



## BCM3037 QAMLINK® UNIVERSAL BURST MODULATOR

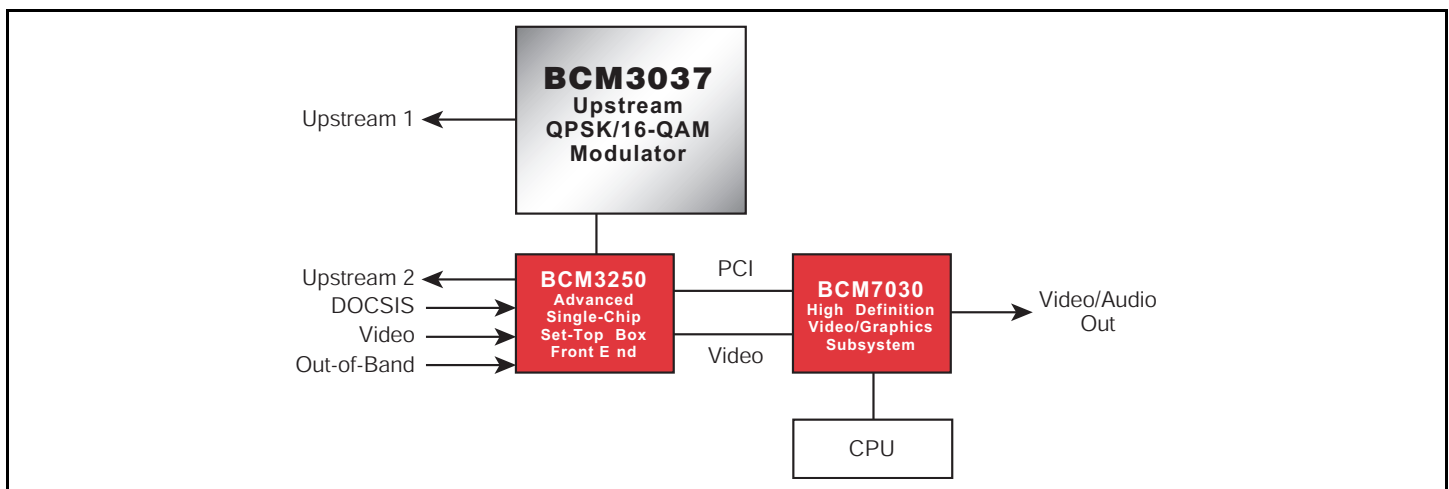
### FEATURES

- The Broadcom BCM3037 is a universal QPSK/QAM burst transmitter for DOCSIS/EuroDOCSIS applications
- DOCSIS/EuroDOCSIS, IEEE 802.14, DAVIC and DVB-compliant
- Programmable Modulation:  $\pi/4$  DQPSK, QPSK, 16-QAM
- Variable symbol rates up to 6.25 MB
- 25 Mbps maximum data rate
- QAMLink modulator with  $\alpha = 0.25/0.50$  square-root Nyquist filters
- Digitally tunable IF center frequency up to 65 MHz
- Programmable Components Include:
  - 6 burst profiles
  - Analog output attenuation up to 25dB
  - Transmitter pre-equalizer
  - RS encoder, GF (256), T = 0 to 10
  - Last RS codeword: fixed length, shortened
  - 23-bit randomizer: polynomial, seed, type
  - Differential/non-differential encoding
- Integrated 10-bit digital-to-analog converter
- Direct interface to BCM3250 MAC
- JTAG Test Interface
- 64-pin PQFP Package

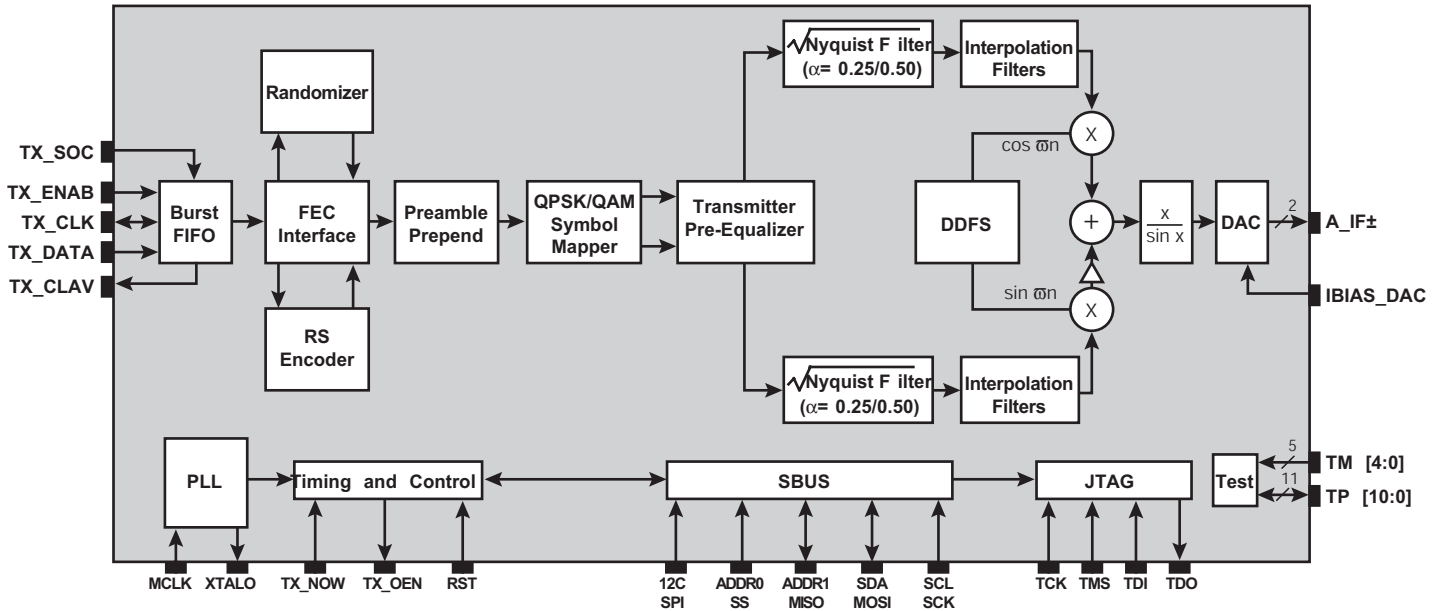
### SUMMARY OF BENEFITS

- A high-performance, integrated solution for upstream modulation in cable data modems, interactive cable-TV set-top boxes, and wireless applications
- Significantly increases upstream channel bandwidth
- Supports multiple standards for worldwide deployment
- Reduces system manufacturing costs and complexities with an on-chip D/A converter
- Improves robustness in noisy upstream channels utilizing pre-equalization
- Fully compatible with the Broadcom BCM3137 QAMLink headend burst demodulator

### Interactive Set-Top Box Block Diagram with Dual Upstream Burst Modulators



# OVERVIEW



The BCM3037 provides a complete  $\pi/4$  DQPSK, QPSK and 16-QAM Upstream Burst Modulator and FEC encoder integrated on a single chip. A burst FIFO buffer provides input data rate decoupling. The FEC encoder consists of a programmable randomizer and a programmable RS encoder. There is also a programmable preamble prepend, programmable symbol mapper, and a programmable transmitter pre-equalizer. The modulator consists of dual square-root raised cosine filters with programmable excess bandwidth,  $\alpha=0.25$  or  $\alpha=0.50$ , interpolation filters, and a digital upconverter which translates the shaped pulse to a digitally tunable IF center frequency. An integrated 10-bit DAC then converts this signal to an analog waveform with programmable attenuation.

The BCM3037 accepts a serial data stream and transmit control inputs. The output consists of an analog modulated and filtered data burst containing data at variable symbol rates and three modulation formats, which are  $\pi/4$  DQPSK, QPSK and 16-QAM. Modulation can include differential or non-differential encoding. The modulated burst consists of a power up, ramp up, preamble, data, FEC, ramp down, guard time and

power down in each burst. The output of the BCM3037 can then be sent to a power amplifier. There are standard DAVIC A0 and ATM UTOPIA serial input interfaces provided. There is also a generic byte-based interface. Alternatively, the BCM3037 can be configured to provide a data bit clock for synchronizing data. Control information is input through either an I<sup>2</sup>C-compatible or SPI-compatible serial interface.

The BCM3037 can be used as a stand-alone chip or with one of Broadcom's QAMLink Receivers/Transceivers. The 10-bit D/A converter in the BCM3037 eliminates fine tuning of external components during high-volume production, which significantly decreases the overall system manufacturing costs. A frequency agile output of [5-65 MHz] that the BCM3037 can generate compensates for severe ingress and effectively combats harsh upstream environments found in coaxial cable applications. The BCM3037 supports all of the cable transmission standards, including SCTE, IEEE802.14, DOCSIS/EuroDOCSIS, DVB, and DAVIC, making it an optimal upstream solution for worldwide coaxial cable applications.

Broadcom®, the pulse logo, and Connecting everything® are trademarks of Broadcom Corporation and/or its subsidiaries in the United States and certain other countries. All other trademarks mentioned are the property of their respective owners.

Connecting  
everything®



**BROADCOM CORPORATION**  
16215 Alton Parkway, P.O. Box 57013  
Irvine, California 92619-7013

© 2004 by BROADCOM CORPORATION. All rights reserved.

3037-PB06-R 07/08/04

Phone: 949-450-8700  
Fax: 949-450-8710  
E-mail: info@broadcom.com  
Web: www.broadcom.com