

**Product:** RTL8196D/RTL8197D/RTL8196E 11n Firmware  
**Version:** 3.2  
**Date:** Feb 29 2012

## Description:

Realtek provides the turnkey solution for 11n Router/AP in hardware and software. The firmware could be adopted in Realtek EV (evaluation) board, or platforms designed according to Realtek reference circuit.

The current release firmware has only supported for router package. Will add AP package support in the future.

The following sections will describe the hardware requirements, firmware features, to-do list, and the release history.

## Hardware Supported:

### Realtek 11n FE Router/AP EV board:

- RTL8196D – SoC, including a CPU, Ethernet switch controller, single PCIe interface, and single USB 2.0 OTG interface
- RTL8197D – SoC, including a CPU, Ethernet switch controller, dual PCIe interface, two USB 2.0 interface(one OTG + one host controller)
- RTL8196E – SoC, including a CPU, Ethernet switch controller, single PCIe interface, and single USB 2.0 OTG interface
- RTL8196EU(Universal Linker) – SoC, including a CPU, Ethernet switch controller, single PCIe interface, and single USB 2.0 OTG interface
- RTL8192CE/RTL8192D – 802.11 a/b/g/n 2x2 MAC/BB/RF controller
- RTL8188E – 802.11 a/b/g/n 1x1 MAC/BB/RF controller
- DDR2 –32M bytes/64M bytes (note1)(note2)
- SPI Flash –4M bytes/8M bytes (note3)(note4)
- SDRAM –32M bytes (note5)

**Note1:** 32M bytes(16bits) DDR2 for 8196D/8196E EV board, 64M bytes(16bits) DDR2 for 8197D

**Note2:** could support Samsung, Nanya, Promos, ISSI and Elpida.

**Note3:** 4M bytes SPI flash for 8196D/8196E EV board, 8Mbytes SPI flash for 8197D EV board

**Note4:**SPI flash could support for:

MX25L1605D, MX25L3205D, MX25L6405D, MX25L12805D, MX25L1635D, MX25L3235D, MX25L6445E , MX25L12845E , S25FL016A, S25FL032A, S25FL064P, EN25F16, EN25F32, EN25Q16, EN25Q32, SST25VF032B, GD25Q16, GD25Q32, W25Q16, W25Q32, W25X32 , W25X64 , AT25DF161

**Note5:**96E+88E EV board using 32M SDRAM

## Hardware limitation:

■ none

## **Firmware Features Supported:**

- 802.11 a/b/g/n Access Point, WiFi compliant
- 802.1x, WEP, WPA TKIP and WPA2 AES/Mixed mode for PSK and TLS (Radius)
- Wireless Auto-channel selection
- WMM and WMM-APSD supported
- WDS supported with WEP, TKIP and AES encryption
- WPS(1.0/2.0) supported in AP and client mode
- IAPP supported
- 802.11 a/b/g/n client mode
  - Support infrastructure mode and ad-hoc mode with roaming capability
  - Support wireless security for WEP, WPA TKIP and WPA2 AES PSK
  - Support MAC Clone (single Ether device) and NAT2.5 (Multiple Ether clients)
  - Support site survey scan and manual connect
  - Support WPA/WPA2 PSK client
  - Support 802.1X
  - Wireless ISP supported (set wireless interface on WAN interface)
- Support universal repeater mode
- Wireless access control by MAC address (deny or accept)
- Support multiple SSID and guest access (note 1)
- 5G /2.4G con-current/selective mode support
- External LNA and high power PA support
- DFS support for 5G band
- Antenna diversity support
- 802.1d with spanning tree protocol
- TCP/UDP/ICMP/ARP protocol stack
- NAT/NAPT. ALG for: FTP, NetMeeting, SIP, VPN pass-through with multiple sessions (IPSEC, L2TP, PPTP)
- Firewall
- Virtual DMZ
- DHCP client and server
- PPPoE
- PPTP client
- L2TP client
- Boa web server
- DNS relay
- UPnP IGD
- IPsec/VPN gateway and NAT traversal
- IPV6/PPPOE pass through support
- DDNS
- NTP client and daylight saving supported
- URL Filtering and DoS (Deny of Service)

- QoS supported by IP or MAC address
- Routing support for RIP1, RIP2 and static route
- System log
- IGMP proxy(v2/v3) and snooping
- MLD snooping support
- Support 802.1Q VLAN for Ethernet and wireless
- WAPI support
- SAMBA support
- DLNA support
- USB 3G module support
- Hostapd support
- GDB server support
- HTTP file server support
- SNMP support
- FTP server support

**Note1:** It could support up to 5 AP SSID (including primary) in the same time. Each virtual SSID could be configured with different security, WMM, data rate, band and port access (LAN or WAN). When using multiple SSID, the MAC address of each AP must be pre-configured with a unique address.

### **Boot Code Features Supported:**

- Support TFTP upload
- Support SPI flash
- Support LZMA compression
- Support Debug Command

### **Release History:**

#### **Gateway/AP firmware v3.2 –Feb,29 2012 \*\***

- Wireless LAN driver changes as:
  - Add RTL8188E support
  - Improve throughput under weak signal and noisy condition
  - Improve throughput in some 5G channels
  - Fix bug of sending CTS\_TO\_SELF
  - Fix some connection issues of client mode
  - Refine performance for RTL8192D high power board
  - Add smart repeater mode
  - Fix some bug of WPS IE contents
  - Improve station expiring mechanism
  - Improve throughput for Galaxy with BenchBee app
  - Improve the accuracy of power tracking for high power board
  - Modify WPS to support WPS spec 2.02 for brute PIN attack.
- Wireless LAN MP image changes as:
  - Improve the accuracy of power tracking for high power board
- Enhance system stability

- Refine DDR and SDRAM parameters for system stability in bootcode
- Add universal linker(96EU) Support
- Bug Fix for Switch Port 0 not stable sometimes
- Add regular expression function for DNS to select an interface
- Bug Fix for 97D high power with 8211DS Throughput no balance
- Bug Fix for RTL8139 nic link slow issue
- Reserve multicast address and do m2u for MDNS packets

#### Gateway/AP firmware v3.1 – Jan 16, 2012 \*\*

- Wireless LAN driver changes as:
  - Fix win7 wzc can't do WPS success when set AP band to n only.
  - Refine dual band performance
  - Fix dual band client connection issue with 2.4G AP
  - Fix dual band client mode issue with "b" only AP
  - Fix client mode IOT issues
  - Fine tune client mode performance
  - Fix NDSi connection issue with dual band AP
  - Fix ethernet lan pc get DHCP renew failure when DUT is at client mode and as DHCP client
  - Refine Auto Channel Selection
  - Fix wapi can not use N rate, and wapi client mode sometimes connect to AP failure.
  - Fix some wifi logo issues of new test plan
  - Add brute force attack mitigation for WPS
  - Fix repeater mode some connection failed issue
  - Refine repeater mode performance
  - Add region domains for CN and Russia
  - Fix bugs of some functions in MP mode
- Enhance system stability
- Bug fix for IPv6 ready LOGO phase 2
- Add 96E Support
- Add 97D+92CE+92D Demo-Board high power support
- Fix nf\_conntrack number may exceed nf\_conntrack\_max in bt stress test, and decrease drop conntrack overhead
- Refine rtk vlan, and add rtk vlan wan<-->lan bridge feature
- Fix airplay disconnect issue
- Bug fix pocket AP domain name query failure in some cases
- Fix lan pc/sta can not access internet when wan mac clone wlan sta mac address.
- Bug fix for web UI will redirect to lan ip when access web from wan side
- Bug fix adding default route failure when lan ip and wan dhcp server ip address is the same
- Fix boa IOT issues with opera/firefox/chrome browser
- Add switch core debug tool command
- Forbid sta under virtual ssid to access AP webpage when access
- Fix l2tp low throughput when l2tp server behind a NAT devices
- Refine redirect IP when LAN/WAN IP conflict
- Avoid CPU utilization high when plug/un-plug lan cable under dhcp wan type
- Improve samba NTFS write performance

#### \*\* Boot code v3.2 –Feb,29 2012 \*\*

- Refine Memory parameter for 96E

#### \*\* Boot code v3.1 – Jan 16, 2012 \*\*

- Add 8196E support

**\*\* Gateway/AP firmware v3.0 – Sep 29, 2011 \*\***

First Release

**\*\* Boot code v3.0 – Sep 29, 2011 \*\***

First Release