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RTL8211FS(I)(-VS)-CG

INTEGRATED 10/100/1000M ETHERNET PRECISION TRANSCEIVER

General Description

The Realtek RTL8211FS-CG/RTL8211FS-VS-CG/RTL8211FSI-CG/RTL8211FSI-VS-CG is a highly integrated Ethernet transceiver that is compatible with 10Base-T, 100Base-TX, and 1000Base-T IEEE 802.3 standards. It provides all the necessary physical layer functions to transmit and receive Ethernet packets over CAT.5 UTP cable. The RTL8211FSI-CG and RTL8211FSI-VS-CG are manufactured to industrial grade standards.

The RTL8211FS(I)-VS-CG provides full hardware support for high-precision clock synchronization based on the Precision Time Protocol (PTP) of IEEE 1588 and 802.1AS standard. The integrated PTP functionality accurately timestamps each PTP packet on the Tx/Rx path, and the upper layer software can use this timing information to determine the timing offset to the PTP master's clock. The device also provides GPIOs as PTP application interfaces.

The RTL8211FS(I)(-VS)-CG uses state-of-the-art DSP technology and an Analog Front End (AFE) to enable high-speed data transmission and reception over UTP cable. Functions such as Crossover Detection & Auto-Correction, polarity correction, adaptive equalization, cross-talk cancellation, echo cancellation, timing recovery, and error correction are implemented in the RTL8211FS(I)(-VS)-CG to provide robust transmission and reception capabilities at 10Mbps, 100Mbps, or 1000Mbps.

Data transfer between MAC and PHY is via the Reduced Gigabit Media Independent Interface (RGMII), or Serial Gigabit Media Independent Interface (SGMII) for 1000Base-T, 10Base-T, and 100Base-TX. The RTL8211FS(I)(-VS)-CG supports various RGMII signaling voltages, including 3.3, 2.5, 1.8, and 1.5V.

The RTL8211FS(I)(-VS)-CG also supports a SerDes interface that can be configured as SGMII, 1000Base-X, or 100Base-FX.

Features

- 1000Base-T IEEE 802.3ab compatible
- 100Base-TX IEEE 802.3u compatible
- 10Base-T IEEE 802.3 compatible
- Supports RGMII
- Supports IEEE 802.3az-2010 (Energy Efficient Ethernet)
- Built-in Wake-on-LAN (WOL) over UTP/Fiber
- Supports Interrupt function over UTP/Fiber
- Supports Parallel Detection
- Crossover Detection & Auto-Correction
- Automatic polarity correction
- Supports PHYRSTB core power Turn-Off
- Baseline Wander Correction
- Supports 120m for CAT.5 cable in 1000Base-T
- Selectable 3.3/2.5/1.8/1.5V signaling for RGMII
- Supports 25MHz external crystal or OSC
- Provides 125MHz clock source for MAC
- Provides 3 network status LEDs
- Supports Link Down power saving

- Green Ethernet (1000/100Mbps mode only)
- Built-in Switching Regulator and LDO
- 48-pin QFN Green Package
- 55 nm process with ultra-low power consumption
- Industrial grade manufacturing process (RTL8211FSI(-VS)-CG)
- Supports SERDES (SGMII/Fiber)
- Supports Fiber-to-UTP Media Convertor mode or SGMII-to-RGMII Bridge mode
- Supports UTP/Fiber Auto Detection
- Complete hardware support for Synchronous Ethernet and Precision Time Protocol (PTP) including IEEE 1588v1, v2, and 802.1AS (RTL8211FS(I)-VS-CG only)
- PTP Packet parser supports Layer 2 Ethernet, IPv4/UDP, IPv6/UDP packets (RTL8211FS(I)-VS-CG only)
- PTP One-Step operation supported (RTL8211FS(I)-VS-CG only)
- PTP clock synchronization (RTL8211FS(I)-VS-CG only)
- PTP timestamp with 8ns resolution (RTL8211FS(I)-VS-CG only)
- Deterministic and low transmission latency for PTP mechanism (RTL8211FS(I)-VS-CG only)
- Adjustable PTP clock (RTL8211FS(I)-VS-CG only)
- Two PTP GPIOs as programmable Time Application Interfaces (RTL8211FS(I)-VS-CG only)
- Low-jitter synchronized PTP clock output (RTL8211FS(I)-VS-CG only)
- Selectable PTP clock input from the external reference clock source (RTL8211FS(I)-VS-CG only)

Applications

- DTV (Digital TV)
- MAU (Media Access Unit)
- CNR (Communication and Network Riser)
- Game Console
- Printer and Office Machine
- DVD Player and Recorder
- Ethernet Hub
- Ethernet Switch
- PTP-featured Equipment with Ethernet Ports
- Base Stations and Controllers
- Routers, DSLAMs, PON Equipment
- Test and Measurement Systems
- Industrial and Factory Automation Equipment
- Multimedia synchronization and Real Time Networking

In addition, the RTL8211FS(I)(-VS)-CG can be used in any embedded system with an Ethernet MAC that needs a UTP physical connection.

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