Qualcomm

Qualcomm® QCC74xM programmable 1x1 Wi-Fi 6, Bluetooth, and IEEE 802.15.4 module

Fully integrated, pre-certified, all-in-one, tri-radio system-on-chip with RISC-V processor for programmable connectivity.

The QCC74xM is a module consisting of a combo tri-radio chipset integrating 1x1 Wi-Fi 6, Bluetooth® 5.4 technology, and IEEE 802.15.4 (Thread) powered by a 32-bit RISC-V MCU that can run up to 325 MHz and optional stacked memory (pSRAM and/or NOR flash).

Unlike other Wi-Fi/Bluetooth/15.4 combo modules on the market, QCC74xM has an integrated, powerful 32-bit RISC-V processor with an FPU and DSP running up to 325 MHz, on-chip 484 KB SRAM, 48 MB cache, 128 KB ROM, and an optional 4/8/16 MB pSRAM and/or 4/8 MB NOR flash System-in-Package (SiP). It also comes with multimedia features such as audio and video codecs and interfaces, and 35 multiplexed GPIOs with rich peripherals. Its all-in-one design and capability contribute to reduced costs and enhanced performance, making it an attractive choice for IoT edge devices requiring a single-chip solution.

QCC74xM operates in hostless mode, capable of running both the protocol stack all the way to the application level as well as IoT applications without requiring an external MCU. Built on FreeRTOS, its SDK is open-sourced and available on CodeLinaro coupled with the Microsoft Visual Studio Code (VS Code) IDE market extension to facilitate rapid IoT application development. It can also be used as an IoT connectivity transceiver in hosted mode (both RCP and NCP) with an external host.

Related Products

This product is based on the QCC74x series, which consists of a tri-radio chipset integrating 1x1 Wi-Fi 6, Bluetooth 5.4, and IEEE 802.15.4 (Thread) powered by a 32-bit RISC-V MCU up to 325 MHz and stacked memory (pSRAM and NOR flash).

Highlights

Full radio integration

QCC74xM integrates all radio required for IoT connectivity, 1x1 Wi-Fi 6, Bluetooth 5.4 (Low Energy with coded PHY), and IEEE 802.15.4 (Thread). It will support Matter over Wi-Fi, Thread, and Ethernet with Bluetooth Low Energy commissioning capability.

High computing power

In addition to all radio integration, QCC74xM also has a powerful 32-bit RISC-V microcontroller that can run up to 325 MHz with a DSP and FPU at its core. It also has the option to add stacked memory like pSRAM and/or NOR flash to boost computing capability.

High security

QCC74xM has a built-in security acceleration engine, supporting both symmetric and asymmetric algorithms. It provides security services like secure boot and secure debug, and can support public key acceleration and TRNG and QSPI (XiP) on-the-fly AES decryption. It has achieved PSA Certified Level One.

Rich peripherals and multimedia support

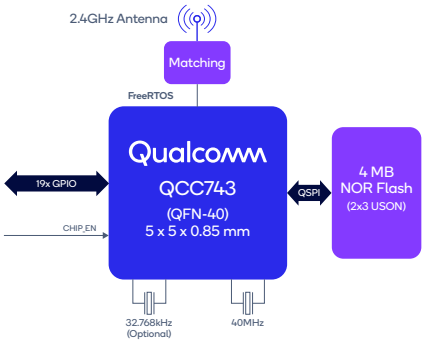
QCC74xM has 35 GPIOs that can be multiplexed to support rich peripheral interfaces like QSPI, SDIO, SD card, SPI, UART, I2C, I2S, PWM, 12-bit ADC, 12-bit DAC, IR remote, RMII (10/100 Ethernet), CAN (ISO11898), DVP camera, and DBI display. It has built-in motion JPEG to support 720p video codec as well as MIC input with 8/12/16/22.05/24/32/44.1/48kHz audio sampling and speaker output.

User-friendly development environment and tools

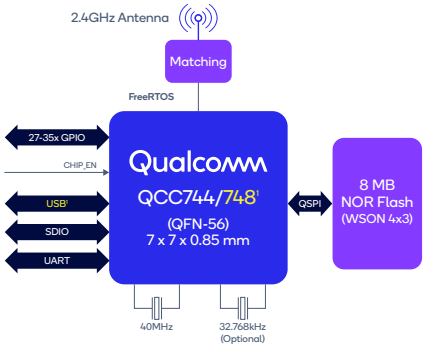
QCC74xM is provided with an open-source SDK available on CodeLinaro, along with a VS Code-based IDE and associated development kits.

Block Diagrams

QCC743M Module Block Diagram



QCC744M/748M Module Block Diagram



[1] QCC748 includes USB support.

Materials are subject to change without notice.
87-84454-1 Rev. F

QCC74xM Target Applications

- Smart Appliances
- Industrial IoT
- IoT Hub/Gateway
- Medical Devices
- Smart Home Devices

Features

- Pre-certified modules for fast time to market
- Full radio integration to address IoT connectivity needs
- High-performance, 32-bit RISC-V MCU with large memory resource and stacked memory SiP option
- Advanced hardware-based security featuring public key acceleration and TRNG and QSPI (XiP) on-the-fly AES decryption
- Secure boot and secure debug
- Rich peripheral interfaces, including Ethernet, CAN, etc.
- Direct camera interface (DVP) and display control (DBI)
- Multimedia features like motion JPEG (720p) and MIC and speaker support
- Supports hostless and hosted (RCP and NCP) operational modes
- Open-source support with SDK on CodeLinaro, VS Code IDE market extension, module, and associated development kits

Specifications

Category	Specifications
CPU	32-bit RISC-V @ 325 MHz with DSP and FPU 128 KB ROM, 4Kb eFuse and 1/2/4KB OTP 484 KB on-chip SRAM (32 KB I-Cache and 16 KB D-Cache) 4/8/16 MB pSRAM SiP (optional) 4/8 MB NOR flash SiP (optional)
Bluetooth	Bluetooth 5.4
Wi-Fi	802.11b/g/n/ax
Security Support	Integrated hardware crypto acceleration Security services (secure boot, secure debug, etc.) PSA Certified Level One
Interfaces & Peripherals	32 and 46-pin LGA module pads SD/MCC/SF, SDIO, QSPI, SPI, I2C, I2S, UART, PWM, ADC/DAC, CAN, RMII, USB[2], VDD, GND
Package Type	QCC743M: 32-pin LGA module • PCB Antenna module: 12.28 x 17.28 x 2.4 mm • RF Connector module: 12.28 x 12.28 x 2.4 mm • Both modules are pin-compatible QCC744M/QCC748M: 46-pin LGA module • PCB Antenna module: 14.82 x 23.63 x 2.4 mm • RF Connector module: 14.82 x 18.63 x 2.4 mm • Both modules are pin-compatible
Temperature	-40~+85°C
Voltage	Input voltage: 2.97~3.63V I/O voltage: 1.8V/3.3V

[2] USB support for QCC748 only.

Ordering Information

Module	Product Code	Order Number	FEM	Embedded Memory	USB	Antenna Config	Ext Memory
QCC743M	QCC743M-1-AA	QCC-743M-1-LGM36-MT-01-0-AA	-	No	N	PCB Antenna	4 MB Flash
	QCC743M-1-AB	QCC-743M-1-LGM36A-MT-01-0-AB	-	No	N	RF Connector	
QCC744M[3]	QCC744M-2-AA	QCC-744M-2-LGM52-MT-01-0-AA	-	4 MB PSRAM	N	PCB Antenna	8 MB Flash
	QCC744M-2-AB	QCC-744M-2-LGM52A-MT-01-0-AB	-	4 MB PSRAM	N	RF Connector	
QCC748M	QCC748M-2-AA	QCC-748M-2-LGM52-MT-01-0-AA	-	4 MB PSRAM	Y	PCB Antenna	8 MB Flash
	QCC748M-2-AB	QCC-748M-2-LGM52A-MT-01-0-AB	-	4 MB PSRAM	Y	RF Connector	
	QCC748M-3-AA	QCC-748M-3-LGM52-MT-01-0-AA	-	8 MB PSRAM	Y	PCB Antenna	
	QCC748M-3-AB	QCC-748M-3-LGM52A-MT-01-0-AB	-	8 MB PSRAM	Y	RF Connector	

EVK	Order Number		FEM	Embedded Memory	USB	Antenna Config	Ext Memory
QCC743M	65-79672-1	EVK-QCC743M-1-01-0-AA	-	No	N	PCB Antenna	4 MB Flash
	65-79672-2	EVK-QCC743M-1-01-0-AB	-	No	N	RF Connector	
QCC744M[3]	65-79674-1	EVK-QCC744M-2-01-0-AA	-	4 MB PSRAM	N	PCB Antenna	8 MB Flash
	65-79674-2	EVK-QCC744M-2-01-0-AB	-	4 MB PSRAM	N	RF Connector	
QCC748M	65-79674-3	EVK-QCC748M-2-01-0-AA	-	4 MB PSRAM	Y	PCB Antenna	8 MB Flash
	65-79674-4	EVK-QCC748M-2-01-0-AB	-	4 MB PSRAM	Y	RF Connector	
	65-79674-5	EVK-QCC748M-3-01-0-AA	-	8 MB PSRAM	Y	PCB Antenna	
	65-79674-5	EVK-QCC748M-3-01-0-AB	-	8 MB PSRAM	Y	RF Connector	

[3] Note: QCC744M-2 module is not recommended for new designs. Use QCC748M-2 module instead (same SW/HW and module footprint).

QCC74xM IoT Connectivity Comparison

Stay connected with industry-leading wireless communication solutions for the Internet of Things.

Features		QCC743M-1/-4	QCC744M-2	QCC748M-2/-3
Processor	32-bit RISC-V @ 325 MHz	Y	Y	Y
Onboard Memory	128 KB ROM, 484 KB SRAM	Y	Y	Y
SiP Memory (Optional)	4/8/16 MB pSRAM (optional)	N	4 MB	4 MB or 8 MB
	4/8 MB NOR Flash (optional)	0 or 4 MB	N	N
WiFi Standard	1x1 2.4GHz 802.11 b/g/n/ac/ax (Wi-Fi 6)	Y	Y	Y
Bluetooth Standard	Bluetooth Low Energy 5.4	Y	Y	Y
802.15.4 Standard	Thread and Zigbee-ready	Y	Y	Y
Operating Temperature	-40 to +85 °C	Y	Y	Y
EVK Input Power	USB or 5V	Y	Y	Y
Module Antenna Config	PCB Antenna / RF Connector	Y	Y	Y
	RF Pin	Y	N	N
Module Onboard Flash	4 MB or 8 MB QSPI Flash	4 MB	8 MB	8 MB
Ethernet	RMII (via GPIO)	N	Y	Y
Audio Codec	1x DAC (Speaker) / 1x ADC (Mic) via GPIO	N	Y	Y
Video Codec	MJPEG Encoding	N	Y	Y
Camera Interface	DVP (via GPIO)	N	Y	Y
Display Interface	DBI (via GPIO)	N	Y	Y
GPIO	19 (5x5 QFN) or 35 (7x7 QFN)	Up to 19	Up to 35	Up to 35
SDIO	SDIO 2.0 Slave, SD Card Interface	Y	Y	Y
USB	1x	N	N	Y
UART	2x	Y	Y	Y
ISO 11898 (CAN Bus)	1x	Y	Y	Y
SPI	Master / Slave	Y	Y	Y
I2C	2x	Y	Y	Y
I2S	Master / Slave	Y	Y	Y
PWM	1x PWM (4 channels)	Y	Y	Y
QSPI	XiP QSPI (Flash)	Y	Y	Y
Timers	RTC, 2x 32-bit, 1x 16-bit	Y	Y	Y
IR Controller	Receiver	Y	Y	Y
ADC	General Purpose 12/14/16 bits	Y	Y	Y
DAC	General Purpose 12-bit	Y	Y	Y
JTAG	via GPIO	Y	Y	Y

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