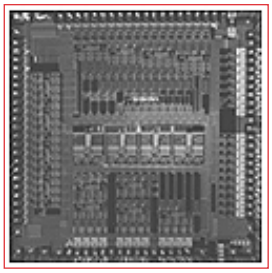
BROADCOM®

BCM4201 PRODUCT Brief



BCM4201 UNIVERSAL SATELLITE RECEIVER

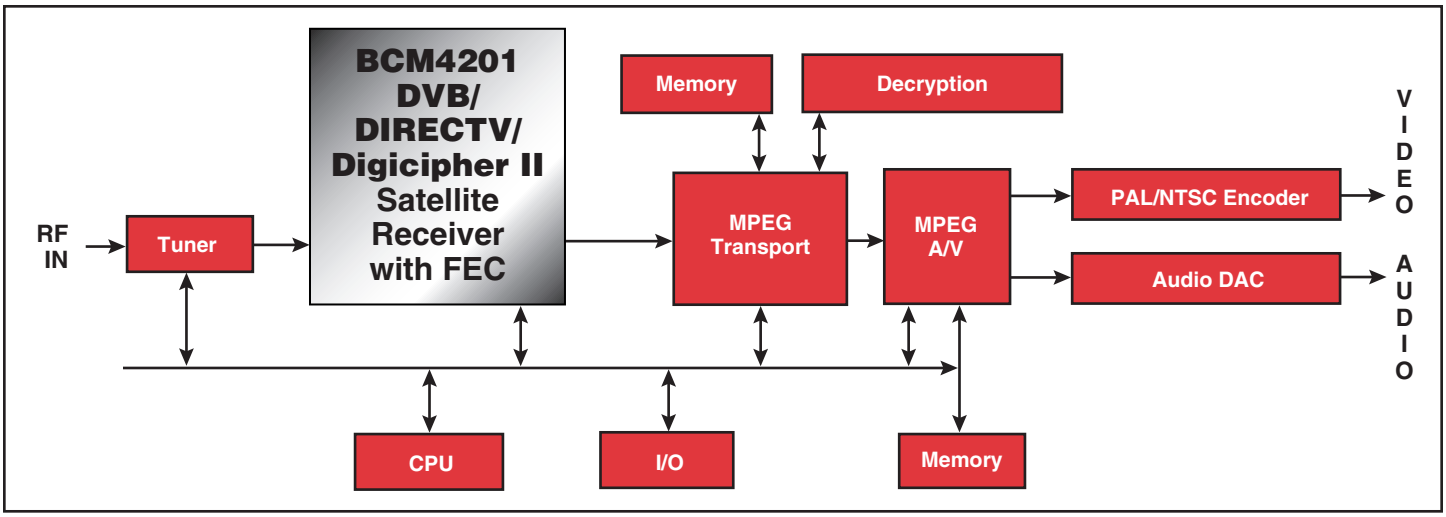
BCM4201 FEATURES

- **The Broadcom® BCM4201 is a universal QPSK receiver for DIRECTV®, DVB and Digicipher™ II digital satellite reception**
- **Integrated satellite receiver**
  - 2-85 Mbps variable rate BPSK/OQPSK/QPSK receiver
  - Dual integrated 8-bit A/D converters
  - Dual square-root Nyquist matched filters (α=0.2-0.35)
  - All digital clock and carrier recovery
  - Integrated PLLs
- **DVB/DIRECTV/Digicipher II-compliant FEC decoder**
  - 64-state Viterbi decoder supports rates = 5/11, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8
  - Programmable convolutional deinterleaver, I=12 or 13 with internal RAM
  - Reed-Solomon decoder: (n,k) = (204,188) or (146,130): t=8
- **Supports direct 480 MHz IF input**
- **I^2C and SPI compatible microcontroller interface**
- **IEEE 1149.1 (JTAG) test interface**
- **80-pin PQFP pin package**
- **3.3 Volt operation**

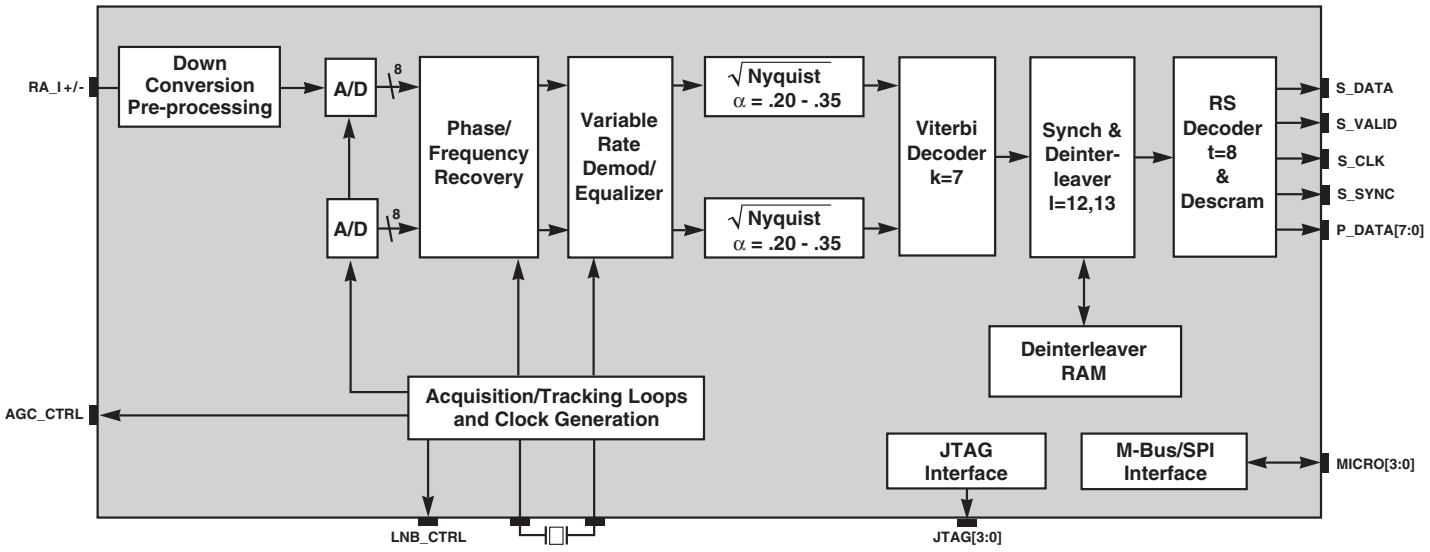
SUMMARY OF BENEFITS

- **A universal digital transmission solution for DVB, DSS and Digicipher II systems**
- **An integrated solution enabling low complexity/low cost digital satellite IRDs**
- **Variable data rates support all satellite systems worldwide**
- **Direct 480 MHz IF input greatly reduces system cost and complexity**
- **Integrated 8-bit A/D converters and PLL reduce system manufacturing costs**
- **Receives up to 85 Mbps for high-speed applications**
- **Operates down to 1 MBaud with excellent adjacent channel rejection characteristics due to 8-bit A/Ds for low-speed applications such as SCPC**
- **Specialized circuitry provided for cycle slip minimization**
- **On-chip BER tester to simplify system optimization**

Satellite IRD Block Diagram



BCM4201 OVERVIEW



The **BCM4201** Universal Satellite Receiver is an integrated digital transmission solution for satellite Integrated Receiver Decoders (IRDs). Integrated features in the **BCM4201** include a 2-85 Mbps variable rate BPSK/QPSK/OQPSK receiver, dual 8-bit A/D converters, a phase/frequency recovery block, variable rate digital filters, square-root Nyquist matched filters, acquisition and tracking loops, and a DVB/DIRECTV/Digicipher II compliant concatenated Viterbi/Reed-Solomon FEC decoder with deinterleaver. The receiver accepts an analog baseband or IF modulated (up to 480 MHz) signal, and transmits a demodulated error corrected output data stream. The **BCM4201** supports the DVB digital transmission standard for satellite broadcasting, that is in worldwide use today, the DIRECTV digital transmission standard and Digicipher II ITU-R 217/11 digital transmission standard.

Analog waveforms received by the **BCM4201** are sampled by the integrated A/D converters, digitally mixed to baseband, resampled, and filtered by dual square-root Nyquist filters. Optimized soft decisions are delivered to a programmable rate 64-state Viterbi decoder, frame synchronization block, deinterleaver, t=8 Reed-Solomon FEC, and derandomizer. The final error-corrected output is delivered in MPEG-2 or DIRECTV transport stream format.

The **BCM4201** is a very flexible, cost-effective solution. It is compatable with DVB, DIRECTV and Digicipher II ITU-R 217/11 standards, enabling manufacturers to design the **BCM4201** into a single-standard IRD or a multi-standard IRD. The receiver supports variable bit rates up to 85 Mbps, which allows it to adapt to various satellite transponders in Europe, North America, and Asia. The **BCM4201** is capable of supporting low rate applications, down to 1 MBaud, for applications such as SCPC. The **BCM4201** is optimized for high-volume manufacturing. This level of integration in the **BCM4201** significantly reduces the cost and complexity of manufacturing IRDs.

The **BCM4201** contains an extremely accurate on-chip BER tester to simplify laboratory set-up and system optimization. Specialized circuitry has been implemented to virtually eliminate cycle slips.

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DIRECTV is a registered trademark of DIRECTV, INC., a unit of Hughes Electronics 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

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4201.PB01-R-05.31.00

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