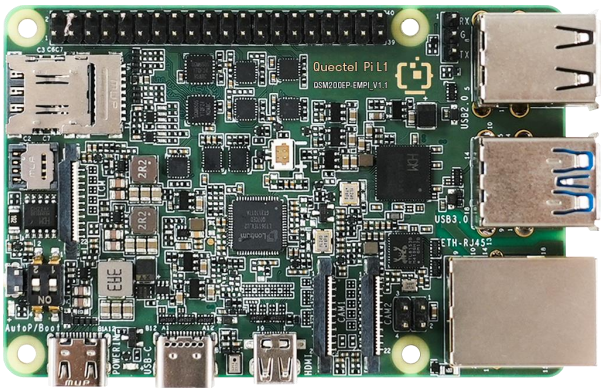
Quectel Pi L1

Single-Board Computer

Product Introduction

Quectel Pi L1 is a smart Single-Board Computer (SBC) built on the Qualcomm QCM2290 platform. Featuring an ARM quad-core 64-bit processor (4 × A53 @ 2.0 GHz) and a Qualcomm Adreno™ 702 GPU, the product is not only equipped with 2 GB LPDDR4X + 32 GB eMMC storage, and a USB Type-C power interface, but also supports LTE Cat 4, dual-band Wi-Fi (2.4 & 5 GHz) compliant with IEEE 802.11a/ b/ g/ n/ ac, Bluetooth 5.0, and display output via LCM or HDMI, thereby delivering robust performance and rich multimedia capabilities to meet the demands of both industrial and consumer applications for high-speed connectivity, multimedia processing, and computing power.



Wi-Fi
2.4 & 5 GHz

Feature-rich
Interfaces

USB Type-C
Power Input

Compact, Full-Featured Design with
Extended Temperature Range

Main Advantages

- **ARM quad-core 64-bit processor:** Well-suited for most algorithm prototyping & inference application development.
- **Adreno™ 702 GPU:** Balances high performance with power efficiency, optimized for embedded and IoT applications.
- **Feature-rich interfaces:** USB, Micro HDMI, ADC, audio, Ethernet, camera, PCIe, antenna, etc.
- **Wireless connectivity:** Wi-Fi 2.4 & 5 G, 802.11a/ b/ g/ n/ ac, delivering enhanced wireless connectivity.
- **Multiple operating systems:** Linux/ Debian/ Android.
- **Extended temperature range:** For harsh outdoor & industrial use; withstand ambient temperatures from -20 °C to +70 °C.
- **Diverse application scenarios:** Edge computing, robotics, industrial automation, multimedia terminals, digital signage, smart security, rugged PDAs, etc.

Version: 3.2
Status: Released

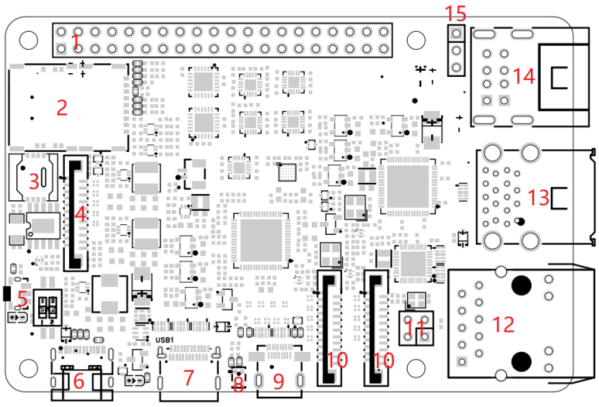
Hardware Specifications

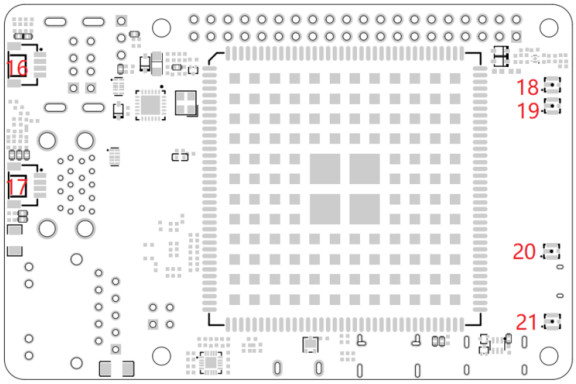
Parameter	Details
Application Processor	ARM quad-core 64-bit processor, 4 x A53 @ 2.0 GHz, 512 KB L2 cache
GPU	64-bit Adreno™ 702 @ 845 MHz
Memory	2 GB LPDDR4X + 32 GB eMMC
OS	Yocto Linux (Kernel 5.15)*/ Debian 13*/ Android 14*
Weight (g)	Approx. 55
USB Interfaces	• 1 x USB 3.1 Type-C with up to 5 Gbps data rate, for firmware programming (when the boot jumper is set) and host-mode communication • 2 x standard USB 3.0 Type-As, host mode only, with up to 5 Gbps data rate • 2 x standard USB 2.0 Type-As, host mode only, with up to 480 Mbps data rate • 1 x USB Type-C, for main power supply
Display Interfaces	• 1 x Micro HDMI interface①, HDMI 2.0 (the frame rate is to be determined*); encoding: 1080p (H.264/ H.265) @ 60 fps*, decoding: 1080p (H.264/ H.265/ VP9) @ 60 fps* • 1 x FPC connector①, based on MIPI standard, with FHD+ (1080 x 2520) @ 60 fps*
Audio Interfaces	• 1 x MX1.25-4P audio interface • 1 x HDMI interface, for audio output • 1 x MEMS microphone
Camera Interfaces	2 x FPC connectors, 4-lane MIPI CSI, with up to 2.5 Gbps/ lane data rate
Ethernet Interface	1 x standard RJ45, supporting 10/ 100/ 1000 Mbps Ethernet and POE function
SIM Card Interfaces	2 x (U)SIM interfaces, 1.8/ 2.95 V (U)SIM cards, DSDS (Nano SIM and eSIM)
SD Card Interface	1 x SD 3.0, 4-bit SDIO
DBG-UART Interface	2.54 mm pin header (1 x 3-pin), only for debugging
Extension Interfaces	• 4 x I2C interfaces (multiplexed with other interfaces) • 3 x SPI interfaces (multiplexed with other interfaces, host mode only) • 4 x UART interfaces (multiplexed with other interfaces) • 28 x GPIO interfaces (multiplexed with other interfaces)
Keypad	1 x PWRKEY; internally pulled up
LED Indicators	Blue and green
Antenna Interfaces	• 1 x MAIN (Main) • 1 x DRX (Rx-diversity) • 1 x GNSS (GNSS) • 1 x WIFI/BT (Wi-Fi & Bluetooth)
LTE	Compliant with 3GPP Rel-10 FDD and TDD
GNSS (Optional)	GPS, GLONASS, BDS, Galileo, QZSS and SBAS
WLAN	• Operating modes: AP and STA • Operating frequencies: 2.4 GHz and 5 GHz
Bluetooth	• *Bluetooth Core Specification Version 5.0* • Bluetooth Classic and Bluetooth Low Energy (BLE)
Temperature Range	• Operating temperature: -20 °C ~ +70 °C • Storage temperature: -40 °C ~ +85 °C
Power Supply Requirements	USB Type-C power input; recommended power adapter: 15W
Shielding Cover	N/A
Firmware Upgrade	• USB0 • OTA
RoHS	All components are fully compliant with the EU RoHS Directive 2011/65/EU

Notes:
*: Under development.
①: The Micro HDMI and MIPI display interfaces are mutually exclusive and cannot be used simultaneously.

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Interface Specifications



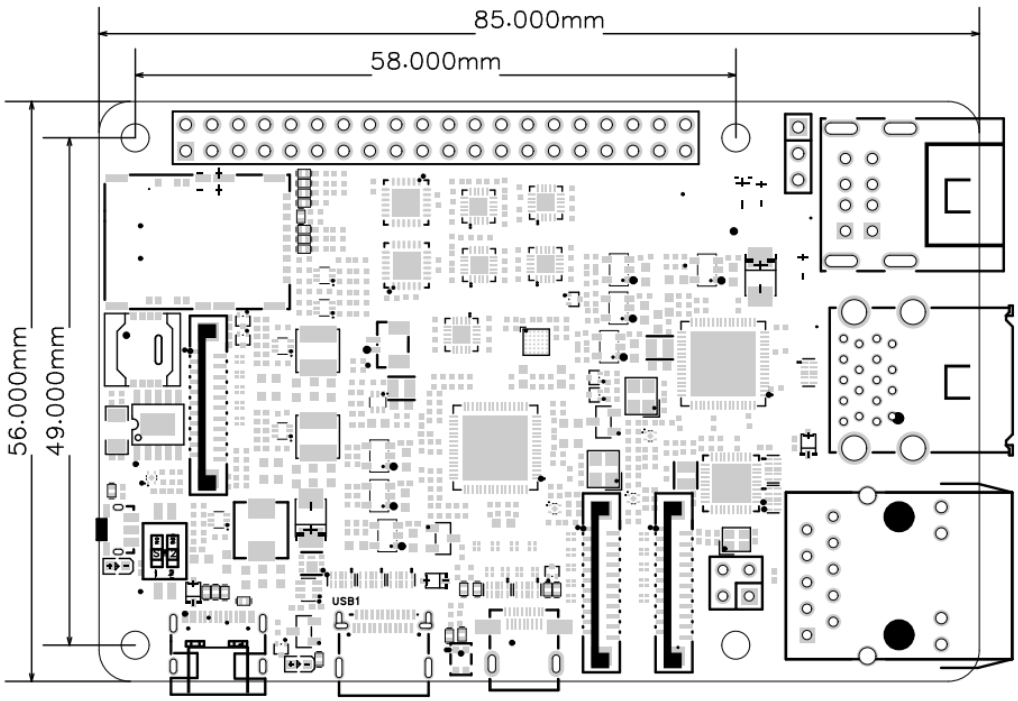


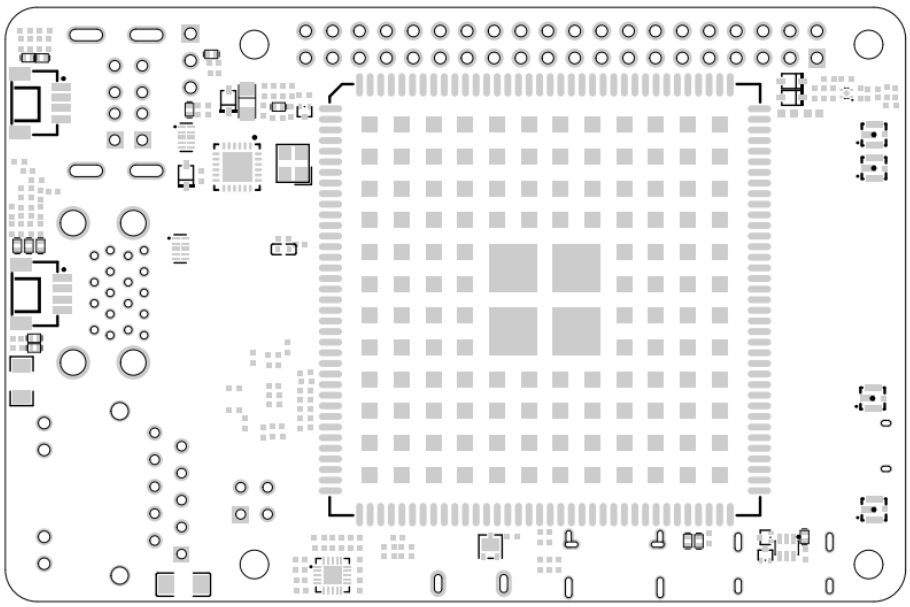
Interface Type	No.	Interface Name	Description
Extension	1	2 x 20-pin header	Multi-function GPIOs (configurable as I2C, SPI, etc.)
Memory	2	SD card interface	Combo SD/ Nano-SIM Socket (SD 3.0)
SIM Card	2	(U)SIM card interface	Combo SD/ Nano-SIM Socket, supporting 1.8/ 2.95 V (U)SIM cards
	3	eSIM card interface	eSIM (MFF2) flip-open connector, supporting 1.8/ 2.95 V eSIM
Display	4	Display interface	One 4-lane MIPI DSI, with up to 1.5 Gbps/ lane data rate, based on MIPI standard, supporting FHD+ (1080 × 2520) @ 60 fps*
	9	Micro HDMI inteface	Micro HDMI interface for video output, supporting 1080P @ 60 Hz*
Camera	5	Camera interface	Two 4-lane MIPI CSIs, with up to 2.5 Gbps/ lane data rate
Multimedia	17	Audio input/ output interface	MX1.25-4P interface for audio input and output
	8	MEMS input	MEMS microphone
USB	7	USB Type-C	USB 3.0 Type-C interface
	13	USB Type-A 3.0	Two USB 3.0 Type-A interfaces
	14	USB Type-A 2.0	Two USB 2.0 Type-A interfaces
Communication	12	Ethernet interface	10/ 100/ 1000 Mbps Ethernet
	20	Main antenna interface	IPEX-4 test socket
	19	Rx-diversity antenna interface	
	18	GNSS antenna interface	
	21	Wi-Fi/ Bluetooth antenna interface	
Others	5	PWRKEY button	Power button
	6	USB Type-C power input	DC power is supplied via USB Type-C with support for Power Delivery (PD)
	16	ADC interface	MX1.25-4P interface: single-channel ADC input, with 0 V to 5.0 V range.
	11	POE interface	Two 2-pin headers for POE power output
	15	DBG interface	One 3-pin header

Note:
*: Under development.

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Dimensions & Appearance

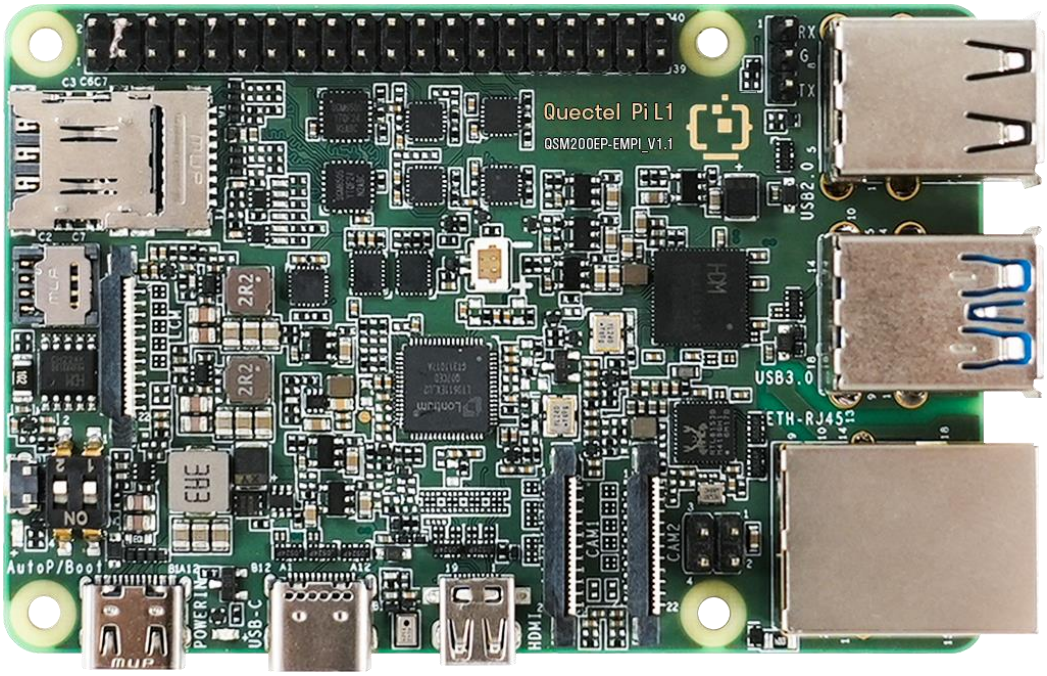


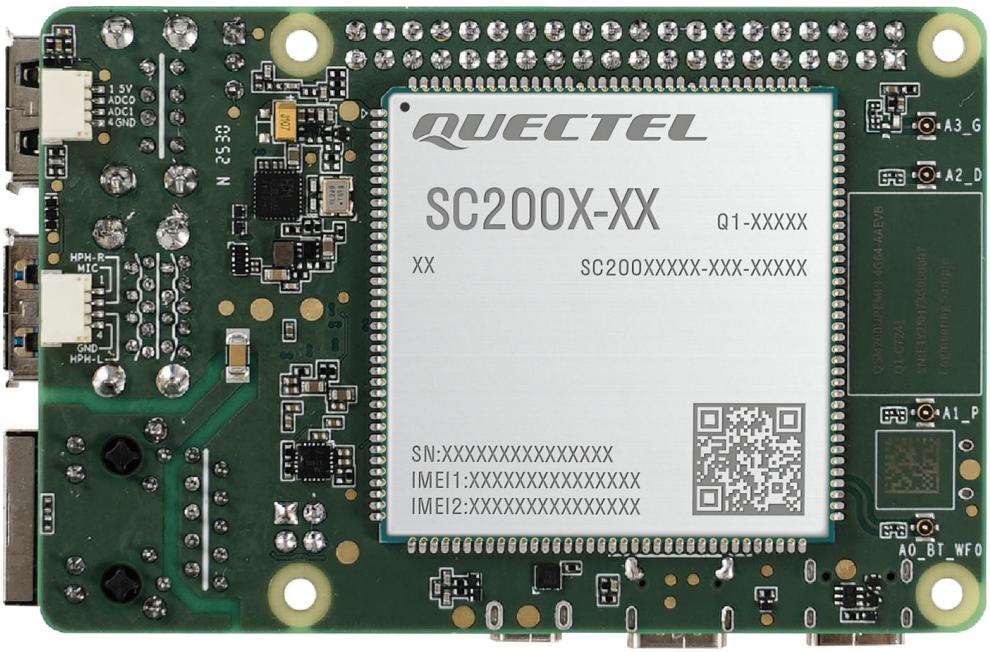


Note:
All dimensions are in millimeters (mm) and are subject to an overall tolerance of ±0.2 mm.

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Product Photos





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