



Canonical

Ubuntu 22.04 for Qualcomm® RB3 Gen 2 Vision Development Kit QCS6490

2024-12 Release Notes

Purpose

This is the Beta release of Ubuntu Server 22.04 for the the Qualcomm® RB3 Gen 2 Development Kit.

Image download and Installation instructions

Ubuntu Server 22.04 image

- [ubuntu-22.04-preinstalled-server-arm64+rb3g2-x07-1.img.xz](#)
 - [ubuntu-22.04-preinstalled-server-arm64+rb3g2-x07-1.img.xz.sha256sum](#)
- [ubuntu-22.04-preinstalled-server-arm64+rb3g2-x07-1.manifest](#)
 - [Ubuntu-22.04-preinstalled-server-arm64+rb3g2-x07-1.manifest.sha256sum](#)

Qualcomm Boot firmware

- <https://artifacts.codelinear.org/ui/native/qli-ci/flashable-binaries/ubuntu-fw/QLI.1.1-Ver.1.1-ubuntu-nhlos-bins.tar.gz>
- [rawprogram0.xml](#)

Please refer to [Download Ubuntu OS images and boot firmware](#) for the image installation instructions.

Tested on Hardware Platforms

This release has been tested on the [Qualcomm® RB3 Gen 2 Vision Kit](#) platform.

List of New Features enabled in this release

Note: Users will need to install additional packages manually to enable some Qualcomm® RB3 Gen 2 Development Kit specific features.

They are available in the PPA:

<https://launchpad.net/~ubuntu-qcom-iot/+archive/ubuntu/qcom-ppa>

e.g. command:

```
sudo add-apt-repository ppa:ubuntu-qcom-iot/qcom-ppa --login
sudo apt install pulseaudio-module-pal-card      gstreamer1.0-qcom-sample-apps
weston-qcom
```

Devices / Features	Features Description
Camera/Video/AI	QIM GStreamer sample apps and QIM plugins with AI/ML dependencies are not installed in the Ubuntu image by default. Sample apps are available in the

	<p>gstreamer1.0-qcom-sample-apps package and plugins are in the gstreamer1.0-plugins-qcom package (both packages are available from the PPA).</p> <p>The CamX framework is provided by the camx-kt package (available from the PPA), which is a dependency of above GStreamer packages.</p>
Sensors	Test applications for sensors are not installed by default in the image. They are available in sensors-ship-qti-utils package (available from the PPA).
ADB	ADB is not enabled by default in the system. adbd package is (available from the PPA).
	ADB shell is running as “ubuntu” user. “sudo” command has to be used to get root permissions.
PAL Pulseaudio plugin is not installed by default	<p>pulseaudio-module-pal-card is not installed by default in the image. In order to get audio functionality working pulseaudio-module-pal-card package has to be installed from the PPA. This will also install all of the dependencies like PulseAudio, AGM, PAL, etc. You may have to start pulseaudio user service (or reboot the board) to make it work:</p> <pre>systemctl start --user pulseaudio.service</pre>
Ethernet	QPS615 PCIe switch is enabled but ONLY the 2.5Gb IX Ethernet port is supported (Refer to Known Issues)

List of Features

Devices / Features	Features Description	Feature Implementation Status (*) Ubuntu FC
OS Version	Ubuntu Server 22.04	Supported
Kernel	Linux kernel 6.8	Supported
Updates		Supported
Certification		Not supported
Bootloader	<p>Bootloader will be provided by the HW the vendor, but not included in Ubuntu ISO.</p> <p>Qualcomm boot process should be scalable for</p>	Supported

	derivative platform.	
UEFI Secure Boot		Not supported
build tool, environment	Ubuntu ISO generated in Canonical infrastructure	Supported
System D		Supported
GPU		Supported
NPU		Not supported
Processor	Qualcomm QCS6490 Qualcomm Kryo™ CPU 670 Qualcomm Adreno™ GPU 643® Qualcomm Hexagon™ DSP Qualcomm Spectra™ ISP 570Image-processing engine Qualcomm Adreno™ VPU633 video encode/decode Qualcomm Adreno™ DPU 1075 display Qualcomm Sensing Hub Qualcomm Secure Processing Unit SPU240 Qualcomm Neural Processing Unit NPU230	Supported
Memory: SDRAM	Samsung-KM2L9001CM-B518 System memory via non-PoP and EBI Dual-channel non-PoP high-speed memory - 6 GB LPDDR4X - uMCP4x	Supported
Storage: UFS	Samsung-KM2L9001CM-B518 128 GB UFS - uMCP4x	Supported
PCIe Switch	PCI Switch (QPS615)	Enabled
DSI to HDMI bridge	Lontium LT9611UCX 4K at 60-Hz HDMI support with I2S audio	Supported
UVC/UAC Host mode		Supported
USB to LAN RJ45 Eth interface	ASIXAX88179 USB 3.0 Gb to 1 Gb Ethernet controller	Enabled (**)
USB connector	USB Type-C with display port (direct connect to processor)	Supported
USB hub	USB Type-A (host mode) USB3.1 Gen 2 through USB hub	Not supported
QPS615 Ethernet ports		Enabled (**)
I2C		Supported
SPI		Supported
CAN bus controller	Microchip MCP2518FD External CAN controller with SPI	Not supported
microSD card	microSD card	Enabled

Debug UART	microUSB connector Connector with FTDI USB to UART converter	Supported
GPIO driver		Supported
Pinctrl		Supported
IPC Controller support		Supported
Multi Core-boot		Supported
SCM drivers		Not supported
Baseport CPU Hotplug		Supported
Power Management	Suspend and Resume	Not supported
	Cold boot	Supported
	Warm boot	Supported
Debug tools	valgrind, gdb, gdbserver, ltrace	Supported
Dev utilities (SSH, SCP)		Supported
Device Tree (DT) merge		Out-of-Scope
Container Orchestration		Supported
Remote proc		Supported
DMABUF		Supported
ZRAM enablement		Supported
Audio	ALSA and PulseAudio	Enabled
	Playback	Enabled
	Recording	Enabled
	Compress Offload (Only MP3)	Enabled
	Software-based audio playback and record	Supported
Audio amplifiers x2	Qualcomm WSA8815 Class-D SoundWire audio amplifier	Enabled
Digital microphone	TDKT5818 PDM digital MEMS microphone	Enabled
Sensors	TDK pressure sensor (ICP-10111) ICM42688	Enabled
	IMU (Accel & Gyro)	Enabled
	Magnato Meter	Enabled
Display	Weston with SDM backend	Enabled
	Overlays, GBM, Splash (applicable with the AMSS license)	Enabled
	DSPP	Enabled

	SSPP	Enabled
	HDR	Enabled
	GBM	Enabled
	Pixman Rendering	Enabled
	DisplayPort over Type-C	Enabled
	eDP interface	Not supported
Graphics	3D rendering	Enabled
	EGL1.4, GLES 3.2	Enabled
	UBWC4.0	Enabled
	Vulkan 1.1	Enabled
	OpenGL ES3.1	Enabled
	Open CL Support for Wayland/Weston	Enabled
	IFPC	Enabled
Camera	Preview	Enabled
	Snapshot	Enabled
	3A	Enabled
	Auto-Exposure compensation (AEC)	Enabled
	Auto White Balance (AWB)	Enabled
	JPEG	Enabled
	Tintless	Enabled
	Single/Multi Camera Support	Enabled
	ML based Face Detection in Camera backend	Enabled
	High Frame Rate (HFR)	Enabled
	Lens Distortion Correction (LDC)	Enabled
	Lens Shading Correction (LSC)	Enabled
	Noise Reduction - Snapshot	Enabled
Noise Reduction - Video	Enabled	
Camera	IMX577 camera	Enabled
Camera	OV9282 tracking camera	Enabled
Video	V4L2	Supported
	Playback	Supported
	Recording	Supported
	Dynamic flip and rotation (180 degree)	Supported
	Video concurrency	Supported

DSP	Fastrpc enablement	Enabled
Computer Vision	FastCV	Enabled
	OpenCV on CPU only	Supported
SDKs	QIMP SDK (Intelligent Multimedia)	Enabled
Security	User data protection (FBE)	Not supported
	Secure boot (including UEFI secboot)	Not supported
	PKCS#11 based secure key management	Not supported
	QTEE	Not supported
	SoftSKU framework	Not supported
	Global Platform	Not supported
	Secure File System	Not supported
	SMCInvoke and Qseecomcompat	Not supported
	QCrypto + PRNG	Not supported
	Public Sec Tools	Not supported
	QcWES (device attestation, feature licensing)	Not supported
WLAN	Qualcomm WCN6750/WCN6856 2.4 GHz/5 GHz/6 GHz, 2 × 2 MU-MIMO, 802.11a/b/g/n/ac/ax - Wi-Fi scanning and connect - STA/SAP & P2P - 6GHz - 802.11ax(2.4,5,6 GHz) - power save and offloads	Supported
	WCN6750 Atch	Supported
	WLAN enablement and legacy features	Supported
	STA/SAP	Supported
	6 GHz and 11ax (2.4, 5, 6 GHz)	Supported
Bluetooth	Qualcomm WCN6750/WCN6856 Bluetooth 5.3 BT Standalone (Non-Audio Profiles), Inquiry, pairing SDP, RFCOMM, BLE, GATT	Supported
	Bluetooth Standardalone	Supported
	Bluetooth Inquiry	Supported
	Bluetooth Pairing	Supported
	SDP	Supported
	BLE	Supported
	GATT	Supported

	FTM	Supported
	Bluetooth Audio (A2DP source, HFP AG, HFP Client)	Supported

(*) Feature Implementation Status

- **Supported:** The feature is implemented and supported in Ubuntu as long term solution
- **Enabled:** The feature is available, but may have some limitations, such as
 - implemented using downstream solution
 - available from PPA
 - may not be maintained in Ubuntu as long term solution
- **Not Supported:** The feature has not been implemented yet, but planned to be implemented in the future releases
- **Out-of-Scope:** The feature is not applicable to the HW or Ubuntu

(**) Enabling this feature requires downloading firmware from a third-party vendor.

Qualcomm will provide instructions in the Quick Start Guide for downloading and flashing the firmware.

Known issues

- 1Gb RJ-45 Ethernet, which is USB-A based, requires additional firmware from Renesas (Renesas uPD720201) to function. This firmware is not included in the Ubuntu image. Users should refer to the Qualcomm Quick Start Guide for instructions on how to download and flash the Renesas firmware. No recompilation is needed. After downloading the firmware, execute the following commands to manually enable Ethernet.
 - `$ sudo cp renesas_usb_fw.mem /lib/firmware/`
 - `$ sudo mkinitramfs -o /boot/initrd.img-$(uname -r)`
 - `$ sudo reboot`
- Some RB3 Gen2 systems may have a 10GbE Ethernet port via PCIe (IX Industrial connector). Typically, this port is not populated on the PCB and requires a 'special order.' To get the 10GbE Ethernet port working, you need to install the Marvell AQR-G4_v5.6.1-QR firmware (which is not shipped to Qualcomm customers) and recompile the software. This is not a recommended option.
- Bluetooth device address is not unique
 - The BD address is the same for all the boards

```
$ ubuntu@ubuntu:~$ bluetoothctl
Agent registered
[CHG] Controller 64:90:00:00:5A:AD Pairable: yes
```
- No SPI devices are detected. This is a known issue listed in "The Limitation" section of Release Notes for the Qualcomm 1.1 release.
- [GStreamer] Camera clients cannot be run as a regular user. As of now, if we don't set CAP_SYS_PTRACE on any camera client (which can be done with the command 'sudo

setcap "CAP_SYS_PTRACE=+ep" [executable]), only root will be able to run these programs. In that case, you would lose the benefit of being able to display output on Weston, unless you rewrite the FD passing mechanism in qmmf_recorder_client.

- Occasionally, the audio does not work after the system has been booted.
- It was observed that, occasionally, the wlan0 interface is not present. It may take more than 200 reboots to reproduce this issue.
- Since Qualcomm's libgbm is incompatible with libgbm built from Mesa in Ubuntu, the package containing this library was renamed to libgbm-qcom.
- The camera stack packages (CamX and CHI-CDK) are larger than necessary because the prebuilt binaries they contain are not stripped.
- The camera stack depends on a custom version of protobuf, which conflicts with the version in Ubuntu.
- Unlike in Yocto, the waylandsink GStreamer plugin does not provide window position and size options.
- Many graphical applications in Ubuntu are compiled and linked with Mesa libraries. Only software rendering is possible with them.
- Changes to the USB gadget configuration (e.g. (un)installing ADB, restarting the service, etc.) may require a reboot.
- Some package names may change in future releases.

Report Bugs

- To report a bug, identify the related package in <https://launchpad.net/ubuntu>, create a bug, then subscribe the [ubuntu-qcom-iot](https://launchpad.net/ubuntu-qcom-iot) team to it.
- For the issues related to Qualcomm's packages, file the bugs in the <https://launchpad.net/ubuntu-qcom-iot> Launchpad project, managed by [ubuntu-qcom-iot](https://launchpad.net/ubuntu-qcom-iot) team.