

BCM2046 Theory of Operations

The Broadcom BCM2046 is a monolithic, single-chip, stand-alone baseband processor with an integrated 2.4-GHz transceiver for Bluetooth Enhanced Data Rate (EDR) applications. It is fully compliant with Bluetooth 2.1 features such as Simple Pairing (SP) and Enhanced Inquiry Response (EIR). The BCM2046 is also completely backward-compatible with any prior Bluetooth versions. The ROM-based solution eliminates the need for external flash memories and active components by integrating critical components into the device, thus minimizing the footprint and system cost of implementing a Bluetooth system. The BCM2046 EDR solution has been designed in 0.13u bulk CMOS technology, the most widely available silicon process today. This use of the advanced process enables the BCM2046 to achieve the lowest possible current consumption in all modes of operation and maintain the lowest cost total solution. The BCM2046 has an architecture that has been designed to take advantage of the EDR standard. Its superior integrated RF design enables higher output power and lower input sensitivity which makes the BCM2046 the ideal solution to support Bluetooth EDR. The built-in Class 1 PA combats interference and reduces dropped connections that can result from distance and physical obstructions. This translates directly into higher and more reliable throughput and greater link range performance. A higher speed UART interface of up to 4 Mbps has been added to the BCM2046 for faster communication. The BCM2046 also includes industry collaborative coexistence solutions with WLAN systems. By using Broadcom's proprietary packet prioritization scheme, the BCM2046 is the industry's first Bluetooth product that is capable of supporting two simultaneous A2DP applications. Cost optimized solutions can be achieved with the BCM2046 by using standard chip-on-board assembly techniques. Low risk applications are enabled through the extensive integration of external passive and active components. All sensitive RF and analog portions of the Bluetooth radio and baseband have been integrated into the device including the most sensitive high-frequency matching components. This eliminates the possibility of board level interference and degradation in performance due to the environment and board level designs. Internal voltage regulation has been added to eliminate the need for a voltage regulator and the device is capable of operation using a noisy digital 1.8 to 3.6V power supply.