Qualcomm® QCC30xx Series Bluetooth Audio SoCs

for True Wireless Earbuds

Extremely low-power Bluetooth® audio SoCs optimized for compact, feature-rich truly wireless earbuds.

The Qualcomm® QCC302x/Qualcomm® QCC303x/Qualcomm® QCC304x/Qualcomm® QCC305x/Qualcomm® QCC307x/Qualcomm® QCC308x SoC series is a family of flash programmable Bluetooth audio System-on-Chips (SoCs) based on an ultra-low power architecture. They are designed specifically for the future of Bluetooth audio, and to meet listener demand for robust and rich-featured truly wireless earbuds that can support all-day use. This series includes options that support the Bluetooth® LE Audio standard and benefit from Snapdragon Sound™ Technology Suite—our optimized chain of superior audio, connectivity, and mobile innovations.

With our highly-integrated Bluetooth technologies, these SoCs are engineered to deliver a superior, sophisticated user experience. Qualcomm TrueWireless™ Mirroring, featured on the QCC304x, QCC305x, QCC307x and QCC308x is designed to maximize robustness, and offers dynamic bud-to-bud role-swapping with Bluetooth address handover. The QCC307x and QCC308x bring LE Audio use cases supported alongside traditional Bluetooth tech, for superior listening experiences in a range of environments.

QCC30xx SoCs offer powerful multi-core processing, designed to support flexible innovation, without extended development cycles. The SoC architecture includes two dedicated, programmable 32-bit application processor subsystems and up to two configurable Qualcomm® Kalimba™ DSPs. A feature-rich audio development kit (ADK) and enhanced development tools are available to help reduce time needed for commercialization.

The QCC305x, Qualcomm® QCC3071 and QCC308x make premium tier Qualcomm products such as Qualcomm® Adaptive Active Noise Cancellation (ANC) and digital assistants, accessible to a wide range of products, and are designed to support Snapdragon Sound technologies.

Highlights

Ultra-low power

The QCC30xx series is designed for ultra-high efficiency in power consumption. These SoCs support the development of very small form factor, richly-featured earbuds that can be used for up to 16 hours with a 65mAh battery[1]. The QCC307x and QCC308x platforms achieve advanced computation at no compromise to our ultra-low power performance.

Bluetooth® LE Audio

QCC308x is designed to support a range of LE Audio-enabled use cases for earbuds, including audio sharing, broadcast and Auracast™, unicast and gaming mode. These dual-mode platforms integrate the best of LE Audio and the best of traditional Bluetooth technology to enable smooth feature adoption for real-world listening.

Lossless and high resolution audio

With Qualcomm® aptX™ Adaptive Audio and high-performance DACs, these platforms are designed to deliver high resolution (24-bit 96kHz) and low latency audio through the Bluetooth audio processing chain. The QCC3071 and QCC3081 feature lossless audio with Snapdragon Sound technologies. The QCC3071 is designed to dynamically scale the wireless connection to deliver 16-bit 44.1kHz lossless audio. The QCC308x goes one step further to deliver up to 48kHz lossless audio over LE Audio.

Integrated noise cancellation

The QCC304x, QCC305x, QCC307x and QCC308x support integrated ultra-low power digital ANC technology. QCC307x and QCC308x are designed to support our 3rd generation Qualcomm Adaptive ANC, with full-band ambient mode for strong, effective noise cancellation and a natural feeling of spatial awareness in relation to the listener's surrounding environment.

Digital Assistant ready

Support for voice services is available via button-press or wake-word activation (QCC305x/QCC307x/QCC308x) and is designed to relay the audio stream and voice control capabilities to a handset to process and execute commands.

[1] Battery life varies significantly with settings, usage, and other factors.

QCC30xx Bluetooth Audio SoCs

This series of audio SoCs is based on an extremely low-power architecture and designed for superior audio quality in compact, feature-optimized and affordable truly wireless earbuds.
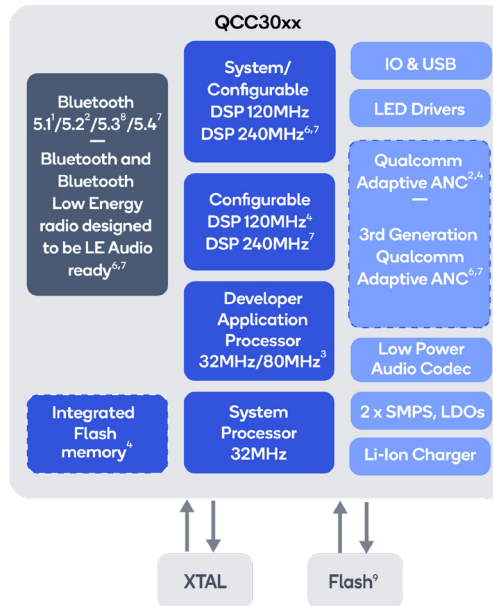
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QCC30xx

QCC302x/QCC304x/QCC305x/QCC307x/QCC308x Features Comparison

	Snapdragon Sound	Qualcomm TrueWireless	aptX Audio	Qualcomm ANC	cVc	Voice Assistant activation	LE Audio	Integrated Flash	DSPs	Package
Qualcomm® QCC3026		Stereo	Classic		2-mic	Button			1x 120MHz	WLCSP 3.98x4.02x0.54mm
Qualcomm® QCC3020		Stereo	Classic		2-mic	Button			1x 120MHz	BGA 5.5x5.5x1.0mm
Qualcomm® QCC3040		Mirroring	Adaptive	FF/Hybrid	2-mic	Button		32 Mbit	1x 120MHz	BGA 5.6x5.9x1.0mm
Qualcomm® QCC3046		Mirroring	Adaptive	FF/Hybrid	2-mic	Button			1x 120MHz	WLCSP 4.38x4.26x0.57mm
Qualcomm® QCC3056	✓	Mirroring	Adaptive	FF/ Adaptive Hybrid	2-mic	Button/ wake-word			2x 120MHz	WLCSP 4.38x4.26x0.57mm
Qualcomm® QCC3050	✓	Mirroring	Adaptive	FF/ Adaptive Hybrid	2-mic	Button/ wake-word		64 Mbit	2x 120MHz	BGA 5.6x5.9x1.0mm
Qualcomm® QCC3071	✓	Mirroring	Lossless[11]	FF/ Adaptive Hybrid[10]	3-mic	Button/ wake-word	✓		1x 240MHz	WLCSP 4.93x3.936x0.57mm
Qualcomm® QCC3072	✓	Mirroring	Adaptive	FF/Hybrid	2-mic	Button	✓		1x 180MHz	WLCSP 4.93x3.936x0.57mm
Qualcomm® QCC3081	✓	Mirroring	Lossless[12]	FF/ Adaptive Hybrid[10]	3-mic	Button/ wake-word	✓		2x 240MHz	WLCSP 4.93x3.936x0.57mm

Features

- Highly integrated SoC with extremely low-power design
- Qualcomm TrueWireless™ Stereo / Qualcomm TrueWireless Mirroring support
- Support for aptX, aptX Adaptive audio and aptX Lossless with Snapdragon Sound
- Programmable Qualcomm® Active Noise Cancellation (ANC)
- Support for Qualcomm® cVc™ Echo Cancelling and Noise Suppression (ECNS)
- QCC302x qualified to Bluetooth 5.1, QCC304x qualified to Bluetooth 5.2, QCC305x/QCC307x qualified to Bluetooth 5.3, and QCC308x qualified to Bluetooth 5.4
- QCC307x/QCC308x designed to integrate LE Audio use cases
- 2Mbps Bluetooth low energy (LE) support
- Variety of form factors, down to ultra-small 4mm x 4mm
- Dual core 32-bit processor application and configurable Kalimba DSP Audio subsystem
- Embedded ROM + RAM and integrated Flash (with QCC3040 and QCC3050)
- High quality, low power audio codec including 1-ch Class D and Class AB analog outputs
- Up to 4-ch[6,7] high quality singled ended line inputs and 192kHz 24-bit I2S input
- Flexible software platform with powerful new IDE support
- Support for digital assistants with minimal integration effort

QCC30xx Block Diagram

QCC30xx

- Bluetooth 5.1[1]/5.2[2]/5.3[8]/5.4[7] — Bluetooth and Bluetooth Low Energy radio designed to be LE Audio ready[6,7]
- System/ Configurable DSP 120MHz DSP 240MHz[6,7]
- IO & USB
- LED Drivers
- Qualcomm Adaptive ANC[2,4] — 3rd Generation Qualcomm Adaptive ANC[6,7]
- Configurable DSP 120MHz[4] DSP 240MHz[7]
- Developer Application Processor 32MHz/80MHz[3]
- Low Power Audio Codec
- Integrated Flash memory[4]
- System Processor 32MHz
- 2 x SMPS, LDOs
- Li-Ion Charger
- XTAL
- Flash[9]

[1] QCC302x only
[2] QCC304x only
[3] QCC305x and QCC307x and QCC308x
[4] QCC305x only
[5] QCC3040 and QCC3050
[6] QCC3071 only
[7] QCC3081 only
[8] QCC305x and QCC307x
[9] QCC302x, QCC3046, QCC3056, QCC3071 and QCC3081
[10] 3rd generation Qualcomm Adaptive ANC
[11] Lossless audio available with Snapdragon Sound/classic Bluetooth
[12] Lossless audio available with Snapdragon Sound/classic Bluetooth and LE Audio

Ordering Information

Product	Part Number	Product	Part Number
QCC3020	QCC-3020-0-CSP90	QCC3026	QCC-3026-0-81WLNSP
QCC3040	QCC-3040-0-CSP90B	QCC3046	QCC-3046-0-WLNSP94B
QCC3050	QCC-3050-0-CSP90B	QCC3056	QCC-3056-0-WLNSP94B
QCC3071	QCC-3071-0-WLNSP99	QCC3072	QCC-3072-0-WLNSP99
QCC3081	QCC-3081-0-WLNSP99		

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