



Qualcomm Technologies International, Ltd.

QCC711 Bluetooth Low Energy

Reference Schematic

80-WL711-41 Rev. AE

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Revision history

Revision	Date	Change reason
AA	October 2021	Initial release.
AB	July 10, 2023	Updated to QCC711.
AC	July 11, 2023	Updated to Production Information.
AD	November 2023	Minor editorial update.
AE	April 2025	Editorial updates.

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1 QCC711 Bluetooth Low Energy

QCC711 is a low- power wireless single mode Bluetooth® Low Energy system on-chip (SoC), see [Figure 1-1](#).

This document provides a QCC711 design example.

NOTE The schematic and parts list included in this document are preliminary, and intended as a reference only.

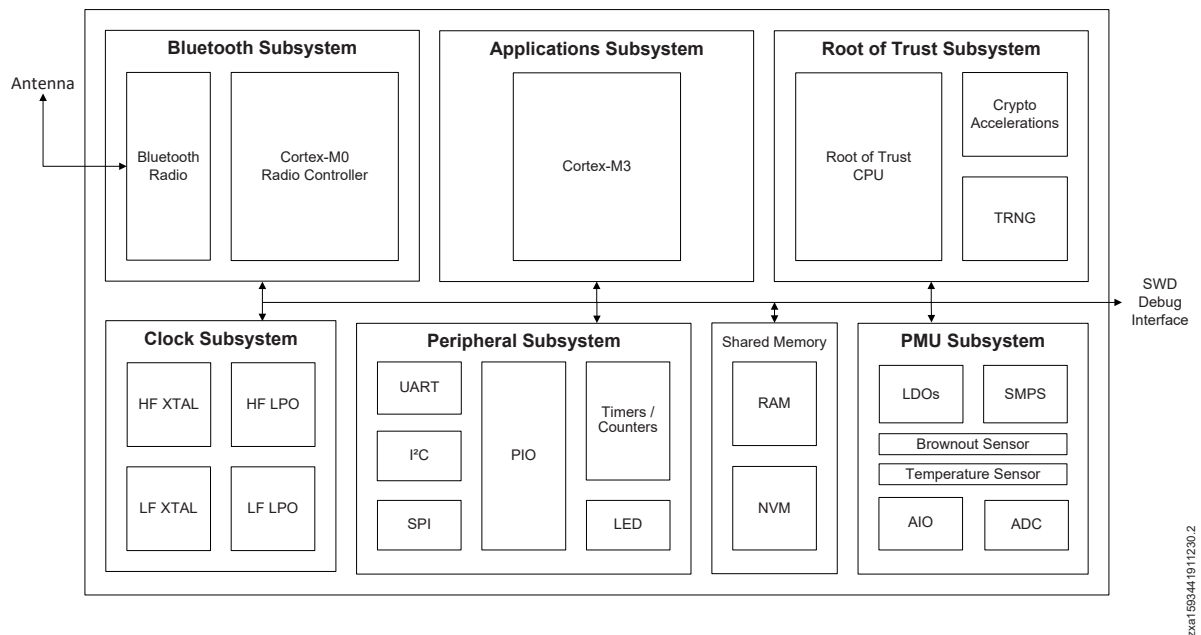


Figure 1-1 QCC711 functional block diagram (Source: *QCC711 Bluetooth Low Energy Data Sheet (80-WL711-1)*)

2 QCC711 Bluetooth Low Energy PIOs

QCC711 Bluetooth Low Energy programmable input/output (PIO)s are configurable using:

- Serial engines and supported interfaces
- Multiplexing functions

2.1 QCC711 serial engines and supported interfaces

QCC711 has four programmable serial engine (SE) / Qualcomm universal peripheral (QUP) that are configurable for serial interfaces, such as serial peripheral interface (SPI), universal asynchronous receiver transmitter (UART), or inter-integrated circuit interface (I²C), see [Table 2-1](#).

Table 2-1 QCC711 serial engines and supported interfaces

SE/QUP	3-wire or 4-wire SPI display controller	True 4-wire SPI controller/peripheral	I ² C controller	UART	9-bit UART	DMA
SE0	Yes	Yes	Yes	Yes	Yes	Yes
SE1	Yes	Yes	Yes	Yes	Yes	Yes
SE2	No	No	Yes	Yes	No	Yes
SE3	No	No	Yes	Yes	No	Yes

Each SE has five output ports. The functions of these ports are specific to each of the selected interfaces. [Table 2-2](#) lists the port feature mapping. The following section shows how these ports can be routed as sets to different physical PIOs. As such, the ports of each SE are presented as numerous copies to the top level multiplex. Alternative copies must be used as a complete block, this restriction keeps the physical interface grouped to adjacent PIOs.

The SEs that [Table 2-2](#) lists have default port mappings for the different types of interface, see [Table 2-2](#).

Table 2-2 Default port mappings for QCC711 serial engines

Default SE port mapping	3-wire SPI display	4-wire SPI display	I ² C	UART	SE0 true 4-wire SPI
Port 0	CS1	CS1	SDA	CTS	MISO
Port 1	SDIN	SDIN	SCL	RFR	MOSI
Port 2	CLK	CLK	-	TX	CLK
Port 3	CS	CS	-	RX	CS
Port 4	-	D/C	-	-	CS1

QCC711 serial engine ports in [Table 2-2](#) can be mapped to specific PIOs, see *Related Information*.

RELATED INFORMATION

[“QCC711 PIO multiplexing functions” on page 8](#)

2.2 QCC711 PIO multiplexing functions

QCC711 PIOs are directly controlled from the Application subsystem using registers or configuration. When multiplexing functions, using QCC711 PIOs, select an individual PIO function from each column in [Table 2-3](#).

NOTE Until otherwise configured, all PIOs are set as a control status register (CSR) of the processor.

NOTE 3-wire and 4-wire SPI interfaces are limited on SE0 to PIO[8:5] and SE1 to PIO[20:16].

Table 2-3 QCC711 PIO multiplexing functions

PIO port	Lead number	Debug and test	Serial engine	QSPI and radio coexistence	I ² C, FTC, LED, and analog
PIO[25]	24	-	se_0_port_4_copy4 se_1_port_4_copy4 se_2_port_4_copy4 se_3_port_4_copy4	mstr_pta_coex_confx	Analog led_white_copy4
PIO[24]	23	-	se_0_port_3_copy4 se_1_port_3_copy4 se_2_port_3_copy4 se_3_port_3_copy4	mstr_pta_coex_status	Analog led_green_copy4 i2c_scl_copy10
PIO[23]	22	-	se_0_port_2_copy4 se_1_port_2_copy4 se_2_port_2_copy4 se_3_port_2_copy4	mstr_pta_coex_active	Analog led_red_copy4 i2c_sda_copy10
PIO[22]	21	-	se_0_port_1_copy4 se_1_port_1_copy4 se_2_port_1_copy4 se_3_port_1_copy4	slv_pta_coex_confx	Analog led_blue_copy4 i2c_scl_copy9
PIO[21]	20	-	se_0_port_0_copy4 se_1_port_0_copy4 se_2_port_0_copy4 se_3_port_0_copy4	slv_pta_coex_status	ftc_in[3] led_white_copy7 i2c_sda_copy9
PIO[20]	19	appss_trace_data_3	se_0_port_4_copy3 se_1_port_4_copy3	slv_pta_coex_active	led_white_copy6 i2c_scl_copy8
PIO[19]	18	appss_trace_data_2	se_0_port_3_copy3 se_1_port_3_copy3 se_2_port_4_copy3 se_3_port_4_copy3	-	ftc3_out[2] led_white_copy5 i2c_sda_copy8

Table 2-3 QCC711 PIO multiplexing functions (cont.)

PIO port	Lead number	Debug and test	Serial engine	QSPI and radio coexistence	I ² C, FTC, LED, and analog
PIO[18]	17	appss_trace_data_1	se_0_port_2_copy3 se_1_port_2_copy3 se_2_port_3_copy3 se_3_port_3_copy3	-	ftc3_out[1] led_white_copy3 i2c_scl_copy7
PIO[17]	16	appss_trace_data_0	se_0_port_1_copy3 se_1_port_1_copy3 se_2_port_2_copy3 se_3_port_2_copy3	-	ftc3_out[0] led_green_copy3 led_white_copy10 i2c_sda_copy7
PIO[16]	15	appss_trace_clk	se_0_port_0_copy3 se_1_port_0_copy3 se_2_port_1_copy3 se_3_port_1_copy3	qspi_io3_copy1	ftc_in[2] led_red_copy3 led_white_copy9 i2c_scl_copy6
PIO[15]	14	-	se_0_port_4_copy2 se_2_port_0_copy3 se_3_port_0_copy3	qspi_io2_copy1	ftc2_out[0] led_blue_copy3 led_white_copy8 i2c_sda_copy6
PIO[14]	12	-	se_0_port_3_copy2 se_1_port_4_copy2 se_2_port_4_copy2 se_3_port_4_copy2	qspi_csb_copy1	ftc2_out[2] i2c_scl_copy5
PIO[13]	11	test_lf	se_0_port_2_copy2 se_1_port_3_copy2 se_2_port_3_copy2 se_3_port_3_copy2	qspi_miso_copy1	ftc2_out[1] i2c_sda_copy5
PIO[12]	10	SWO	se_0_port_1_copy2 se_1_port_2_copy2 se_2_port_2_copy2 se_3_port_2_copy2	qspi_mosi_copy1	i2c_scl_copy4
PIO[11]	9	test_hf	se_0_port_0_copy2 se_1_port_1_copy2 se_2_port_1_copy2 se_3_port_1_copy2	qspi_clk_copy1	ftc_in[1] i2c_sda_copy4
PIO[10]	7	SWD_DIO ^a	se_1_port_0_copy2 se_2_port_0_copy2 se_3_port_0_copy2	-	-
PIO[9]	6	SWD_CLK ^a	se_1_port_4_copy1 se_2_port_4_copy1 se_3_port_4_copy1	-	-

Table 2-3 QCC711 PIO multiplexing functions (cont.)

PIO port	Lead number	Debug and test	Serial engine	QSPI and radio coexistence	I ² C, FTC, LED, and analog
PIO[8]	47	-	se_0_port_4_copy1 se_1_port_3_copy1 se_2_port_3_copy1 se_3_port_3_copy1	-	-
PIO[7]	46	-	se_0_port_3_copy1 se_1_port_2_copy1 se_2_port_2_copy1 se_3_port_2_copy1	-	led_green_copy1 i2c_scl_copy3
PIO[6]	44	-	se_0_port_2_copy1 se_1_port_1_copy1 se_2_port_1_copy1 se_3_port_1_copy1	-	ftc_in[0] led_red_copy1 i2c_sda_copy3
PIO[5]	43	-	se_0_port_1_copy1 se_1_port_0_copy1 se_2_port_0_copy1 se_3_port_0_copy1	qspi_io3_copy0	ftc1_out[2] led_blue_copy1 i2c_scl_copy2
PIO[4]	42	-	se_0_port_0_copy1 se_1_port_4_copy0 se_2_port_4_copy0 se_3_port_4_copy0	qspi_io2_copy0	ftc1_out[1] led_white_copy1 i2c_sda_copy2
PIO[3]	41	-	se_0_port_3_copy0 se_1_port_3_copy0 se_2_port_3_copy0 se_3_port_3_copy0	qspi_csb_copy0	ftc1_out[0] led_white_copy0 i2c_scl_copy1
PIO[2]	40	-	se_0_port_2_copy0 se_1_port_2_copy0 se_2_port_2_copy0 se_3_port_2_copy0	qspi_miso_copy0	ftc0_out[2] led_green_copy0 i2c_sda_copy1
PIO[1]	39	-	se_0_port_1_copy0 se_1_port_1_copy0 se_2_port_1_copy0 se_3_port_1_copy0	qspi_mosi_copy0	ftc0_out[1] led_red_copy0 i2c_scl_copy0
PIO[0]	38	-	se_0_port_0_copy0 se_1_port_0_copy0 se_2_port_0_copy0 se_3_port_0_copy0	qspi_clk_copy0	ftc0_out[0] led_blue_copy0 i2c_sda_copy0

^a If an application or product requires these PIOs for features other than debug, ensure there is sufficient delay so that after power up it is possible to attach a debugger and stop the processor. If application code instantly remaps these PIOs away from SWD it is not possible to use serial wire debug.

3 QCC711 Bluetooth Low Energy Schematic

NOTE The schematic included in this document is preliminary and subject to change without notice. The schematic on the following pages is for reference only and is not optimized for production due to its conservative design approach and Qualcomm® internal test requirements.

DATE	REVISION NUMBER	INITIALS	DESCRIPTION
24/9/2021	AA	JC	Initial schematic release.
07/7/2023	AB	LC	Update to QCC711.
10/7/2023	AC	LC	Updated to Production Information.
06/10/2023	AD	LC	Minor editorial update.
29/04/2025	AE	SV	Minor editorial update.

QCC711 Reference Schematic

01-TITLE

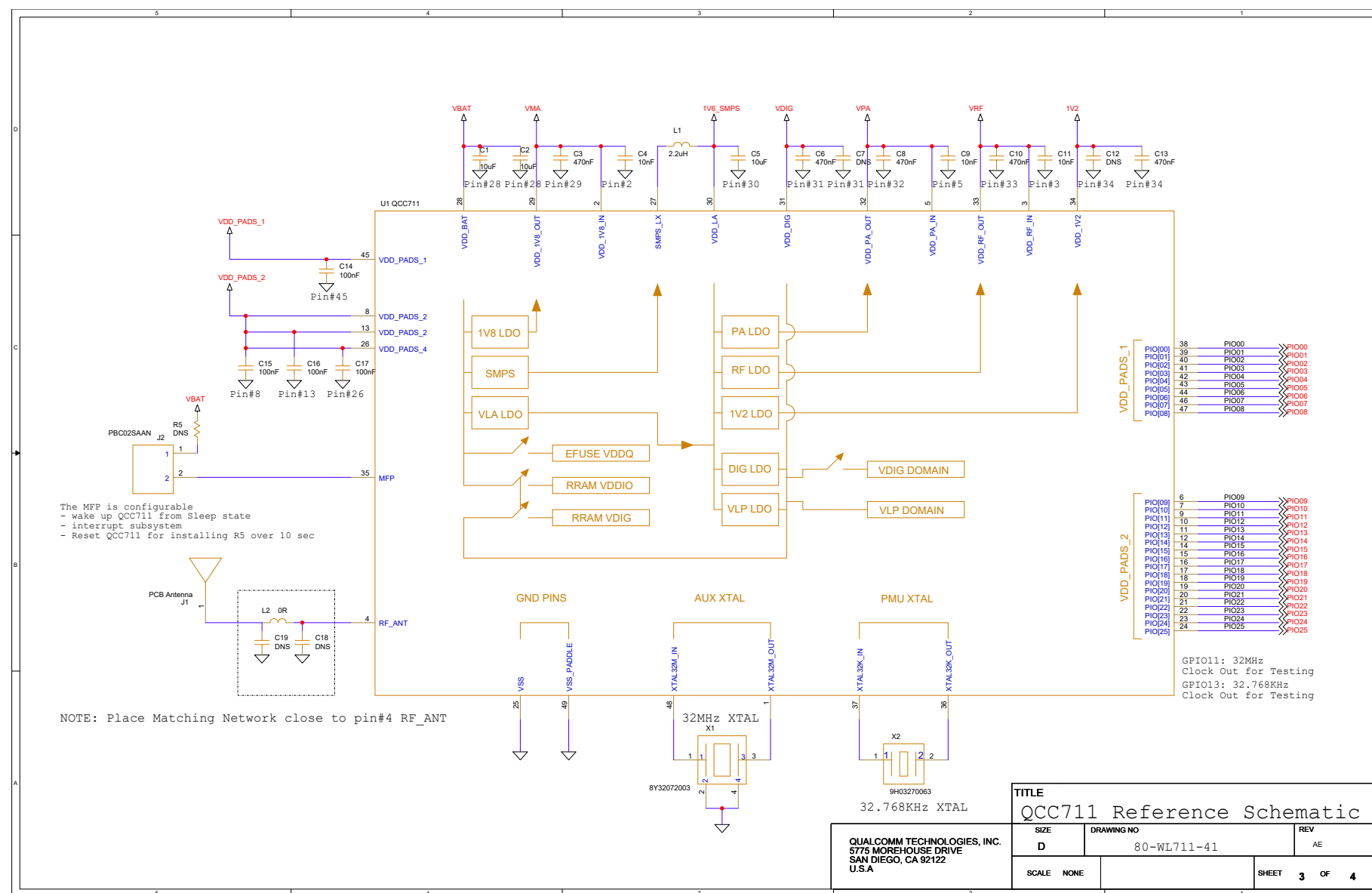
02_MODULE_PINOUT

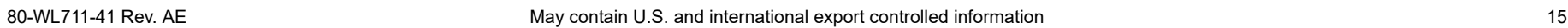
03_QCC711_INTERFACE

04_SERIAL NOR FLASH

CONTRACT NO.		QUALCOMM TECHNOLOGIES, INC.	
DRAWN BY	DATE	5775 MOREHOUSE DRIVE	
ENGINEER		SAN DIEGO, 92121 U.S.A	
PROJECT ENGINEER		TITLE	
QUALITY ASSURANCE		QCC711 Reference Schematic	
CONFIGURATION		SIZE	DRAWING NO
DESIGN ACTIVITY APPROVAL		D	80-WL711-41
DESIGN APPROVAL		SCALE	REV
		NONE	AE
		RELEASE DATE	SHEET
			1 OF 4







4 QCC711 Bluetooth Low Energy Parts List

NOTE The parts list included in this document is preliminary and subject to change without notice. The parts list on the following pages is for reference only and is not optimized for production due to its conservative design approach and Qualcomm Technologies, Inc. internal test requirements.

Table 4-1 QCC711 Bluetooth Low Energy parts list

Item	Description	Reference designators	Quantity	Vendor	Part number
Sheet: 03_QCC711_INTERFACE					
1	CAP, CHIP CERAMIC 10.0 μ F 20% X7T 10 V ROHS	C1, C2, C5	3	MURATA	GRM188D71A106MA73D
2	CAP, CHIP CERAMIC 0.47 μ F 10% X5R 10 V ROHS	C3, C6, C8, C10, C13	5	MURATA	GRM155R61A474KE15D
3	CAP, CHIP CERAMIC 0.01 μ F 10% X7R 6.3 V (MS) ROHS	C4, C9, C11	3	MURATA	GRM033R70J103KA01D
4	CAP, CHIP CERAMIC 0.1 μ F 10% X7R 16 V ROHS	C14, C15, C16, C17	4	MURATA	GRM155R71C104KA88D
6	INDUCTOR, POWER 2.2 μ H 20% DCR=60 M Ω ISAT=2.7 A HF-ROHS	L1	1	SAMSUNG ELECTRO-MECHANICS	CIGT201610EH2R2MNE
7	RES 0 JUMPER 0.050 W 0201 0.05 Ω (MS) ROHS	L3	1	YAGEO CORPORATION	RC0201FR-070RL
8	INDUCTOR, CHIP FILM 3.3 NH $\pm$ 0.1 NH Q=14 at 500 MHZ SRF=6000 ROHS	L2	1	MURATA ERIE NORTH AMERICA INC	LQP03TN3N3B02
9	CAP, CHIP CERAMIC HIGH FREQ 1.4 PF $\pm$ 0.05 PF C0G/NP0 25 V ROHS	C18, C19	2	MURATA ERIE NORTH AMERICA INC	GJM0335C1E1R4WB01D
10	QCC711 QFN48, 5.6 mm x 5.6 mm, 0.4 mm	U1	1	QUALCOMM	QCC-711-1-MQFN48C-MT-02-1 or QCC-711-1-MQFN48C-TR-02-1
11	CRYSTAL, 32.000 MHZ, 20 PPM at -30/85, 25 PPM at -40/85, CL=6 PF ROHS	X1	1	TXC	8Y32072003
12	CRYSTAL, 32.768 KHZ 20 PPM CL=6.0 PF HF-ROHS	X2	1	TXC	9H03270063
Sheet: 04_SERIAL NOR FLASH					
1	CAP, CHIP CERAMIC 0.1 μ F 10% X7R 16 V ROHS	C20	1	MURATA	GRM155R71C104KA88D
2	RES 100 K 200 PPM 5% 0.050 W 0201 ROHS	R2	1	CYNTEC CO. LTD.	RR0306S-104-JNH-39
3	IC, FLASH MEMORY SERIAL DUAL/QUAD SPI 16 MBIT 3 V 104 MHZ HF-ROHS	U2	1	WINBOND	W25Q16JVSNIQ

Glossary

Term	Definition
CSR	Control status register
I ² C	Inter-integrated circuit interface
PIO	Programmable input/output, also known as general-purpose I/O
QUP	Qualcomm universal peripheral
SE	Serial engine
SoC	System on-chip
SPI	Serial peripheral interface
UART	Universal asynchronous receiver transmitter

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