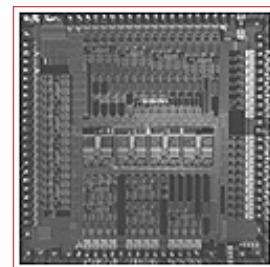




# BCM3033 PRODUCT Brief



## BCM3033 QAMLINK™ UNIVERSAL MODULATOR

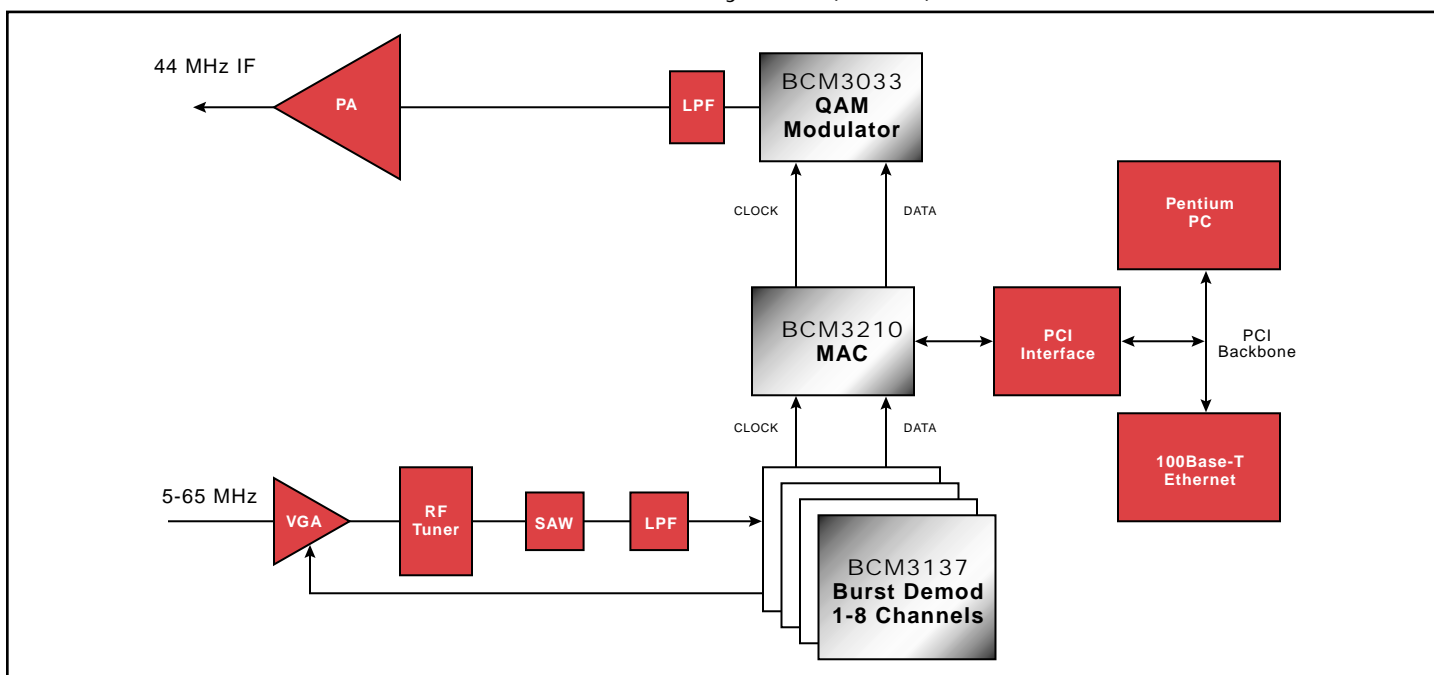
### BCM3033 FEATURES

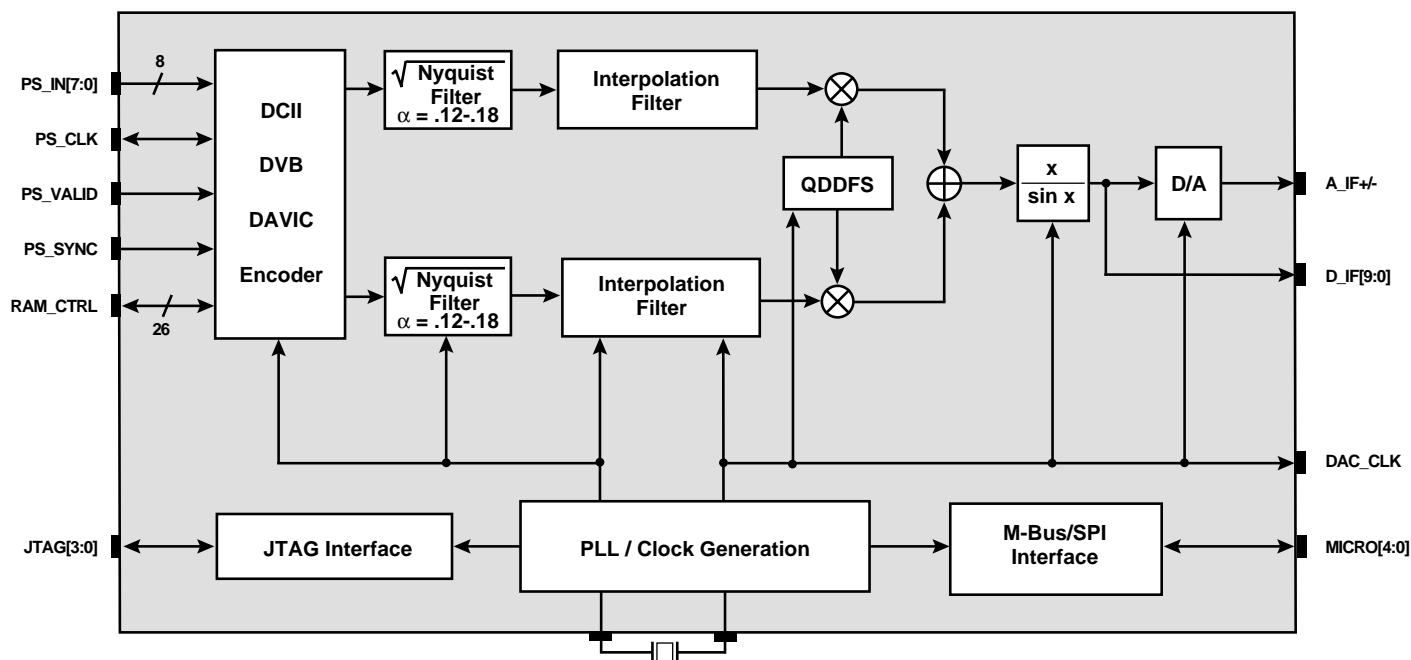
- The Broadcom BCM3033 is a universal headend QAM modulator.
- **Integrated QAMLink Modulator**
  - Supports 4, 16, 32, 64, 128 and 256-QAM
  - Variable data rates up to 7 MBaud
  - Linear phase digital square-root Nyquist transmit filters
  - >60 dB stopband attenuation in digital filters
  - Perfect quadrature amplitude and phase balance
  - X/sinX filter for DAC distortion compensation
- **Integrated ITU-T J.83/Annex A (DVB/DAVIC/IEEE802.14), Annex B (DigiCipher II®/SCTE/DOCSIS/EuroDOCSIS/IEEE 802.14), and Annex C (Japan) FEC Encoding**
- **Integrated 10-bit digital-to-analog converter**
- **Compatible with Broadcom's QAMLink Receivers**
- **I<sup>2</sup>C or SPI-compatible Microcontroller Interface**
- **JTAG Test Interface**
- **120-pin PQFP Package**

### SUMMARY OF BENEFITS

- A high-performance, integrated solution for modulators in digital cable-TV headend, digital cable modem headend, digital microwave radio, SMATV and MMDS applications
- An integrated solution that reduces board space and costs
- A flexible solution that supports the FEC encoding standards for North America, Europe and Asia
- A universal modulator solution that supports all data rates worldwide

### Termination System (CMTS)





The **BCM3033** QAMLink Universal Modulator is a highly-integrated solution that significantly decreases the board space and cost of modulators in digital cable-TV headends, digital cable modem headends, digital microwave radio, SMATV and MMDS applications. Integrated features in the **BCM3033** include an Integrated ITU-T J.83 Annex A (DVB/DAVIC/ IEEE802.14), Annex B (DigiCipher II/SCTE/DOCSIS/EuroDOCSIS/ IEEE802.14), and Annex C (Japan) FEC encoder, a QAM modulator and a D/A converter. The encoder provides coding gain and burst error correction and can be programmed to comply with the ITU-T J.83 Annex A, Annex B and Annex C coding standards. Baseband filtering and quadrature upconversion of the resulting signal is provided by the integrated QAM modulator, which can achieve IF frequencies of up to 1/2 of the output sample rate.

The QAM modulator is rate adaptable up to 7 MBaud and supports 4, 16, 32, 64, 128 and 256-QAM. Triple linear phase square-root Nyquist baseband filters are in the QAM modulator and have a programmable excess bandwidth factor of 12%, 15% or 18%. The QAM modulator also has an X/sinX filter

that compensates for DAC distortion. The integrated DAC in the **BCM3033** is a 10-bit, 114 MS/s DAC with differential analog outputs.

Operation of the **BCM3033** involves a serial or parallel bit stream input that can be passed through the FEC encoder or directly to the modulator. The resulting data is interpolated, filtered, and modulated to the IF carrier. The modulator provides a 10-bit output at the chosen sample rate, which is converted to a 2-Vpp differential analog output waveform by the integrated 10-bit D/A converter.

The **BCM3033** is a flexible, cost-effective worldwide solution. Because the chip accepts variable data rates and supports multiple digital transmission standards, manufacturers only need to develop one modulator for worldwide usage. The integrated feature set in the **BCM3033** significantly reduces the board space in modulators, giving manufacturers a chip solution that is both cost-effective and easy to use.

Broadcom® and the pulse logo are registered trademarks of Broadcom Corporation.  
QAMLink is a trademark of Broadcom Corporation.  
DigiCipherII is a registered trademark of General Instrument Corporation.

For more information please contact us at:  
Phone: 949-450-8700, FAX: 949-450-8710  
Email: info@broadcom.com



Visit our web site at: [www.broadcom.com](http://www.broadcom.com)