



## SINGLE-CHIP BLUETOOTH<sup>®</sup> MOUSE AND KEYBOARD

### FEATURES

- Single-chip Bluetooth device with fully integrated Human Interface Device (HID) profile and full Bluetooth stack
- On-board 8051 processor and RAM/ROM memory
- Custom-integrated Bluetooth core processor has been optimized to support the HID profile and minimize power consumption
- Bluetooth version 1.2 compliant including support for adaptive frequency hopping and fast connect
- Fully integrated radio eliminates all filters and matching components and features a single-pin interface directly to antenna
- Direct interface to keyboard scan matrix with full support for 152 keys and user-customizable hot keys
- Integrated quadrature signal decoder to support both ball and optical mouse designs
- Direct interface to LED and LCD displays
- Drive capability to power external optoelectronics
- ROM-based design eliminates external flash memories
  - Flash option offered to support feature development
- Fully integrated low dropout (LDO) regulator provides direction interface to batteries
- Available in 64-pin fpBGA and 100-pin fpBGA packages

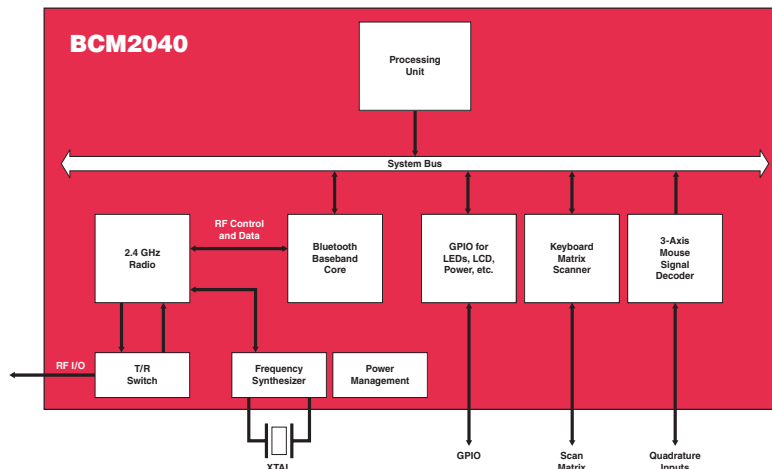
### SUMMARY OF BENEFITS

- Cost-optimized solution for mouse and keyboard applications - not a generic HCI device adapted for mouse and keyboard
- Achieves lowest possible cost through the integration of all external components
- Direct interface to key scan matrix or ball/optical mouse encoders
- Replaces existing mouse or keyboard processor and memory and adds Bluetooth functionality
- Lowest power consumption solution provides greater than six-month battery life
- Adaptive frequency hopping support ensures full interoperability and coexistence with WLAN enabled personal computers
- Optimized radio provides long-range, interference-free operation in high-interference environments
  - Transmitter provides +4 dBm output power and satisfies Class 2 operation
  - Receiver provides -85 dBm receiver sensitivity
- Single monolithic bulk CMOS device providing low cost and high availability of manufacturing supply
- AT commands (7.05 and 7.07)

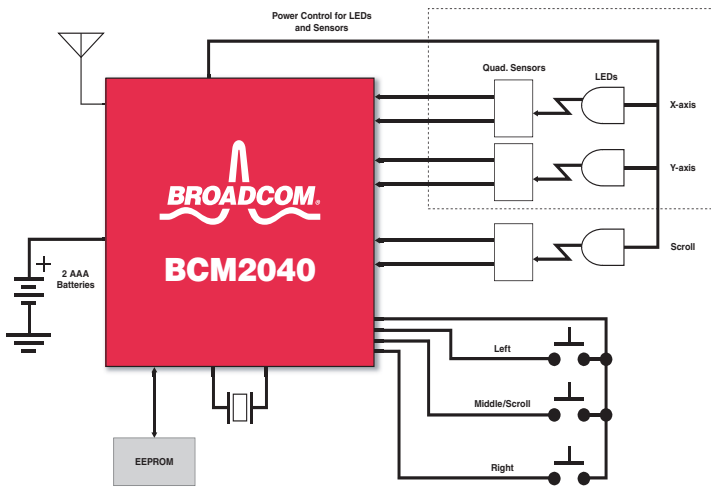
### APPLICATIONS

- Bluetooth mouse
- Bluetooth keyboard
- Combination mouse/keyboard
- Remote control HID devices
- Game controllers

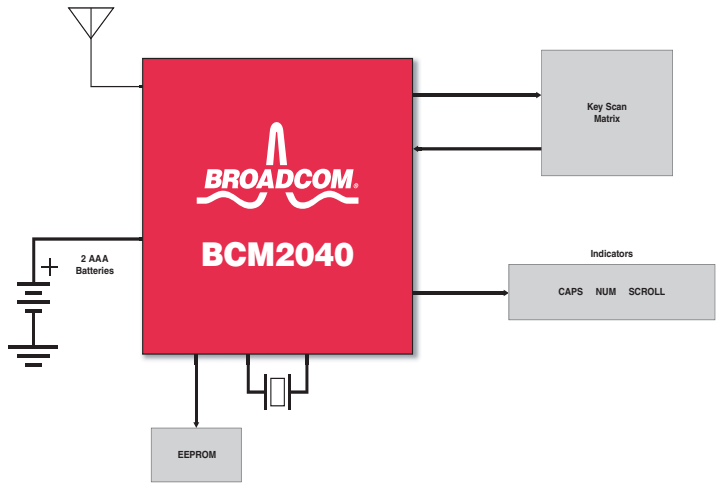
### BCM2040 Functional Block Diagram



## OVERVIEW



BCM2040 Mouse Block Diagram



BCM2040 Keyboard Block Diagram

The BCM2040 is a major breakthrough in the design of low-cost Bluetooth mouse and keyboard devices. The BCM2040 is a true single chip that integrates the entire profile, application, and Bluetooth protocol stack and is fully compliant with the Bluetooth SIG specification for human interface devices. The BCM2040 is fully compliant with the version 1.2 Bluetooth specification, including adaptive frequency hopping and fast connection, which are essential to mouse and keyboard applications in personal computers.

Integration is key to achieving the system cost targets of today's PC OEMs. By integrating all components within today's mouse and keyboard into the BCM2040, low system costs can be achieved to approach the price points of legacy-wired mice and keyboards. The BCM2040 can interface directly to mouse optical or ball encoders and keyboard scan matrices.

The Bluetooth baseband core has been optimized to maximize the battery life and functionality required for a mouse or keyboard application. Battery life has been optimized in the BCM2040 to meet greater than six months for the typical user using standard battery technology.

The BCM2040 integrates a high-performance radio implemented in standard bulk CMOS. It incorporates a proprietary self-calibrating VCO structure for both excellent phase noise and fast frequency hopping covering the entire band. All filters have been fully integrated into the device and are also self-calibrating to automatically compensate for changes in temperature and any process variation during manufacturing. The RF interface to the device fully integrates the T/R switch and its associates matching circuits, enabling direct interface with the antenna.

The block diagrams show how the BCM2040 can be used in either a mouse or keyboard application.

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