

Description

Arduino® UNO Q (hereafter UNO Q) is a single-board computer that combines the Qualcomm® Dragonwing™ QRB2210 Microprocessor (MPU), a quad-core Arm® Cortex®-A53 running Debian Linux OS, with the STMicroelectronics STM32U585 Microcontroller (MCU), an Arm® Cortex®-M33 running Arduino Core on Zephyr OS. The Linux system and the microcontroller communicate through Bridge, Arduino's RPC (Remote Procedure Call) library. This allows Arduino sketches on the microcontroller to access Linux services for high-level tasks, while Linux applications can interact with microcontroller peripherals to handle real-time operations within the same project.

UNO Q comes with embedded eMMC storage (options 16 GB, 32 GB) and LPDDR4X SDRAM (options 2 GB, 4 GB) to run Linux and your projects smoothly. It features dual-band Wi-Fi® 5 and Bluetooth® 5.1 for wireless connectivity, a USB-C® connector with power delivery input and video output, and Arduino-compatible headers for easy expansion with shields, carriers, and accessories.

UNO Q integrates seamlessly with Arduino App Lab, enabling developers to combine Arduino sketches, Linux applications, and AI models in one environment. App Lab can run directly on the board or from a connected PC, offering ready-to-use examples, and the flexibility to create custom apps tailored to your projects.



Target Areas

Prototyping, Edge AI & ML, Machine Vision, Education, Smart Devices, Robotics, Home and Building Automation, Gaming

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1 Application Examples

UNO Q combines an AI-capable Linux processor with a real-time microcontroller, delivering the best of high-level computing and deterministic control. Alongside this dual architecture, it supports a broad ecosystem of Arduino shields, carriers, Modulino® nodes, and third-party accessories, making it a flexible platform for diverse applications.

- **Prototyping:** Rapid proof-of-concepts such as vision-based inspection tools, smart kiosks, or compact edge computers with built-in connectivity.
- **Education:** Teaching Linux, real-time programming, AI, and computer vision through project-based learning, from science experiments to interactive educational robots.
- **Robotics:** Autonomous delivery robots, gesture-following companions, and robotic arms with visual feedback, combining Linux vision with MCU-driven motor control.
- **Smart Consumer Devices:** DIY smart cameras, interactive displays, or AR projects powered by dual cameras and GPU acceleration.
- **Home & Building Automation:** Smart doorbells with facial recognition, voice-controlled systems, and personalized climate hubs.
- **Gaming:** Retro console emulation, custom arcade cabinets, or enhanced gameplay with gesture-based controls, face tracking, and real-time feedback.

2 Features

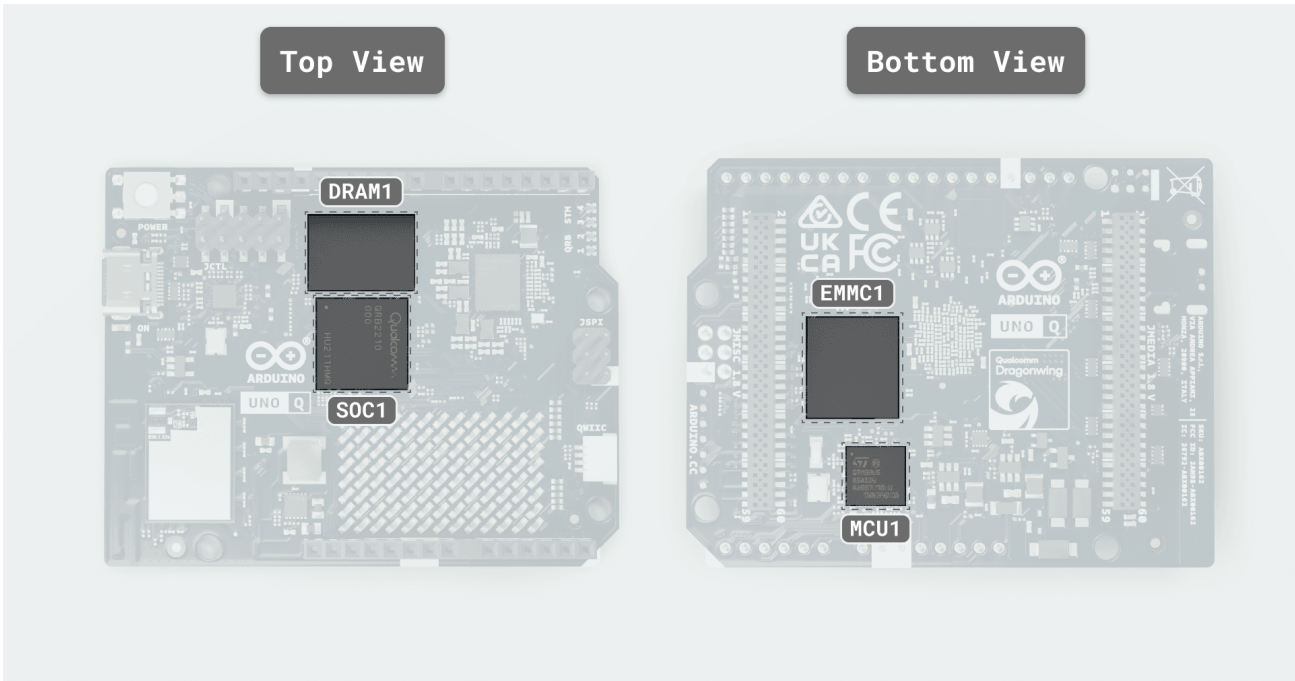
2.1 UNO Q Variants

UNO Q is available in two variants:

- **ABX00162:** 2 GB RAM, 16 GB on-board storage
- **ABX00173:** 4 GB RAM, 32 GB on-board storage

2.2 General Specifications Overview

2.2.1 Processing & Memory

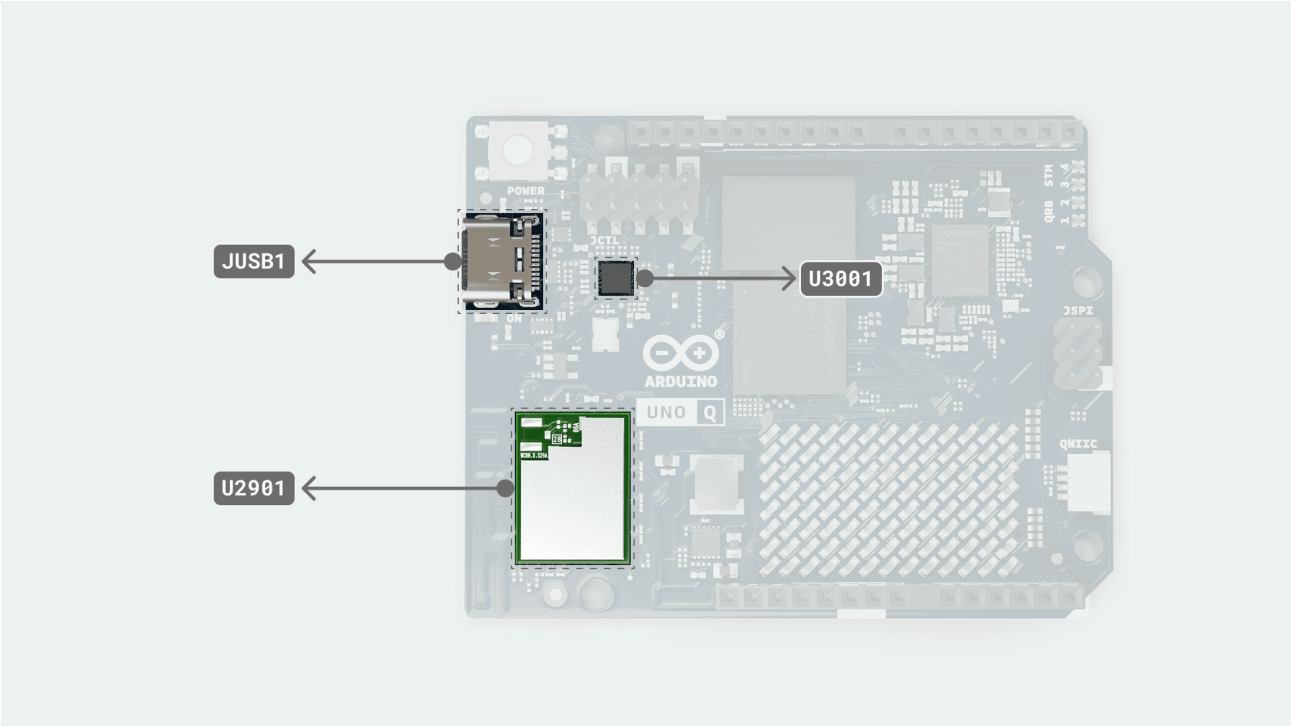


Subsystem	Details
Main MPU	- Qualcomm Dragonwing™ QRB2210 - System-on-Chip (SoC) (MPU) (SOC1): 4 × Arm Cortex-A53 @ 2.0 GHz, 64-bit - Adreno 702 GPU @ 845 MHz (3D graphics) - Dual ISPs: 13 MP + 13 MP or 25 MP @ 30 fps - Debian OS (upstream support) - I/O: USB 3.1 with Role-Switching Capabilities over USB Connector, SDIO 3.0, 4-lane MIPI-CSI-2 & 4-lane MIPI-DSI
Real-time MCU	- ST STM32U585 (MCU) (MCU1), Arm Cortex-M33 up to 160 MHz - Arduino Core on Zephyr OS

Subsystem	Details
	- 2 MB Flash, 786 kB SRAM
System Memory	- eMMC 16 or 32 GB options (EMMC1) for OS/data - LPDDR4X 2GB or 4 GB options (single-rank, 32-bit) (DRAM1)

The Qualcomm Dragonwing™ QRB2210 I/O operates at 1.8 V. The MPU drives the MIPI-CSI-2 camera and MIPI-DSI display interfaces on JMEDIA, and the 1.8 V MPU (SoC) GPIO and audio endpoints exposed on JMISC. JMISC is a mixed-voltage header that also carries 3.3 V MCU signals and analog audio alongside the 1.8 V MPU lines. DisplayPort video is provided by the on-board ANX7625, which converts the MPU's MIPI-DSI to DisplayPort Alt-Mode on USB-C. The STM32U585 manages ADC, PWM, CAN, the LED matrix, and the 3.3 V headers (JDIGITAL, JANALOG, JSPI, and Qwiic).

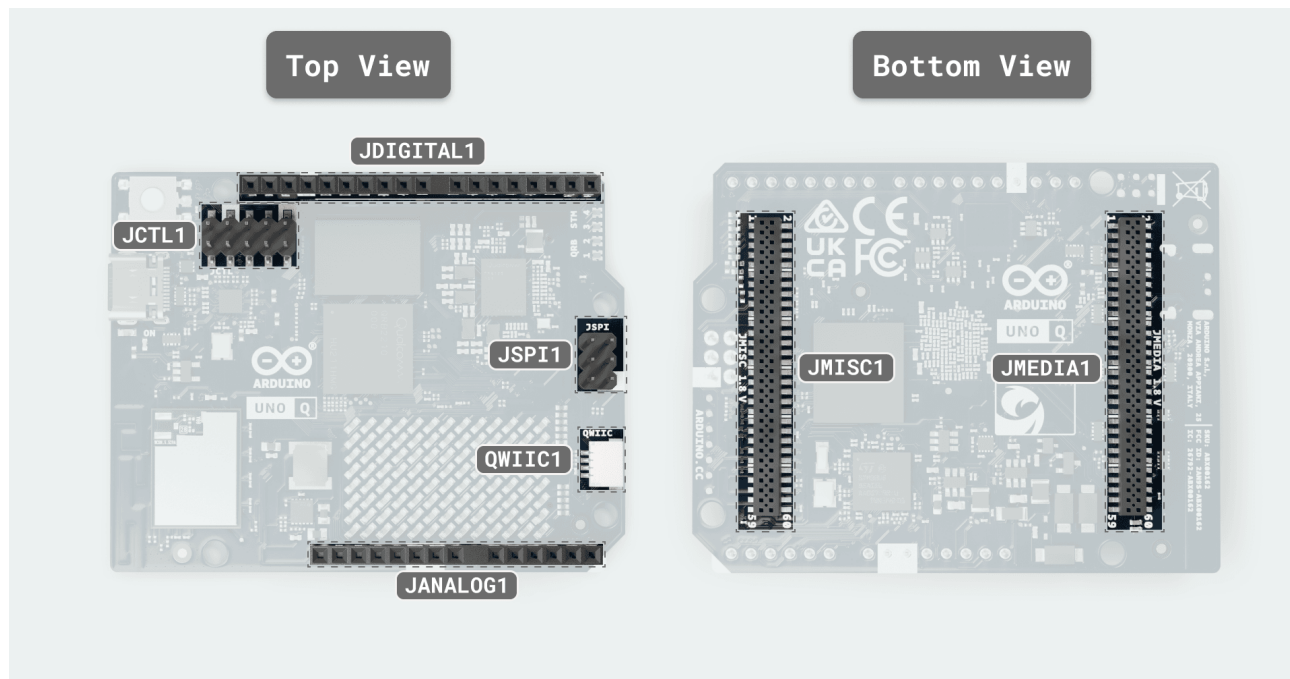
2.2.2 Connectivity & Media



Subsystem	Details
Wireless Module	- WCBN3536A (Qualcomm WCN3980) (U2901) - Wi-Fi® 5 802.11a/b/g/n/ac (dual-band) + Bluetooth® 5.1
USB-C Port (JUSB1)	- USB 3.1 with Role-Switching Capabilities - DisplayPort Alt-Mode via the ANX7625 DSI-to-DP bridge (U3001) (SuperSpeed differential pairs on the Type-C are routed for DP Alt Mode) - USB Power Delivery negotiation requests a 5 V / 3 A contract only (no higher-voltage profiles) - VBUS load-switch/back-drive protection (Q2801)

The wireless module uses SDIO for Wi-Fi® data and a UART for Bluetooth® control, with a shared PCB antenna.

2.2.3 Expansion & Headers



Interface (Connector)	Voltage & Pin Count	Details
JMEDIA (JMEDIA1)	1.8 V signals, 60-pin	- High-speed camera/display lanes (MIPI DSI, CSI) - Camera control bus (CCI I²C) - dedicated, not general-purpose GPIO - Camera clocks (SOC_CAM_MCLK0/1) - Also carries power rails (+3V3 OUT, VIN IN) and GND
JMISC (JMISC1)	Mixed 1.8 V / 3.3 V, 60-pin	- Mixed GPIO and SDIO - MCU peripherals: SDMMC1, TRACE, PSSI (parallel camera), I²C4, MCO/CRS_SYNC, OPAMP1 pins - Audio endpoints: Mic2 INP/INM/BIAS, Headphone L/R + REF, LineOut P/M, Earpiece P/R, HS_DET - MPU (SoC) GPIO banks (SE0) at 1.8 V - Also carries power rails (+5V USB OUT, +3V3 OUT, +1V8 OUT, VBAT IN, VCOIN IN) and GND
JCTL (JCTL1)	1.8 V, 10-pin	- SE4 UART console - Forced USB boot input - PMIC reset input



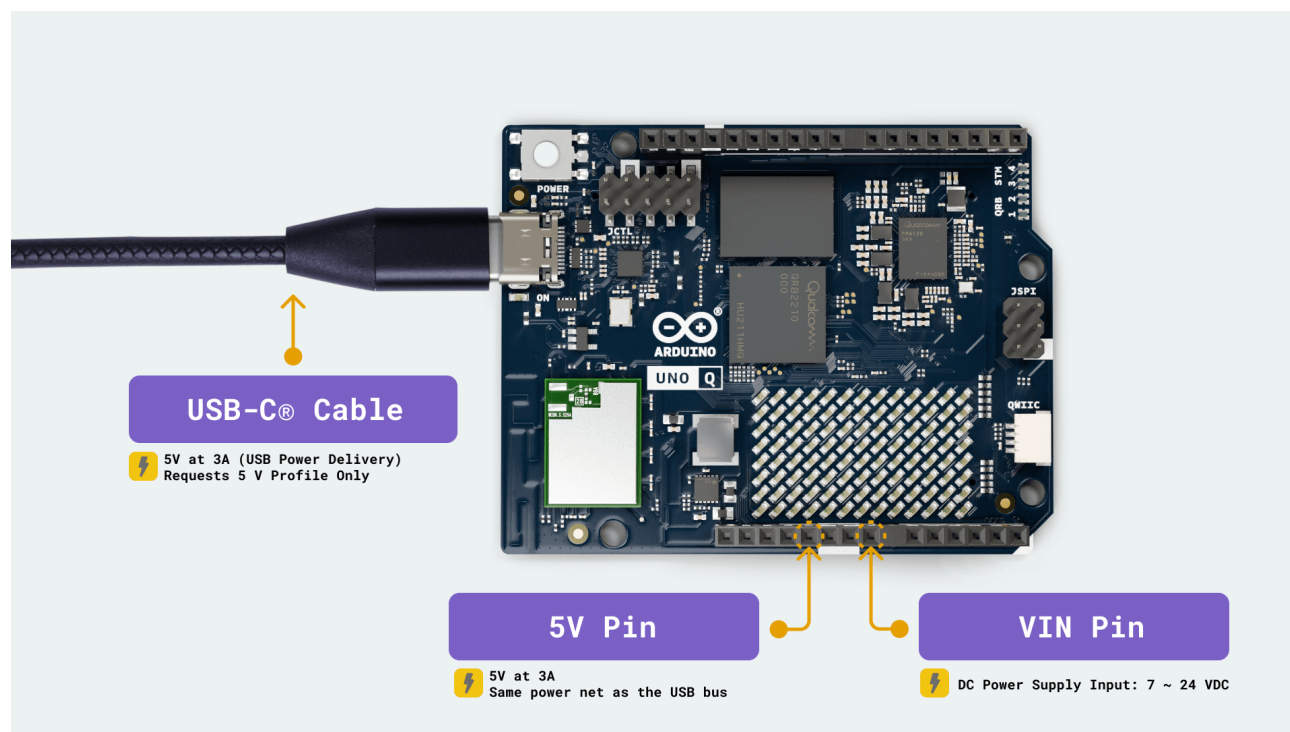
Interface (Connector)	Voltage & Pin Count	Details
		- VBUS power-switch disable - 1.8 V rail and GND
JDIGITAL (JDIGITAL1)	3.3 V, 18-pin	- Digital I/O for SPI, I ² C, UART, PWM, CAN
JANALOG (JANALOG1)	3.3 V, 14-pin	- Analog I/O - ADC channels and references
JSPI (JSPI1)	3.3 V logic, 6-pin + 5 V VBUS	- Dedicated SPI: MOSI, MISO, SCLK - MCU reset (NRST) - Ground - 5 V VBUS (USB power)
Qwiic (QWIIC1)	3.3 V, 4-pin	- I ² C (Qwiic ecosystem)

2.3 Related Products

- Arduino UNO shields via JDIGITAL and JANALOG
- UNO Q compatible carrier boards
- Full 24-pin USB-C cable
- USB-C dongle with external power delivery capabilities

3 Ratings

3.1 Input Power



UNO Q Input Methods

Source	Voltage Range	Maximum Current	Connector
USB-C VBUS	5 V	up to 3 A	USB-C connector
VIN (DC IN)	7-24 V	-	JMEDIA, JANALOG (VIN)
5 V Pin	5 V	up to 3 A	JANALOG

UNO Q supports dual power inputs: a USB-C port and a 7-24V DC input. Over USB Power Delivery, it requests only the 5 V / 3 A contract and does not request higher-voltage PD profiles. Use a supply and cable rated for 5 V at 3 A to avoid undervoltage during short activity peaks such as wireless bursts or display initialization. A regulated external 5 V DC source can also be used to supply power to the board via the 5 V pin on the JANALOG header.

USB-C VBUS and the 5 V output of the 7-24 V buck are *diode-OR* combined onto the system 5 V bus (5V_SYS). From 5V_SYS, the design derives the 3.8 V pre-regulator node and, subsequently, the 3.3 V. The PMIC, powered by 5V_SYS, derives the 1.8V rail.

Reverse-polarity protection: Verified with -24 V applied to DC IN. The operation is specified only with the correct polarity. Do not apply reverse voltage during normal use.

Schottky OR path: Forward-voltage drop from the buck output to 5V_SYS was measured as follows (JANALOG VIN injection, Rigol DP832 supply in series, Keithley DMM6500 measurement, 8542B active load). Power dissipation is calculated as $P = I \times V_f$.

Load current	Forward drop (Vf)	Diode dissipation
1.0 A	0.35 V	0.35 W
1.5 A	0.37 V	0.56 W
2.0 A	0.39 V	0.78 W

3.2 Recommended Operating Conditions

Use the limits below to size power sources, define rail tolerances, and plan thermal margin:

Parameter	Symbol	Minimum	Typical	Maximum	Unit
USB-C input	VBUS_USBC	4.5	5.0	5.5	V
DC input	DC_IN	7.0	-	24.0	V
3.3 V system rail	PWR_3P3V	3.1	3.3	3.5	V
Operating temperature	T_OP	-10	-	60	°C

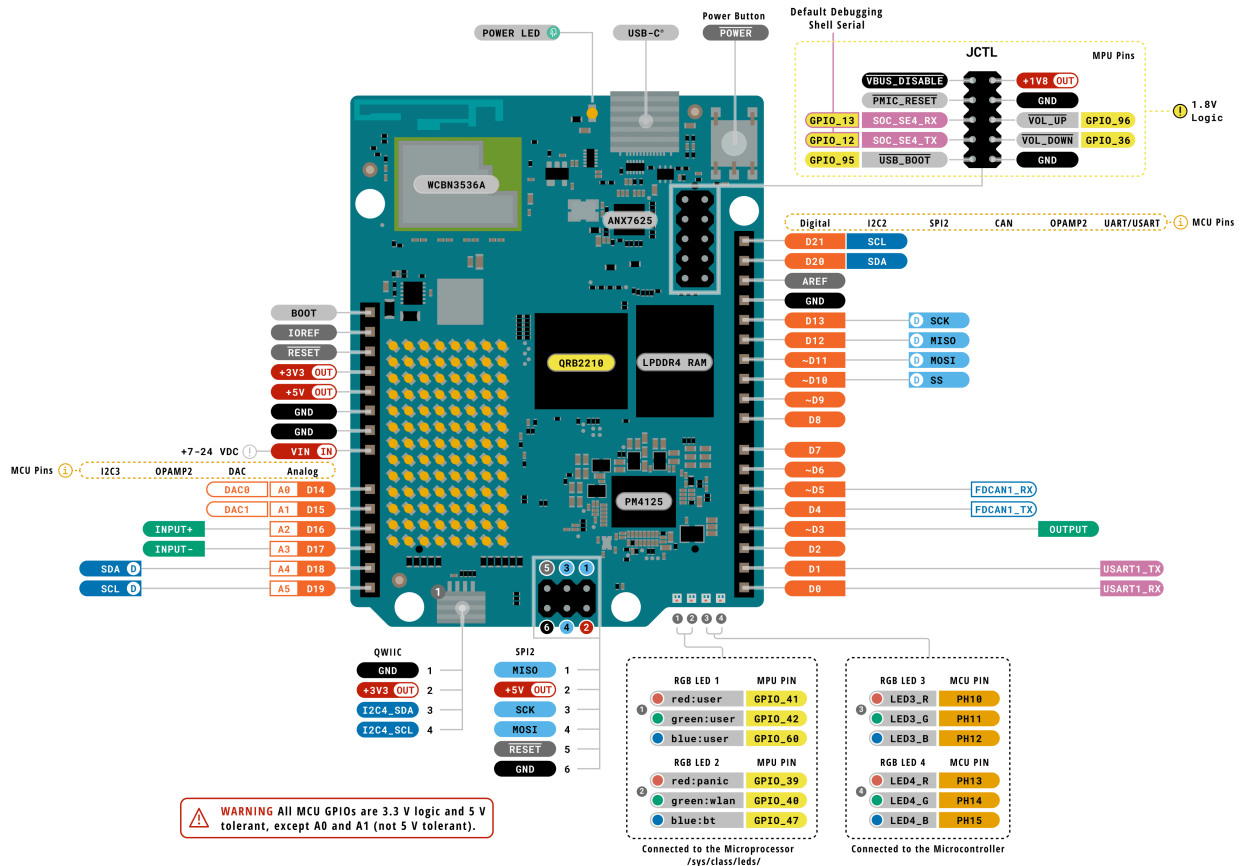
Minimum indicates the lowest continuous value for regular operation; brief dips can cause resets or link drops. *Typical* is the nominal design point. *Maximum* must not be exceeded. For DC_IN (7-24 V), select a supply that comfortably covers the 5 V load and use short cables to reduce voltage drop. The PWR_3P3V range reflects regulator tolerance and load. The temperature range refers to ambient air near the board, and operating near the limits can reduce available output current.

3.3 On-Board Voltage Rails

Voltage	Rail	Origin / Regulator
5.0 V	5V_SYS	Diode OR of USB-C VBUS and 7-24 V buck output (both via Schottky rectifiers)
3.8 V	PWR_3P8V	Step-down (buck) from 5V_SYS
3.3 V	PWR_3P3V	Step-down (buck) from PWR_3P8V
1.8 V	VREG_L15A_1P8V	PM4125 LDO L15A from 5V_SYS

4 Functional Overview

4.1 Pinout

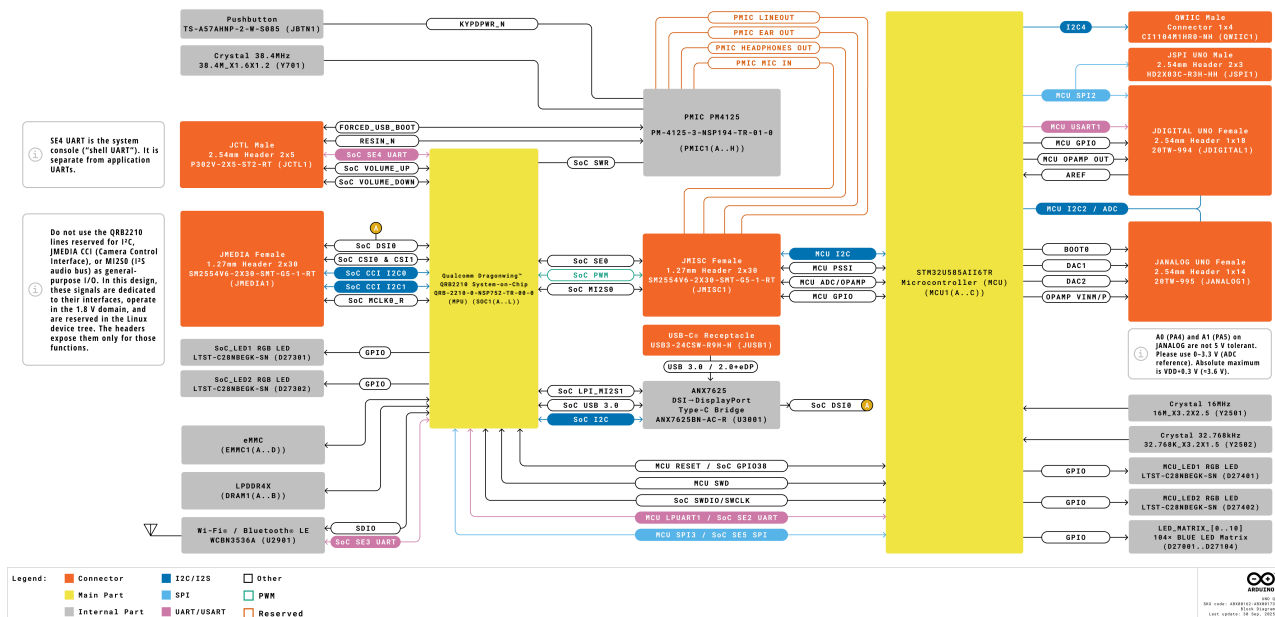


Legend:	Digital	I2C	Other SERIAL
Power	Analog	SPI	Analog
Ground	Main Part	UART/USART	Internal Part



UNO Q
SKU code: ABX00162-ABX00173
Pinout
Last update: 30 Sept, 2025

4.2 Block Diagram



4.3 Power Supply

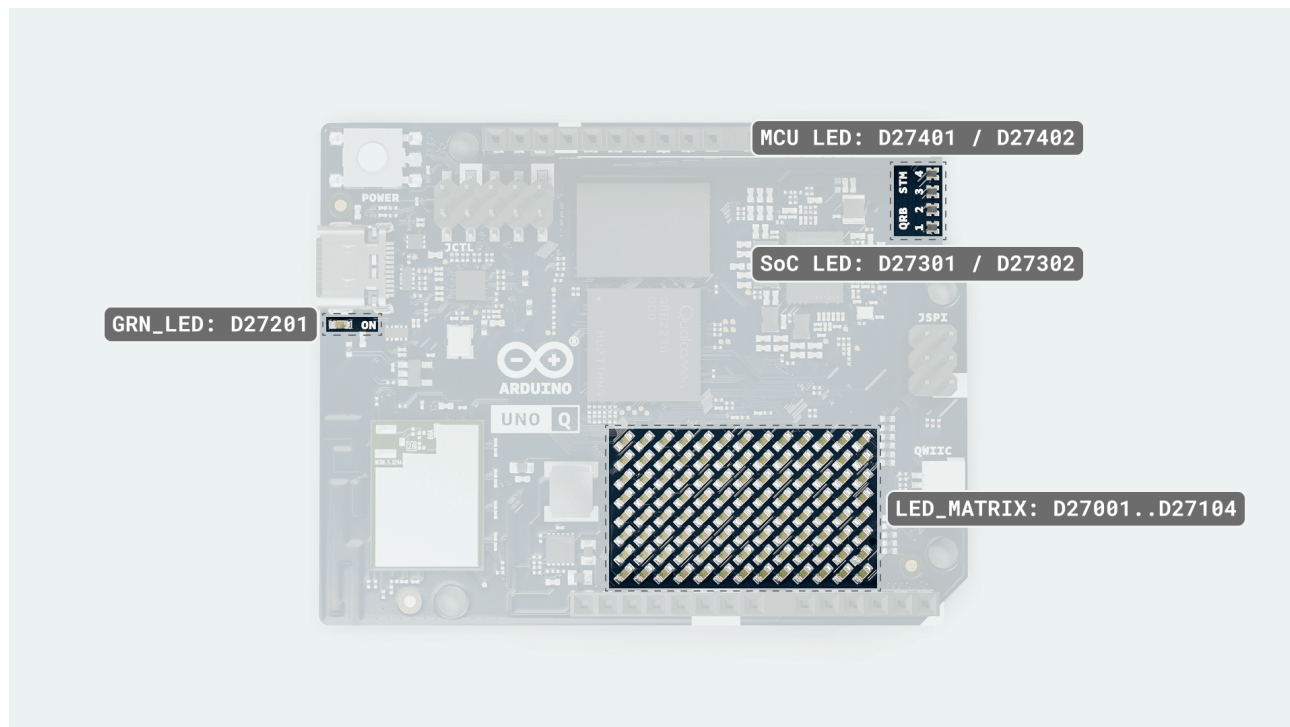
UNO Q supports dual power inputs: a USB-C port and a 7-24V DC input. *USB-C VBUS* and the 5 V output of the 7-24 V buck are *diode-OR* combined onto the system 5 V bus (5V_SYS).

5V_SYS supplies the **PM4125 PMIC (PMIC1)** at USB_IN. The PMIC's L15A LDO provides the 1.8 V rail (VREG_L15A_1P8V) and powers the SoC I/O banks, ANX7625 DVDD18, Wi-Fi® digital logic, and the on-board level shifters. The 1.8 V rail is also available on JMISC. From 5V_SYS, a buck generates the PWR_3P8V (3.8 V) reserved for system design and future features. A second buck generates PWR_3P3V for the STM32U585, the ANX7625 (3.3 V rails), the Wi-Fi® 3.3 V domain, and the 3.3 V header pins.

A *protected P-channel MOSFET* (Q2801) can source USB VBUS from 5V_SYS when the board operates as a USB host/OTG. The VC0IN powers only the real-time clock of the PMIC and does not power the Linux or MCU domains. The VBAT powers the real-time clock of the MCU.



5 UI & Indicators



- **RGB LEDs (Linux-controlled):** Two tri-color LEDs are driven by the Qualcomm Dragonwing™ QRB2210 application processor and exposed via `/sys/class/leds/`.
 - **RGB LED 1 (D27301):** channels: red:user → **GPIO_41**, green:user → **GPIO_42**, blue:user → **GPIO_60**.
 - **RGB LED 2 (D27302):** channels: red:panic → **GPIO_39**, green:wlan → **GPIO_40**, blue:bt → **GPIO_47**.
By default, RGB LED 2 indicates system status, PANIC, WLAN, and BT, but it can also be user-controlled. PWM frequency is approximately 2 kHz for smooth color transitions.
- **RGB LEDs (MCU-controlled):** Two tri-color LEDs are driven by the STM32U585.
 - **RGB LED 3 (D27401):** LED3_R → **PH10**, LED3_G → **PH11**, LED3_B → **PH12**.
 - **RGB LED 4 (D27402):** LED4_R → **PH13**, LED4_G → **PH14**, LED4_B → **PH15**.

The RGB LEDs are active-low, meaning they turn on when driven to logic `0`.

- **LED matrix (D27001..D27104):** 8 × 13 monochrome blue LED matrix (104 pixels) driven by the STM32U585. It displays the boot logo for approximately 20–30 seconds during Linux startup. Accessing the matrix before startup completes may interfere with MCU operation.
- **Power LED (D27201):** Green indicator tied to the 3.3 V rail and illuminated whenever the board is powered.

6 MPU & MCU

An MPU (Microprocessor unit) is a high-performance application processor designed to run a full operating system and complex software. An MCU (Microcontroller unit) is a small, power-efficient controller focused on fast, precise timing for I/O and control. UNO Q combines both to pair OS-level compute with responsive, time-critical control on a single-board board and communicate through Bridge, an RPC layer implemented on both sides.

6.1 Application Processor (MPU)

Qualcomm® Dragonwing™ QRB2210 is a quad-core Arm® Cortex®-A53 running Debian Linux OS. Its I/O operates at 1.8 V and it handles the high-speed media and Type-C/PD policy.

- Voltage domain: 1.8 V for MPU (SoC) GPIO and high-speed interfaces
- Drives JMEDIA: MIPI-CSI-2 camera and MIPI-DSI display lanes
- Drives 1.8 V MPU GPIO and audio endpoints on JMISC (mixed-voltage header)
- USB-C: role switching and PD negotiation (requests 5 V / 3 A)
- DisplayPort output via on-board ANX7625 (converts MIPI-DSI to DP Alt-Mode)

6.2 Real-Time Microcontroller (MCU)

STMicroelectronics® STM32U585 is an Arm® Cortex®-M33 running Arduino Core on Zephyr OS. It provides fast, precise timing for control tasks and 3.3 V I/O headers.

- Voltage domain: 3.3 V for GPIO and analog (VREF+ $\approx$ 3.3 V)
- Manages ADC, PWM, CAN, LED matrix, timers
- Handles 3.3 V headers: JDIGITAL, JANALOG, JSPI, Qwiic

JMISC handles both domains: 1.8 V MPU lines sit alongside 3.3 V MCU signals (e.g., PSSI, SDMMC1, TRACE, I²C4) and analog/audio. Please check the voltage levels when attaching carriers or external logic.

7 Inter-Processor Communication

The Qualcomm® Dragonwing™ QRB2210 (MPU) and the STM32U585 (MCU) communicate through the Arduino Bridge, a software-based Remote Procedure Call (RPC) layer implemented on both the Linux and MCU sides. Bridge provides a service-oriented API that allows either processor to expose services for the other to call, while also supporting one-way notifications for asynchronous events. It manages message routing between processors and accommodates multiple physical transports. Through its API, Bridge enables type-safe function calls, allowing microcontroller sketches to invoke Linux services and receive structured responses, or to push data via notifications.

If a hardware indicator is required for a carrier board or external logic, firmware can dedicate a 1.8V MPU GPIO on JMISC, or an available JCTL GPIO, as a ready or wake output. This signal can be received on an MCU GPIO through level-compatible circuitry, such as a level shifter or open-drain configuration with a pull-up resistor. The firmware defines the exact role of this signal. Alternatively, activity on the selected transport (USB CDC, UART, or SPI) can serve as a wake source when the MCU is in sleep mode.

MPU GPIO signals operate in the application processor's low-voltage domain (1.8 V). Ensure any connection to the microcontroller is level-compatible with its I/O voltage rail (3.3 V). For example, use a level shifter or an open-drain configuration with a pull-up to the microcontroller's I/O rail.

8 Hardware Acceleration

The UNO Q provides hardware acceleration for both 3D graphics and video encoding/decoding through the integrated Adreno 702 GPU running at 845 MHz.

8.1 Graphics Acceleration

The Adreno 702 GPU provides hardware-accelerated 3D graphics rendering through open-source Mesa drivers. Applications can access GPU acceleration via standard graphics APIs, including OpenGL, OpenGL ES, Vulkan, and OpenCL.

Graphics API	Driver	Hardware Support	Current Driver Version	Device Name
Desktop OpenGL	freedreno	-	3.1	FD702
OpenGL ES	freedreno	3.1	3.1	FD702
Vulkan	turnip	1.1	1.0.318	Turnip Adreno (TM) 702
OpenCL	Mesa	2.0	2.0	-

The Adreno 702 GPU features unified memory architecture, sharing system RAM with the CPU for data transfer. It supports 64-bit memory addressing and provides direct rendering capabilities for optimal graphics performance.

Parameter	Specification
Clock Frequency	845 MHz
Memory Architecture	Unified (shared with system RAM)
Available Video Memory	1740 MB
Memory Addressing	64-bit
Direct Rendering	Yes
Maximum 2D Texture Size	16384 × 16384 pixels
Maximum 3D Texture Size	2048 ³ voxels
Maximum Cube Map Size	16384 × 16384 pixels
OpenGL Shading Language (GLSL)	1.40
OpenGL ES Shading Language	3.10 ES

The Mesa graphics stack provides support for standard OpenGL extensions and features. Applications using OpenGL, OpenGL ES, or Vulkan will automatically use hardware acceleration without additional configuration. Standard graphics utilities such as `mesa-utils` and `vulkan-tools` work out of the box on the UNO Q.

Note: The OpenGL and Vulkan drivers are available through the **freedreno (OpenGL/OpenGL ES)** and **turnip (Vulkan)** open-source Mesa drivers, providing transparency and community support. While the Adreno 702 hardware supports Vulkan 1.1, the current driver implementation provides Vulkan 1.0.318. **There are no UNO Q-specific OpenGL or Vulkan examples. However, standard Mesa utilities and examples from the Mesa project can be used as references.**

8.2 Video Acceleration

The Adreno 702 GPU includes dedicated hardware video encoders and decoders accessible through the V4L2 (Video4Linux2) API via /dev/video0 and /dev/video1 devices. Hardware acceleration is available for the following video codecs:

Codec	Encoding	Decoding	GStreamer Element
H.264 (AVC)	Yes	Yes	v4l2h264enc / v4l2h264dec
H.265 (HEVC)	Yes	Yes	v4l2h265enc / v4l2h265dec
VP9	No	Yes	v4l2vp9dec

The hardware video encoder and decoder offload compression and decompression tasks from the CPU to dedicated hardware, enabling efficient real-time video processing. This reduces system power consumption and allows the CPU to focus on application logic. Hardware acceleration is available for resolutions up to 1920×1080 (Full HD), including common formats such as 720p (1280×720).

8.2.1 GStreamer Integration

The recommended approach for accessing hardware video acceleration is through **GStreamer**, which provides a high-level pipeline interface to the V4L2 devices. The following GStreamer elements provide hardware-accelerated video processing:

For H.264 decoding, the following pipeline can be used:

```
gst-launch-1.0 filesrc location=videos/xxxxx.mp4 \
! qtdemux name=demux demux.video_0 ! queue ! h264parse ! v4l2h264dec \
! videoconvert ! autovideosink
```

For H.265 decoding, the following pipeline can be used:

```
gst-launch-1.0 filesrc location=videos/xxxxx.mp4 \
! qtdemux name=demux demux.video_0 ! queue ! h265parse ! v4l2h265dec \
! videoconvert ! autovideosink
```

For VP9 decoding, the following pipeline can be used:

```
gst-launch-1.0 filesrc location=videos/xxxxx.webm \
! matroskademux ! queue ! v4l2vp9dec \
! videoconvert ! autovideosink
```

For H.264 encoding, the following pipeline can be used:

```
gst-launch-1.0 videotestsrc num-buffers=30 \
! video/x-raw,width=1280,height=720,framerate=30/1 \
! v4l2h264enc ! h264parse ! mp4mux ! filesink location=/tmp/output.mp4
```

For H.265 encoding, the following pipeline can be used:

```
gst-launch-1.0 videotestsrc num-buffers=30 \
! video/x-raw,width=1920,height=1080,framerate=30/1 \
! v4l2h265enc ! h265parse ! mp4mux ! filesink location=/tmp/output.mp4
```

For concurrent encoding and decoding, the following pipeline can be used:

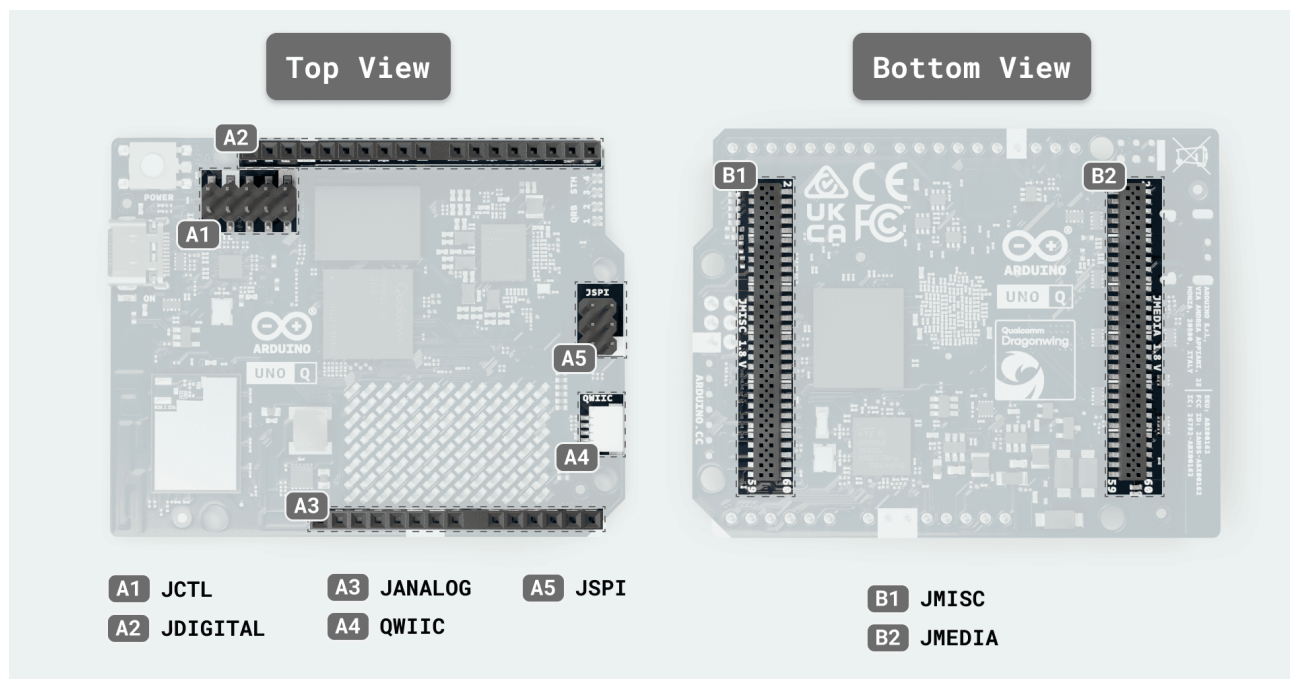
```
gst-launch-1.0 -v videotestsrc num-buffers=1000 \  
! video/x-raw,format=NV12,width=1280,height=720,framerate=30/1 \  
! v4l2h264enc capture-io-mode=4 output-io-mode=2 ! h264parse \  
! v4l2h264dec capture-io-mode=4 output-io-mode=2 ! videoconvert \  
! autovideosink
```

Developer Access: The V4L2 video devices are accessible through standard Linux APIs, allowing direct integration into C/C++ applications using libv4l2 or through higher-level frameworks like GStreamer, FFmpeg, or OpenCV with V4L2 backend support.

8.3 OpenCL Support

OpenCL 2.0 support is available through the Mesa implementation, allowing general-purpose GPU (GPGPU) computing for parallel processing tasks, scientific computing, and compute-intensive operations. The Adreno 702's OpenCL capabilities allow offloading compute-intensive workloads from the CPU to the GPU for improved performance.

9 Peripherals



UNO Q Peripherals

- **JDIGITAL (A2) (JDIGITAL1) / JANALOG (A3) (JANALOG1):** 3.3 V GPIO with support for SPI, UART, CAN, PWM, and ADC inputs. Analog inputs are referenced to VREF+ on the 3.3 V rail. Valid input range is 0 V to VREF+. Some STM32U585 pads may be 5 V-tolerant in digital mode, but when configured as ADC or any analog function (such as A0 through A5), they are not 5 V-tolerant and must not exceed $VDD + 0.3$ V. Use external conditioning like a voltage divider or buffer for higher voltages. For A4/A5 when used as I2C3 (PC1/PC0), use pull-ups to 3.3 V only.
- **QWIIC Connector (A4) (QWIIC1):** Additional I²C bus (3.3 V logic). It maps as **PD13 (I2C4_SDA)** and **PD12 (I2C4_SCL)**. It guarantees plug-and-play compatibility with Modulino® nodes and 3rd party sensors and actuators.
- **JSPI (A5) (JSPI1):** 3.3 V SPI header for peripherals that provides MOSI, MISO, and SCLK signals, with chip-select available through a GPIO pin on JDIGITAL/JMISC. The pins use STM32U585 FT-type configuration with MISO on PC2, MOSI on PC3, and SCK on PD1. They are 5 V-tolerant as inputs or in open-drain, while outputs drive 3.3 V. Add level shifting if a 5 V input threshold or 5 V bidirectional signaling is required. Includes a 5V_SYS power pin.
- **JMEDIA (B2) (JMEDIA1):** Four-lane camera and display signals in the 1.8 V domain (MIPI-CSI-2 and MIPI-DSI).
- **JMISC (B1) (JMISC):** Mixed function header combining 3.3 V MCU signals and 1.8 V MPU signals. It provides MCU PSSI (parallel camera) bus, SDMMC1 test pins, TRACE, I2C4, MCO/CRS_SYNC, and OPAMP1 analog pins. Also it breakout out audio (Mic2, Headphone L/R+REF, LineOut P/M, Earpiece P/R, HS_DET) and power rails (+3V3, +5V_USB, +1V8, VBAT and VCOIN for system use). Observe voltage domains: **MCU pins are 3.3 V, MPU GPIO are 1.8 V.**
- **JCTL (A1) (JCTL1):** Boot-mode pins, reset, and low-power wake signals (1.8 V logic).

SE4 UART is the system console (shell UART). It is separate from application UARTs and should not be repurposed for user I/O. It operates in the MPU's **1.8 V** I/O domain.

Do not use the Qualcomm Dragonwing™ QRB2210 lines reserved for **I²C**, **JMEDIA CCI** (Camera Control Interface), or **MI2S0** (I²S audio bus) as general-purpose I/O. These signals are interface-dedicated, operate at **1.8 V**, and are reserved in the Linux device tree. The headers expose them only for those functions.

9.1 JMISC (B1) (JMISC1) - Pin Map

Pin	Designation	MCU/SoC Pin	Domain	Notes
1	MCU_PSSI_D0	PC6	3.3V MCU	PSSI D0
2	MCU_SDMMC1_CMD	PD2	3.3V MCU	SDMMC1 CMD / test
3	MCU_PSSI_D1	PC7	3.3V MCU	PSSI D1
4	MCU_TRACE_CLK	PE2	3.3V MCU	Trace clock
5	MCU_PSSI_D2	PC8	3.3V MCU	PSSI D2
6	MCU_TRACE_D0	PE3	3.3V MCU	Trace data 0
7	MCU_PSSI_D3	PC9	3.3V MCU	PSSI D3
8	MCU_TRACE_D2	PE5	3.3V MCU	Trace data 2
9	MCU_PSSI_D4	PE4	3.3V MCU	PSSI D4
10	MCU_TRACE_D3	PE6	3.3V MCU	Trace data 3
11	MCU_PSSI_D5	PI4	3.3V MCU	PSSI D5
12	MCU_PE7	PE7	3.3V MCU	GPIO
13	MCU_PSSI_D6	PI6	3.3V MCU	PSSI D6
14	MCU_PE8	PE8	3.3V MCU	GPIO
15	MCU_PSSI_D7	PI7	3.3V MCU	PSSI D7
16	MCU_I2C4_SCL	PF14	3.3V MCU	I ² C4 SCL
17	MCU_PSSI_PDCK	PD9	3.3V MCU	PSSI clock
18	MCU_I2C4_SDA	PF15	3.3V MCU	I ² C4 SDA
19	MCU_PSSI_RDY	PI5	3.3V MCU	PSSI ready
20	MCU_OPAMP1_VOUT	PA3	Analog	OpAmp1 VOUT
21	MCU_PSSI_DE	PD8	3.3V MCU	PSSI data enable
22	MCU_OPAMP1_VINP	PA0	Analog	OpAmp1 VINP
23	MCU_MCO	PA8	3.3V MCU	MCU clock out
24	MCU_OPAMP1_VINM	PA1	Analog	OpAmp1 VINM
25	MCU_CR5_SYNC	PA10	3.3V MCU	CR5 sync
26	GND	-	Power	Ground
27	GND	-	Power	Ground
28	EAR_P_R	-	Analog	Audio ear P_R
29	MIC2_INP	-	Analog	Mic2 IN+
30	EAR_M_R	-	Analog	Audio ear M_R
31	MIC2_INM	-	Analog	Mic2 IN-
32	LINEOUT_P	-	Analog	Line out P
33	MIC2_BIAS	-	Analog	Mic2 bias
34	LINEOUT_M	-	Analog	Line out M
35	GND	-	Power	Ground

Pin	Designation	MCU/SoC Pin	Domain	Notes
36	HPH_L	-	Analog	Headphone L
37	SOC_GPIO_0_SE0	-	1.8V MPU	SoC GPIO 0 (SE0)
38	HPH_R	-	Analog	Headphone R
39	SOC_GPIO_1_SE0	-	1.8V MPU	SoC GPIO 1 (SE0)
40	HPH_REF	-	Analog	Headphone REF
41	SOC_GPIO_2_SE0	-	1.8V MPU	SoC GPIO 2 (SE0)
42	HS_DET	-	Analog	Headset detect
43	SOC_GPIO_3_SE0	-	1.8V MPU	SoC GPIO 3 (SE0)
44	GND	-	Power	Ground
45	SOC_GPIO_86_SE0	-	1.8V MPU	SoC GPIO 86 (SE0)
46	SOC_GPIO_98	-	1.8V MPU	SoC GPIO 98
47	SOC_GPIO_82_SE0	-	1.8V MPU	SoC GPIO 82 (SE0)
48	SOC_GPIO_99	-	1.8V MPU	SoC GPIO 99
49	SOC_GPIO_18	-	1.8V MPU	SoC GPIO 18
50	SOC_GPIO_100	-	1.8V MPU	SoC GPIO 100
51	SOC_GPIO_28	-	1.8V MPU	SoC GPIO 28
52	SOC_GPIO_101	-	1.8V MPU	SoC GPIO 101
53	+3V3 (OUT)	-	Power	3.3 V power out
54	+5V_USB (OUT)	-	Power	5 V power out
55	+3V3 (OUT)	-	Power	3.3 V power out
56	+5V_USB (OUT)	-	Power	5 V power out
57	+1V8 (IN)	-	Power	1.8 V rail in
58	GND	-	Power	Ground
59	VCOIN (IN)	-	Power	System voltage (PMIC RTC)
60	VBAT (IN)	-	Power	System voltage (MCU RTC)

Note: SoC GPIO lines on JMISC are interface-dedicated (not maker GPIO). MCU are at 3.3 V logic, MPU are at 1.8 V logic, and audio/mic are analog.

9.2 JMEDIA (B2) (JMEDIA1) - Pin Map

Pin	Designation	Domain	Notes
1	GND	Power	Ground
2	GND	Power	Ground
3	MIPI_DSI0_CLK_M	MIPI D-PHY	DSI clock -
4	MIPI_DSI0_L1_P	MIPI D-PHY	DSI lane1 +
5	MIPI_DSI0_CLK_P	MIPI D-PHY	DSI clock +
6	MIPI_DSI0_L1_M	MIPI D-PHY	DSI lane1 -
7	GND	Power	Ground
8	GND	Power	Ground
9	MIPI_DSI0_L2_M	MIPI D-PHY	DSI lane2 -
10	MIPI_DSI0_L0_P	MIPI D-PHY	DSI lane0 +
11	MIPI_DSI0_L2_P	MIPI D-PHY	DSI lane2 +
12	MIPI_DSI0_L0_M	MIPI D-PHY	DSI lane0 -
13	GND	Power	Ground
14	GND	Power	Ground
15	MIPI_DSI0_L3_M	MIPI D-PHY	DSI lane3 -
16	SOC_CAM_MCLK0 (GPIO_20)	1.8V MPU	Camera master clock 0
17	MIPI_DSI0_L3_P	MIPI D-PHY	DSI lane3 +
18	SOC_CAM_MCLK1 (GPIO_21)	1.8V MPU	Camera master clock 1
19	GND	Power	Ground
20	GND	Power	Ground
21	CSI0_C0_LN0_M	MIPI D-PHY	CSI0 data0 -
22	CCI_I2C_SDA1 (GPIO_29)	1.8V MPU	Camera control I ² C SDA1
23	CSI0_B0_LN0_P	MIPI D-PHY	CSI0 data0 +
24	CCI_I2C_SCL1 (GPIO_30)	1.8V MPU	Camera control I ² C SCL1
25	GND	Power	Ground
26	GND	Power	Ground
27	CSI0_B1_LN1_M	MIPI D-PHY	CSI0 data1 -
28	CSI1_B2_LN3_P	MIPI D-PHY	CSI1 data3 +
29	CSI0_A1_LN1_P	MIPI D-PHY	CSI0 data1 +
30	CSI1_C2_LN3_M	MIPI D-PHY	CSI1 data3 -
31	GND	Power	Ground
32	GND	Power	Ground
33	CSI0_A0_CLK_M	MIPI D-PHY	CSI0 clock -
34	CSI1_C1_LN2_P	MIPI D-PHY	CSI1 data2 +
35	CSI0_NC_CLK_P	MIPI D-PHY	CSI0 clock +
36	CSI1_A2_LN2_M	MIPI D-PHY	CSI1 data2 -
37	GND	Power	Ground
38	GND	Power	Ground
39	CSI0_A2_LN2_M	MIPI D-PHY	CSI0 data2 -
40	CSI1_NC_CLK_P	MIPI D-PHY	CSI1 clock +

Pin	Designation	Domain	Notes
41	CSI0_C1_LN2_P	MIPI D-PHY	CSI0 data2 +
42	CSI1_A0_CLK_M	MIPI D-PHY	CSI1 clock -
43	GND	Power	Ground
44	GND	Power	Ground
45	CSI0_C2_LN3_M	MIPI D-PHY	CSI0 data3 -
46	CSI1_A1_LN1_P	MIPI D-PHY	CSI1 data1 +
47	CSI0_B2_LN3_P	MIPI D-PHY	CSI0 data3 +
48	CSI1_B1_LN1_M	MIPI D-PHY	CSI1 data1 -
49	GND	Power	Ground
50	GND	Power	Ground
51	CCI_I2C_SCL0 (GPIO_23)	1.8V MPU	Camera control I ² C SCL0
52	CSI1_B0_LN0_P	MIPI D-PHY	CSI1 data0 +
53	CCI_I2C_SDA0 (GPIO_22)	1.8V MPU	Camera control I ² C SDA0
54	CSI1_C0_LN0_M	MIPI D-PHY	CSI1 data0 -
55	GND	Power	Ground
56	GND	Power	Ground
57	VIN (IN)	Power	7-24 V input
58	+3V3 (OUT)	Power	3.3 V power out
59	VIN (IN)	Power	7-24 V input
60	+3V3 (OUT)	Power	3.3 V power out

Note: MIPI CSI/DSI lanes are D-PHY differential pairs and not general-purpose I/O. Control lines (CCI_I2C_*, SOC_CAM_MCLK*) are 1.8 V MPU domain. VIN on JMEDIA is the raw 7-24 V input (power only).

9.3 Qwiic (A4) (QWIIC1) - Pin Map

Pin	Designation	Net / Function	Domain	Notes
1	GND	Ground	Power	-
2	+3V3 OUT	PWR_3P3V	Power	Supply for Qwiic devices
3	SDA	PD13 (I2C4_SDA)	3.3 V	-
4	SCL	PD12 (I2C4_SCL)	3.3 V	-

9.4 JSPI (A5) (JSPI1) - Pin Map

Pin	Designation	Net / Function	Domain	Notes
1	MISO	PC2 (SPI2_MISO)	3.3 V	-
2	+5V	5V_USB_VBUS	Power	Power only
3	SCK	PD1 (SPI2_SCK)	3.3 V	-
4	MOSI	PC3 (SPI2_MOSI)	3.3 V	-
5	RESET	MCU_NRST	3.3 V	-
6	GND	Ground	Power	-

9.5 JCTL (A1) (JCTL1) - Pin Map

Pin	Designation	Net / Function	Domain	Notes
1	GND	Ground	Power	-
2	USB_BOOT	Boot strap	1.8 V	-
3	VOL_DOWN	GPIO_36	1.8 V	GPIO
4	SOC_SE4_TX	Console UART TX (SE4)	1.8 V	System console
5	VOL_UP	GPIO_96	1.8 V	GPIO
6	SOC_SE4_RX	Console UART RX (SE4)	1.8 V	System console
7	GND	Ground	Power	-
8	PMIC_RESET	PM4125 reset	1.8 V	-
9	+1V8 OUT	VREG_L15A_1P8V	Power	1.8 V reference
10	VBUS_DISABLE	VBUS power switch disable	1.8 V	Controls VBUS path

9.6 JDIGITAL (A2) (JDIGITAL1) - Pin Map

Pin	Designation	MCU pin	Functions	Domain	Notes
1	D0	PB7	- USART1_RX - TIM4_CH2	3.3 V	UART
2	D1	PB6	- USART1_TX - TIM4_CH1	3.3 V	UART
3	D2	PB3	- TIM2_CH2	3.3 V	-
4	~D3	PB0	- OPAMP2_OUTPUT - TIM3_CH3	3.3 V	PWM
5	D4	PA12	- FDCAN1_TX - TIM1_ETR	3.3 V	-
6	~D5	PA11	- FDCAN1_RX - TIM1_CH4	3.3 V	PWM
7	~D6	PB1	- TIM3_CH4	3.3 V	PWM
8	D7	PB2	- TIM8_CH4N	3.3 V	-
9	D8	PB4	- TIM3_CH1	3.3 V	-
10	~D9	PB8	- TIM4_CH3	3.3 V	PWM
11	~D10	PB9	- SPI2_SS (Chip Select) - TIM4_CH4	3.3 V	PWM
12	~D11	PB15	- SPI2_MOSI - TIM1_CH3N	3.3 V	PWM
13	D12	PB14	- SPI2_MISO - TIM1_CH2N	3.3 V	-
14	D13	PB13	- SPI2_SCK - TIM1_CH1N	3.3 V	-
15	GND	-	- Ground	Power	-
16	AREF	-	- Analog reference	-	Analog ref pin (not a GPIO)
17	D20	PB11	- I2C2_SDA - TIM2_CH4	3.3 V	-
18	D21	PB10	- I2C2_SCL - TIM2_CH3	3.3 V	-

All JDIGITAL lines are 3.3 V logic.

9.7 JANALOG (A3) (JANALOG1) - Pin Map

Pin	Designation	Net / MCU pin	Functions	Domain	Notes
1	BOOT	MCU_BOOT0	- Boot strap	3.3 V	-
2	IOREF	PWR_3P3V	- I/O voltage reference (mirrors 3.3 V rail)	Power	Output only; do not back-feed
3	RESET	MCU_NRST	- MCU reset	3.3 V	-
4	+3V3 OUT	PWR_3P3V	- 3.3 V supply	Power	-
5	+5V USB VBUS	5V_USB_VBUS	- 5 V supply (pass-through)	Power	Power only
6	GND	GND	- Ground	Power	-
7	GND	GND	- Ground	Power	-
8	VIN IN	DC_IN	- 7-24 V input	Power	Power only
9	A0 / D14	PA4	- ADC input - DAC0 - TIM2_CH1	Analog / 3.3 V	Direct ADC / not 5 V-tolerant
10	A1 / D15	PA5	- ADC input - DAC1 - TIM3_CH1	Analog / 3.3 V	Direct ADC / not 5 V-tolerant
11	A2 / D16	PA6	- ADC input - OPAMP2_INPUT+ - TIM3_CH2	Analog / 3.3 V	
12	A3 / D17	PA7	- ADC input - OPAMP2_INPUT-	Analog / 3.3 V	-
13	A4 / D18	PC1	- ADC input - I2C3_SDA - LPTIM1_CH1	Analog / 3.3 V	-
14	A5 / D19	PC0	- ADC input - I2C3_SCL - LPTIM1_IN1	Analog / 3.3 V	-

A0 (PA4) and A1 (PA5) are direct STM32U585 ADC inputs referenced to VREF+. They are not 5 V-tolerant. Valid input range is 0 - VREF+ (≈ 3.3 V). The absolute maximum at the pin is $V_{DD} + 0.3$ V, approximately 3.6 V. Above this level, the MCU's internal protection diodes begin to conduct. The header also provides 5V_SYS and PWR_3P3V power pins, which are intended for power supply only. Do not apply 5 V to **A0** or **A1**. IOREF is

connected to the 3.3 V rail (PWR_3P3V) and is provided as a reference/output for shields. It is not to be used to feed power back into the board.

10 High-Speed Peripherals

- **USB-C:** USB 3.1 with Role-Switching Capabilities. DisplayPort Alt-Mode via ANX7625 DSI-to-DP bridge. The connector's SuperSpeed differential pairs are shared between DP Alt-Mode and USB 3.1 data. When DisplayPort Alt-Mode is active, USB data speed is reduced.
- **Camera:** Four-lane **MIPI-CSI-2** (1.8 V I/O).
- **Display:** Four-lane **MIPI-DSI** into **ANX7625** for DisplayPort Alt-Mode on USB-C.
- **Wireless:** Dual-band Wi-Fi® (802.11a/b/g/n/ac) and Bluetooth® 5.1 on a shared module.

11 Device Operation

11.1 Getting Started - Arduino App Lab

Arduino App Lab [1] is a unified editor that builds and runs projects on both processors of the board. A project is an **App** that can include:

- A Python® program that runs on the Linux system (Qualcomm Dragonwing™ QRB2210)
- An Arduino sketch that runs on the microcontroller (MCU) (STM32U585)
- Optional **Brick** (pre-packaged services such as AI models, web servers, or API clients) that are deployed alongside the App (runs on the Linux system as well).

Apps use **Bridge** to exchange data between the Linux side and the microcontroller.

Arduino App Lab can be installed on your PC, or executed directly on the UNO Q in Single-Board Computer mode. For this setup, the UNO Q's 4GB LPDDR4X variant is recommended to ensure sufficient memory for stable operation and resource-intensive applications. To use the board:

- Launch a ready-to-use example in Arduino App Lab, customize it to your needs, or build a new application from scratch using the integrated editor.
- Press the **Run** button in Arduino App Lab [1].
- The editor builds the Linux component, flashes the MCU sketch, deploys any selected Brick, and starts everything on the board.
- Logs for both sides are available in the editor and you can iterate without leaving Arduino App Lab.

For first time setting up:

1. Install Arduino App Lab [1], launch it, and connect UNO Q, use a **USB-C data** cable for PC-hosted mode, or simply power the board for SBC mode.
2. The board will automatically check for updates. If there are any updates available, you will be prompted to install them. Once the update is finished, the Arduino App Lab[1] will need to be restarted.
3. During the first setup, you will be asked to provide a name and password for the device. You will also be asked to provide Wi-Fi® credentials for your local network.
4. To test the board, navigate to an example App in the **"Examples"** section of the Arduino App Lab[1], and click on the "Run" button in the top right corner. You can also create a new App in the **"Apps"** section.
5. The status of the App can be monitored in the console tab of the App.

Note: In **PC-hosted** mode, a *USB data* connection is required for first-time setup. Afterwards you can use the **Network** target over LAN (SSH). In **Single-Board Computer (SBC)** mode, no USB data link is needed for setup, just power the board and use the **Network** target once it joins your network. For peripherals in SBC mode (keyboard, mouse, USB camera, microphone), use a USB-C dongle with external power delivery capabilities. When DisplayPort Alt-Mode is active, USB data speed is reduced.

Use a 5 V / 3 A USB-C source and cable, or power from the 5 V or VIN pins as specified in the input power section (USB-C is 5 V only / VIN is 7-24 V).

First boot typically takes 20-30 seconds while Linux starts. Wait for the boot LED sequence or the LED-matrix animation to finish before interacting with the board.

11.2 Bricks

Bricks are modular building blocks in Arduino App Lab that let you extend your application without writing all of the underlying infrastructure. Each Brick encapsulates ready-made functionality, such as sensor integration, AI models, databases, or user interfaces, that you can drop into a project. Typical Bricks provide:

- An AI model (e.g., object classification or keyword spotting)
- A web UI or REST API service
- An integration to an external data source

Bricks are deployed alongside the App and managed by the Linux side. The typical workflow is:

1. Create an **App** in Arduino App Lab.
2. Select any **Brick** the App should use.
3. Add your Python® code (Linux) and/or your Arduino sketch (MCU).
4. The Brick needs to be imported into your ``main.py`` file, and initialized following the Brick's API.
5. Press **Run** to deploy the Linux application, flash the MCU, and launch your App together with its Bricks.
6. The **Bridge** tool handles data exchange between Linux and MCU.

While an App is bound and running, USB interfaces may be occupied by the system. Use Arduino App Lab [1] to deploy and monitor. To use external CLI tools over USB, stop the App or disconnect the board.

11.3 Hello World

Let's program UNO Q with the classic Arduino "Hello World" - the *Blink LED* example. This helps verify that the board is correctly connected to Arduino App Lab.

1. Open Arduino App Lab. It starts in the **Examples** section.
2. If you are not using single-board computer mode, **connect UNO Q** to your PC.
3. Open *Blink LED*. Review the example notes to see how the App works.
4. Click **Run** and wait for the upload to complete.

You should now see the red channel of the built-in RGB LED turn on for one second, then off for one second, repeatedly. The LED is driven by the STM32U585 microcontroller through the Arduino sketch.

You can start from a blank App or use an existing example. For first-time use, the Hello World example is recommended to learn the basic structure.

Every time you run an App, the microcontroller sketch is compiled and the Python® application starts on the Linux system. Depending on complexity, this may take up to a minute.

11.4 How to Check the App Is Running

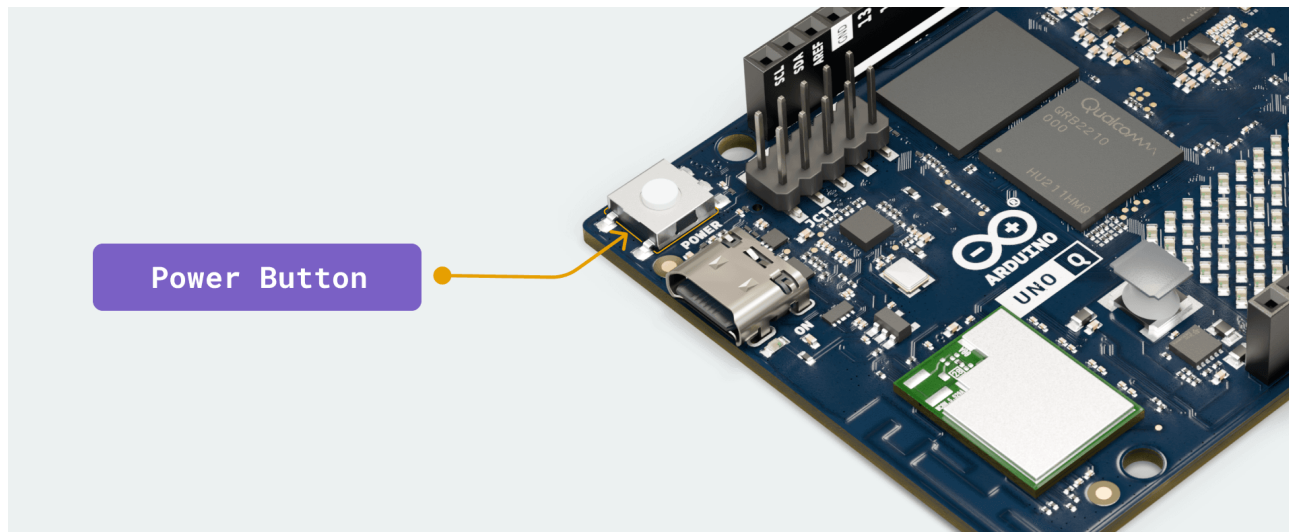
Open the **Console** in App Lab. There are three tabs:

- **Start-up:** logs from the launch sequence, including MCU compilation and Linux deployment
- **Main (Python®):** output from the Python® application (`print()`)
- **Sketch (Microcontroller):** serial output from the Arduino sketch (`Serial.println()`)

An App can launch successfully yet still have runtime issues. Check the Python® log for errors. If a sketch compilation error occurs, launch is aborted.

11.5 Power Button

UNO Q includes a **power button (JBTN1)** you can use to reboot the board.



UNO Q Power Button

Long press (≥ 5 s): reboots the Linux system (MPU). This does not cut power to the board.

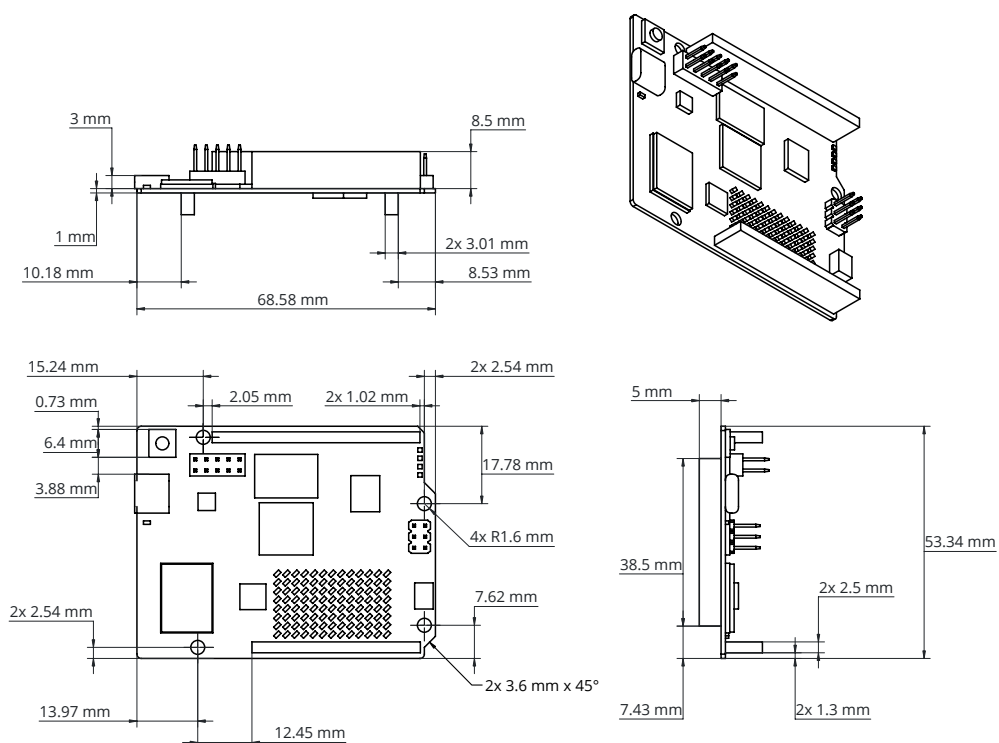
Note: A long-press reboot restarts the Linux environment and may interrupt running Apps. Save work and ensure safe shutdown of external processes where applicable. The board boots up automatically when power is supplied. Pressing the button is not required for normal boot.

11.6 Online Resources

Explore community projects on Project Hub [3], browse the Library Reference [4] for supported APIs, and find accessories such as Qwiic sensors, UNO Shield and carrier boards in the Arduino Store [5].

12 Mechanical Information

The board dimension measures 68.58 mm × 53.34 mm, with bottom-side parts kept below 2 mm so the board can stack onto carrier bases. The outline and hole pattern follows and are compatible with the UNO form factor.



Certifications

13 Declaration of Conformity CE DoC (EU)

English: We declare under our sole responsibility that the products above are in conformity with the essential requirements of the following EU Directives and therefore qualify for free movement within markets comprising the European Union (EU) and European Economic Area (EEA).

French : Nous déclarons sous notre seule responsabilité que les produits indiqués ci-dessus sont conformes aux exigences essentielles des directives de l'Union européenne mentionnées ci-après, et qu'ils remplissent à ce titre les conditions permettant la libre circulation sur les marchés de l'Union européenne (UE) et de l'Espace économique européen (EEE).

14 Declaration of Conformity to EU RoHS & REACH 191 11/26/2018

Arduino boards are in compliance with Directive 2011/65/EU of the European Parliament and Directive 2015/863/EU of the Council of 4 June 2015 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Substance	Maximum Limit (ppm)
Lead (Pb)	1000
Cadmium (Cd)	100
Mercury (Hg)	1000
Hexavalent Chromium (Cr6+)	1000
Poly Brominated Biphenyls (PBB)	1000
Poly Brominated Diphenyl ethers (PBDE)	1000
Bis(2-Ethylhexyl) phthalate (DEHP)	1000
Benzyl butyl phthalate (BBP)	1000
Dibutyl phthalate (DBP)	1000
Diisobutyl phthalate (DIBP)	1000

Exemptions: No exemptions are claimed.

Arduino boards are fully compliant with the related requirements of European Union Regulation (EC) 1907 /2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). We declare none of the SVHCs (<https://echa.europa.eu/web/guest/candidate-list-table>), the Candidate List of Substances of Very High Concern for authorization currently released by ECHA, is present in all products (and also package) in quantities totaling in a concentration equal or above 0.1%. To the best of our knowledge, we also declare that our products do not contain any of the substances listed on the "Authorization List" (Annex XIV of the REACH regulations) and Substances of Very High Concern (SVHC) in any significant amounts as specified by the Annex XVII of Candidate list published by ECHA (European Chemical Agency) 1907 /2006/EC.

15 Conflict Minerals Declaration

As a global supplier of electronic and electrical components, Arduino is aware of our obligations with regards to laws and regulations regarding Conflict Minerals, specifically the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502. Arduino does not directly source or process conflict minerals such as Tin, Tantalum, Tungsten, or Gold. Conflict minerals are contained in our products in the form of solder, or as a component in metal alloys. As part of our reasonable due diligence Arduino has contacted component suppliers within our supply chain to verify their continued compliance with the regulations. Based on the information received thus far we declare that our products contain Conflict Minerals sourced from conflict-free areas.

16 FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference
- (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC RF Radiation Exposure Statement:

- 1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- 2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.
- 3. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator & your body.

English:

User manuals for licence-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both. This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC SAR Warning:



English This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

French: Lors de l'installation et de l'exploitation de ce dispositif, la distance entre le radiateur et le corps est d'au moins 20 cm.

Company Information

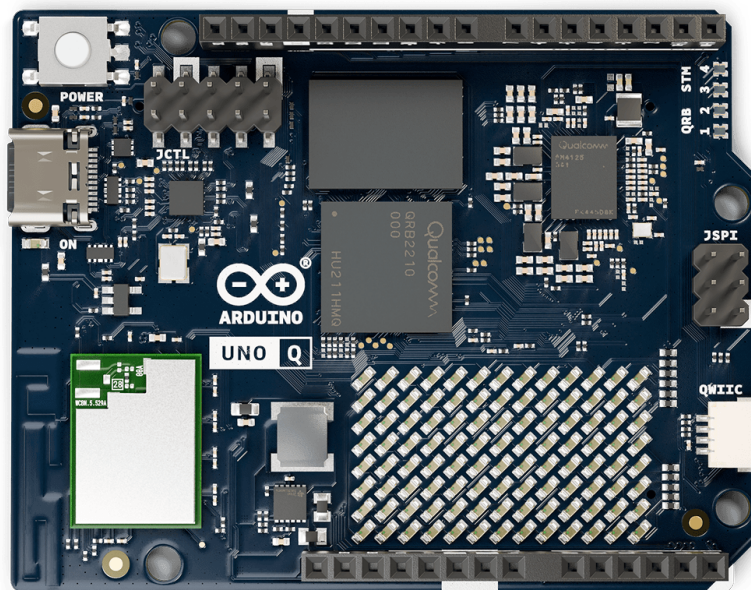
Company name	Arduino S.r.l.
Address	Via Andrea Appiani 25, 20900 Monza (Italy)

Documentation Reference

No.	Reference	Link
1	Arduino App Lab	https://www.arduino.cc/en/software
2	Arduino UNO Q Documentation	https://docs.arduino.cc/hardware/uno-q/
3	Project Hub	https://projecthub.arduino.cc/
4	Library Reference	https://docs.arduino.cc/libraries/
5	Arduino Store	https://store.arduino.cc/

Document Revision History

Date	Revision	Changes
24/11/2025	4	Add hardware acceleration section (graphics APIs, video codecs, OpenCL support); remove incorrect default password reference
05/11/2025	3	Update operational information
27/10/2025	2	Mechanical drawing and RTC power detail update
01/10/2025	1	First release



描述

Arduino® UNO Q（以下简称UNO Q）是一款单板计算机，Qualcomm® Dragonwing™ QRB2210 微处理器（MPU）、四核Arm® Cortex®-A53处理器 运行Debian Linux操作系统，以及意法半导体STM32U585微控制器（MCU）——该MCU基于Arm® Cortex®-M33架构，运行Zephyr OS上的Arduino核心。Linux系统与微控制器通过Arduino的RPC（远程过程调用）库Bridge进行通信。这使得微控制器上的Arduino程序能够调用Linux服务完成高级任务，同时Linux应用程序可与微控制器外设交互，在同一项目中处理实时操作。

UNO Q 配备嵌入式 eMMC 存储（可选 16 GB 或 32 GB）和 LPDDR4X SDRAM（可选 2 GB 或 4 GB），可流畅运行 Linux 系统及您的项目。该开发板支持双频Wi-Fi® 5和Bluetooth® 5.1蓝牙模块实现无线连接，配备支持电源输入与视频输出的USB-C®接口，并提供兼容Arduino的扩展接口，便于通过扩展板、载体板及配件进行功能扩展。

UNO Q与Arduino App Lab无缝集成，使开发者能够在一个环境中同时运行Arduino程序、Linux应用程序和AI模型。App Lab既可直接在开发板上运行，也可通过连接的电脑运行，提供现成的示例程序，并支持灵活创建定制应用程序以满足项目需求。



目标领域

原型设计、边缘人工智能与机器学习、机器视觉、教育、智能设备、机器人技术、家庭与建筑自动化、游戏

目录

17 应用示例

UNO Q融合了具备AI能力的Linux处理器与实时微控制器，实现了高级计算与确定性控制的完美结合。凭借这种双架构设计，它兼容广泛的生态系统，包括Arduino扩展板、载体板、Modulino®节点及第三方配件，成为适用于多样化应用的灵活平台。

- **原型设计:** 快速实现概念验证，例如基于视觉的检测工具、智能自助终端或内置连接功能的紧凑型边缘计算机。
- **教育应用:** 通过项目式学习教授Linux、实时编程、人工智能及计算机视觉，涵盖科学实验到交互式教育机器人等领域。
- **机器人技术:** 融合Linux视觉与MCU驱动电机控制的自主配送机器人、手势跟随伴侣机器人及具备视觉反馈的机械臂。
- **智能消费设备:** 搭载双摄像头与GPU加速的DIY智能相机、交互式显示屏或AR项目。
- **家居与建筑自动化:** 配备人脸识别功能的智能门铃、语音控制系统及个性化气候控制中心。
- **游戏领域:** 复古主机模拟器、定制街机柜，或通过手势控制、面部追踪及实时反馈增强游戏体验。

18 特点

18.1 UNO Q 型号

UNO Q 提供两种型号：

- **ABX00162**：2 GB 内存，16 GB 板载存储
- **ABX00173**：4 GB 内存，32 GB 板载存储

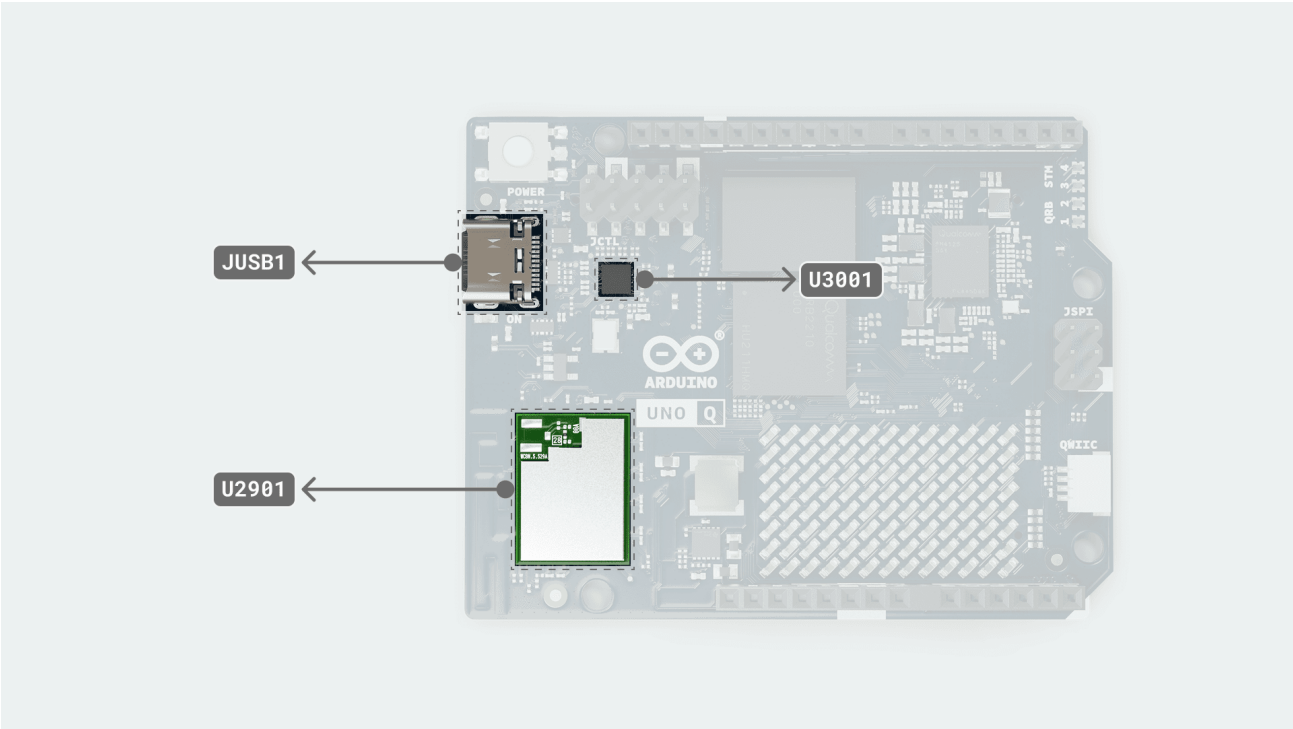
18.2 一般规格概述

18.2.1 处理器与内存

子系统	详细信息
主MPU	- Qualcomm Dragonwing™ QRB2210 - 系统级芯片 (SoC) (MPU) (SOC1): 4 × Arm Cortex-A53 @ 2.0 GHz, 64位 - Adreno 702 GPU @ 845 MHz 3D图形处理 - Dual ISPs: 13 MP + 13 MP 或 25 MP @ 30 fps - Debian操作系统（上游支持） - I/O：USB 3.1接口支持USB连接器角色切换功能，SDIO 3.0，4通道MIPI-CSI-2及4通道MIPI-DSI
实时时钟 MCU	- ST STM32U585 (MCU) (MCU1)，Arm Cortex-M33 最高160 MHz - Zephyr OS上的Arduino核心 - 2 MB闪存，786 kB SRAM
系统内存	- eMMC 16或32 GB选项（EMMC1）用于操作系统/数据存储 - LPDDR4X 2GB或4 GB选项（单通道，32位）（DRAM1）

Qualcomm Dragonwing™ QRB2210 I/O工作电压为1.8V。该MPU驱动JMEDIA上的MIPI-CSI-2摄像头接口与MIPI-DSI显示接口，同时通过JMISC引出1.8V MPU（SoC）GPIO及音频端点。JMISC为混合电压接口，除1.8V MPU线路外，同时承载3.3V MCU信号及模拟音频。显示端口视频由板载ANX7625提供，该芯片将MPU的MIPI-DSI信号转换为USB-C接口的DisplayPort替代模式。STM32U585芯片管理ADC、PWM、CAN、LED矩阵及3.3V接口（JDIGITAL、JANALOG、JSPI和Qwiic）。

18.2.2 连接性与媒体



子系统	详细信息
无线模块	- WCBN3536A (Qualcomm WCN3980) (U2901) - Wi-Fi® 5 802.11a/b/g/n/ac (双频) + Bluetooth® 5.1
USB-C 接口 (JUSB1)	- 具备角色切换功能的USB 3.1 - 通过ANX7625 DSI转DP桥接器实现DisplayPort替代模式 (U3001)
(Type-C接口的超高速差分对专用于DP替代模式) - USB电源传输协议仅支持 5V/3A 供电协议 (不支持更高电压配置文件) - VBUS负载开关/背驱动保护 (Q2801)	

无线模块采用SDIO传输Wi-Fi®数据，通过UART控制Bluetooth®蓝牙模块功能，并共享PCB天线。

18.2.3 扩展与头

接口 (连接器)	电压与引脚数量	详细信息
JMEDIA (JMEDIA1)	1.8 V 信号, 60 引脚	- 高速摄像头/显示通道 (MIPI DSI、CSI) - 摄像头控制总线 (CCI I2C) - - 专用接口, 非通用GPIO- 摄像头时钟 (SOC_CAM_MCLK0/1) - 同时承载电源轨 (+3V3 OUT、VIN IN) 及地线 (GND)
JMISC (JMISC1)	混合 1.8 V / 3.3 V, 60 引脚	- 混合GPIO和SDIO - MCU外设: SDMMC1、TRACE、PSSI (并行摄像头)、I2C4、MCO/CRS_SYNC、运算放大器1引脚 - 音频端点: 麦克风2输入/负反馈/偏置、耳机L/R+参考、线路输出P/M、听筒P/R、耳机检测器 HS_DET - MPU (SoC) GPIO银行 (SE0) 工作于1.8V - 同时承载电源轨 (+5V USB输出、+3.3V输出、+1.8V输出、电池输入、硬币输入) 及地线 (GND)
JCTL (JCTL1)	1.8 V, 10 引脚	- SE4 UART控制台 - 强制USB启动输入 - PMIC复位输入 - VBUS电源开关禁用 - 1.8V电源轨及接地
JDIGITAL (JDIGITAL1)	3.3 V, 18 引脚	- 用于SPI、I2C、UART、PWM、CAN的数字I/O
JANALOG (JANALOG1)	3.3 V, 14 引脚	- 模拟I/O - ADC通道及基准电压
JSPI (JSPI1)	3.3 V 数字逻辑电压参考, 6 引脚 + 5 V VBUS	- 专用SPI: MOSI、MISO、SCLK- MCU复位 (NRST) - 接地- 5V VBUS (USB供电)
Qwiic (QWIIC1)	3.3 V, 4 引脚	- I2C (Qwiic生态系统)

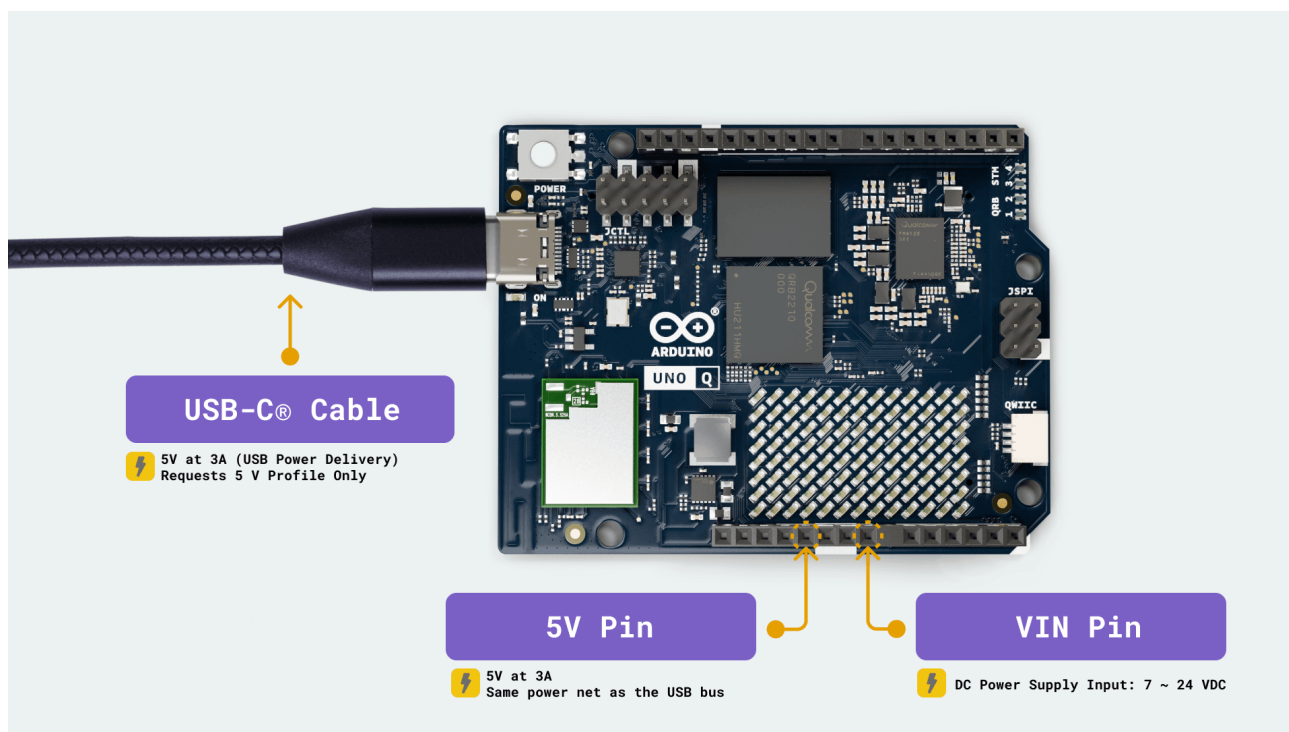


18.3 相关产品

- 通过DIGITAL和ANALOG实现的Arduino UNO扩展板
- 兼容UNO Q的载体板
- 全规格24针USB-C线缆
- 具备外接电源传输功能的USB-C转接头

19 额定值

19.1 输入电源



UNO Q Input Methods

源电流	工作电压	最大限值	连接器
USB-C VBUS	5 V	高达3 A 位	USB-C 连接器
VIN (DC IN)	7-24 V	-	JMEDIA, JANALOG (VIN)
5 V 引脚	5 V	高达3 A 位	JANALOG

UNO Q支持双电源输入：USB-C接口和7-24V直流输入。通过USB电源传输协议时，仅请求5V/3A供电协议，不请求更高电压的PD配置文件。请使用额定5V/3A的电源线和线缆，以避免在无线传输突发或显示初始化等短时活动高峰期间出现欠压情况。也可通过JANALOG接头上的5V引脚，使用稳压外部5V直流电源为电路板供电。

USB-C VBUS与7-24V降压稳压器的5V输出经二极管或门组合接入系统5V总线（5V_SYS）。设计从5V_SYS衍生出3.8V预稳压节点，进而生成3.3V电源。由5V_SYS供电的PMIC则衍生出1.8V电源轨。

反极性保护：经直流输入端施加-24V电压验证。本器件仅在正确极性条件下保证工作特性。正常使用时请勿施加反向电压。

肖特基或路径：从降压输出到5V_SYS的正向电压降测量如下（JANALOG VIN注入，Rigol DP832电源串联，Keithley DMM6500测量，8542B有源负载）。功耗按 $P = I \times Vf$ 计算。

负载电流	正向压降 (Vf)	二极管功耗
1.0 A	0.35 V	0.35 W
1.5 A	0.37 V	0.56 W

负载电流	正向压降 (Vf)	二极管功耗
2.0 A	0.39 V	0.78 W

19.2 建议运行条件

使用以下限制来确定电源规格、定义电源轨容差并规划热余量：

参数	符号	最小值	输出功率典型值	最大限值	单位
USB-C 输入	VBUS_USBC	4.5	5.0	5.5	V
DC 输入	DC_IN	7.0	-	24.0	V
3.3 V 电源轨	PWR_3P3V	3.1	3.3	3.5	V
工作温度	T_OP	-10	-	60	°C

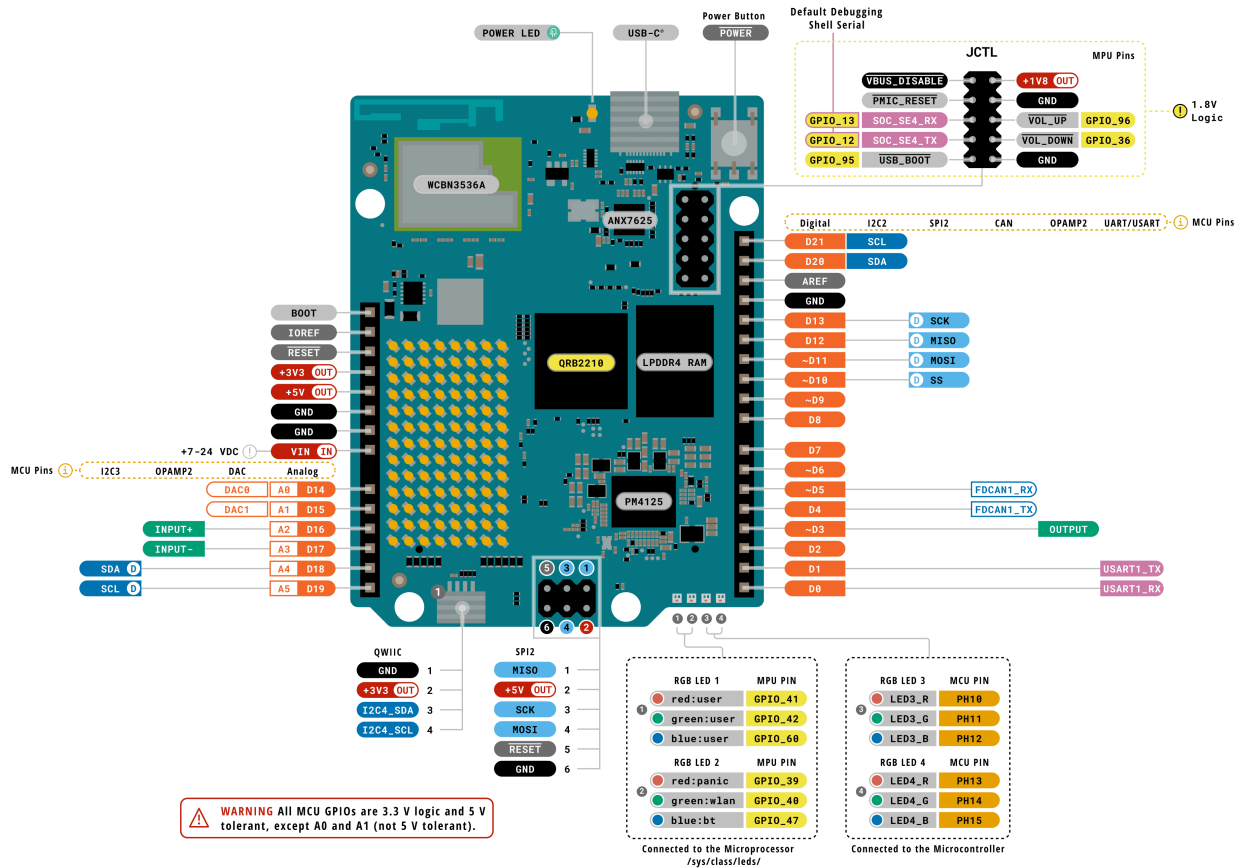
2最小值表示常规操作的最低持续值；短暂跌压可能导致重置或链路中断。典型值为设计标称点。最大值不可逾越。对于DC_IN（7-24 V），应选用能轻松满足5 V负载需求的电源，并使用短电缆以减少压降。PWR_3P3V范围反映稳压器容差与负载特性。温度范围指电路板附近环境空气温度，在临界值附近运行可能降低可用输出电流。

19.3 板载电压轨

工作电压	电源轨	原点 / 调节器
5.0 V	5V_SYS	USB-C VBUS与7-24V降压输出（均通过肖特基整流器）的二极管或门电路
3.8 V	PWR_3P8V	降压电路（降压型）从5V_SYS供电
3.3 V	PWR_3P3V	降压电路（降压型）从PWR_3P8V供电
1.8 V	VREG_L15A_1P8V	PM4125 LDO L15A 从5V_SYS供电

20 功能概述

20.1 引脚布局



Legend:	Digital	I2C	Other SERIAL
Power	Analog	SPI	Analog
Ground	Main Part	UART/USART	Internal Part



UNO Q
SKU code: ABX00162-ABX00173
Pinout
Last update: 30 Sept, 2025

20.2 方框图

20.3 电源

UNO Q支持双电源输入：USB-C端口和7-24V直流输入。USB-C VBUS与7-24V降压稳压器的5V输出通过二极管或门组合接入系统5V总线（5V_SYS）。

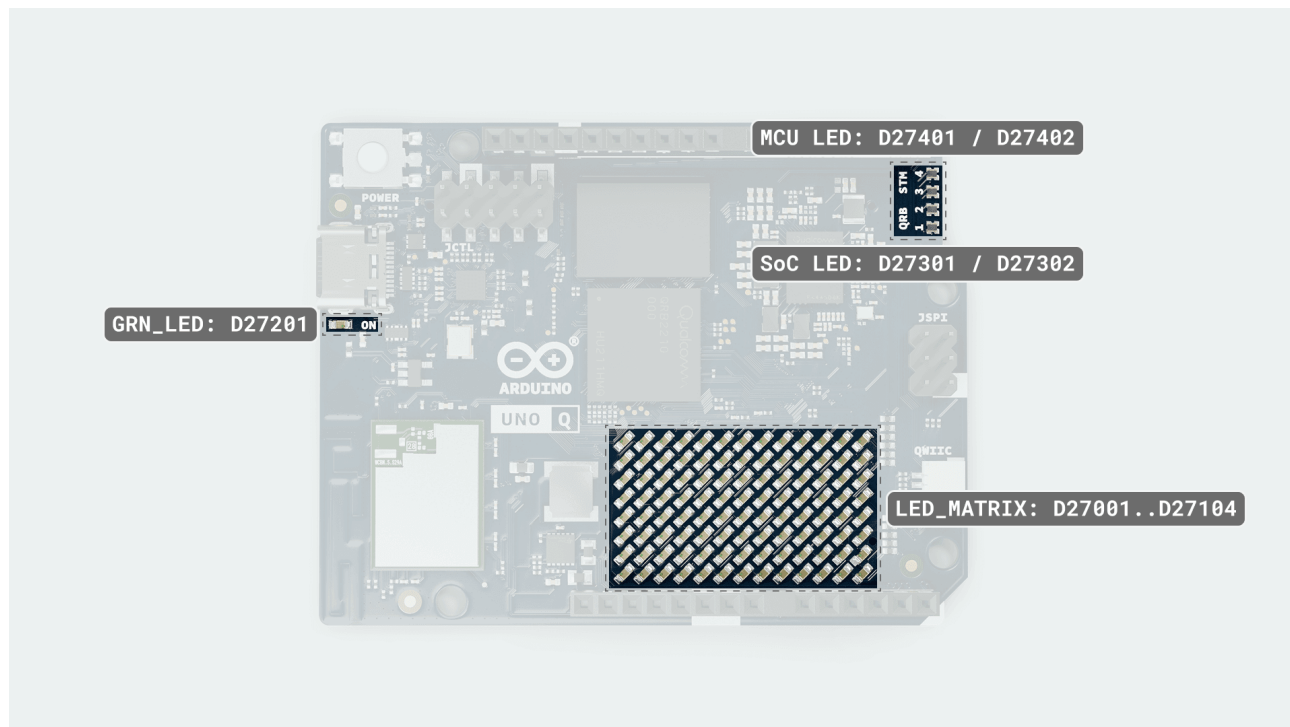
5V_SYS通过USB_IN接口为**PM4125**电源管理集成电路(PMIC1)供电。该PMIC的L15A低压差稳压器提供1.8V电源轨（VREG_L15A_1P8V），为SoC I/O总线、ANX7625的DVDD18引脚、Wi-Fi®数字逻辑电路及板载电平转换器供电。1.8 V电源轨也可通过JMISC接口获取。由5V_SYS供电的降压电路生成PWR_3P8V（3.8 V）电源，该电源专用于系统设计及未来功能扩展。第二个降压电路生成PWR_3P3V，为STM32U585、ANX7625（3.3V电源轨）、Wi-Fi® 3.3V域及3.3V接头引脚供电。

当板卡作为USB主机/OTG运行时，受保护的P沟道MOSFET（Q2801）可从5V_SYS为USB VBUS供电。VCOIN仅为PMIC的实时时钟供电，不为Linux或MCU域供电。VBAT为MCU的实时时钟供电。

 Arduino UNO Q Power Tree

Arduino UNO Q Power Tree

21 用户界面与指示器



- **RGB LED(Linux控制):** 两颗三色LED由Qualcomm Dragonwing™ QRB2210应用处理器驱动，并通过/sys/class/leds/路径暴露。
 - **RGB LED 1 (D27301):** 通道配置：red:user → **GPIO_41**, green:user → **GPIO_42**, blue:use → **GPIO_60**。
 - **RGB LED 2 (D27302):** 通道配置：red:panic → **GPIO_39**, green:wlan → **GPIO_40**, blue:bt → **GPIO_47**。

默认情况下，RGB LED 2 指示系统状态、PANIC、WLAN 和 BT，但也可由用户控制。PWM 频率约为 2 kHz，以实现平滑的色彩过渡。
- **RGB LED (MCU控制):** 两个三色LED由STM32U585驱动。
 - **RGB LED 3 (D27401):** LED3_R → **PH10**, LED3_G → **PH11**, LED3_B → **PH12**。
 - **RGB LED 4 (D27402):** LED4_R → **PH13**, LED4_G → **PH14**, LED4_B → **PH15**。

RGB LED为低电平有效，即逻辑`0`时点亮。

- **LED矩阵 (D27001..D27104):** 由STM32U585驱动的8×13单色蓝色LED矩阵（104像素）。在Linux启动过程中，该矩阵会显示启动徽标约20–30秒。启动完成前访问该矩阵可能干扰MCU运行。
- **电源指示灯 (D27201):** 绿色指示灯连接至3.3V电源轨，当电路板通电时始终亮起。

22 MPU & MCU

MPU（微处理器单元）是一种高性能应用处理器，专为运行完整操作系统和复杂软件而设计。MCU（微控制器单元）则是小型节能控制器，专注于实现I/O与控制的快速精准时序。UNO Q将二者融合，在单板上实现操作系统级计算与响应迅速的时序控制，并通过双向实现的RPC层Bridge进行通信。

22.1 应用处理器（MPU）

Qualcomm® Dragonwing™ QRB2210是一款搭载Debian Linux操作系统的四核Arm® Cortex®-A53处理器。其I/O接口工作电压为1.8V，可处理高速媒体传输及Type-C/PD电源管理策略。

- 电压域：1.8 V 供电（用于 SoC 的 MPU GPIO 及高速接口）
- 驱动 JMEDIA：MIPI-CSI-2 相机通道与 MIPI-DSI 显示通道
- 驱动 1.8 V MPU GPIO 及 JMISC（混合电压接口）上的音频端点
- USB-C：角色切换与 PD 协商（请求 5 V / 3 A）
- 通过板载ANX7625实现DisplayPort输出（将MIPI-DSI转换为DP替代模式）

22.2 实时微控制器（MCU）

意法半导体® STM32U585是一款基于Arm® Cortex®-M33架构的微控制器，在Zephyr OS系统上运行Arduino核心。它为控制任务提供快速精准的定时功能，并配备3.3 V I/O接口。

- 电压域：GPIO和模拟信号为3.3 V (VREF+ ≈ 3.3 V)
- 管理ADC、PWM、CAN、LED矩阵、定时器
- 支持3.3 V接口：JDIGITAL、JANALOG、JSPI、Qwiic

JMISC同时处理两个电压域：1.8 V MPU线路与3.3 V MCU信号（如PSSI、SDMMC1、TRACE、I2C4）及模拟/音频信号并行。连接载板或外部逻辑电路时，请务必核查电压等级。

23 处理器间通信

Qualcomm® Dragonwing™ QRB2210（MPU）与 STM32U585（MCU）通过 Arduino Bridge 进行通信，该软件层在Linux 和 MCU 两端均实现了基于软件的远程过程调用（RPC）。该桥接器提供面向服务的API，使任一处理器都能为另一处理器暴露可调用的服务，同时支持异步事件的单向通知。它管理处理器间的消息路由，并兼容多种物理传输方式。通过其API，桥接器实现类型安全的函数调用，允许微控制器程序调用Linux服务并接收结构化响应，或通过通知推送数据。

若载板或外部逻辑需要硬件指示器，固件可将JMISC上的1.8V MPU GPIO或JCTL的可用GPIO指定为就绪/唤醒输出。该信号可通过电平兼容电路（如电平转换器或带上拉电阻的开漏配置）接收到MCU GPIO端口。固件将定义该信号的具体功能。另一方案是：当MCU处于睡眠模式时，选定传输通道（USB CDC、UART或SPI）的活动状态可作为唤醒源。

MPU GPIO信号在应用处理器的低电压域（1.8 V）内工作。确保与微控制器之间的任何连接均与其I/O电压轨（3.3 V）电平兼容。例如，可采用电平转换器或开漏配置，并通过上拉电阻连接至微控制器的I/O电压轨。

24 硬件加速

UNO Q通过集成Adreno 702 GPU（运行频率845 MHz）为3D图形和视频编解码提供硬件加速。

24.1 图形加速

Adreno 702 GPU通过开源Mesa驱动程序提供硬件加速的3D图形渲染。应用程序可通过标准图形API（包括OpenGL、OpenGL ES、Vulkan和OpenCL）访问GPU加速功能。

图形API	驱动程序	硬件支持	当前驱动程序版本	设备名称
Desktop OpenGL	freedreno	-	3.1	FD702
OpenGL ES	freedreno	3.1	3.1	FD702
Vulkan	turnip	1.1	1.0.318	Turnip Adreno (TM) 702
OpenCL	Mesa	2.0	2.0	-

Adreno 702 GPU采用统一内存架构，与CPU共享系统RAM进行数据传输。它支持64位内存寻址，并提供直接渲染能力以实现最佳图形性能。

参数	规格
时钟频率	845 MHz
内存架构	统一内存（与系统RAM共享）
可用显存	1740 MB
内存寻址	64-bit
直接渲染	是
最大2D纹理尺寸	16384 × 16384 像素
最大3D纹理尺寸	20483 体素
最大立方体贴图尺寸	16384 × 16384 像素
OpenGL着色语言（GLSL）	1.40
OpenGL ES着色语言	3.10 ES

Mesa图形栈支持标准的OpenGL扩展功能。使用OpenGL、OpenGL ES或Vulkan的应用程序将自动启用硬件加速，无需额外配置。标准图形工具如mesa-utils和vulkan-tools在UNO Q上开箱即用。

注:OpenGL 和 Vulkan 驱动程序可通过开源 Mesa 驱动程序 **freedreno (支持 OpenGL/OpenGL ES)** 和 **turnip (支持 Vulkan)** 获取，这些驱动程序具有透明性并获得社区支持。尽管 Adreno 702 硬件支持 Vulkan 1.1，但当前驱动程序实现仅提供 Vulkan 1.0.318 版本。**目前尚无针对 UNO Q 平台的 OpenGL 或 Vulkan 示例代码。但可参考 Mesa 项目提供的标准 Mesa 工具及示例代码。**

24.2 视频加速

Adreno 702 GPU 包含专用硬件视频编解码器，可通过 V4L2 (Video4Linux2) API 经由 /dev/video0 和 /dev/video1 设备访问。以下视频编解码器支持硬件加速：

编解码器	编码	解码	GStreamer元素
H.264 (AVC)	是	是	v4l2h264enc / v4l2h264dec
H.265 (HEVC)	是	是	v4l2h265enc / v4l2h265dec
VP9	没有	是	v4l2vp9dec

硬件视频编解码器将压缩与解压任务从CPU卸载至专用硬件，从而实现高效的实时视频处理。这既降低了系统功耗，又使CPU能够专注于应用逻辑。硬件加速支持最高1920×1080（全高清）分辨率，涵盖720p（1280×720）等常见格式。

24.2.1 GStreamer集成

访问硬件视频加速的推荐方案是通过**GStreamer**实现，该框架为V4L2设备提供了高级管道接口。以下GStreamer组件支持硬件加速视频处理：

H.264解码可采用以下管道：

```
gst-launch-1.0 filesrc location=videos/xxxxx.mp4 \  
  ! qtdemux name=demux demux.video_0 ! queue ! h264parse ! v4l2h264dec \  
  ! videoconvert ! autovideosink
```

H.265解码可采用以下管道：

```
gst-launch-1.0 filesrc location=videos/xxxxx.mp4 \  
  ! qtdemux name=demux demux.video_0 ! queue ! h265parse ! v4l2h265dec \  
  ! videoconvert ! autovideosink
```

VP9解码可采用以下管道：

```
gst-launch-1.0 filesrc location=videos/xxxxx.webm \  
  ! matroskademux ! queue ! v4l2vp9dec \  
  ! videoconvert ! autovideosink
```

对于H.264编码，可使用以下处理流程：

```
gst-launch-1.0 videotestsrc num-buffers=30 \  
  ! video/x-raw,width=1280,height=720,framerate=30/1 \  
  ! v4l2h264enc ! h264parse ! mp4mux ! filesink location=/tmp/output.mp4
```

对于H.265编码，可使用以下处理流程：

```
gst-launch-1.0 videotestsrc num-buffers=30 \  
  ! video/x-raw,width=1920,height=1080,framerate=30/1 \  
  ! v4l2h265enc ! h265parse ! mp4mux ! filesink location=/tmp/output.mp4
```

对于并发编码与解码，可以采用以下管道：

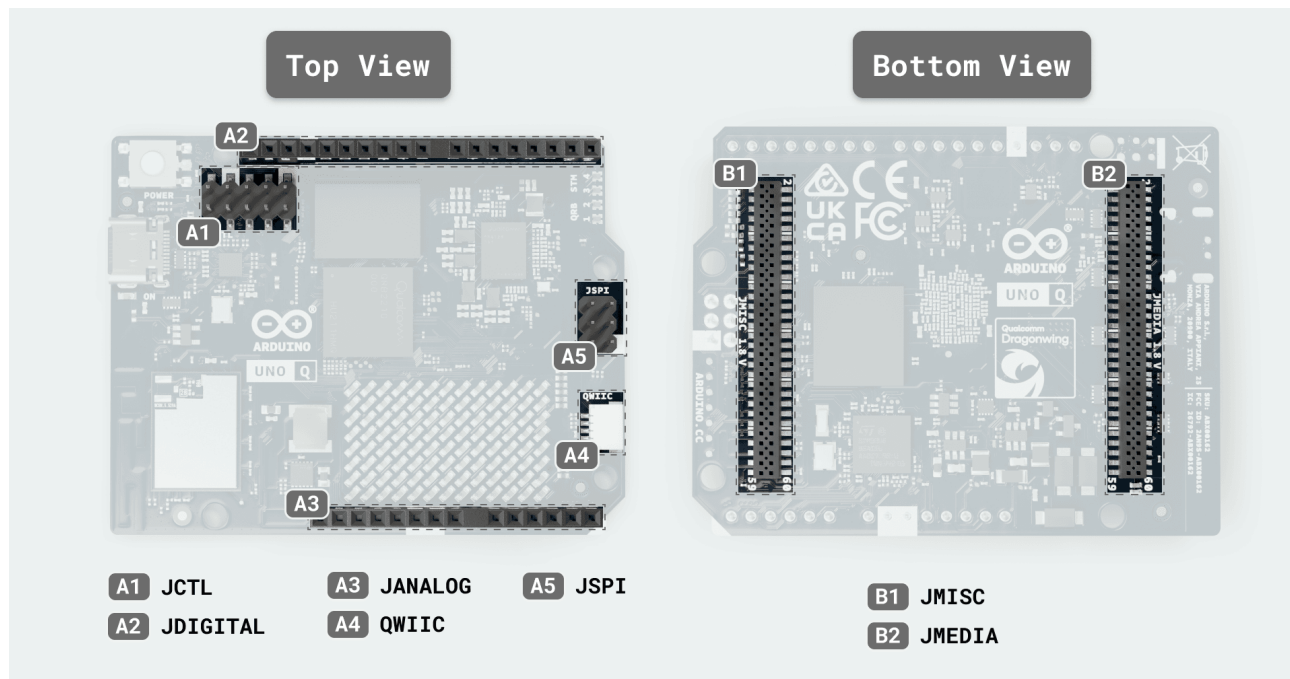
```
gst-launch-1.0 -v videotestsrc num-buffers=1000 \  
! video/x-raw,format=NV12,width=1280,height=720,framerate=30/1 \  
! v4l2h264enc capture-io-mode=4 output-io-mode=2 ! h264parse \  
! v4l2h264dec capture-io-mode=4 output-io-mode=2 ! videoconvert \  
! autovideosink
```

开发者访问：V4L2视频设备可通过标准Linux API访问，支持直接集成至使用libv4l2的C/C++应用程序，或通过具备V4L2后端支持的高级框架（如GStreamer、FFmpeg或OpenCV）进行集成。

24.3 OpenCL支持

通过Mesa实现支持OpenCL 2.0，可为并行处理任务、科学计算及计算密集型操作提供通用GPU（GPGPU）计算能力。Adreno 702的OpenCL功能可将计算密集型工作负载从CPU卸载至GPU，从而提升性能表现。

25 外设



UNO Q Peripherals

- **JDIGITAL (A2) (JDIGITAL1) / JANALOG (A3) (JANALOG1):** 3.3 V GPIO，支持 SPI、UART、CAN、PWM 和 ADC 输入。模拟输入以 3.3 V 电源轨上的 VREF+ 为基准。有效输入范围为 0 V 至 VREF+。部分 STM32U585 引脚在数字模式下可耐受 5 V 电压，但配置为 ADC 或任何模拟功能（如 A0 至 A5）时，则不耐受 5 V 电压，且输入电压不得超过 $VDD + 0.3$ V。若需处理更高电压，请使用分压器或缓冲器等外部信号调理电路。当 A4/A5 引脚作为 I2C3（PC1/PC0）使用时，仅允许使用上拉电阻连接至 3.3V。
- **QWIIC 连接器 (A4) (QWIIC1):** 额外的 I2C 总线（3.3V 逻辑）。其映射为 **PD13 (I2C4_SDA)** 和 ****PD12(I2C4_SCL)****。确保与 Modulino® 节点及第三方传感器和执行器的即插即用兼容性。
- **JSPI (A5) (JSPI1):** 3.3 V SPI 外设接口，提供 MOSI、MISO 和 SCLK 信号，芯片选通信号通过 JDIGITAL/JMISC 上的 GPIO 引脚实现。引脚采用 STM32U585 FT 型配置：MISO 在 PC2，MOSI 在 PC3，SCK 在 PD1。输入模式或开漏状态下可耐受 5 V 电压，输出驱动 3.3 V。若需 5 V 输入阈值或 5 V 双向信号传输，请添加电平转换器。包含 5V_SYS 电源引脚。
- **JMEDIA (B2) (JMEDIA1):** 四通道摄像头与显示信号，工作于 1.8V 电压域（MIPI-CSI-2 和 MIPI-DSI）。
- **JMISC (B1) (JMISC):** 混合功能接口，整合 3.3V MCU 信号与 1.8V MPU 信号。提供 MCU PSSI（并行摄像头）总线、SDMMC1 测试引脚、TRACE、I2C4、MCO/CRS_SYNC 及 OPAMP1 模拟引脚。同时引出音频接口（麦克风 2、耳机 L/R+参考电平、线路输出 P/M、听筒 P/R、耳机检测 HS_DET）及电源轨（+3V3、+5V_USB、+1V8、系统用 VBAT 和 VCOIN）。注意电压域：**MCU 引脚为 3.3V，MPU 通用输入输出为 1.8V。**
- **JCTL (A1) (JCTL1):** 启动模式引脚、复位信号及低功耗唤醒信号（1.8V 逻辑电平）。

SE4 UART 是系统控制台（shell UART）。它与应用程序 UART 独立，不应用于用户 I/O。该接口运行于 MPU 的 **1.8V** I/O 域。

请勿将 Qualcomm Dragonwing™ QRB2210 专用于 **I2C**、**JMEDIA CCI**（相机控制接口）或 **MI2S0**（I2S 音频总线）的线路用作通用输入输出。这些信号为专用接口，工作电压为 **1.8V**，并在 Linux 设备树中被保留。接头仅为实现上述功能而暴露这些信号。

25.1 JMISC (B1) (JMISC1) - 引脚功能概述

引脚	名称	MCU/SoC 引脚	域名	注释
1	MCU_PSSI_D0	PC6	3.3V MCU	PSSI D0
2	MCU_SDMMC1_CMD	PD2	3.3V MCU	SDMMC1 CMD / 测试
3	MCU_PSSI_D1	PC7	3.3V MCU	PSSI D1
4	MCU_TRACE_CLK	PE2	3.3V MCU	跟踪时钟
5	MCU_PSSI_D2	PC8	3.3V MCU	PSSI D2
6	MCU_TRACE_D0	PE3	3.3V MCU	跟踪数据 0
7	MCU_PSSI_D3	PC9	3.3V MCU	PSSI D3
8	MCU_TRACE_D2	PE5	3.3V MCU	跟踪数据 2
9	MCU_PSSI_D4	PE4	3.3V MCU	PSSI D4
10	MCU_TRACE_D3	PE6	3.3V MCU	跟踪数据 3
11	MCU_PSSI_D5	PI4	3.3V MCU	PSSI D5
12	MCU_PE7	PE7	3.3V MCU	GPIO
13	MCU_PSSI_D6	PI6	3.3V MCU	PSSI D6
14	MCU_PE8	PE8	3.3V MCU	GPIO
15	MCU_PSSI_D7	PI7	3.3V MCU	PSSI D7
16	MCU_I2C4_SCL	PF14	3.3V MCU	I2C4 SCL
17	MCU_PSSI_PDCK	PD9	3.3V MCU	PSSI 时钟
18	MCU_I2C4_SDA	PF15	3.3V MCU	I2C4 SDA
19	MCU_PSSI_RDY	PI5	3.3V MCU	PSSI 就绪
20	MCU_OPAMP1_VOUT	PA3	模拟	OpAmp1 VOUT
21	MCU_PSSI_DE	PD8	3.3V MCU	PSSI 数据启用
22	MCU_OPAMP1_VINP	PA0	模拟	OpAmp1 VINP
23	MCU_MCO	PA8	3.3V MCU	MCU 时钟输出
24	MCU_OPAMP1_VINM	PA1	模拟	OpAmp1 VINM
25	MCU_CR2_SYNC	PA10	3.3V MCU	CR2 同步
26	GND	-	电源	接地
27	GND	-	电源	接地
28	EAR_P_R	-	模拟	音频耳机 P_R
29	MIC2_INP	-	模拟	Mic2 IN+
30	EAR_M_R	-	模拟	Audio ear M_R
31	MIC2_INM	-	模拟	Mic2 IN-
32	LINEOUT_P	-	模拟	线路输出 P
33	MIC2_BIAS	-	模拟	麦克风 2 偏置
34	LINEOUT_M	-	模拟	线路输出 M
35	GND	-	电源	接地
36	HPH_L	-	模拟	耳机 L

引脚	名称	MCU/SoC 引脚	域名	注释
37	SOC_GPIO_0_SE0	-	1.8V MPU	SoC GPIO 0 (SE0)
38	HPH_R	-	模拟	耳机R
39	SOC_GPIO_1_SE0	-	1.8V MPU	SoC GPIO 1 (SE0)
40	HPH_REF	-	模拟	耳机REF
41	SOC_GPIO_2_SE0	-	1.8V MPU	SoC GPIO 2 (SE0)
42	HS_DET	-	模拟	耳机检测
43	SOC_GPIO_3_SE0	-	1.8V MPU	SoC GPIO 3 (SE0)
44	GND	-	电源	接地
45	SOC_GPIO_86_SE0	-	1.8V MPU	SoC GPIO 86 (SE0)
46	SOC_GPIO_98	-	1.8V MPU	SoC GPIO 98
47	SOC_GPIO_82_SE0	-	1.8V MPU	SoC GPIO 82 (SE0)
48	SOC_GPIO_99	-	1.8V MPU	SoC GPIO 99
49	SOC_GPIO_18	-	1.8V MPU	SoC GPIO 18
50	SOC_GPIO_100	-	1.8V MPU	SoC GPIO 100
51	SOC_GPIO_28	-	1.8V MPU	SoC GPIO 28
52	SOC_GPIO_101	-	1.8V MPU	SoC GPIO 101
53	+3V3 (输出)	-	电源	3.3V电源输出
54	+5V_USB (输出)	-	电源	5 V 电源输出
55	+3V3 (输出)	-	电源	3.3V电源输出
56	+5V_USB (输出)	-	电源	5 V 电源输出
57	+1V8 (IN)	-	电源	1.8 V 电源轨
58	GND	-	电源	接地
59	VCOIN (IN)	-	电源	系统电压 (PMIC RTC)
60	VBAT (IN)	-	电源	系统电压 (MCU RTC)

注：JMISC上的SoC GPIO引脚为专用接口（非创客GPIO）。MCU采用3.3V逻辑电平，MPU采用1.8V逻辑电平，音频/麦克风为模拟信号。

25.2 JMEDIA (B2) (JMEDIA1) - 引脚功能概述

引脚	名称	域名	注释
1	GND	电源	接地
2	GND	电源	接地
3	MIPI_DSI0_CLK_M	MIPI D-PHY	DSI 时钟 -
4	MIPI_DSI0_L1_P	MIPI D-PHY	DSI 通道1 +
5	MIPI_DSI0_CLK_P	MIPI D-PHY	DSI 时钟 +
6	MIPI_DSI0_L1_M	MIPI D-PHY	DSI 通道1 -
7	GND	电源	接地
8	GND	电源	接地
9	MIPI_DSI0_L2_M	MIPI D-PHY	DSI lane2 -
10	MIPI_DSI0_L0_P	MIPI D-PHY	DSI lane0 +
11	MIPI_DSI0_L2_P	MIPI D-PHY	DSI lane2 +
12	MIPI_DSI0_L0_M	MIPI D-PHY	DSI lane0 -
13	GND	电源	接地
14	GND	电源	接地
15	MIPI_DSI0_L3_M	MIPI D-PHY	DSI lane3 -
16	SOC_CAM_MCLK0 (GPIO_20)	1.8V MPU	摄像机主时钟 0
17	MIPI_DSI0_L3_P	MIPI D-PHY	DSI lane3 +
18	SOC_CAM_MCLK1 (GPIO_21)	1.8V MPU	摄像机主时钟 1
19	GND	电源	接地
20	GND	电源	接地
21	CSI0_C0_LN0_M	MIPI D-PHY	CSI0 data0 -
22	CCI_I2C_SDA1 (GPIO_29)	1.8V MPU	相机控制 I2C SDA1
23	CSI0_B0_LN0_P	MIPI D-PHY	CSI0 data0 +
24	CCI_I2C_SCL1 (GPIO_30)	1.8V MPU	相机控制 I2C SCL1
25	GND	电源	接地
26	GND	电源	接地
27	CSI0_B1_LN1_M	MIPI D-PHY	CSI0 data1 -
28	CSI1_B2_LN3_P	MIPI D-PHY	CSI1 data3 +
29	CSI0_A1_LN1_P	MIPI D-PHY	CSI0 data1 +
30	CSI1_C2_LN3_M	MIPI D-PHY	CSI1 data3 -
31	GND	电源	接地
32	GND	电源	接地
33	CSI0_A0_CLK_M	MIPI D-PHY	CSI0 时钟 -
34	CSI1_C1_LN2_P	MIPI D-PHY	CSI1 data2 +
35	CSI0_NC_CLK_P	MIPI D-PHY	CSI0 时钟 +
36	CSI1_A2_LN2_M	MIPI D-PHY	CSI1 data2 -
37	GND	电源	接地
38	GND	电源	接地
39	CSI0_A2_LN2_M	MIPI D-PHY	CSI0 data2 -

引脚	名称	域名	注释
40	CSI1_NC_CLK_P	MIPI D-PHY	CSI1 时钟 +
41	CSI0_C1_LN2_P	MIPI D-PHY	CSI0 data2 +
42	CSI1_A0_CLK_M	MIPI D-PHY	CSI1 时钟 -
43	GND	电源	接地
44	GND	电源	接地
45	CSI0_C2_LN3_M	MIPI D-PHY	CSI0 data3 -
46	CSI1_A1_LN1_P	MIPI D-PHY	CSI1 data1 +
47	CSI0_B2_LN3_P	MIPI D-PHY	CSI0 data3 +
48	CSI1_B1_LN1_M	MIPI D-PHY	CSI1 data1 -
49	GND	电源	接地
50	GND	电源	接地
51	CCI_I2C_SCL0 (GPIO_23)	1.8V MPU	相机控制 I2C SCL0
52	CSI1_B0_LN0_P	MIPI D-PHY	CSI1 data0 +
53	CCI_I2C_SDA0 (GPIO_22)	1.8V MPU	相机控制 I2C SDA0
54	CSI1_C0_LN0_M	MIPI D-PHY	CSI1 data0 -
55	GND	电源	接地
56	GND	电源	接地
57	VIN (IN)	电源	7-24 V 输入
58	+3V3 (输出)	电源	3.3V电源输出
59	VIN (IN)	电源	7-24 V 输入
60	+3V3 (输出)	电源	3.3V电源输出

注：MIPI CSI/DSI通道为D-PHY差分对，而非通用I/O。控制线（CCI_I2C_*、SOC_CAM_MCLK*）属于1.8V MPU域。JMEDIA接口上的VIN为原始7-24V输入（仅供电）。

25.3 Qwiic (A4) (QWIIC1) - 引脚功能概述

引脚	名称	网络 / 功能	域名	注释
1	GND	接地	电源	-
2	+3V3 OUT	PWR_3P3V	电源	Qwiic设备的供货
3	SDA	PD13 (I2C4_SDA)	3.3 V	-
4	SCL	PD12 (I2C4_SCL)	3.3 V	-

25.4 JSPI (A5) (JSPI1) - 引脚功能概述

引脚	名称	网络 / 功能	域名	注释
1	MISO	PC2 (SPI2_MISO)	3.3 V	-
2	+5V	5V_USB_VBUS	电源	仅供电力
3	SCK	PD1 (SPI2_SCK)	3.3 V	-
4	MOSI	PC3 (SPI2_MOSI)	3.3 V	-
5	RESET	MCU_NRST	3.3 V	-
6	GND	接地	电源	-

25.5 JCTL (A1) (JCTL1) - 引脚功能概述

引脚	名称	网络 / 功能	域名	注释
1	GND	接地	电源	-
2	USB_BOOT	自举电路	1.8 V	-
3	VOL_DOWN	GPIO_36	1.8 V	GPIO
4	SOC_SE4_TX	UART TX (SE4) 控制台	1.8 V	系统控制台
5	VOL_UP	GPIO_96	1.8 V	GPIO
6	SOC_SE4_RX	UART RX (SE4) 控制台	1.8 V	系统控制台
7	GND	接地	电源	-
8	PMIC_RESET	PM4125 复位	1.8 V	-
9	+1V8 OUT	VREG_L15A_1P8V	电源	1.8 V 参考资料
10	VBUS_DISABLE	VBUS电源开关禁用	1.8 V	控制VBUS路径

25.6 JDIGITAL (A2) (JDIGITAL1) - 引脚功能概述

引脚	名称	MCU 引脚	功能	域名	注释
1	D0	PB7	- USART1_RX - TIM4_CH2	3.3 V	UART
2	D1	PB6	- USART1_TX - TIM4_CH1	3.3 V	UART
3	D2	PB3	- TIM2_CH2	3.3 V	-
4	~D3	PB0	- OPAMP2_OUTPUT - TIM3_CH3	3.3 V	PWM
5	D4	PA12	- FDCAN1_TX - TIM1_ETR	3.3 V	-
6	~D5	PA11	- FDCAN1_RX - TIM1_CH4	3.3 V	PWM
7	~D6	PB1	- TIM3_CH4	3.3 V	PWM
8	D7	PB2	- TIM8_CH4N	3.3 V	-
9	D8	PB4	- TIM3_CH1	3.3 V	-
10	~D9	PB8	- TIM4_CH3	3.3 V	PWM
11	~D10	PB9	- SPI2_SS (芯片选择) - TIM4_CH4	3.3 V	PWM
12	~D11	PB15	- SPI2_MOSI - TIM1_CH3N	3.3 V	PWM
13	D12	PB14	- SPI2_MISO - TIM1_CH2N	3.3 V	-
14	D13	PB13	- SPI2_SCK - TIM1_CH1N	3.3 V	-
15	GND	-	- 接地	电源	-
16	AREF	-	- 模拟参考	-	模拟基准引脚（非GPIO引脚）
17	D20	PB11	- I2C2_SDA - TIM2_CH4	3.3 V	-
18	D21	PB10	- I2C2_SCL - TIM2_CH3	3.3 V	-

所有JDIGITAL线路均为3.3V逻辑电平。

25.7 JANALOG (A3) (JANALOG1) - 引脚功能概述

引脚	名称	网络 / MCU 引脚	功能	域名	注释
1	BOOT	MCU_BOOT0	- 自举电路	3.3 V	-
2	IOREF	PWR_3P3V	- I/O电压基准 (镜像3.3V电源轨)	电源	仅输出; 禁止反向馈入
3	RESET	MCU_NRST	- MCU 复位	3.3 V	-
4	+3V3 OUT	PWR_3P3V	- 3.3 V 电源	电源	-
5	+5V USB VBUS	5V_USB_VBUS	- 5V电源 (直通)	电源	仅供电力
6	GND	GND	- 接地	电源	-
7	GND	GND	- 接地	电源	-
8	VIN IN	DC_IN	- 7-24 V 输入	电源	仅供电力
9	A0 / D14	PA4	- ADC 输入 - DAC0 - TIM2_CH1	模拟 / 3.3 V	直接ADC / 不耐5V
10	A1 / D15	PA5	- ADC 输入 - DAC1 - TIM3_CH1	模拟 / 3.3 V	直接ADC / 不耐5V
11	A2 / D16	PA6	- ADC 输入 - OPAMP2_INPUT+ - TIM3_CH2	模拟 / 3.3 V	
12	A3 / D17	PA7	- ADC 输入 - OPAMP2_INPUT-	模拟 / 3.3 V	-
13	A4 / D18	PC1	- ADC 输入 - I2C3_SDA - LPTIM1_CH1	模拟 / 3.3 V	-
14	A5 / D19	PC0	- ADC 输入 - I2C3_SCL - LPTIM1_IN1	模拟 / 3.3 V	-

A0 (PA4) 和A1 (PA5) 是直接参考VREF+的STM32U585 ADC输入引脚。它们不耐受5V电压, 有效输入范围为0-VREF+ ($\approx 3.3V$)。引脚绝对最大电压为 $VDD + 0.3 V$ (约3.6 V)。超过此电压时, MCU内部保护二极管将开始导通。该接口还提供5V_SYS和PWR_3P3V电源引脚, 仅用于电源供应。切勿向A0或A1引脚施加5V电压。IOREF引脚连接至3.3V电源轨 (PWR_3P3V), 作为扩展板的参考/输出端口, 严禁将其用于向主板回馈电源。

26 高速外围设备

- **USB-C:** 支持角色切换功能的USB 3.1接口。通过ANX7625 DSI转DP桥接器实现DisplayPort替代模式。该连接器的超高速差分线对同时服务于DP替代模式和USB 3.1数据传输。当DisplayPort替代模式激活时，USB数据传输速率将降低。
- **摄像头:** 四通道**MIPI-CSI-2**（1.8V I/O）。
- **显示:** 四通道**MIPI-DSI**接口接入**ANX7625**芯片，实现USB-C端口的DisplayPort替代模式。
- **无线:** 双频Wi-Fi®（802.11a/b/g/n/ac）与Bluetooth®5.1集成于共享模块。

27 电路板操作

27.1 入门指南 - Arduino App Lab

Arduino App Lab [1] 是一个统一编辑器，可在开发板的两个处理器上构建并运行项目。项目即为**App**，可包含：

- 在Linux系统（Qualcomm Dragonwing™ QRB2210）上运行的Python®程序
- 在微控制器（MCU）（STM32U585）上运行的Arduino程序
- 可选的**Bricks**（预打包服务，如AI模型、Web服务器或API客户端）与应用程序并行部署（同样在Linux系统上运行）。

App通过**Bridge**在Linux侧与微控制器之间交换数据。

Arduino App Lab 可安装在您的电脑上，或直接在单板计算机模式的 UNO Q 上运行。此配置推荐使用 UNO Q 的 4GB LPDDR4X 版本，以确保有足够内存支持稳定运行和资源密集型应用。使用该开发板的方法：

- 在Arduino App Lab中启动现成示例，根据需求进行定制，或使用集成编辑器从零构建新应用。
- 点击Arduino App Lab中的**Run**按钮[1]。
- 编辑器将构建Linux组件、烧录MCU程序、部署所选Bricks，并启动板载所有组件。
- 编辑器中可同时查看双方日志，无需离开Arduino App Lab即可进行迭代开发。

首次设置时：

1. 安装Arduino App Lab [1]并启动，连接UNO Q开发板：采用**USB-C数据线**进入PC主机模式，或直接供电进入单板计算机模式。
2. 该开发板将自动检查更新。若有可用更新，系统将提示您安装。更新完成后，需重新启动Arduino App Lab[1]。
3. 初始设置将要求您为设备设置名称和密码，同时需提供本地网络的Wi-Fi®凭证。
4. 测试开发板时，请在Arduino App Lab[1]的“**Examples**”(示例) 部分选择一个示例应用程序，点击右上角的“运行”按钮。您也可在“**App**”板块创建新应用。
5. App的状态可在App控制台选项卡中监控。

注意:在**PC-hosted**模式下，首次设置需要**USB数据**连接。之后可通过局域网（SSH）使用**网络**目标。在单板计算机（SBC）模式下，设置无需USB数据连接，只需为板卡供电，待其加入**网络**后即可使用**网络**目标。SBC模式下外设（键盘、鼠标、USB摄像头、麦克风）需使用具备外接电源传输功能的USB-C转接头。当DisplayPort替代模式激活时，USB数据传输速率将降低。.

使用5V/3A的USB-C电源适配器及数据线供电，或参照输入电源部分说明通过5V或VIN引脚供电（USB-C仅支持5V / VIN支持7-24V）。

首次启动通常需20-30秒完成Linux系统初始化。请等待启动LED序列或LED矩阵动画结束再与开发板交互。

27.2 Bricks

在Arduino应用实验室中，**Bricks**是模块化构建块，可让您无需编写底层基础设施即可扩展应用程序。每个Brick封装了现成的功能，例如传感器集成、AI模型、数据库或用户界面，您可将其直接拖入项目中使用。典型Bricks提供：

- 一个AI模型 (例如物体分类或关键词检测)
- 一个Web UI或REST API服务
- 与外部数据源的集成

Bricks与App并行部署，并由Linux侧管理。典型工作流如下：

1. 在Arduino App Lab中创建**应用程序**。
2. 选择应用程序应使用的任意**Brick**。
3. 添加您的Python®代码（Linux）和/或Arduino草图（MCU）。
4. 需将Brick导入`main.py`文件，并按Brick的API进行初始化。
5. 点击“**Run**”部署Linux应用程序，烧录MCU，并启动应用程序及其Bricks组件。
6. **Bridge**工具负责处理Linux与MCU之间的数据交换。

当应用程序处于绑定运行状态时，USB接口可能被系统占用。请使用Arduino App Lab [1]进行部署和监控。若需通过USB使用外部命令行工具，请停止应用程序或断开开发板连接。

27.3 Hello World

让我们用经典的Arduino“Hello World”——**闪烁LED**示例来编程UNO Q。这有助于验证该板是否已正确连接至Arduino App Lab。

1. 打开Arduino App实验室。它从“**Examples**”部分开始。
2. 若未使用单板计算机模式，**请将UNO Q**连接至电脑。
3. 打开“**Blink LED**”示例。阅读示例说明以了解App工作原理。
4. 点击“**Run**”并等待上传完成。

此时您应能看到内置RGB LED的红色通道以一秒亮起、一秒熄灭的节奏循环闪烁。该LED通过Arduino程序由STM32U585微控制器驱动。

您可以从空白 App 开始，或使用现有示例。首次使用时，建议通过“Hello World”示例学习基本结构。

每次运行App时，微控制器程序都会被编译，同时Python®应用程序会在Linux系统上启动。根据复杂程度，此过程可能需要长达一分钟。

27.4 如何检查应用程序是否正在运行

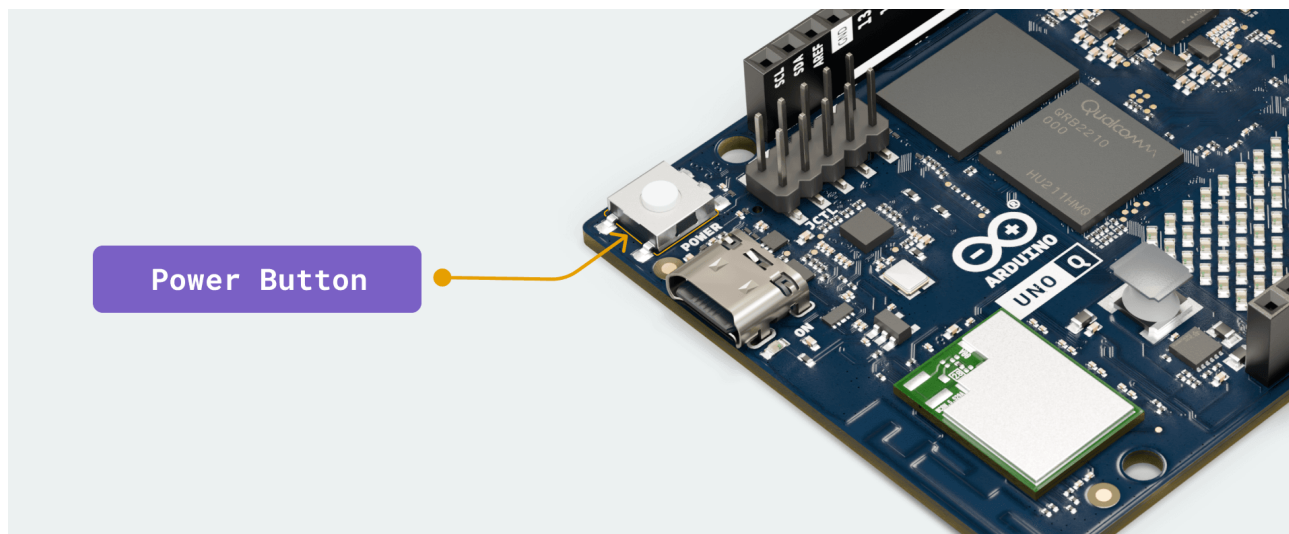
在 App Lab 中打开**控制台**。共有三个选项卡：

- **启动**：启动序列日志，包括MCU编译和Linux部署
- **主程序 (Python®)**：Python®应用程序输出 (`print()`)
- **Sketch (微控制器)**：Arduino程序串行输出 (`Serial.println()`)

应用程序可能启动成功，但仍存在运行时问题。请检查Python®日志中的错误信息。若发生草图编译错误，启动过程将被中止。

27.5 电源按钮

UNO Q 包含一个**电源按钮** (JBTN1)，可用于重启开发板。



UNO Q Power Button

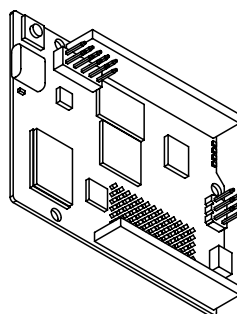
长按 (≥5秒):重启Linux系统 (MPU)。此操作不会切断电路板电源。

注: 长按重启按钮将重启Linux环境，可能中断正在运行的应用程序。请保存工作内容，并在适用情况下确保外部进程安全关闭。供电后主板将自动启动，正常启动时无需按压按钮。

27.6 在线资源

在Project Hub[3]探索社区项目，浏览Library Reference[4]了解支持的API，并在Arduino Store [5]选购配件，例如Qwiic传感器、UNO扩展板和载体板。

电路板尺寸为68.58毫米×53.34毫米，底部元件高度控制在2毫米以下，以便堆叠至载体基座上。其轮廓与孔位布局遵循UNO规格，兼容该标准。



认证

29 符合性声明 CE DoC (欧盟)

我们在此郑重声明，上述产品符合以下欧盟指令的基本要求，因此有资格在包括欧盟（EU）和欧洲经济区（EEA）在内的市场内自由流通。

French : Nous déclarons sous notre seule responsabilité que les produits indiqués ci-dessus sont conformes aux exigences essentielles des directives de l'Union européenne mentionnées ci-après, et qu'ils remplissent à ce titre les conditions permettant la libre circulation sur les marchés de l'Union européenne (UE) et de l'Espace économique européen (EEE).

30 声明符合欧盟 RoHS 和 REACH 191 11/26/2018

Arduino 电路板符合欧洲议会关于限制在电子电气设备中使用某些有害物质的指令 2011/65/EU 和欧盟理事会于 2015 年 6 月 4 日颁布的关于限制在电子电气设备中使用某些有害物质的指令 2015/863/EU。

物质	最大值 (ppm)
铅 (Pb)	1000
镉 (Cd)	100
汞 (Hg)	1000
六价铬 (Cr6+)	1000
多溴联苯 (PBB)	1000
多溴联苯醚 (PBDE)	1000
邻苯二甲酸二(2-乙基己)酯 (DEHP)	1000
邻苯二甲酸丁苄酯 (BBP)	1000
邻苯二甲酸二丁酯 (DBP)	1000
邻苯二甲酸二异丁酯 (DIBP)	1000

豁免：未申请任何豁免。

Arduino 电路板完全符合欧盟法规 (EC) 1907/2006 中关于化学品注册、评估、许可和限制 (REACH) 的相关要求。我们声明，所有产品（包括包装）中的 SVHC (<https://echa.europa.eu/web/guest/candidate-list-table>)，（欧洲化学品管理局目前发布的《高度关注物质候选授权清单》）含量总浓度均未超过 0.1%。据我们所知，我们还声明，我们的产品不含 ECHA（欧洲化学品管理局）1907/2006/EC 公布的候选清单附件 XVII 中规定的“授权清单”（REACH 法规附件 XIV）和高度关注物质 (SVHC) 所列的任何物质。

31 冲突矿产声明

作为电子和电气元件的全球供应商，Arduino 意识到我们有义务遵守有关冲突矿产的法律法规，特别是《多德-弗兰克华尔街改革与消费者保护法案》第 1502 条。Arduino 不直接采购或加工锡、钽、钨或金等冲突矿物。冲突矿物以焊料的形式或作为金属合金的组成部分存在于我们的产品中。作为我们合理尽职调查的一部分，Arduino 已联系供应链中的元件供应商，以核实他们是否始终遵守法规的相关规定。根据迄今收到的信息，我们声明我们的产品中含有来自非冲突地区的冲突矿物。

32 FCC 警告

任何未经合规性负责方明确批准的更改或修改都可能导致用户无权操作设备。

本设备符合 FCC 规则第 15 部分的规定。操作须满足以下两个条件：

- (1) 此设备不会造成有害干扰。
- (2) 此设备必须接受接收到的任何干扰，包括可能导致不良操作的干扰。

FCC 射频辐射暴露声明：

1. 此发射器不得与任何其他天线或发射器放在同一位置或同时运行。
2. 此设备符合为非受控环境规定的射频辐射暴露限值。
3. 安装和操作本设备时，辐射源与您的身体之间至少应保持 20 厘米的距离。

English:

User manuals for licence-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both. This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC SAR警告:

English This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.



French: Lors de l'installation et de l'exploitation de ce dispositif, la distance entre le radiateur et le corps est d'au moins 20 cm.

公司信息

公司名称	Arduino S.r.l.
公司地址	Via Andrea Appiani, 25 - 20900 MONZA (意大利)

参考资料

版本号	参考资料	链接
1	Arduino App Lab	https://www.arduino.cc/en/software
2	Arduino UNO Q 文档	https://docs.arduino.cc/hardware/uno-q/
3	Arduino Project Hub	https://projecthub.arduino.cc/
4	库参考	https://docs.arduino.cc/libraries/
5	Arduino 在线商店	https://store.arduino.cc/

修订记录

日期	版次	变更
24/11/2025	4	添加硬件加速部分（图形处理API、视频编解码器、OpenCL支持）；删除错误的默认密码引用
05/11/2025	3	更新运行信息
27/10/2025	2	机械图纸及RTC电源细节更新
01/10/2025	1	首次发布