



UNIVERSAL SATELLITE RECEIVER

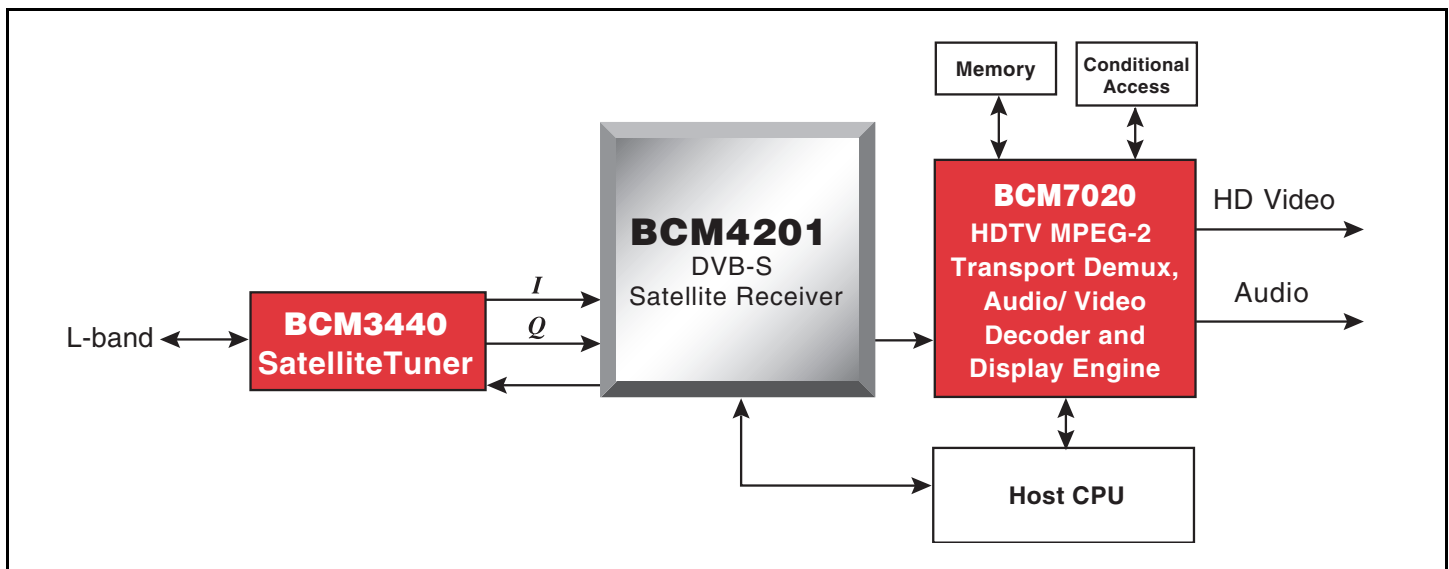
FEATURES

- **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 ($a=0.2-0.35$)
 - All digital clock and carrier recovery
 - Integrated PLLs
- **DVB/DIRECTV/DigiCipher II-compliant FEC decoder**
 - 64-state Viterbi decoder supports rates of 5/11, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 6/7, and 7/8
 - Programmable convolutional deinterleaver, I=12 or I=13 with internal RAM
 - Reed-Solomon decoder: $(n,k) = (204,188)$ or $(146,130)$; $t=8$
- **Seamless interface to BCM3440 CMOS satellite tuner or direct IF input**
- **I²C and SPI compatible microcontroller interface**
- **IEEE 1149.1 (JTAG) test interface**
- **80-pin PQFP pin package**
- **3.3V operation**

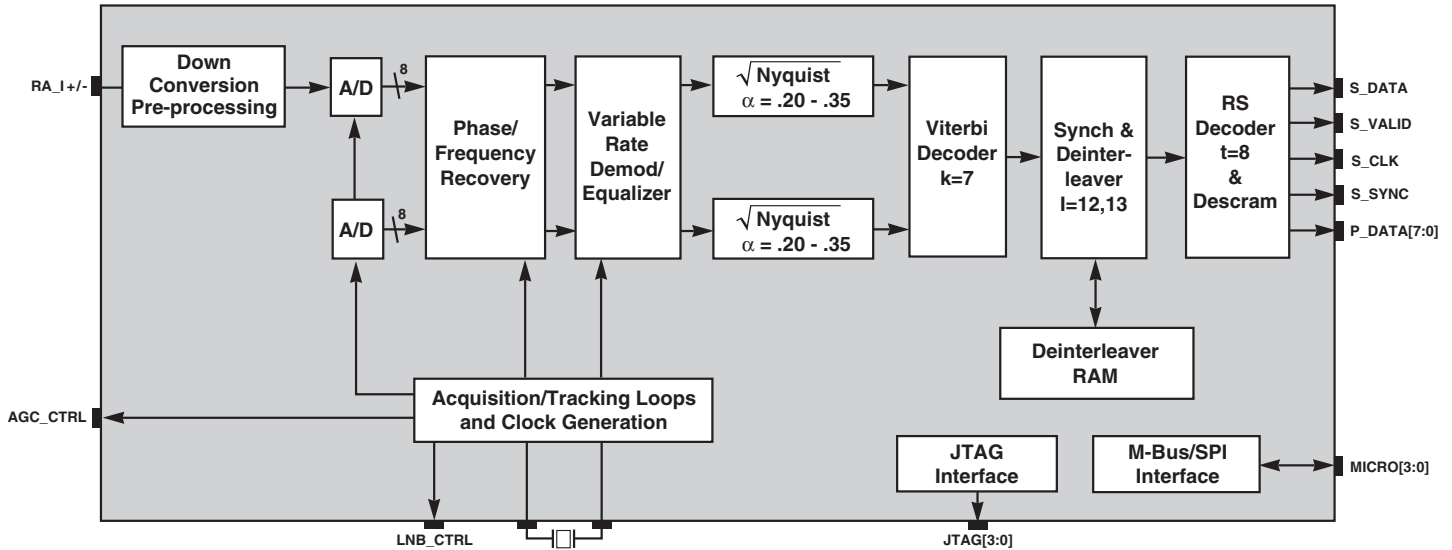
SUMMARY OF BENEFITS

- **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**
- **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 Mbd 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



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, 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 flexible, cost-effective solution that is compatible with DVB, DIRECTV, and DigiCipher II ITU-R 217/11 standards. This enables 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 MBd) 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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