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BCM93138 PRODUCT Brief
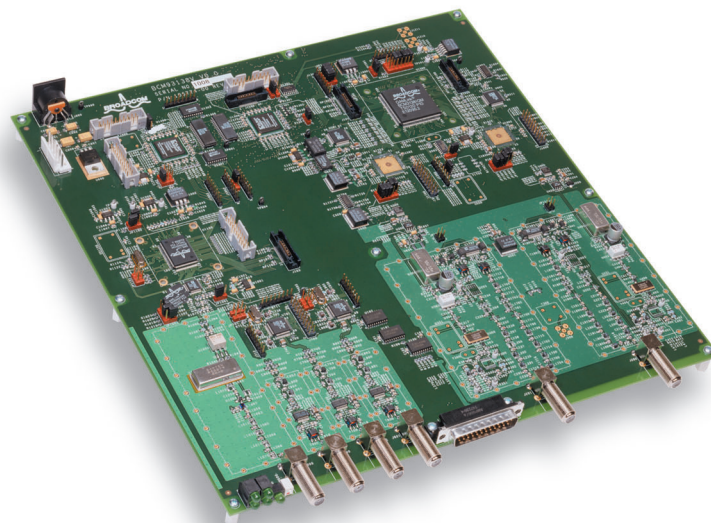
BCM93138 ADVANCED PHY TRANSMITTER/RECEIVER EVALUATION SYSTEM

BCM93138 FEATURES

- **The BCM93138 is a dual-channel upstream cable burst transmitter/receiver evaluation system**
- **Support for advanced TDMA PHY layer functions for DOCSIS/EuroDOCSIS, IEEE802.14, DAVIC and DVB applications**
- **Programmable modulation formats including BPSK, and QPSK up to 256 QAM**
- **Frequency-agile from 5 to 65 MHz**
- **Flexible options for evaluating upstream analog front end (AFE)**
  - Wideband external A/D with direct sampling
  - Narrowband external A/D sampling
  - Narrowband internal A/D sampling
- **50 dB dynamic range for transmitter and receiver**
- **Full Reed-Solomon encoder/decoder with programmable 23-bit randomizer/derandomizer**
- **Multiple operation modes:**
  - Continuous
  - DOCSIS/EuroDOCSIS TDMA
  - Random-arrival
- **Easy-to-use Broadband Studio evaluation software**

SUMMARY OF BENEFITS

- **The BCM93138 enables complete cable upstream advanced PHY layer testing and evaluation with:**
  - BCM3138: DOCSIS/EuroDOCSIS-based advanced TDMA PHY burst receiver
  - BCM3037: DOCSIS/EuroDOCSIS-based QPSK/16 QAM burst transmitter
  - BCM3034: DOCSIS/EuroDOCSIS-based advanced QAM modulator
- **Dramatically reduces time to market by providing a complete reference design for a DOCSIS/EuroDOCSIS based advanced TDMA PHY cable upstream implementation.**
- **Implements pre-equalization for improved performance in heavily impaired cable channels.**
- **Enables digital cable set-top boxes, modems and telephony implementations.**
- **Provides self-contained subscriber and headend system with seamless interface between subscriber and headend components.**
- **Windows software for running test functions and scripts enable user-based evaluation tools with fast turn-up.**
- **Windows software API for register, memory and control access allows visibility to system performance for design comparisons and tradeoffs.**

BCM93138 DOCSIS/EuroDOCSIS Upstream Advanced PHY Transmitter/Receiver Evaluation System

BCM93138 DOCSIS/EuroDOCSIS Upstream Advanced TDMA PHY Transmitter/Receiver Evaluation System Block Diagram
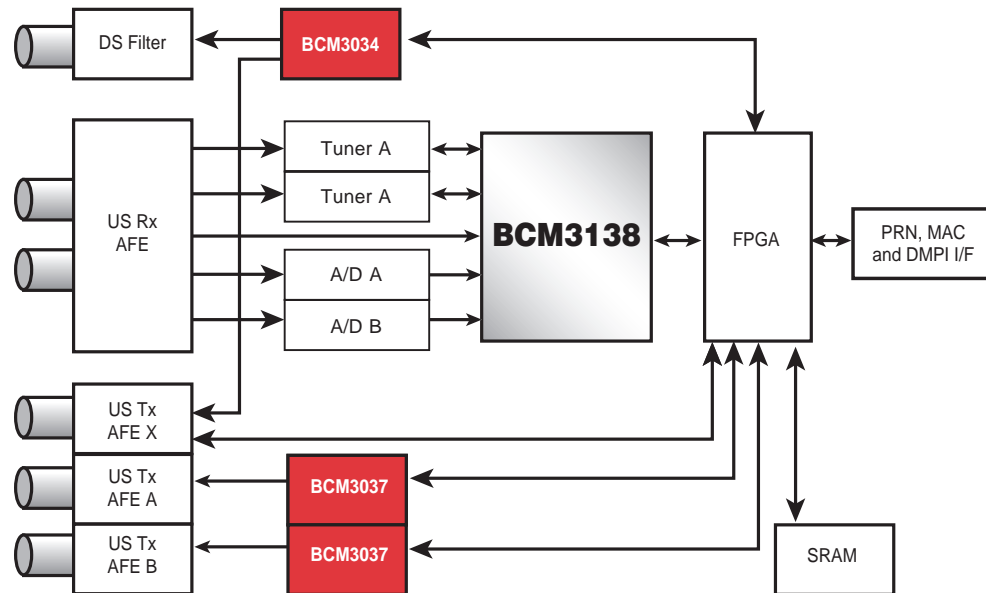
The **BCM93138** is a complete cable network transceiver system for frequency-agile, time-division multiple access (TDMA) systems. It is an ideal platform for evaluating the BCM3138 Dual Universal Advanced TDMA PHY Burst Receiver and the BCM3037 Universal Burst Modulator chips from Broadcom. The **BCM93138** has several modes of operation, including random burst arrival, continuous mode and TDMA with various burst types like those defined in the DOCSIS/EuroDOCSIS standard. Burst data can be generated internally, programmed into internal memory, or supplied via an external test connector. A comprehensive software package is included to control and monitor the performance of the transceiver.

The receiver module operates in a 5–65 MHz range with multiple options for the analog front end. These include wideband direct sampling and narrowband sampling (typically using a low-IF carrier) with either external or chip-internal A/D converters. The receiver can operate in multiple modes: continuous mode, single burst type with external Receive_now, single burst type with random arrival and full DOCSIS/EuroDOCSIS burst types.

The transmitter is the BCM3037 Universal QPSK/16-QAM Burst Modulator capable of operating in all DOCSIS/EuroDOCSIS modes with integrated 10-bit DAC and pre-equalization. The transmitter can operate in both continuous and burst modes. The BCM3034 Universal headend modulator is used to emulate advanced TDMA PHY equipped CPE by creating the upstream advanced TDMA PHY signal for system evaluation.

The FPGA controller has a 64K x 16-bit RAM for pattern storage and/or data capture. It also implements basic DOCSIS/EuroDOCSIS MAC functions, data generation and verification. Access to the controller is via a printer port or RS-232 to PC host.

The **BCM93138** represents the industry's first complete DOCSIS/EuroDOCSIS-based silicon solution for the cable upstream channel supporting advanced TDMA PHY features and is based on Broadcom's field-proven QAMLink® technology. It comes complete with schematics, gerber file, Bill of Materials (BOM), data sheet, software source code and application support.

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