>”). For example, if the <Device\_LAN\_IP\_Address> is 192.168.1.1, use <http://192.168.1.1>.
- At the login prompt, enter the web interface password and click OK.
- Then click the “Administration” link on the upper right tab.
- Then click the “Firmware Upgrade” tab.
- Click the “Browse...” button and browse to the wrt300n[X].bin firmware file on the client computer.
- Click the “Start to Upgrade” button. If you get the error message “There is no new version of firmware to upgrade” you will need to power-cycle the device and then reference the CB User's Manual section 12.7 “Firmware Upgrade Will ...” to further continue the upgrade process.
- Watch the interface for any additional steps/error messages/information.

**Reboots Automatically After Upgrade:** Yes

**Approximate Upgrade Time:** 180 seconds

**Known Issues:** None

### 3. Wireless Upgrade Procedure

**Prerequisites:**

- client computer with 802.11 wireless client card (or built-in 802.11 client hardware)
- “Wireless Upgrade Package for Linksys WRT300N v2 fw 2.00.08” – see “README\_fw2.00.08 from the Wireless Upgrade Package for Linksys WRT300N v2 fw 2.00.08” section below
- device LAN IP address
- client IP address

**Limitations:**

- wireless encryption (WEP or WPA/WPA2) must be disabled on device
- device must be running manufacturer's original firmware (not CB firmware)

**Firmware Filename:** N/A (wireless upgrade package handles this)

**Instructions:** Follow the instructions carefully in the README below, (which is the same as the README\_fw2.00.08 in the “Wireless Upgrade Package for Linksys WRT300N v2 fw 2.00.08”).

**Reboots Automatically After Upgrade:** Yes

**Approximate Upgrade Time:** 90 seconds

**Known Issues:** wireless driver (manufacturer's original) sometimes crashes or has madwifi “stuck beacon” on boot – physical power-cycle (i.e., physically unplugging the power supply and then plugging it back in) always resolves the issue.

## **README\_fw2.00.08 from the Wireless Upgrade Package for Linksys WRT300N v2 fw 2.00.08:**

Linksys WRT300N v2 firmware 2.00.08 Wireless Upgrade Documentation

### INTRODUCTION:

This document discusses the procedures for performing a wireless upgrade of a Linksys WRT300N v2 running firmware version 2.00.08.

### ONE-TIME SETUP:

The following setup steps need only be performed once:

1. Boot a Windows XP Laptop with a 802.11 wireless card (any standards conforming 802.11 b/g card should work).
2. Install full cygwin distribution on the laptop:
  - a. go to <http://www.cygwin.com/>
  - b. click the "Install or update now" icon.
  - c. A dialog will popup -- click "Run".
  - d. Another dialog will popup. Click "Next" until you reach the "Select Packages" dialog. Note you may have to select a different mirror site on the "Choose Download Site" dialog.
  - e. On the "Select Packages" dialog, on the lines that starts with "All" (top line), click the circular arrow icon until the line shows "All ( ) Install".
  - h. Click "Next" and follow the instructions for the rest of the install,

which can take a long time (~1 hour).

- i. Verify that you can open a cygwin command window.  
Verify that you have the program "make" by entering:  
    cygcheck -cd | grep make  
Verify that you have the program "gcc" by entering:  
    cygcheck -cd | grep gcc  
Verify that you have the program "perl" by entering:  
    cygcheck -cd | grep perl

3. Install the {XYZ}\_PACKAGE on the laptop, where {XYZ} is the name of the package (typically TEST\_XXX or REAL\_XXX, where TEST packages are to be used during the TEST phase, and the REAL packages are to be used during the operation). It is critical that all PACKAGE files be in the right directories!

Hereafter, the {XYZ}\_PACKAGE is referred to as <PACKAGE>.

- a. Insert the "Wireless Upgrade Package for Linksys WRT300N v2 fw 2.00.08" cdrom into the laptop.
- b. Copy the <PACKAGE>.tar.gz of interest to your cygwin home directory, which is typically C:\cygwin\home\- c. Open a cygwin command window and untar the PACKAGE:  
    tar -xzvf <PACKAGE>.tar.gz
- d. cd into <HOME>/<PACKAGE> and execute:  
    ./setup\_windows\_fw2.00.08.sh

4. Verify the <PACKAGE> setup:

- a. Verify that <HOME>/<PACKAGE>/update\_server.exe runs properly. From a cygwin command prompt, cd to <HOME>/<PACKAGE> and execute:  
    ./update\_server.exe  
The program should execute and exit immediately with no output (but should not report an error loading executable, permission denied, etc).
- b. Verify checksums of the \*.sqsh and original image (wrt300n.bin) files. In <HOME>/<PACKAGE>, execute:  
    md5sum \*.sqsh wrt300n.bin  
Compare the checksums with those in  
    <HOME>/<PACKAGE>/md5sums.txt.

5. Connect the WAN port of the Linksys WRT300N v2 with firmware 2.00.08 to the internet with an ethernet cable. Power the device on and verify wireless client connectivity and internet connectivity.

6. Disable the device's wireless security (package has only been tested against disabled wireless security):

- Log on to the device's webpage (default IP is 192.168.1.1, default password is admin, leave the username field blank).
- Click the "Wireless" tab, and click the "Wireless security" sub-tab.
- In the "Security Mode:" drop down box, select "Disabled".
- At the bottom of the page, click the "Save Settings" button.

#### TEST PROCEDURE:

This section describes the test procedures. If you are performing the operation, skip to the "OPERATIONAL PROCEDURES" section.

1. Restore the device to the manufacturer's 2.00.08 image.
  - Connect the laptop to a wired LAN port of the device with an ethernet cable.
  - Open a browser (IE) to "http://<device\_LAN\_IP\_address>" (default <device\_LAN\_IP\_address> is 192.168.1.1).
  - Enter the username and password (leave the username field blank, default password is admin) and click OK (if password has not already been cached).
  - Click "Administration" link on the upper right tab.
  - Click the "Firmware Upgrade" tab.
  - Click "Browse ...", select the <HOME>/<PACKAGE>/wrt300n.bin file on the cdrom.
  - Click the "Update" button.
  - Wait 3 minutes for the device to reboot.

IMPORTANT: the original web page to upgrade firmware does not work on CB firmware. If you have tried to upgrade using the original web page, and have gotten the error message "There is no new version of firmware to upgrade", you will need to:

- See the CB User's Manual, section 12.7 "Firmware Upgrade Will ...".

2. IMPORTANT: when the device has come back up, manually power-cycle it again. Testing has shown that an additional power-cycle after restoring the original manufacturer's image results in better success of loading of the wireless driver. This is also more similar to the operational scenario.
- 2a. IMPORTANT: wireless upgrade only works when wireless security is disabled. Verify that wireless security is disabled, and if not, disable it:
  - Log on to the web page (as in step 1).
  - Click the "Wireless" tab.
  - Click the "Wireless security" tab.
  - Set the "Security Mode" combo box to "disabled".
  - Click the "Save Settings" button.
3. Disconnect the laptop's LAN cable, and wirelessly connect the laptop to the device.
4. Verify connectivity of the wireless client and internet connectivity.
5. Next move on to the "OPERATIONAL PROCEDURES" section. When finished with "OPERATIONAL PROCEDURES", return to step 6 in this section.
6. Verify a successful upgrade after the device has rebooted. After reboot, reconnect your wireless client.
7. Login to CherryWeb (see CB User's Manual; requires a person logged into a G terminal) and verify the device has beacons. It should beacon at the MM\_INITIAL\_BEACON\_PERIOD\_SEC parameter specified in <HOME>/<PACKAGE>/flytrap.config.<SQSH\_FILE> plus 30 to 60 seconds for device boot/init time -- i.e., if MM\_INITIAL\_BEACON\_PERIOD\_SEC has been specified as 60, then the device should beacon after 90 - 120 seconds from the reboot event.
8. Firmware supports erasure of persistent data IF you upgrade from one CB firmware to a different CB firmware. Note that, if a device has CB firmware 'A' on it, then you upgrade to the manufacturer's

original firmware, and then upgrade again to CB firmware 'A', the persistent data is NOT erased. If a device has CB firmware 'A' on it, then you upgrade to the manufacturer's original firmware, and then you upgrade to CB firmware 'B', the persistent data will be erased.

#### OPERATIONAL PROCEDURES:

The operator must be extremely familiar with the following procedure. Ideally, the operator will have practiced many times on a test device.

0. It is assumed that the laptop is wirelessly connected to the Linksys WRT300N v2 running original manufacturer's firmware 2.00.08. The operator must know:
  - The IP address of the Linksys WRT300N v2 (192.168.1.1 by default), referred to hereafter as <DEVICE IP>. This is usually the wireless client's default gateway.
  - The IP address of the wireless client, referred to hereafter as <WIRELESS CLIENT IP>. To get this address, from a cygwin shell run:  
ipconfig /all
1. Open a cygwin shell, cd to <HOME>/<PACKAGE>, and run:  
perl cisc0wn-2.00.08.pl <DEVICE IP>

In about 15 seconds, the program should return the device's password.

NOTE: the most common case of failure here is running the program against a device that already is already running a CB firmware. See the "TROUBLESHOOTING AND DEVICE RECOVERY" section for how to get out of this situation.

2. From the same cygwin shell, run the following:  
./update\_server.exe 2313 <SQSH\_FILE>  
Where <SQSH\_FILE> is the .sqsh image to deploy to the device. NOTE that each <SQSH\_FILE> has a corresponding flytrap.config.<SQSH\_FILE> that shows it's configuration. Be sure to specify the appropriate file.

The update\_server.exe program should report:

```
Image Size: nnnnnnnn
Waiting for client connection
```

3. Open a browser (IE) and go to the following url:  
http://<DEVICE IP>/update.cgi?<WIRELESS CLIENT IP>+2313  
For example, if the <DEVICE IP> is 192.168.1.1, and the <WIRELESS CLIENT IP> is 192.168.1.100, go to:  
http://192.168.1.1/update.cgi?192.168.1.100+2313

An authentication box should pop up (unless you have previously authenticated). Enter the password from step 1, and leave the username field blank.

4. The cygwin shell from step 2 should nearly immediately report:  
Connection Accepted  
bytesSent nnnnnnnn  
Sent nnnnnnnn bytes  
At this point the <SQSH\_FILE> has been uploaded to the device's RAM, and writing to flash has begun. Note at this point, the operator can leave.

5. After about 50 seconds, assuming a constant connection, the cygwin shell from step 2 should report:  
Update succeeded  
Waiting for client connection

At this point, the <SQSH\_FILE> has been written to flash, and the device is going to reboot.

If the operator loses connection at some point, the cygwin shell will report:  
Failed to receive status  
Waiting for client connection  
and the device will not be able to report the "Update succeeded" status.

As long as the cygwin shell has reported Connection Accepted as in step 4, and the device is not power-cycled during the 50 seconds of flash writing, the upgrade should succeed. See the "TROUBLESHOOTING AND DEVICE RECOVERY" section if any problems arise.

6. The device takes 30-60 seconds to reboot -- the operator should see the wireless network go down for this period of time.

#### TROUBLESHOOTING AND DEVICE RECOVERY:

The manufacturer's original 2.00.08 firmware has shown to be flaky, particularly in regards to the (Atheros) wireless driver. That said, the upgrade procedure has been tested with high likelihood (> 98%) of success. Testing showed that in > 98% of test runs, the upgrade was successful. In some cases, the device would reboot, but an error or kernel panic (usually related to the wireless driver) would occur. In all cases where an error occurred during the reboot process, an additional power-cycle would resolve the problem.

During testing, the most common action leading to a failure was not setting the device back to the manufacturer's original firmware AND performing an additional power-cycle after the device fully rebooted (steps 1 and 2 of the TEST PROCEDURE section).

If the ciscOwn-2.00.08.pl script returns "Failed", the most common cause is running against a CB firmware (instead of original manufacturer's firmware). This puts the device in a state whereby even if the original manufacturer's firmware is restored, upon reboot the device's web page will always report "500 Internal Error". To recover the unit, do the following:

1. Hold the reset button while powering the router on. Continue holding it until the power LED begins alternating between green and orange.
2. Connect a laptop to one of the four LAN ports of the device.
3. Statically assign an IP address such as 192.168.0.7 to the laptop. Note that the router will have the address 192.168.0.10, which should be pingable.
4. telnet to 192.168.0.10, port 9000:  
telnet 192.168.0.10 9000  
When the telnet program connects, hit CTRL-C twice very quickly.  
A "RedBoot>" prompt should appear.
5. From the Redboot prompt, execute (exactly and carefully):  
mfill -b 0x70000 -l 128 -1  
fis write -f 0x503b0000 -b 0x70000 -l 128  
(the fis write command will have you verify 'y' to continue)

6. Once the `write` command completes, type `reset`, and the router should reboot.