Qualcomm

Qualcomm® QCC300x Family Bluetooth Audio SoCs

Programmable entry-level flash audio SoCs designed for optimizing Bluetooth® headset and speaker applications.

QCC300x flexible System-on-Chips (SoCs) support increased OEM customization and are engineered to offer a rich set of audio features which have not typically been associated with mid to low tier Bluetooth wireless audio devices.

The QCC300x family includes eight SoC devices – five (QCC3001 – QCC3005) which support Bluetooth headset applications, and three (QCC3006 – QCC3008) for Bluetooth speaker applications. Coupled with the audio development kit (ADK) and tools, these devices help to provide a flexible, cost effective platform for designing high quality Bluetooth audio products.

A single-chip dual-mode Bluetooth 5 system, QCC300x SoCs feature 8th generation Qualcomm® cVc™ Noise Cancellation Technology with one and two microphone inputs; an enhanced GAIA designed for better communication with mobile devices; and has external QSPI flash memory for configuration and voice prompts.

More consumers are making the move to wireless due to disruptive industry events like the removal of the headphone jack. By offering a wider range of what were once considered premium features at a competitive price point, the QCC300x platform supports expansion of the overall wireless audio market and potential of increased unit sales.

Solution Highlights

Cost-effective, single-chip flash programmable platform solution

QCC300x includes low-power audio DSP with on-chip ROM and RAM, audio codec, battery charger, switch mode and linear regulators, and LED drivers all in one chip. It is optimized to support reduced development time with its fixed-function and customizable SoCs.

Differentiated, production quality, software and development tools

Offers a combination of proprietary features and flash programmability at fixed-function ROM price points, and a purpose-built development kit designed to support a flexible and comprehensive development environment.
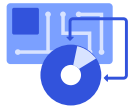
Support for Over-the-Air updates

Over-the-Air (OTA) update of external Flash supports updates of file partitions of the external Quad SPI Flash. Combine multiple features, for example update voice prompts or make updates to the application running in external Flash memory.

8th generation cVc noise cancellation technology

cVc technology is a suite of algorithms designed to work on the transmit and receive paths to help deliver optimum audio quality and echo cancellation on headsets, speakers, speakerphones, and other hands-free devices.

Bluetooth Headset and Speaker Applications

· Stereo Bluetooth Headphones
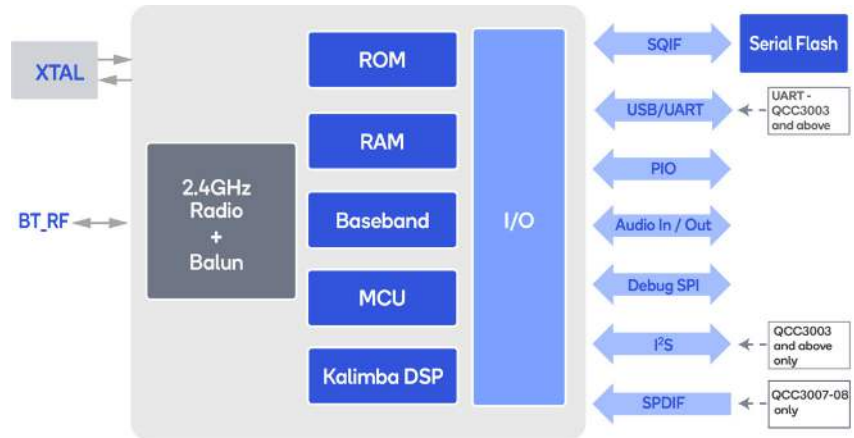· Bluetooth Earbuds
· Bluetooth Car Speakers
· Portable Speakers
· Bluetooth Speakers

QCC300x

Features

- Dual-mode Bluetooth 5 qualified radio

- Variants designed to address both headsets/headphones and speaker applications

- Low-power Qualcomm® Kalimba™ DSP with on-chip ROM and RAM, stereo codec, battery charger, switch mode and linear regulators and LED drivers in a single chip solution

- Customizable application code

- Access to technologies such as Link Layer and Dual Mode topologies (LLT/DMT), Qualcomm® aptX™, cVc noise cancellation technology and Qualcomm TrueWireless™ Stereo (depending on variant)

- A rich set of features, use cases and programmability at more cost-effective price points

- Pin compatible with CSRA63xxx and CSRA64xxx family of products

- Supports OTA updates

- Integrated Qualcomm TrueWireless Stereo technology

- Qualcomm® meloD™ Expansion audio processing: 3D stereo widening

- Supports aptX audio designed to deliver high quality Bluetooth wireless audio (QCC3002, QCC3005 and QCC3008 only)

- SBC and AAC codecs

- Promotes reduced development time with support of application image and source code, IDE and configuration

- Updated Generic Application Interface Architecture (GAIA) protocol v3

To learn more visit: qualcomm.com

QCC300x Block Diagram

QCC300x Specifications

Bluetooth	Integrated dual-mode radio and balun (50 Ω)
	Bluetooth 5.0 qualified
	HFP v1.7, A2DP v1.3, AVRCP v1.6
MCU	80MHz RISC CPU
DSP	Integrated 24-bit fixed-point 80 MHz Kalimba DSP
Memory Architecture	On-chip ROM, RAM and QSPI external Flash memory
Audio Interfaces	I^2S/PCM outputs and inputs (QCC3003 and above)
	SPDIF inputs (QCC3007 & 3008 only)
	USB audio enumeration (dual)
	Stereo audio ADC with line input
	Stereo audio DAC (except QCC3001, 02 & 06 with mono DAC)
	Analog and digital microphone inputs
Serial Interfaces	USB 2.0, I^2C, SPI; UART (QCC3003 and above)
	up to 16x GPIOs (BGA package), 3x LED drivers
Battery Support	USB charging architecture
	Modes: Disable, Trickle Charge, Fast Charge, Standby, Error
	200mA Charger current with external BJT option
	USB Charging spec enumeration compliant
Power Management	1V8 (185mA) and 1V35 (160mA) SMPS regulators
	(can be combined in parallel for single 1V8 (340mA) output)
	USB 3.3V regulator; integrated 1V35 linear regulators

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Bluetooth®

QCC300x Feature Comparison

	Headset/Headphone/Earbuds					Speaker		
	QCC3001	QCC3002	QCC3003	QCC3004	QCC3005	QCC3006	QCC3007	QCC3008
aptX		YES			YES			YES
DAC output	Mono	Mono	Stereo	Stereo	Stereo	Mono	Stereo	Stereo
# of Mics	2-mic	2-mic	1-mic	2-mic	2-mic	1-mic	1-mic	1-mic
cVc Noise Reduction Technology	YES	YES	YES	YES	YES	YES	YES	YES
High End Platform					YES			YES
Qualcomm TrueWireless Stereo	YES	YES				YES	YES	YES
Package	WLCSP/BGA	WLCSP/BGA	6x6 QFN	BGA	BGA	8x8 QFN	8x8 QFN	8x8 QFN
CSRA6xxxx Pin Compatibility	CSRA63120	CSRA63120 + aptX	CSRA63210	CSRA63220	CSRA63225	CSRA64110	CSRA64210	CSRA64215

QCC300x SoCs and Development Kits Ordering Information

Device	Package	Order Number	Dev Kit P/N	Dev Board P/N
HEADSET/HEADPHONE/BUD				
QCC3001	WLCSP	QCC3001-1-48WLCSP	DK-QCC3001-WLCSP-CE752-1A	DB-QCC3001-WLCSP-CE752-1A
QCC3001	BGA	QCC3001-2-68CSP	DK-QCC3001-BGA-CE889-1A	DB-QCC3001-BGA-CE889-1A
QCC3002	WLCSP	QCC3002-1-48WLCSP	DK-QCC3002-WLCSP-CE751-1A	DB-QCC3002-WLCSP-CE751-1A
QCC3002	BGA	QCC3002-2-68CSP	DK-QCC3002-BGA-CE890-1A	DB-QCC3002-BGA-CE890-1A
QCC3003	6x6 QFN	QCC3003-0-52MQFN	DK-QCC3003-6x6QFN-CE690-1A	DB-QCC3003-6x6QFN-CE690-1A
QCC3004	BGA	QCC3004-1-68CSP	DK-QCC3004-BGA-CE742-1A	DB-QCC3004-BGA-CE742-1A
QCC3005	BGA	QCC3005-1-68CSP	DK-QCC3005-BGA-CE729-1A	DB-QCC3005-BGA-CE729-1A
SPEAKERS				
QCC3006	8x8 QFN	QCC3006-0-68CMQFN	DK-QCC3006-8x8QFN-CE680-1A	DB-QCC3006-8x8QFN-CE680-1A
QCC3007	8x8 QFN	QCC3007-0-68CMQFN	DK-QCC3007-8x8QFN-CE679-1A	DB-QCC3007-8x8QFN-CE679-1A
QCC3008	8x8 QFN	QCC3008-0-68CMQFN	DK-QCC3008-8x8QFN-CE678-1A	DB-QCC3008-8x8QFN-CE678-1A

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