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Features

- 6th generation 1-mic CVC audio enhancements
- HFP v1.6 and HSP v1.2.
- Wideband speech supports codec negotiation and mSBC codec
- A2DP v1.2 for high-quality mono music streaming
- Programmable audio prompts: available from either EEPROM or a low-cost SPI flash
- Bidirectional noise reduction: *Hear and Be Heard*
- Non-linear echo cancellation feature for low-cost speakerphones and car-kits
- Low power consumption: over 11 hours talk time from a 120mAh battery
- Advanced multipoint support: enables a headset (HFP) connection to 2 phones for voice
- Multipoint A2DP streaming: enables a mono headset (A2DP) connection to 2 A2DP source devices for music playback
- Secure simple pairing, CSR's proximity pairing and CSR's proximity connection
- 64MIPS Kalimba DSP coprocessor
- Integrated linear and switch-mode regulators
- 150mA lithium battery charger, with fast charge and external boost charge for a total 240mA
- High-quality mono codec with 95dB SNR DAC
- 48-lead 7 x 7 x 0.9mm, 0.5mm pitch QFN, pin compatible with BC6140™ QFN and BC6130™ QFN
- Green (RoHS compliant and no antimony or halogenated flame retardants)

General Description

BlueCore® BC6145™ QFN is a low-cost fully-featured ROM IC solution for Bluetooth mono headsets with extremely low power consumption. The BC6145 QFN ensures increased speech clarity and improves intelligibility through spectral enhancement, with the bidirectional noise reduction *Hear and Be Heard* feature.

BC6145 QFN reduces the number of external components required, minimising production costs. It includes a Bluetooth radio, baseband, Kalimba DSP, DAC/ADC, switch-mode power supply and battery charger in a QFN package for low-cost designs.

The Kalimba DSP coprocessor supports enhanced audio applications. A2DP streaming enables music playback on a mono headset.

BC6145 QFN includes CVC single-microphone echo and noise reduction, which reduces headset echo enabling the headset-user to be heard more clearly. A low-power wind noise reduction feature improves intelligibility in windy environments.

BlueCore® BC6145™ QFN

1-mic CVC Mono Headset Solution Advanced Echo and Noise Cancellation

Fully Qualified Single-chip Bluetooth® v3.0 System

Production Information

BC6145A04

Issue 4

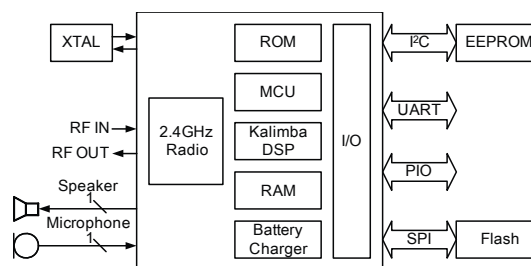
Applications

- BC6145 QFN DSP mono headset solution
- Low-cost speakerphones and car-kits

BC6145 QFN supports secure simple pairing which simplifies the pairing process and makes it easier to use a Bluetooth headset.

The device includes auto-calibration and BIST routines to simplify development, type approval and production test.

See *CSR Glossary* at www.csrsupport.com.





Device Details

Radio

- Common TX/RX terminal simplifies external matching; eliminates external antenna switch
- Bluetooth v3.0 specification compliant

Transmitter

- 8.5dBm RF transmit power with level control from on-chip 6-bit DAC over a dynamic range typically >30dB
- Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch

Receiver

- Receiver sensitivity of -91dBm
- Integrated channel filters
- Digital demodulator for improved sensitivity and co-channel rejection
- Real-time digitised RSSI available on HCI interface
- Fast AGC for enhanced dynamic range

Synthesiser

- Fully integrated synthesiser requires no external VCO, varactor diode, resonator or loop filter
- Compatible with crystals 16MHz to 26MHz

Baseband and Software

- Support for Bluetooth v3.0 specification when using updated configuration as described in the BC6145 QFN software release note, see www.csrsupport.com
- Internal ROM
- 48KB of internal RAM, enables full-speed data transfer, mixed voice/data and full piconet support
- Logic for FEC, HEC, access code correlation, CRC, demodulation, encryption bit stream generation, whitening and transmit pulse shaping
- Transcoders for A-law, μ -law and linear voice from host and A-law, μ -law and CVSD voice over air
- Configurable mono headset ROM software to set-up headset features and user interface
- HFP v1.6 and HSP v1.2
- Secure simple pairing
- CSR's proximity pairing (headset-initiated pairing)
- Supports mSBC wideband speech decoder
- Advanced multipoint support, enables a headset to connect to 2 mobile phones or 1 mobile phone and a VoIP dongle
- DSP-based 6th generation 1-mic CVC echo and noise cancellation for effective noise cancellation under all conditions
- Bidirectional noise reduction ensures increased speech clarity in preparation for improving intelligibility through spectral enhancement for the user and the person they are speaking to

Kalimba DSP

- Very low-power Kalimba DSP coprocessor, 64MIPS, 24-bit fixed point core
- Single-cycle MAC; 24 x 24-bit multiply and 56-bit accumulator
- Separate program memory and dual data memory
- Program memory cache when executing from ROM

Audio Codec

- 16-bit resolution mono codec
- Integrated amplifiers for driving a 16 Ω speaker; no need for external components
- Support for single-ended speaker termination and line output
- Integrated low-noise microphone bias
- Digital enhancements to add bass cut and side tone
- Analogue enhancements to support single-ended speaker drive capability and reference availability

Physical Interfaces

- Synchronous serial interface for system debugging
- I²C compatible interface communicates with an external EEPROM which contains all of the device configuration (PS Keys)
- Synchronous serial interface communicates with an external SPI flash device, which can store programmable audio prompts
- UART interface with data rates up to 3Mbits/s

Auxiliary Features

- BIST minimises production test time
- Crystal oscillator with built-in digital trimming
- Device can run in low power modes from an external 32.768kHz clock signal
- Programmable audio prompts
- Power management includes digital shutdown, and wake up commands with an integrated low power oscillator for ultra low power Park/Sniff/Hold mode
- Integrated regulators: 1.5V output from 1.7V to 2.8V input and 1.9V output from 2.7V to 5.5V input
- Integrated high-efficiency switch-mode regulator; 1.5V output from 2.2V to 4.4V input
- Power-on-reset cell detects low supply voltage
- Arbitrary sequencing of power supplies permitted
- 10-bit ADC
- Battery charger with programmable current, 20mA to 150mA for lithium ion/polymer battery. Supports external boost charge for up to a total of 240mA fast charge current.
- 2 LED drivers with faders

Package Option

- 48-lead 7 x 7 x 0.9mm, 0.5mm pitch QFN



1 Ordering Information

Device	Package			Order Number
	Type	Size	Shipment Method	
BC6145 QFN DSP Mono Headset Solution	QFN 48-lead (Green)	7 x 7 x 0.9mm, 0.5mm pitch	Tape and reel	BC6145A04-IQQB-R

Note:

BC6145 QFN is a ROM-based device where the product code has the form BC6145Axx. Axx is the specific ROM-variant, A04 is the ROM-variant for BC6145 QFN DSP Mono Headset Solution.

Minimum order quantity is 2kpcs taped and reeled.

Supply chain: CSR's manufacturing policy is to multisource volume products. For further details, contact your local sales account manager or representative.

To contact a CSR representative, email sales@csr.com or go to www.csr.com/contacts.

1.1 Development Kit Ordering Information

Description	Order Number
BC6145 QFN DSP Mono Headset Solution Development Kit	DK-BC-6145-10037-1A



Document History

Revision	Date	Change Reason
1	04 AUG 10	Original publication of this document.
2	12 NOV 10	Production Information added, ordering information and ROM code updated. Bidirectional noise reduction feature added and minor editorial changes.
3	25 JAN 11	Replaced incorrect reference to long-tail echo cancellation with correct reference to non-linear processing function. Update to copyright years and minor editorial changes.
4	17 MAY 11	HFP v1.6 and wideband speech feature added. Style updated. If you have any comments about this document, email comments@csr.com giving the number, title and section with your feedback.

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