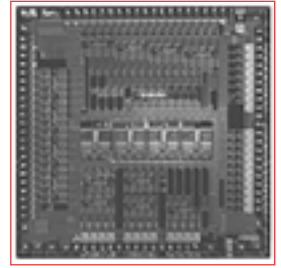




# BCM2051 PRODUCT Brief



## BCM2051 802.11B RADIO

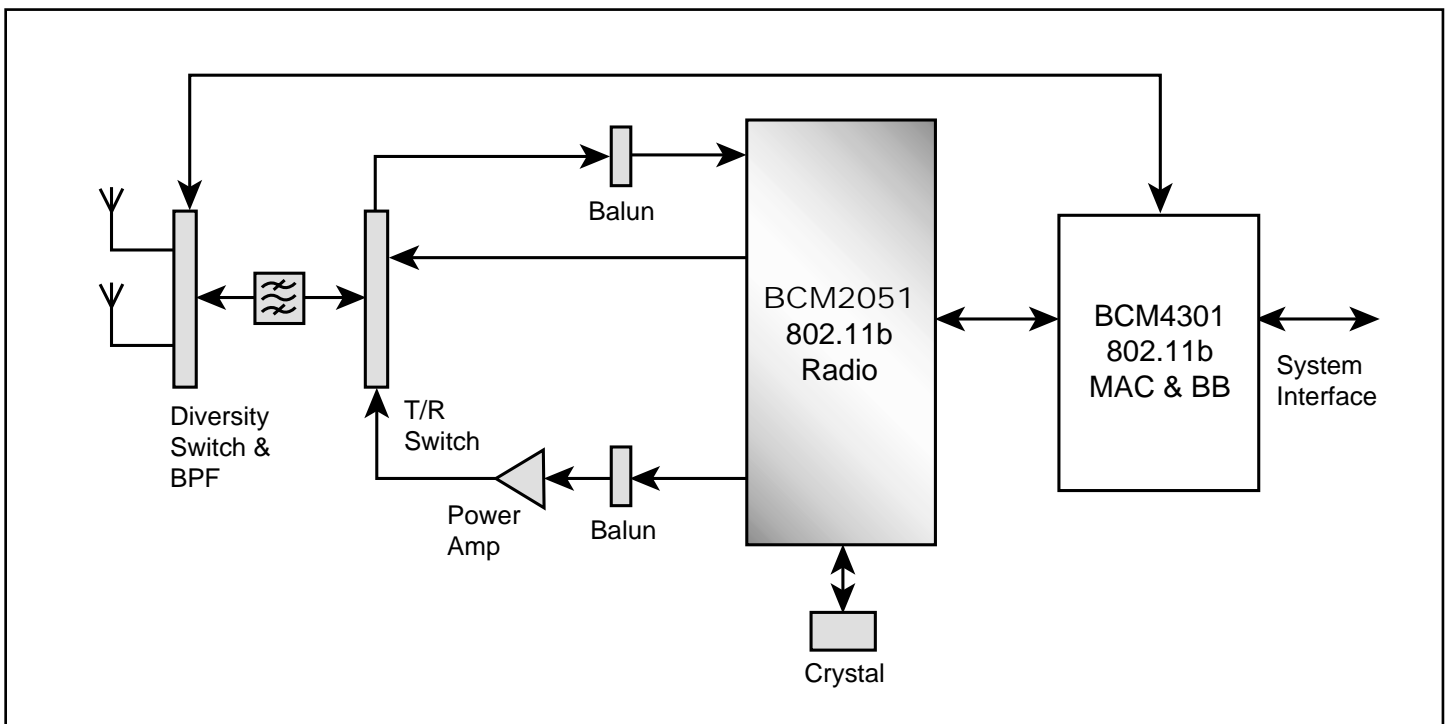
### BCM2051 FEATURES

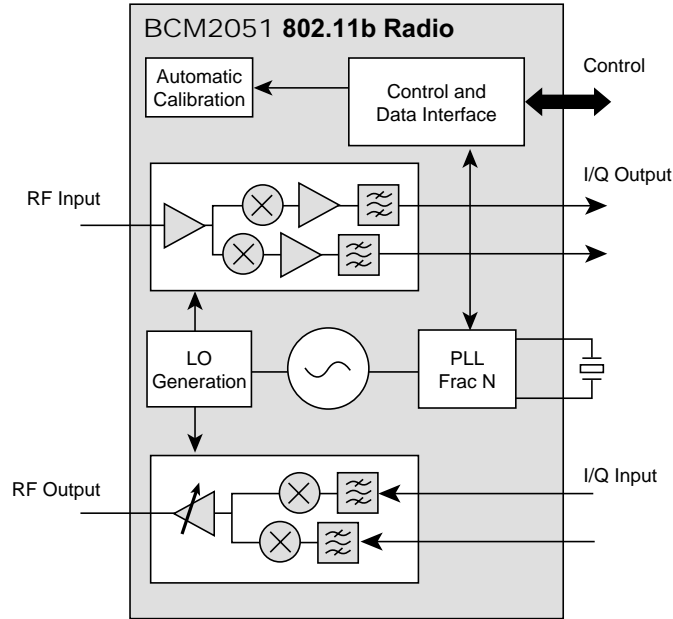
- Zero IF, single-chip direct conversion radio integrates complete 802.11b RF and IF.
- Fully integrated VCO minimizes external component count and reduces overall BOM cost.
- Single 2.7V to 3.3V voltage supply.
- Operation over extended temperature range provides robust radio performance in integrated laptop and embedded designs.
- Highly linear receive path ensures robust, interference-free operation.
- Exceptional adjacent channel and out-of-band blocking mitigates the effects of other wireless LAN, Bluetooth, and microwave oven effects.

### SUMMARY OF BENEFITS

- Monolithic implementation in a standard digital CMOS process with minimal external components provides a manufacturable low-cost 802.11b RF/IF solution.
- On-chip auto-calibration eliminates process variation across components and mitigates temperature variation, enabling it to be used in high-volume applications.
- Performance is optimized to ensure the robust performance in real-world operating environments.
- Low power consumption enables integration into low-power wireless solutions.
- Minimum external BOM provides the lowest cost solution for 802.11b radio solutions.

### 802.11b Application





The **BCM2051** 802.11b zero IF Radio is an integrated transceiver device that has been optimized for use in 2.4-GHz 802.11b wireless systems. It has been designed to provide low-power, low-cost, and robust communications for applications operating in the globally available 2.4-GHz unlicensed ISM band. It is fully compliant with the 802.11b specification and meets or exceeds the requirements where appropriate to provide the highest communication link quality of service.

The **BCM2051** features a simple, innovative shared LO architecture that allows a high-performance radio implementation in a single CMOS chip. A proprietary PLL design generates quadrature LO signals in the 2.4-GHz band for both the transmitter and receiver. The PLL is locked to a 12-MHz free running crystal oscillator. A proprietary self-calibrating VCO is fully integrated and does not require external VCO or tank circuits. This creates a frequency agile LO, ensures the lowest phase noise performance and covers the full 2.4-GHz ISM band.

The receiver front end consists a low noise amplifier, a single side band mixer and on-chip low pass filter, which provide good performance without a costly external IF band pass filter. Because the entire receive channel is one chip, all sensitive components are eliminated from the board design and this leads to the most robust and noise-immune design, optimal for integration in laptop computers and embedded applications.

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An overall noise figure of 6 dB is achieved along with 85-dB gain which can achieve -84-dBm sensitivity for 11-Mbps CCK modulation.

The internal lowpass filter structure also features DC cancellation loop and self-calibration circuitry, which automatically adjusts circuit elements to compensate for any process variation. This eliminates tuning and ensures that the devices are uniform across process variation and temperature. An RSSI signal is also generated in these amplifiers for the system to determine signal strength. The output is a stable I/Q output for direct interface to the BCM430X series of baseband/MAC components.

The transmit signal is input through the I/Q input from the baseband. It is then filtered and upconverted to RF using the quadrature LO signals. The signal is then boosted to a minimum 1-mW output power level by an internal power amplifier. The output signal is optimized to enable easy integration with widely available power amplifiers and minimizes the linearity requirements for these devices. Output power control is digitally programmable from full power to low power in 4-dB steps.

The **BCM2051** is controlled directly from the baseband and MAC through a fully digital control interface. This interface provides control for the various sections of the chip, defines data transfers and allows access to the various internal registers of the device.

The **BCM2051** is in a 64-pin LPCC package.



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