

RTL8650B/RTL8651B

Advanced Home Gateway Controller

General Description

The RTL8650B/RTL8651B is a highly integrated multi-layer switching gateway controller designed to provide the best performance at a competitive price for broadband and wireless gateway applications.

The RTL8650B/RTL8651B integrates the following key components and technologies:

6-port layer 2/3/4 switch MAC, 5 Fast Ethernet transceivers, and an MII interface

Hardware Access Control List (ACL) for firewall applications

A 32-bit RISC CPU with a 4K I-Cache, a 4K D-Cache, an 8K I-MEM, and a 4K D-MEM

A powerful protocol engine to support auto L3/L4 checksum check and re-generation, auto VLAN tagging, and auto PPPoE encapsulation

Rich set of peripherals for value-added services: two UART ports, a USB 1.1 host controller, a PCM interface, and 22 GPIOs

The RTL8650B/RTL8651B is embedded with a PCI host interface to access high-speed devices, providing enhanced application capabilities.

With the built-in layer 2/3/4 switching architecture, the RTL8650B/RTL8651B provides wire-speed performance for not only layer 2 switching, but also IP and NAT switching. This unique architecture frees the embedded CPU from software routing cycles so that the CPU horsepower can be fully utilized to provide the most efficient services.

Features

System Processor

LX5280 32-bit RISC CPU, clock rates up to 200MHz

Embedded 4K I-Cache, 4K D-Cache, 8K I-MEM, 4K D-MEM

Integrated Switch

6-port integrated MAC switch with 5-port physical layer and transceiver for 10Base-T and 100Base-TX

Automatic MDI/MDX crossover on all ports

Supports sixth Port 5, MAC interface with 3 configurations to connect to external MAC or PHY

PHY mode MII (also known as Reverse MII) for router application

PHY mode SNI (also known as GPSI or 7 wires) for router application

MAC mode MII for HomePNA or other PHY application

L2 Capabilities

1024-entry 4-way hash look-up table and 16-entry CAM

Supports source and destination MAC address filtering

Supports 8 active VLANs with 4096 VID number spaces to distinguish IP interfaces

Supports port-based and packet-tagged VLANs

Supports VLAN-based spanning tree forwarding

Non-blocking wire-speed reception and transmission and non-head-of-line-blocking forwarding

Complies with IEEE 802.3, 802.3u, 802.1D, and 802.1Q

Flexible full-duplex 802.3x flow control and optional half-duplex backpressure flow control

L3 Capabilities

Supports 8-entry IPv4 hardware routing table and longest-prefix-matching table lookup

Supports hardware ARP table for host IP addresses

L4 Capabilities

Supports hardware-switched Network Address Port Translation (NAPT) for TCP, UDP, and ICMP protocols

Supports hardware-switched 1-1 Network Address Translation (NAT) for IP protocol

Supports hardware-switched server ports (virtual servers)

Supports Application Level Gateway (ALG) tables for packets that should be further processed by software

QoS Support

Supports 2-level QoS based on port, VLAN tag, TCP/IP TOS/DS, L2/L3 table entry, and firewall rule

Supports policy-based QoS

PPPoE Support

Supports configurable automatic PPPoE encapsulation and decapsulation

Up to 8 PPPoE sessions

Firewall Capabilities

Supports 128 hardware Access Control List (ACL) rules for packet filtering

Supports both ingress and egress filtering

Supports Stateful Packet inspection (SPI) firewall

Supports whole packet inspection function to scan contents of incoming packets

Supports policy-based routing function

Supports policy-based QoS function

Supports policy-based mirroring function

Peripherals

USB v1.1 host controller

33MHz PCI v2.2 host interface for glueless connection of up to two devices

Two 16C550-compatible UARTs

22 GPIOs

System Design

208-pin PQFP package for RTL8650B

292-pin TFBGA package for RTL8651B

3.3V power supply

Applications

Broadband IP-sharing gateways

Wireless gateways

L3 switches

High-performance FTTx routers

Firewall and VPN appliances

Residential gateways

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