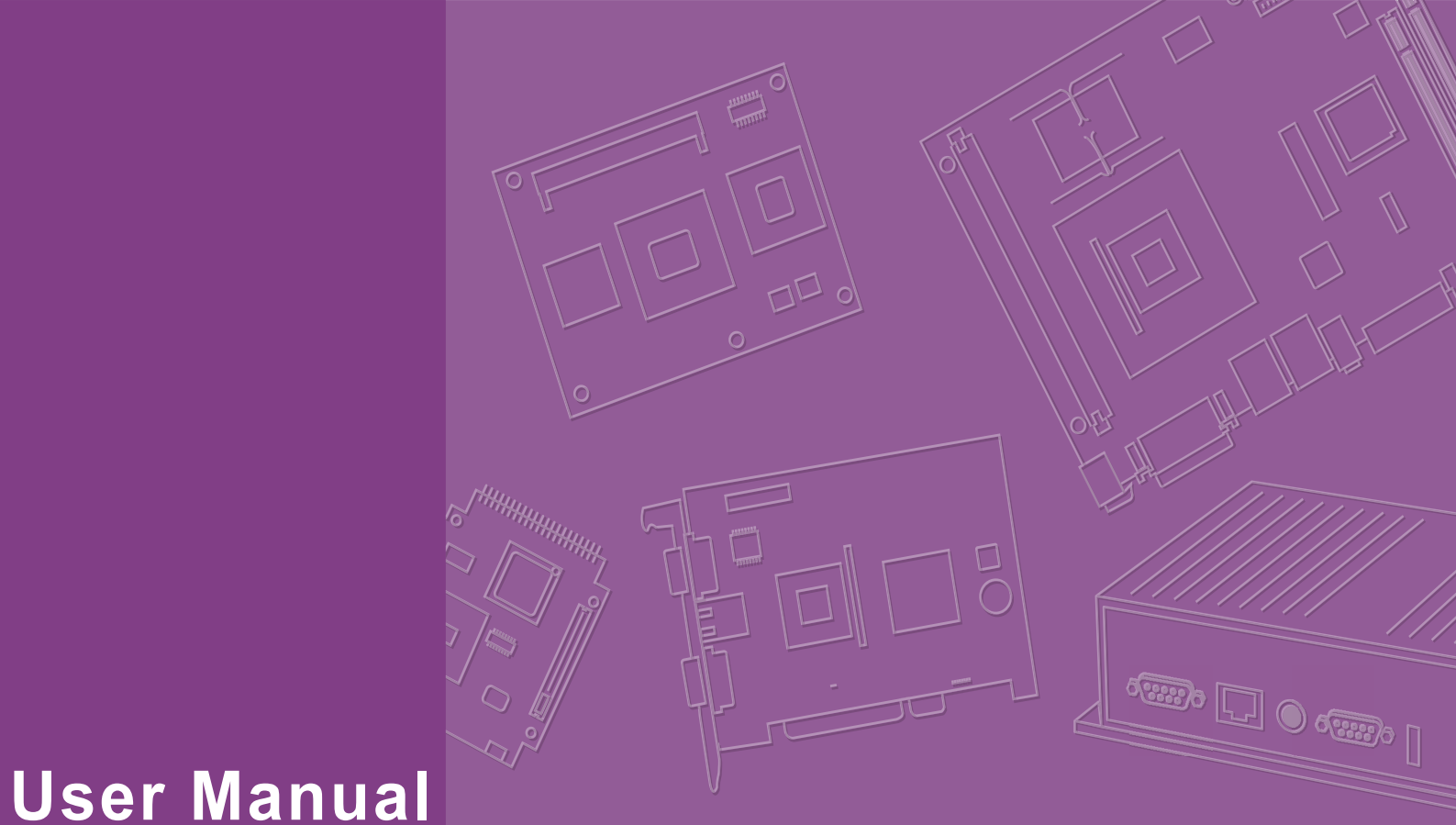




User Manual

DS-011

Qualcomm QCS6490 Edge-AI Box

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be defective, follow the steps outlined below.

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Declaration of Conformity

FCC Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions, and Notes

Warning! *Warnings indicate conditions that if not observed can cause personal injury!*



Les avertissements indiquent des conditions qui, si elles ne sont pas observées, peuvent causer des blessures!

Caution! *Cautions are included to help prevent hardware damage and data losses. For example,*



Batteries are at risk of exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Des précautions sont incluses pour vous aider à éviter d'endommager le matériel ou à perdre des données. par exemple.

Une pile neuve risque d'exploser si elle n'est pas installée correctement. N'essayez pas de recharger, d'ouvrir de force ou de chauffer la batterie. Remplacez la pile uniquement par le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.

Note! *Notes provide additional optional information.*



Les notes fournissent des informations supplémentaires facultatives.

Warning! *The equipment is not suitable for use in locations where children are likely to be present.*



Cet équipement ne convient pas à une utilisation dans des lieux pouvant accueillir des enfants.

Caution! *To avoid risk of electric shock, this equipment must only be connected to supply mains with protective earth.*



Pour éviter tout risque d'électrocution, cet équipement ne doit être branché réseau d'alimentation avec une terre de protection.

Warning! *Restricted access area*



Area accessible only to skilled persons and instructed persons with the proper authorization.

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**

Ne pas laisser cet équipement dans un environnement où la température de stockage pourrait être inférieure à -20°C (-4°F) ou supérieure à 60°C (140°F). Cela pourrait endommager l'équipement. L'équipement doit être dans un environnement contrôlé.
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

Attention: Danger d'explosion en cas de remplacement incorrect de la batterie.

- Remplacez uniquement avec le même type ou le type équivalent recommandé par le fabricant, déposez les piles utilisées selon les instructions du fabricant.
17. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).
Le niveau de pression acoustique au poste de l'opérateur selon la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).
 18. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Area.
ZONE D'ACCÈS RESTRICTED: L'équipement ne doit être installé que dans une zone d'accès restreint.
 19. DISCLAIMER: These instructions are provided according to IEC 704-1 standards. Advantech disclaims all responsibility for the accuracy of any statements contained herein.
AVERTISSEMENT: Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce document.
 20. The product is intended to be supplied by an UL listed power supply suitable for use at minimum Tma 40 degree C whose output meets PS2(or LPS) and is rated: 19Vdc, 3.42A min. If need further assistance, please contact Advantech for further information.
Le produit doit être alimenté par une alimentation certifiée UL, adaptée à une utilisation à une température ambiante minimale (Tma) de 40 °C, dont la sortie répond aux exigences PS2 (ou LPS) et est spécifiée: 19 Vcc, 3,42 A minimum. Pour toute assistance supplémentaire, veuillez contacter Advantech pour plus d'informations.

Packing List

Before installation, please ensure the following items have been shipped:

- 1 x DS-011
- 1 x 96PSA-A65W19V1-3 (19V power adapter)
- 1 x 1960057740T002 (Wall Mount brackets)

Optional Accessory

Part Number	Description
1700001524	3-pin power cord (US)
170203183C	3-pin power cord (EU)
170203180A	3-pin power cord (UK)
1702031836	3-pin power cord (AU)
1700008921	3-pin power cord with PSE (Japan)
1700019146	3-pin power cord with CCC (China)
1700018553	3-pin power cord (AU)
1700024849-01	3-pin power cord (TW)

Ordering Information

Part Number	Description
DS-011QF-U0A1E	DS-011,QCS6490,HDMI x 2
DS-011QF-U1A1E	DS-011,QCS6490,HDMI x 2,GMSL x 2
DS-011QF-U0A1U	DS-011,QCS6490,HDMI x 2,TW
DS-011QF-U1A1U	DS-011,QCS6490,HDMI x 2,GMSL x 2,TW

DS-011 Series Part Number

DS-011QF-U0A1E	DS-011QF-U0A3E	DS-011QF-U0A5E	DS-011QF-U2A1E	DS-011QF-U2A2E	DS-011QF-U0A1E
DS-011QF-U1A1E	DS-011QF-U1A3E	DS-011QF-U1A5E	DS-011QF-U3A1E	DS-011QF-U3A2E	DS-011QF-U1A1E
DS-011QF-U0A1U	DS-011QF-U0A3U	DS-011QF-U0A5U	DS-011QF-U4A1E	DS-011QF-U4A2E	DS-011QF-U0A1U
DS-011QF-U1A1U	DS-011QF-U1A3U	DS-011QF-U1A5U	DS-011QF-U5A1E	DS-011QF-U5A2E	DS-011QF-U1A1U
DS-011QF-U0A2E	DS-011QF-U0A4E	DS-011QF-U0A6E	DS-011QF-U2A1U	DS-011QF-U2A2U	DS-011QF-U0A2E
DS-011QF-U1A2E	DS-011QF-U1A4E	DS-011QF-U1A6E	DS-011QF-U3A1U	DS-011QF-U3A2U	DS-011QF-U1A2E
DS-011QF-U0A2U	DS-011QF-U0A4U	DS-011QF-U0A6U	DS-011QF-U4A1U	DS-011QF-U4A2U	DS-011QF-U0A2U
DS-011QF-U1A2U	DS-011QF-U1A4U	DS-011QF-U1A6U	DS-011QF-U5A1U	DS-011QF-U5A2U	DS-011QF-U1A2U
DS-011QF-U0A1E	DS-011QF-U0A3E	DS-011QF-U0A5E	DS-011QF-U2A1E	DS-011QF-U2A2E	DS-011QF-U0A1E
DS-011QF-U1A1E	DS-011QF-U1A3E	DS-011QF-U1A5E	DS-011QF-U3A1E	DS-011QF-U3A2E	DS-011QF-U1A1E
DS-011QF-U0A1U	DS-011QF-U0A3U	DS-011QF-U0A5U	DS-011QF-U4A1E	DS-011QF-U4A2E	DS-011QF-U0A1U
DS-011QF-U1A1U	DS-011QF-U1A3U	DS-011QF-U1A5U	DS-011QF-U5A1E	DS-011QF-U5A2E	DS-011QF-U1A1U
DS-011QF-U0A2E	DS-011QF-U0A4E	DS-011QF-U0A6E	DS-011QF-U2A1U	DS-011QF-U2A2U	DS-011QF-U0A2E
DS-011QF-U1A2E	DS-011QF-U1A4E	DS-011QF-U1A6E	DS-011QF-U3A1U	DS-011QF-U3A2U	DS-011QF-U1A2E

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Chapter 1

General Introduction

This chapter gives background information of DS-011 series.

1.1 Introduction

Advantech DS-011 is a compact digital signage player powered by the Qualcomm QCS-6490 processor, delivering advanced AI capabilities, multiple display outputs, and robust connectivity in a fanless, energy-efficient design — ideal for retail, transportation, and industrial applications requiring reliable, high-performance content delivery.

1.2 Product Features

1.2.1 General

- Qualcomm QCS-6490 processor.
- GPU Adreno™ 643, 812Mhz
- Supports 2 HDMI ports.
- Supports 2 x USB 3.2 Gen1
- Supports M.2 2280 M Key (NVME) for storage

1.2.2 Display

- **HDMI1:** 1 x HDMI 2.1 TMDS @3840 x 2160 30Hz(4K30)
- **HDMI2:** 1 x HDMI 2.1 TMDS @3840 x 2160 60Hz(4K60)

Note! Up to 1x 4K60 video playback on one of the 4K displays.
Default setting is 2K resolution.



1.2.3 Thermal Solution

- Fanless

1.3 Hardware & Software Specifications

- **CPU:** Qualcomm QCS-6490
- **GPU:** Adreno™ 643, 812Mhz
- **NPU:** Hexagon™ 770, 1.45Ghz, 12 TOPS
- **System Memory:** 8GB LPDDR5 8533MT/s on board
- **Storage:** M.2 2280 M Key (NVME)
- **IO Interfaces:**
 - 2 x HDMI ports
 - 2 x USB 3.2 Gen1
 - 2 x RS232
 - 2 x LAN (by RJ-45)
 - 2 x GMSL for options
- **Ethernet Chipset:**
 - Controller: RTL8211FS
 - Speed: 10/100/1000 Mbps
 - Interface: Gigabit LAN Controller
 - Connector: 2 x RJ45

1.4 Mechanical Specifications

1.4.1 Dimensions

180 x 177 x 23 mm

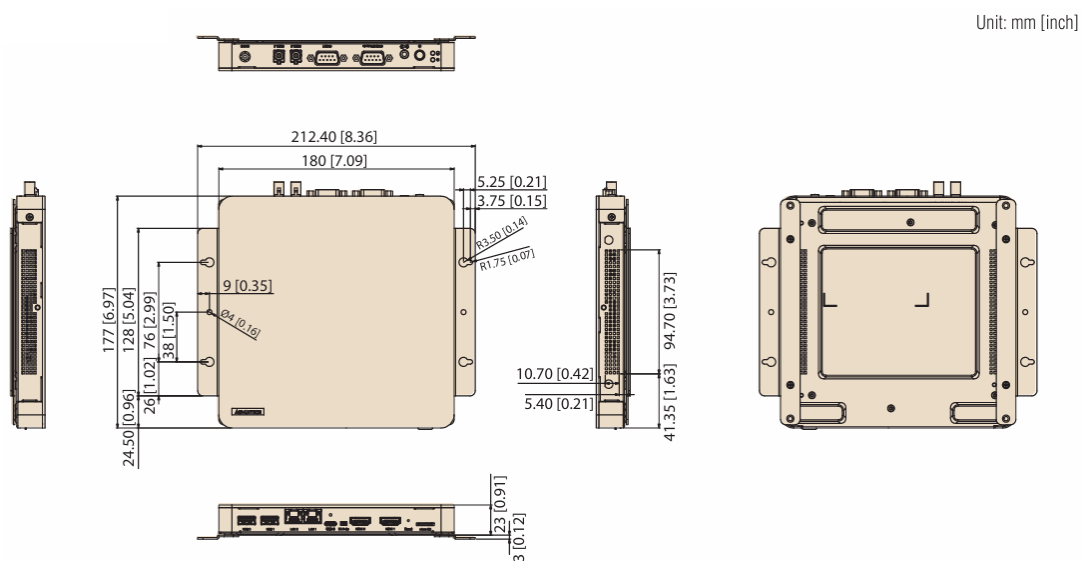


Figure 1.1 Dimensions

1.4.2 Weight

- 0.9 kg (Net weight)

1.5 Power Requirements

1.5.1 System Power

- **Max:** 19V@3.42A

1.6 Environment Specifications

1.6.1 Operating Temperature

- 0 ~ 40 °C with air flow

1.6.2 Relative Humidity

- 95% @40 °C (non-condensing)

1.6.3 Storage Temperature

- -20 ~ 85 °C (-4 ~ 140 °F)

1.6.4 Vibration Loading During Operation

- 0.5 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 3 axes, 1 hr/axis.

1.6.5 Shock During Operation

- 20 G, IEC 60068-2-27, half sine, 11 ms duration

1.6.6 Safety

- UL, CB, BSMI

1.6.7 EMC

- CE, FCC Class B, BSMI, UKCA

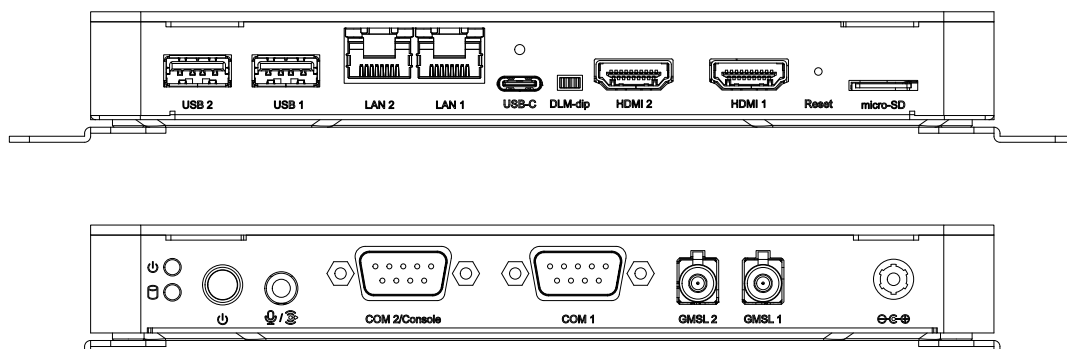
Chapter 2

Hardware Installation

This chapter introduces external IO and the installation of DS-011 series Hardware.

2.1 DS-011 I/O

With GMSL



Without GMSL

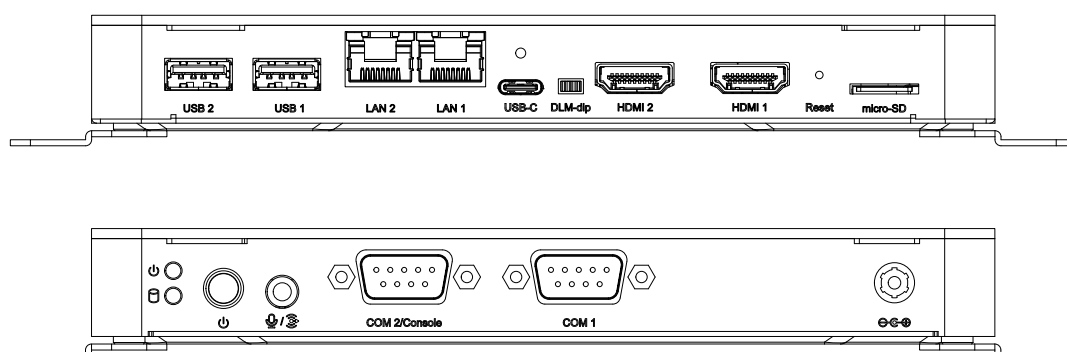


Figure 2.1 DS-011 I/O

2.1.1 Audio Connectors

DS-011 audio connectors can be connected with stereo speakers, or microphone by selecting from the audio application in the operating system.



Figure 2.2 Audio Connectors

2.1.2 LED

This LED indicator means power on status when it shows green.



Figure 2.3 Power

This LED indicator means eMMC status is active when it shows orange.



Figure 2.4 LED - Storage

2.1.3 Power On/Off

Push this button to power on/off DS-011.



Figure 2.5 Power Button

2.1.4 COM Connector

DS-011 provides two D-sub 9-pin connector serial communication interface port. The port supports RS-232 communications.

2.1.4.1 COM1 Connector

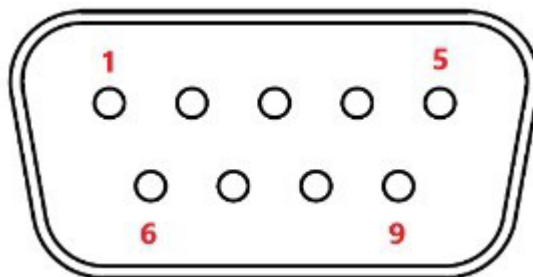


Figure 2.6 DB9 connector

Table 2.1: COM1 Connector

Pin	Signal
1	COM3 TX (Jumper option)
2	COM1 RX
3	COM1 TX
4	NA
5	GND
6	COM3 RX (Jumper option)
7	COM1 RTS#
8	COM1 CTS#
9	PWR BTN (Jumper option)

2.1.4.2 COM2 Connector

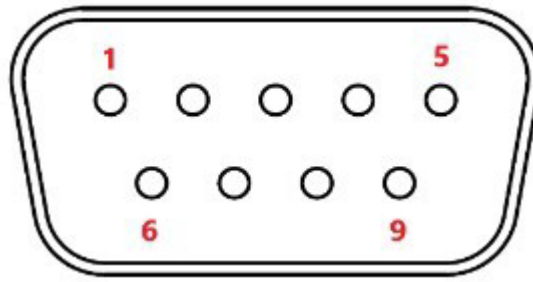


Figure 2.7 DB9 connector

Table 2.2: COM2 Connector

Pin	Signal
1	NA
2	COM2 RX or Console RX (Jumper option)
3	COM3 TX or Console TX (Jumper option)
4	NA
5	GND
6	NA
7	NA
8	NA
9	NA

2.1.5 USB Connector

DS-011 provides two USB 3.2 Gen1.

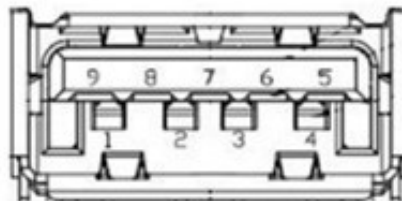


Figure 2.8 USB 3.2 Connector

Table 2.3: USB Port Pin Assignments

Pin	Signal
1	VCC
2	USB Data-
3	USB Data+
4	GND
5	SSRX-
6	SSRX+
7	GND
8	SSTX-
9	SSTX+

2.1.6 LAN Connector

The DS-011 is equipped with two Gigabit LAN ports compliant with IEEE 802.3u standards for 10/100/1000Base-T CSMA/CD. Each Ethernet port uses a standard RJ-45 connector with built-in LEDs to indicate link/activity status and connection speed.

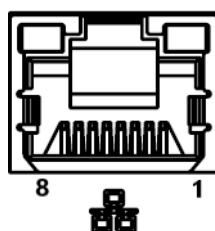


Figure 2.9 RJ-45 connector

Table 2.4: LAN Port Pin Assignments

Pin	Signal
1	MDI1+
2	MDI1-
3	MDI2+
4	MDI3+
5	MDI3-
6	MDI2-
7	MDI4+
8	MDI4-

Table 2.5: LEDs

Right side LED: Green LED

Link Status	Always turn on without transmitting/receiving data Activity status
Activity status	Flash

Left side LED: Green/Orange LED

Status	Display
10 Mbps	Always off
100 Mbps	Orange
1000 Mbps	Green

2.1.7 Reset Button

This button resets the CPU, allowing the system to reboot in case of errors or to help resolve faults.



Reset

Figure 2.10 Reset Button

2.1.8 HDMI Port

The HDMI ports deliver uncompressed, all-digital audio and video, are HDCP-compliant, and support connections to HDMI-compatible devices. Ports 1 and 2 support resolutions up to 4K.

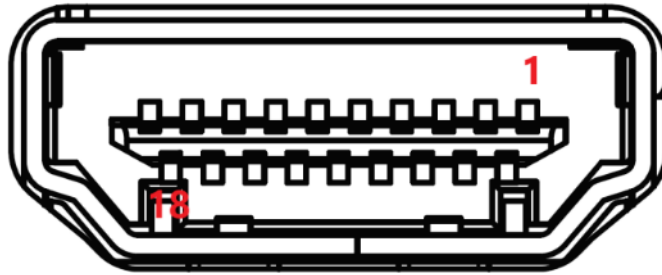


Figure 2.11 HDMI Connector

Table 2.6: HDMI Pin Assignments

Pin	Signal
1	TMDS Data 2+
2	TMDS Data 2 shield
3	TMDS Data 2-
4	TMDS Data 1+
5	TMDS Data 1 shield
6	TMDS Data 1-
7	TMDS Data 0+
8	TMDS Data 0 shield
9	TTMDS Data 0-
10	TMDS Clock+
11	TMDS Clock shield
12	TMDS Clock-
13	CEC (Support by OEM/ODM)
14	Reserved
15	SCL
16	SDA
17	DDC/CEC Ground
18	+5V

2.2 Switch

The main switch 1 & 7 locations and functions are listed in below DS-011 PCB location.

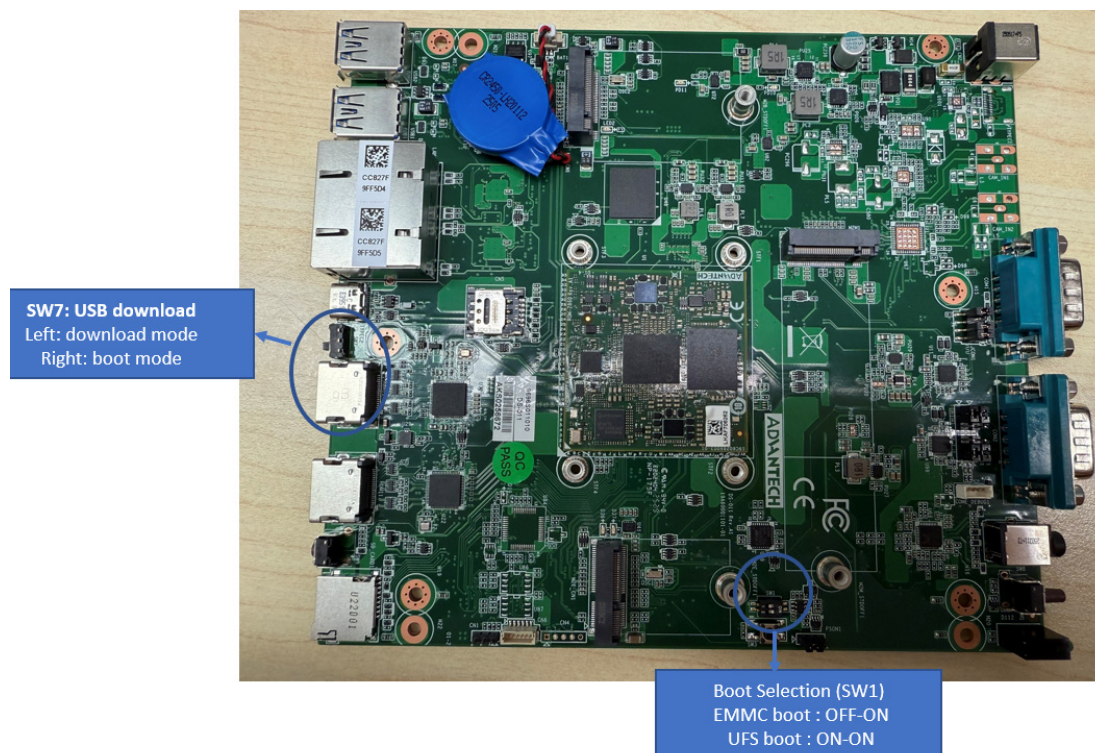


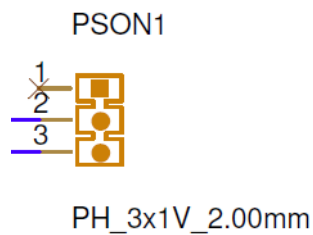
Table 2.7: Switch

Item	SW 7	SW 1
Function	USB download	Boot Selection
Switch to right	Boot mode	EMMC boot off-on
Switch to left	Download mode	UFS boot off-on

2.2.1 AT/ATX Mode Jumper

Table 2.8: AT/ATX Mode Jumper

Location	PSON1
Part number	1653003101
Foot Print	HD_3x1P_79_D
Description	PIN HEADER 3x1P2.0mm 180D(M)DIP 2000-13WS
Setting	Function
(1-2) *	ATX (Default)
(2-3)	AT



2.2.2 Other Jumpers

Other Jumpers in the PCB are reserved for circuit options and OEM support. Please keep it as default shipping status.

2.3 Installation

2.3.1 SSD/Wireless Module Installation

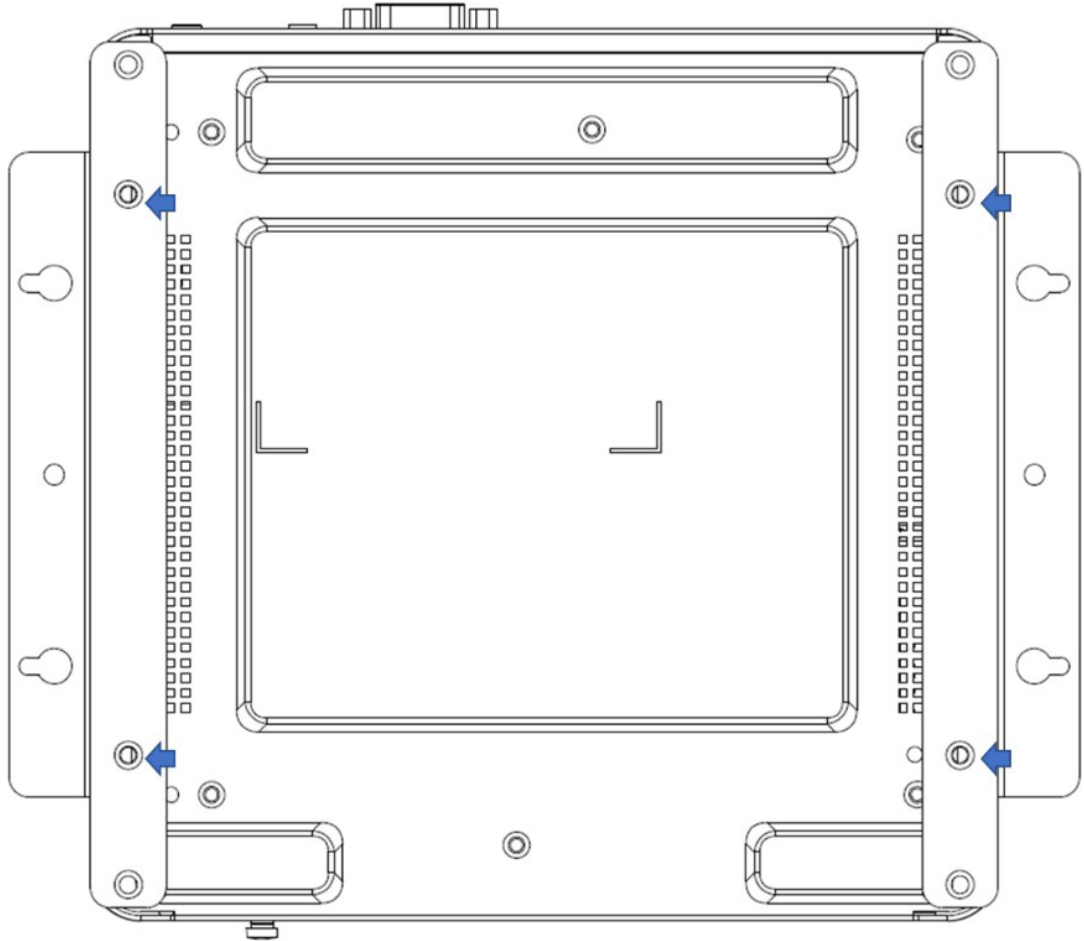
1. Remove the 6 yellow-marked screws from the back cover.
2. Remove the top cover, install storage/LTE/WiFi module, and secure it with a screw.



2.3.2 Wall Mount Installation

To install the system using the wall mount kit, secure it with four M3-4L (7 mm) screws, following the indicated arrow directions.

Lors de l'installation du système avec le kit de montage mural, veuillez visser les quatre vis M3-4L selon les indications des flèches.



Chapter 3

ARM-Base Device
Firmware

3.1 DS-011 Firmware Introduction

The DS-011 offers flexible software images supporting both Yocto-based Linux and Android 15 Kernel: 6.6.28. Windows base will be released in Q4 2025.

This multi-platform design enables developers and system integrators to choose the ideal environment for their applications — Yocto provides a customizable, lightweight Linux distribution for embedded solutions, while Android 15 delivers a modern, user-friendly interface with robust app ecosystem support.

3.2 Device Part Numbers and Firmware

This table lists the corresponding part numbers with their supported operating systems. For detailed hardware configurations, please refer to the DS-011 datasheet.

Table 3.1: Device Part Numbers and Firmware

Part Number	OS	Version
DS-011QF-U0A1E	Yocto	kirkstone4.0.18/ Kernel: 6.6.28
DS-011QF-U1A1E	Yocto	kirkstone4.0.18/ Kernel: 6.6.28
DS-011QF-U0A1U	Yocto	kirkstone4.0.18/ Kernel: 6.6.28
DS-011QF-U1A1U	Yocto	kirkstone4.0.18/ Kernel: 6.6.28
DS-011QF-U0A2E	Android	15 Kernel: 6.6.28
DS-011QF-U0A2U	Android	15

3.3 Software Functionality

3.3.1 Display

3.3.1.1 HDMI

It can support the 4K@30, 1080P@60, 720P@60 and 480P@60 timing. And it can also support the Dynamic Resolution Switch.

■ Manually Switch to 4K@30

```
# echo 3840 2160 30 > /sys/bus/i2c/drivers/lt9611/2-002b/edid_mode
# systemctl restart init_display.service
```

■ Manually Switch to 1080P@60

```
# echo 1920 1080 60 > /sys/bus/i2c/drivers/lt9611/2-002b/edid_mode
# systemctl restart init_display.service
```

■ Manually Switch to 720P@60

```
# echo 1280 720 60 > /sys/bus/i2c/drivers/lt9611/2-002b/edid_mode
# systemctl restart init_display.service
```

■ Manually Switch to 480P@60

```
# echo 720 480 60 > /sys/bus/i2c/drivers/lt9611/2-002b/edid_mode
# systemctl restart init_display.service
```

3.3.2 Audio

Audio Path

```
# pactl set-source-port regular2 speaker-mic
# tinymix set "Stereo1 ADC L Mux" 0
# tinymix set "STO1 ADC Capture Switch" 1
# tinymix set "RECMIX1L CBJ Switch" 1
# tinymix set "IF1 01 ADC Swap Mux" 2
# tinymix set "CBJ Boost Volume" 3
# tinymix set "Stereo1 ADC L1 Mux" 1
# tinymix set "Stereo1 ADC R1 Mux" 1
# tinymix set "Stereo1 ADC MIXL ADC2 Switch" 0
# tinymix set "Stereo1 ADC MIXR ADC2 Switch" 0
# tinymix set "Stereo1 ADC MIXL ADC1 Switch" 1
# tinymix set "Stereo1 ADC MIXR ADC1 Switch" 1
# source /opt/qcom/qirp-sdk/qirp-setup.sh
```

Mic-in (Either one)

```
# gst-launch-1.0 -v pulsesrc volume=5 ! audioconvert ! wavenc !
filesink location=/tmp/audio_48k.wav
```

Or

```
# parec -v --rate=48000 --format=s16le --channels=1 --file-for-
mat=wav /tmp/audio_48k.wav --device=regular2
```

When you see the countdown timer start, it means recording has begun.

To stop the recording, press Ctrl + C.

```
/GstPipeline:pipeline0/GstPulseSrc:pulsesrc0: current-device = regular0
0:00:13.4 / 99:99:99.
```

Line-out

command (Either one)

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# gst-launch-1.0 -e filesrc location=/tmp/audio_48k.wav ! wavparse !
audioconvert ! pulsesink volume=5
```

or

```
# paplay /tmp/audio_48k.wav
```

3.3.3 Storages

3.3.3.1 EMMC

eMMC: /dev/mmcblk0

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mmcblk0 of=backup bs=1 count=1024 skip=4096 # dd
if=data of=/dev/mmcblk0 bs=1 seek=4096
# dd if=/dev/mmcblk0 of=data1 bs=1 count=1024 skip=4096 # diff data
data1
# dd if=backup of=/dev/mmcblk0 bs=1 seek=4096
```

3.3.3.2 SD Card

Connect the Micro SD card to the ROM-ED92 SD_CARD1.

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mmcblk1 of=backup bs=1 count=1024 skip=4096 # dd
if=data of=/dev/mmcblk1 bs=1 seek=4096
# dd if=/dev/mmcblk1 of=data1 bs=1 count=1024 skip=4096 # diff data
data1
# dd if=backup of=/dev/mmcblk1 bs=1 seek=4096
```

3.3.3.3 UFS

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/sda of=backup bs=1 count=1024 skip=4096 # dd if=data
of=/dev/sda bs=1 seek=4096
# dd if=/dev/sda of=data1 bs=1 count=1024 skip=4096 # diff data data1
# dd if=backup of=/dev/sda bs=1 seek=4096
```

Need to do the UFS Provision, first.

3.3.3.4 SPI Flash

- ROM-ED92: SPI1 CS0 and CS1
- ROM-ED92: SPI2 CS0 and CS1
- ROM-ED92: SPI3 CS0 and CS1

For the ROM-ED92: SPI0 CS1

(1) HW need to rework R419 and R421 of ROM-ED92

(2) SW need to change the cdt:

```
/tools/cdt/emmcChangeToHDMIwithSGTL5000AllSPI.sh or
/tools/cdt/ufsChangeToHDMIwithSGTL5000AllSPI.sh
```

For the ROM-ED92: SPI1 CS1

(1) HW need to rework R420 and R422 of ROM-ED92

(2) SW need to change the cdt:

```
/tools/cdt/emmcChangeToHDMIwithSGTL5000AllSPI.sh or
/tools/cdt/ufsChangeToHDMIwithSGTL5000AllSPI.sh
```

/dev/mtd0

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mtd0 of=backup bs=1 count=1024 skip=4096 # dd if=data
of=/dev/mtd0 bs=1 seek=4096
# dd if=/dev/mtd0 of=data1 bs=1 count=1024 skip=4096 # diff data
data1
# dd if=backup of=/dev/mtd0 bs=1 seek=4096
```

3.3.4 Serial Ports

COM 1

2-Wire command:

```
# stty -F /dev/ttyHS3 -echo -onlcr 115200 raw
# cat /dev/ttyHS3 &
# echo "Serial Port Test" > /dev/ttyHS3
```

4-Wire command:

```
# stty -F /dev/ttyHS2 -echo -onlcr 115200 raw
# cat /dev/ttyHS2 &
# echo "Serial Port Test" > /dev/ttyHS2
```

COM 2

```
# stty -F /dev/ttyHS4 -echo -onlcr 115200 raw
# cat /dev/ttyHS4 &
# echo "Serial Port Test" > /dev/ttyHS4
```

3.3.5 Wireless Module

3.3.5.1 LTE Function (M.2 Key B)

default at+gtusbmode=17 mode

Command

Remove effected Driver

```
# rmmod qmi_wwan
```

Connect

```
# pppd connect 'chat -v -s -t 10 "" "AT" "" "ATDT*99#" "CONNECT" ""'
user username password password /dev/ttyUSB2 460800 nodetach crtscts
debug usepeerdns defaultroute &
```

```

root@qcs6490aom2721a1:~# rmmod qnl_wan
root@qcs6490aom2721a1:~# pppd connect chat -v -s -t 10 "" "AT" "" "ATDT'99#" "CONNECT" "" user username password password /dev/ttyUSB2 460800 nodetach crtscts debug usepeerdns defaultroute &
[1] 1990
root@qcs6490aom2721a1:~# send (AT'M)
send (ATDT'99#)
expect (CONNECT)
^M
OK^M
^M
CONNECT
-- got it

send (RM)
Script chat -v -s -t 10 "" "AT" "" "ATDT'99#" "CONNECT" "" finished (pid 1991), status = 0x0
Serial connection established.
Using channel 1
Using interface ppp0
Connect: ppp0 <-> /dev/ttyUSB2
sent [LCP ConfReq id=0x1 <asyncmap 0x0> <magic 0x8617344c> <pcmp> <accomp>]
rcvd [LCP ConfReq id=0x0 <asyncmap 0x0> <auth chap MD5> <magic 0xf321195> <pcmp> <accomp>]
sent [LCP ConfAck id=0x0 <asyncmap 0x0> <auth chap MD5> <magic 0xf321195> <pcmp> <accomp>]
rcvd [LCP ConfAck id=0x1 <asyncmap 0x0> <magic 0x8617344c> <pcmp> <accomp>]
rcvd [LCP DiscReq id=0x1 <magic 0xf321195>]
rcvd [CHAP Challenge id=0x1 <5c2a8b0c4652f8a8e6df63bea378a6d>, name = ""]
sent [CHAP Response id=0x1 <b94816d8f46213cd488858fbd0662a4>, name = "username"]
rcvd [CHAP Success id=0x1 ""]
CHAP authentication succeeded
CHAP authentication succeeded
sent [LCP ConfReq id=0x1 <deflate 15> <deflate(older) 15> <bsd v1 15>]
sent [IPv6CP ConfReq id=0x1 <addr fe80::81f8:0053:1f46:475e>]
sent [IPv6CP ConfReq id=0x2 00 1d 01 01 00 0f 1a 04 78 00 16 04 78 00 15 03 2f]
Protocol-Reject for 'Compression Control Protocol' (0x00fd) received
rcvd [IPCP ConfReq id=0x0]
sent [IPCP ConfNak id=0x0 <addr 0.0.0.0>]
rcvd [IPCP ConfReq id=0x1 <compress VJ 0f 01>]
sent [IPCP ConfReq id=0x2 <addr 0.0.0.0> <ms-dns1 0.0.0.0> <ms-dns2 0.0.0.0>]
rcvd [IPCP ConfReq id=0x1]
sent [IPCP ConfNak id=0x1]
rcvd [IPCP ConfReq id=0x2 <addr 10.126.244.113> <ms-dns1 108.95.1.1> <ms-dns2 108.95.192.1>]
sent [IPCP ConfReq id=0x3 <addr 10.126.244.113> <ms-dns1 108.95.1.1> <ms-dns2 108.95.192.1>]
rcvd [IPCP ConfAck id=0x3 <addr 10.126.244.113> <ms-dns1 108.95.1.1> <ms-dns2 108.95.192.1>]
Could not determine remote IP address: defaulting to 10.64.64.64
local IP address 10.126.244.113
remote IP address 10.64.64.64
primary DNS address 108.95.1.1
secondary DNS address 108.95.192.1
Script /etc/ppp/ip-up started (pid 2016)
Script /etc/ppp/ip-up finished (pid 2016), status = 0x0
sent [IPv6CP ConfReq id=0x1 <addr fe80::81f8:0053:1f46:475e>]
rcvd [IPv6CP ConfReq id=0x0 <addr fe80::49d4:daff:7c71:14cd>]
sent [IPv6CP ConfNak id=0x0 <addr fe80::49d4:daff:7c71:14cd>]
rcvd [IPv6CP ConfNak id=0x1 <addr fe80::54f4:521c:d711:1bab>]
sent [IPv6CP ConfReq id=0x2 <addr fe80::54f4:521c:d711:1bab>]
rcvd [IPv6CP ConfAck id=0x2 <addr fe80::54f4:521c:d711:1bab>]
local LL address fe80::54f4:521c:d711:1bab
remote LL address fe80::49d4:daff:7c71:14cd

```

Confirm IP and confirm to connect

```

# ifconfig -a
# ping 8.8.8.8

```

```

ppp0      Link encap:Point-to-Point Protocol
          inet addr:10.126.244.113 P-t-P:10.64.64.64  Mask:255.255.255.255
          inet6 addr: fe80::54f4:521c:d711:1bab/128 Scope:Link
          UP POINTOPOINT RUNNING NOARP MULTICAST MTU:1500 Metric:1
          RX packets:8 errors:0 dropped:0 overruns:0 frame:0
          TX packets:21 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:3
          RX bytes:104 (104.0 B)  TX bytes:897 (897.0 B)

root@qcs6490aom2721a1:~#
root@qcs6490aom2721a1:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=114 time=83.2 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=114 time=60.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=114 time=101 ms

```

3.3.5.2 WiFi Function (M.2 Key E)

Module: AIW-170BQ-001

Wi-Fi

Command

Please replace SSID and PASSWORD with your hotspot's username and password.

```
# wpa_supplicant -i wlp1s0 -Dnl80211 -c /etc/wpa_supplicant.conf &

# wpa_cli -i wlp1s0 -p /var/run/sockets remove_network all
# wpa_cli -i wlp1s0 -p /var/run/sockets add_network
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 ssid \"SSID\"
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 key_mgmt WPA-PSK
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 proto WPA RSN
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 auth_alg OPEN
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 pairwise TKIP CCMP
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 group TKIP CCMP
# wpa_cli -i wlp1s0 -p /var/run/sockets set_network 0 psk \"PASS-WORD\"
# wpa_cli -i wlp1s0 -p /var/run/sockets select_network 0
# wpa_cli -i wlp1s0 -p /var/run/sockets reconnect
```

Bluetooth

```
# setenforce 0
# hciconfig
# hciconfig hci0 up
# bluetoothctl
# discoverable on
# pairable on
# scan on
[NEW] FC:18:3C:8D:75:F4 myphone
# scan off
# pair FC:18:3C:8D:75:F4
# connect FC:18:3C:8D:7
```

3.3.6 Ethernet

Check Ethernet

```
enP1p5s0f0 Link encap:Ethernet HWaddr EE:A9:36:72:A7:B9
            inet addr:172.22.12.138 Bcast:172.22.15.255
            Mask:255.255.252.0 inet6 addr:
            fe80::2009:4a63:5a32:d2ab/64 Scope:Link inet6
            addr: fe80::eca9:36ff:fe72:a7b9/64
            Scope:Link UP BROADCAST RUNNING MULTICAST
            MTU:1500 Metric:1 RX packets:118
            errors:0 dropped:10 overruns:0 frame:0 TX packets:37
            errors:0 dropped:0 overruns:0 carrier:0 collisions:0
            txqueuelen:1000 RX bytes:27625 (26.9 KiB)
            TX bytes:6142 (5.9 KiB) Interrupt:239

enP1p5s0f1 Link encap:Ethernet HWaddr
            EE:51:3E:06:D5:3C UP BROADCAST MULTICAST
            MTU:1500 Metric:1
            RX packets:0 errors:0 dropped:0 overruns:0 frame:0
            TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000 RX bytes:0 (0.0 B)
            TX bytes:0 (0.0 B) Interrupt:244

lo          Link encap:Local Loopback
            inet addr:127.0.0.1 Mask:255.0.0.0 inet6 addr: ::1/128
            RX packets:18 errors:0 dropped:0 overruns:0 frame:0
            TX packets:18 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:2272 (2.2 KiB) TX bytes:2272 (2.2 KiB)
```

Ping Test

```
# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: icmp_seq=0 ttl=113 time=5.320 ms
64 bytes from 8.8.8.8: icmp_seq=1 ttl=113 time=7.445 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=113 time=7.367 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=113 time=7.431 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=113 time=6.394 ms
```

Ethernet LED Lights Test

■ Link LED Light

1. 10M - orange and green light: always off
2. 100M - orange light: always on
3. 1000M - green light: always on

■ Active LED Light

1. 10M - green light: flashing on
2. 100M - green light: flashing on
3. 1000M - green light: flashing on

10M Speed Setting

```
# ethtool -s enP1p5s0f0 speed 10 duplex full
# ethtool -s enP1p5s0f1 speed 10 duplex full
```

100M Speed Setting

```
# ethtool -s enP1p5s0f0 speed 100 duplex full
# ethtool -s enP1p5s0f1 speed 100 duplex full
```

1000M Speed Setting

```
# ethtool -s enP1p5s0f0 speed 1000 duplex full
# ethtool -s enP1p5s0f1 speed 1000 duplex full
```

3.3.7 USB

- Micro USB: ROM-ED92 USB0
- USB 2.0/3.0 Type A: ROM-ED92 USB1

Micro USB

Micro USB is only for the EDL download. If you need to use the adb or fastboot, you need to set the Micro USB to peripheral mode.

```
# mount -t debugfs none /sys/kernel/debug
echo "peripheral" > /sys/devices/platform/soc/a600000.ssusb/mode
```

USB 2.0/3.0 Type A

If you want to use the USB 2.0/3.0 Type A, please you don't connect the Micro USB. Then inserting the USB 2.0/3.0 flash drive to the USB 2.0/3.0 Type A.

Check the USB flash drive

```
# lsusb -t
/: Bus 05.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/lp, 5000M
| Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 5000M
| Port 2: Dev 3, If 0, Class=Mass Storage, Driver=usb-storage,
5000M
/: Bus 04.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/lp, 480M
/: Bus 03.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/0p, 5000M
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=xhci-hcd/lp, 480M
| Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 480M
| Port 1: Dev 3, If 0, Class=Mass Storage, Driver=usb-storage,
480M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=dummy_hcd/lp, 480M
```

USB Flash Drive Read/Write

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/sda of=backup bs=1 count=1024 skip=4096 # dd if=data
of=/dev/sda bs=1 seek=4096
# dd if=/dev/sda of=data1 bs=1 count=1024 skip=4096 # diff data data1
# dd if=backup of=/dev/sda bs=1 seek=4096
```

3.3.8 TPM

Perform read/write tests on the TPM.

Command: The red text below can be replaced with any string.

```
# tpm2_nvdefine -Q 0x1500031 -C o -s 32 -a "ownerread|policy-  
write|ownerwrite"  
# echo "write_tpm_adv" > adv.data  
# tpm2_nvwrite -Q 0x1500031 -C o -i adv.data  
# tpm2_nvread -Q 0x1500031 -C o -s 32 -o read.data  
# cat read.data
```

```
root@qcs6490aom2721a1:~# tpm2_nvdefine -Q 0x1500031 -C o -s 32 -a "ownerread|policywrite|ownerwrite"  
root@qcs6490aom2721a1:~# echo "write_tpm_adv" > adv.data  
root@qcs6490aom2721a1:~# tpm2_nvwrite -Q 0x1500031 -C o -i adv.data  
root@qcs6490aom2721a1:~# tpm2_nvread -Q 0x1500031 -C o -s 32 -o read.data  
root@qcs6490aom2721a1:~# cat read.data  
write_tpm_adv  
root@qcs6490aom2721a1:~#
```

If encounter errors,

```
ERROR:esys:../tpm2-tss-2.4.6/src/tss2-esys/api/Esys_NV_DefineSpace.c:122:Esys_NV_DefineSpace() Esys Finish ErrorCode (0x0000014c)  
ERROR: Failed to define NV area at index 0x1500031
```

Please input the following command to reset

```
# tpm2_nvundefine 0x1500031
```

3.3.9 External RTC

Set system time to current, then write to RTC

```
# date 032010452024 && hwclock -w &&  
date Wed Mar 20 10:45:00 UTC 2024  
Wed Mar 20 10:45:01 UTC 2024
```

Set one incorrect time, then read time from RTC to verify

```
# date 010100002000 && hwclock -r &&  
date Sat Jan 1 00:00:00 UTC 2000  
2024-03-20 10:47:33.749407+00:00  
Sat Jan 1 00:00:00 UTC 2000
```

Restore the RTC time to system time

```
# hwclock -s && date  
Wed Mar 20 10:49:03 UTC 2024
```

3.3.10 Internal Watchdog

The system will enter the ramdump mode after the system crash about 11 seconds by the following command:

```
# echo c > /proc/sysrq-trigger
```

3.3.11 GMSL

MIPI-CSI (IMX577 with ROM-EV50)

MIPI CSI1 (IMX577)

Preview

1. 3840x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston
&& export WAYLAND_DISPLAY=wayland-1
&& gst-launch-1.0 -e qtiqmmfsrc camera=0 name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink fullscreen=true
```

2. 1920x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston
&& export WAYLAND_DISPLAY=wayland-1
&& gst-launch-1.0 -e qtiqmmfsrc camera=0 name=camsrc ! video/x-raw,format=NV12,width=1920,height=1080,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

MIPI CSI2 (IMX577)

Preview

1. 3840x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston
&& export WAYLAND_DISPLAY=wayland-1
&& gst-launch-1.0 -e qtiqmmfsrc camera=1 name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink fullscreen=true
```

2. 1920x2160@30:

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston
&& export WAYLAND_DISPLAY=wayland-1
&& gst-launch-1.0 -e qtiqmmfsrc camera=1 name=camsrc ! video/x-raw,format=NV12,width=1920,height=1080,framerate=30/1 ! waylandsink fullscreen=true async=true sync=false
```

MIPI CSI1 and MIPI CSI2 Multi Camera Preview

```
# source /opt/qcom/qirp-sdk/qirp-setup.sh
# export XDG_RUNTIME_DIR=/dev/socket/weston
&& export WAYLAND_DISPLAY=wayland-1
&& gst-launch-1.0 -e qtiqmmfsrc camera=0
name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink x=0 y=0 &
# export XDG_RUNTIME_DIR=/dev/socket/weston
&& export WAYLAND_DISPLAY=wayland-1
&& gst-launch-1.0 -e qtiqmmfsrc camera=1 name=camsrc ! video/x-raw,format=NV12,width=3840,height=2160,framerate=30/1 ! waylandsink x=960 y=0 &
```

3.4 Yocto

3.4.1 Flash Image

3.4.1.1 Flashing Tool - Linux-based Command

1. Copy Files to Host.
Copy the provided files to a Linux-based host system.
2. Extract the Tool.

```
$ tar -zxvf ds011_flash_tool.tar.gz
```

3. File List.
The flashing tool package contains:

```
ds011_flash_tool
├─ flash.sh
└─ qdl
```

Assume that the image archive is placed in this directory.

```
-rw-rw-r-- 1 adv adv 14938 七 25 16:18 flash.log
-rwxrwxr-x 1 adv adv 1893 七 25 16:16 flash.sh
drwxrwxr-x 8 adv adv 4096 七 25 11:16 .git
drwxr-xr-x 2 adv adv 4096 七 23 18:00 qcom-robotics-full-image
drwxr-xr-x 2 adv adv 4096 七 25 16:12 qcom-robotics-full-image-emmc
-rwxr--r-- 1 adv adv 5493405630 七 24 09:51 qcom-robotics-full-image.tar.gz
-rwxrwxr-x 1 adv adv 167168 七 25 11:16 qdl
-rw-rw-r-- 1 adv adv 985 七 25 11:16 README.md
```

- **qcom-robotics-full-image.tar.gz** – Image archive
- **qcom-robotics-full-image-emmc** – Extracted folder for eMMC boot images
- **qcom-robotics-full-image** – Extracted folder for UFS boot images
- **flash.sh** – Flashing script
- **flash.log** – Flashing process log
- **qdl** – Flashing utility

4. Board Switches and I/O
Boot Selection (SW1)
eMMC boot: **OFF-ON**
UFS boot: **ON-ON**



- 1) Power Button



- 2) Boot Mode (SW7)
Left: **Download mode**
Right: **Boot mode**



3.4.1.2 Online Flashing Procedure (Test)

- Before Flashing, **power off the board**.
- **Select the storage type you want to flash (eMMC or UFS).**
- **Switch SW7 to Download mode.**
- **Power on the board and press the Power Button.**
- Connect to Host: **Use a USB-C to USB-A cable to connect the device to the Linux host PC. Verify that the device is detected:**

Flash Command

Run the flashing script with the following syntax:

```
$ ./flash.sh -i <image_path> -s <storage>
```

Example: Flashing an eMMC image:

```
$ ./flash.sh -i qcom-robotics-full-image-emmc -s emmc  
-i : Path to the image directory containing the image files
```

```
[adv@qcom7890 09:25:02 projects]$ ls Qualcomm/qcom-robotics-full-image  
aop.mbn      gpt_backup0.bin  gpt_backup5.bin  gpt_main4.bin  kernel-modules.tgz  patch1.xml  prog_firehose.ldr.elf  rawprogram0.xml  rawprogram5.xml  tz.mbn      xbl.elf  
cpucp.elf    gpt_backup1.bin  gpt_main0.bin    gpt_main5.bin  KODIAK_IOT_2.1.bin  patch2.xml  prog_firehose_lite.elf  rawprogram1.xml  shrm.elf     uEFI.elf    xblRamdump.elf  
devcfg.mbn   gpt_backup2.bin  gpt_main1.bin    hypvm.mbn      logfs_ufs_8mb.bin  patch3.xml  provision_ufs31.xml    rawprogram2.xml  system.img   uEFI_sec.mbn  zeros_sectors.bin  
dtb.bin      gpt_backup3.bin  gpt_main2.bin    image          multi_image.mbn    patch4.xml  qd1                    rawprogram3.xml  tools.fv     valinux     zeros_sectors.bin  
efl.bin      gpt_backup4.bin  gpt_main3.bin    imagefv.elf    patch0.xml         patch5.xml  qupv3fw.elf            rawprogram4.xml  typescript   xbl_config.elf
```

-s : Target storage (ufs or emmc)

After Flashing

```
LOG: INFO: Calling handler for patch  
LOG: INFO: Calling handler for setbootablestoragedrive  
LOG: INFO: Using scheme of value= 0  
partition 0 is now bootable  
LOG: INFO: Calling handler for power  
LOG: INFO: Will issue reset/power off 100 useconds, if this hangs check if watchdog is enabled  
LOG: INFO: bsp_target_reset() 1  
[INFO] Flash Process Completed at 公曆 20廿五年 七月 廿五日 週五 十六時32分廿三秒  
[SUCCESS] Upgrade successful
```

Once the flashing process completes (as confirmed by the log output), power off the device. Set SW7 back to **Boot mode**. Power on and press the **Power Button**.

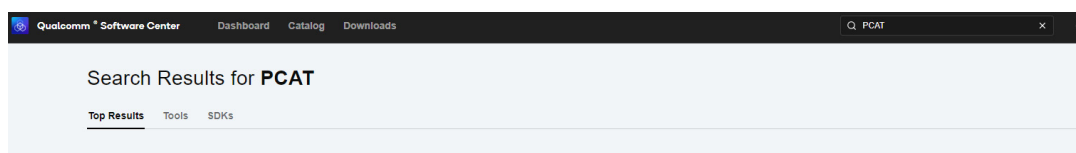
Important:

It is strongly recommended **not** to flash both storage types (eMMC and UFS) on the same DUT and then attempt to boot from UFS, as this may cause issues. In production, only one storage type is provided, so this situation should not occur.

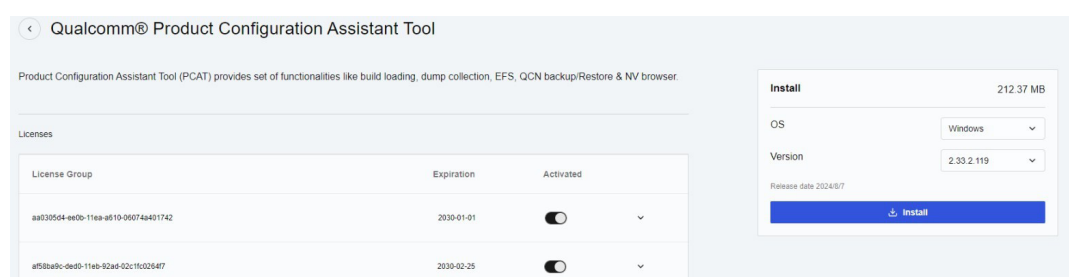
3.4.1.3 Flashing Tool - Windows PCAT Tool

Prepare

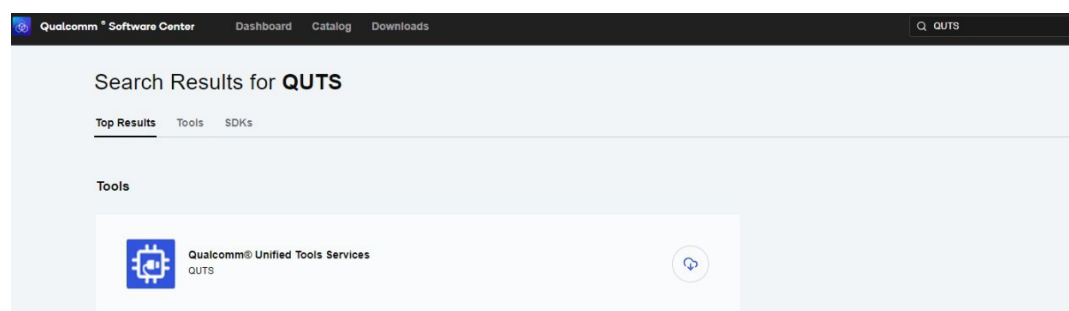
1. Download the Qualcomm Software Center:
https://softwarecenter.qualcomm.com/#/catalog/item/Qualcomm_Software_Center
2. Open the Qualcomm Software Center.
3. Search “PCAT” in the search bar.



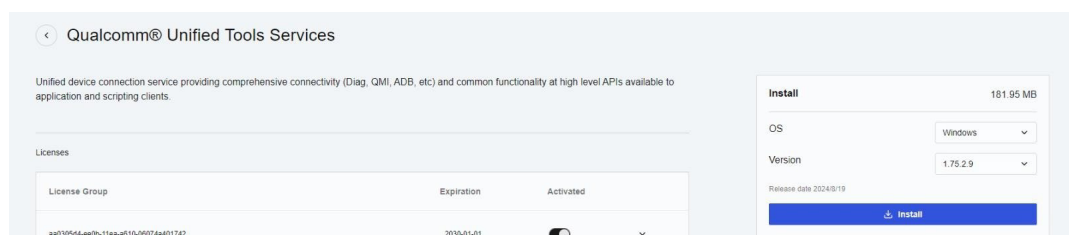
4. Click Qualcomm® Product Configuration Assistant Tool.
5. Select Qualcomm® Product Configuration Assistant Tool version: 2.33.2.119.



6. Install Qualcomm® Product Configuration Assistant Tool 2.33.2.119.
7. Search “QUTS” in the search bar.



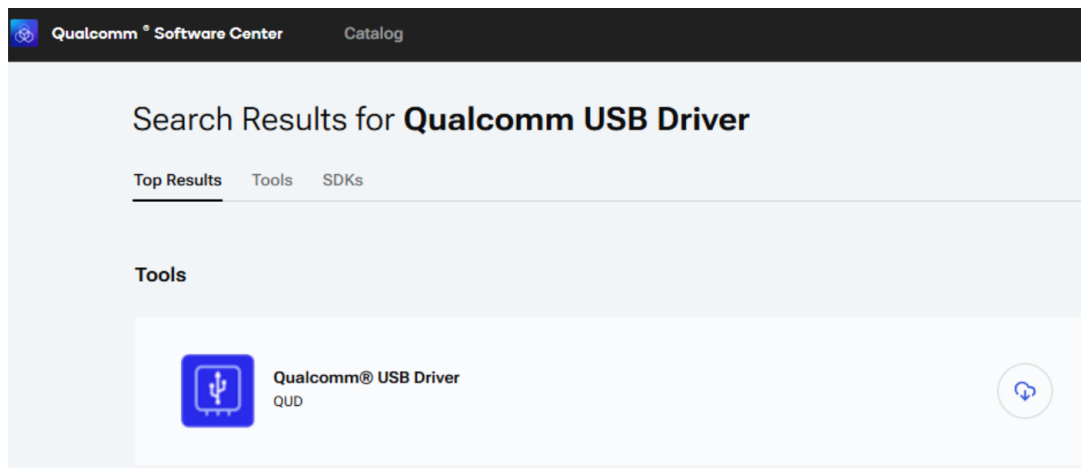
8. Click the Qualcomm® Unified Tools Services.
9. Select Qualcomm® Unified Tools Services version: 1.75.2.9.
10. Install Qualcomm® Unified Tools Services 1.75.2.9.



11. You will find the new application in your Windows system.



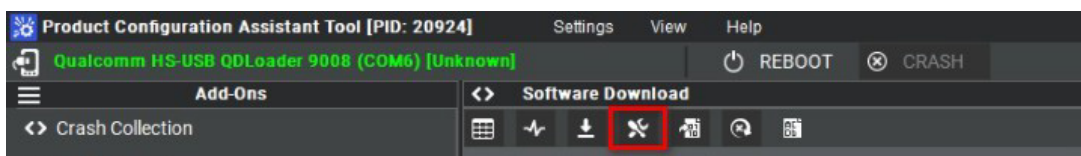
12. Unzip the UFS File and eMMC File.
For example:
2860A1AIM38LIV11030_2024-11-18_ufs.tgz
2860A1AIM38LIV11030_2024-11-18_emmc.tgz
13. Connect your device via Micro USB.
14. If your pc can not identify the USB, please download the “Qualcomm USB Driver”.
15. Search “Qualcomm USB Driver” in the search bar, then install the driver.



Reformat

For confirmation, we will erase the partition before UFS installation.

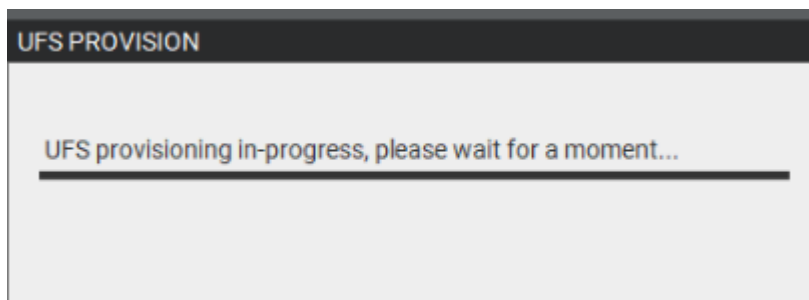
1. Select provision button.



2. Add the prog_firehose_dds.elf and provision_ufs31.xml in UFS folder.



- Then press “OK”, it will start to do USF Provision.

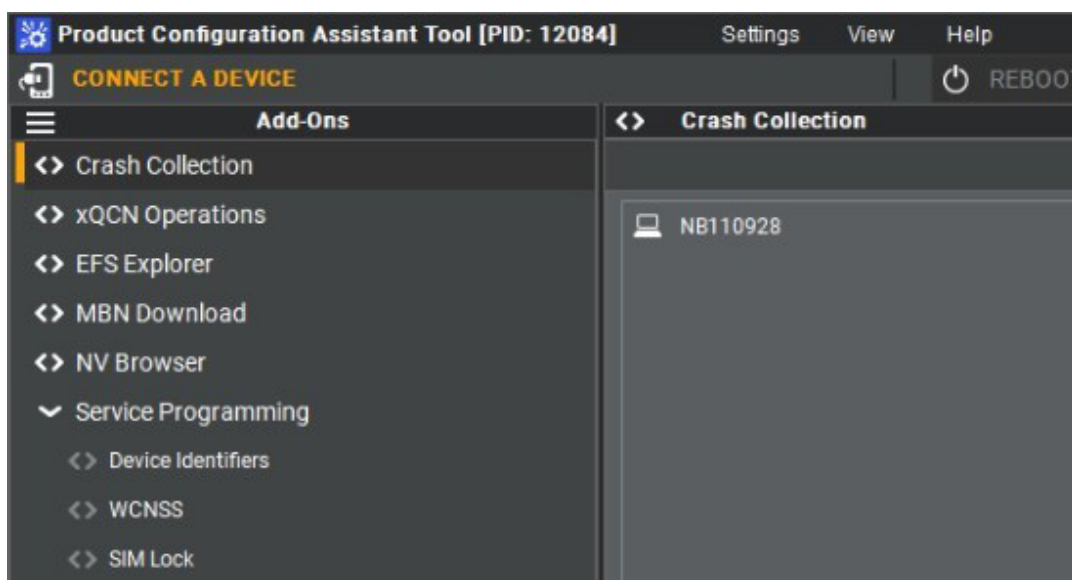


- When the Provision finished, you can see the result in message window.

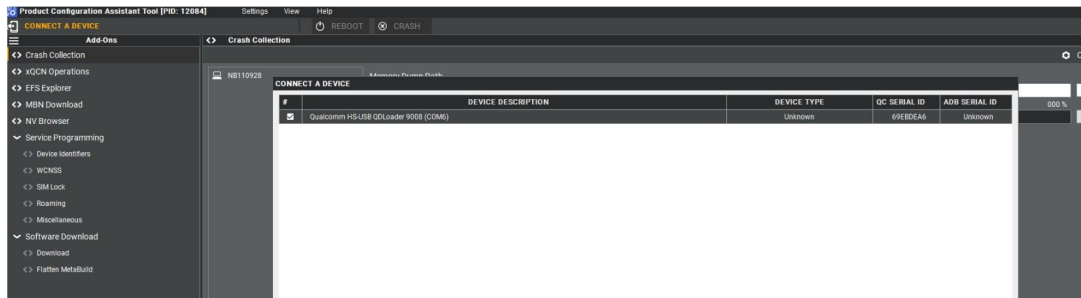
```
八月 28, 2024 11:31:22 STATUS [ FIRMWARE DOWNLOAD LOG ] Process Finished
八月 28, 2024 11:31:22 STATUS =====; Device UFS provisioning completed on the device - Qualcomm HS-USB QDLoader 9008 (COM6) :=====
八月 28, 2024 11:31:22 STATUS [ Status - DEVICE_NO_ERROR, Response - NO ERROR ]
```

Flash UFS

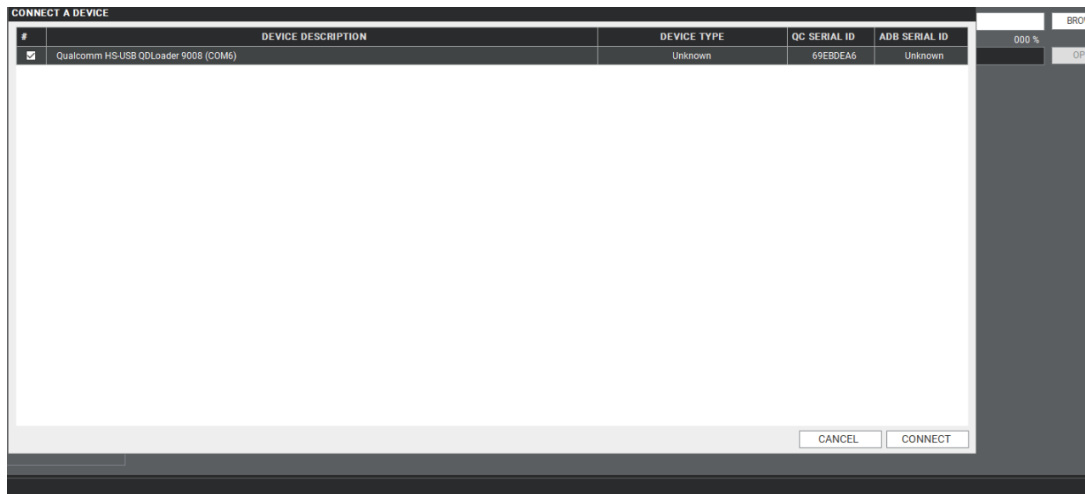
- Change the SW1 and SW2:
 - Flash UFS: The SW1 switch to 1-on, 2-on
 - Forced Recovery: The SW2 switch to 1-on, 2-on
- Turn on the power.
- Open “PCATApp” Tool.
- Click “Connect A Device”.



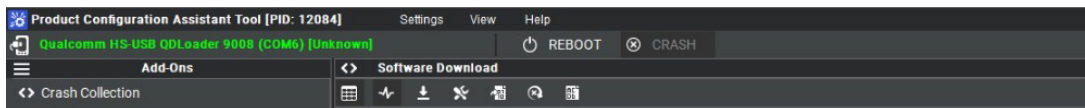
5. Select “Qualcomm HS-USB QDLoader 9008 (COM6).



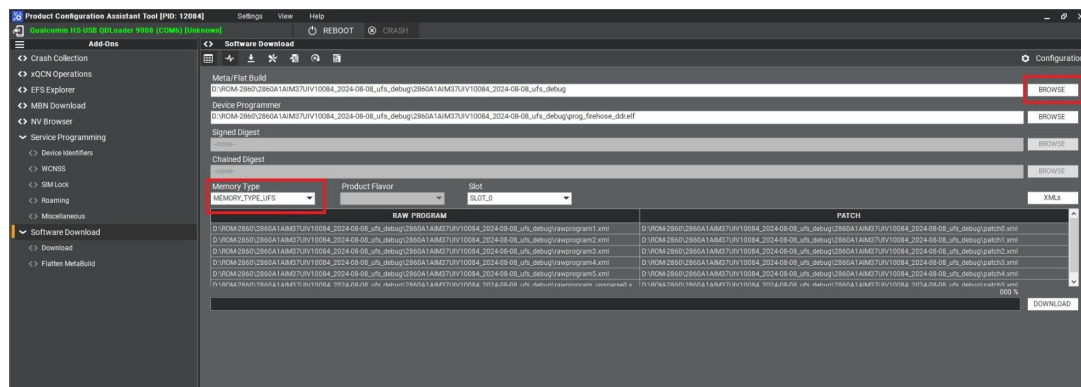
6. Click “Connect “device.



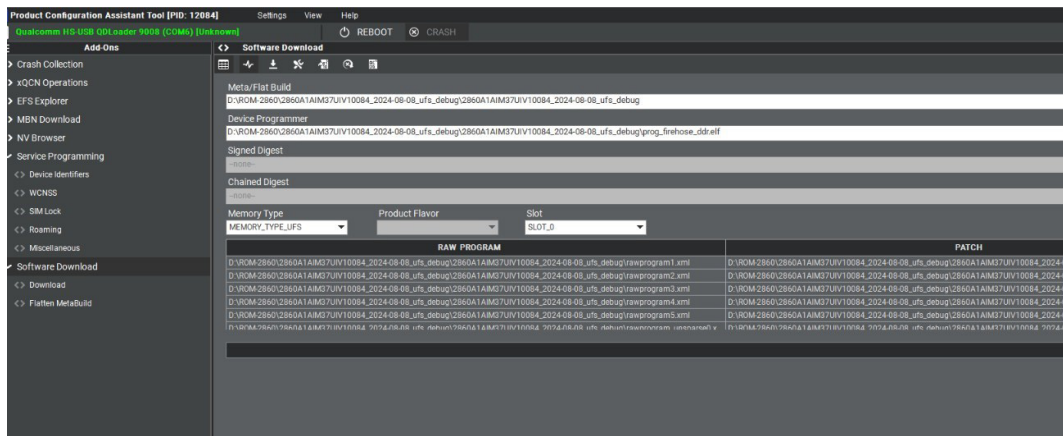
7. When you connected successfully, it will show “green word” - Qualcomm HS-USB QDLoader 9008 (COM 6).



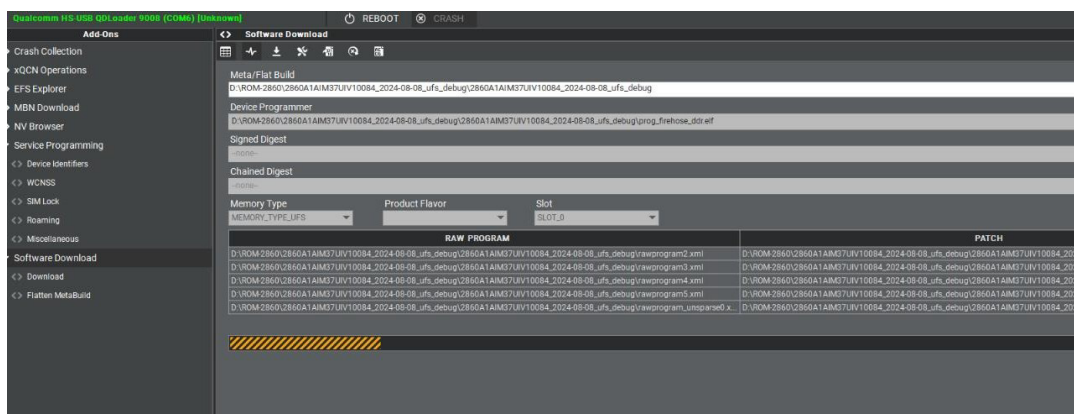
8. Select UFS Folder in PCAT Tool, the Tool will help load Files automatically and Select “MEMORY_TYPE_UFS”.



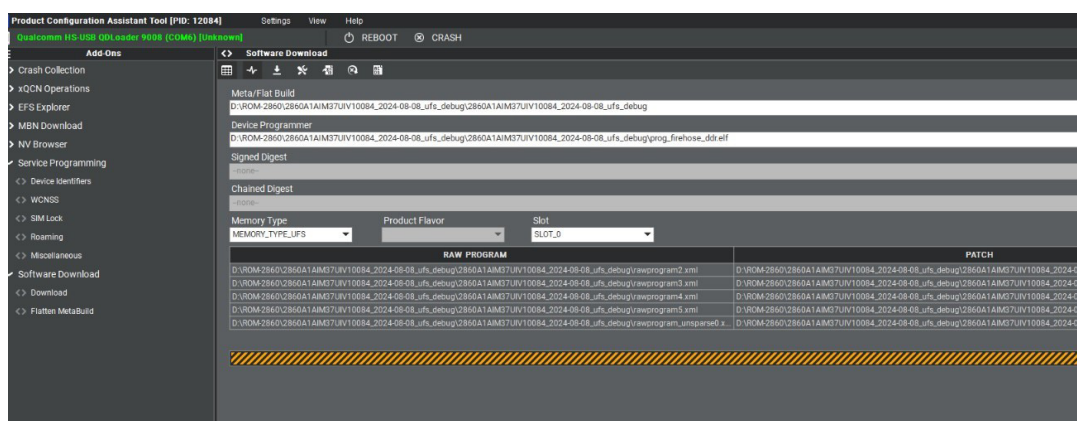
9. Click “Download”.



10. UFS Download Status.



11. UFS Download 'completed'.

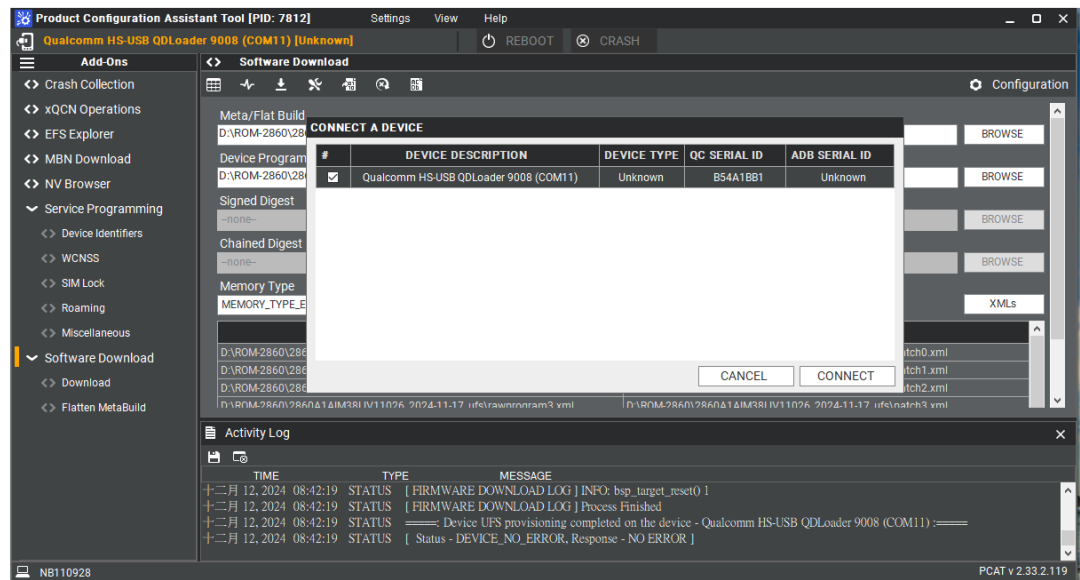


12. When you finish the download process, please change the switch.

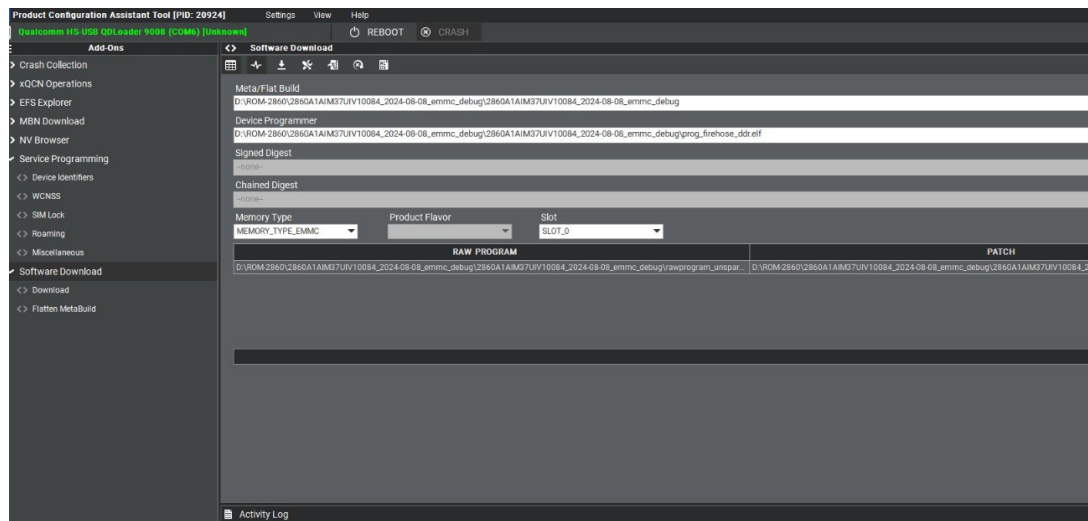
- Flash UFS: the SW1 switch to 1-off, 2-off.
- Forced Recovery: The SW2 switch to 1-on, 2 - on.

Flash EMMC

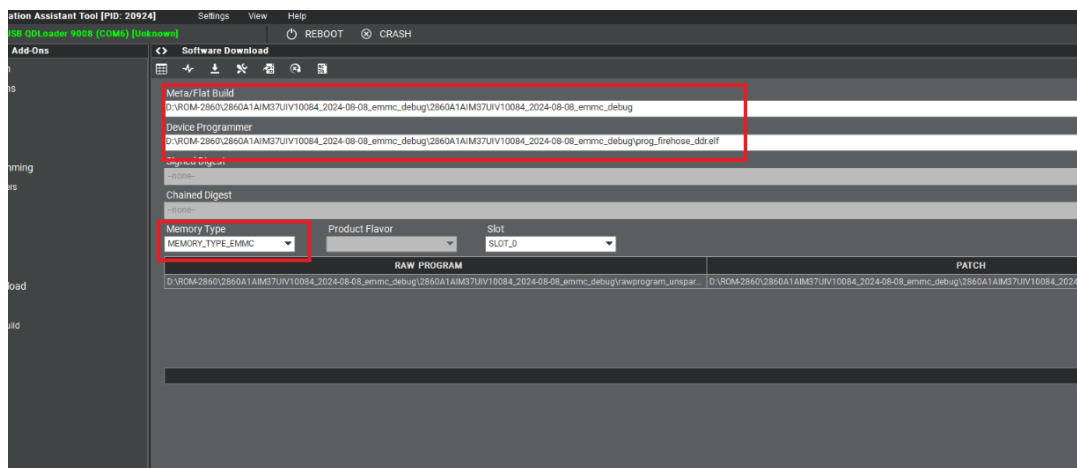
1. Turn off the Power.
2. Change the SW1 and SW2.
 - Flash eMMC: the SW1 switch to 1-off, 2-on.
 - Forced Recovery: The SW2 switch to 1-on, 2 - on.
3. Turn on the power.
4. Make sure the device connection status.
5. If the device disconnect with PCAT Tool, please connect it again.



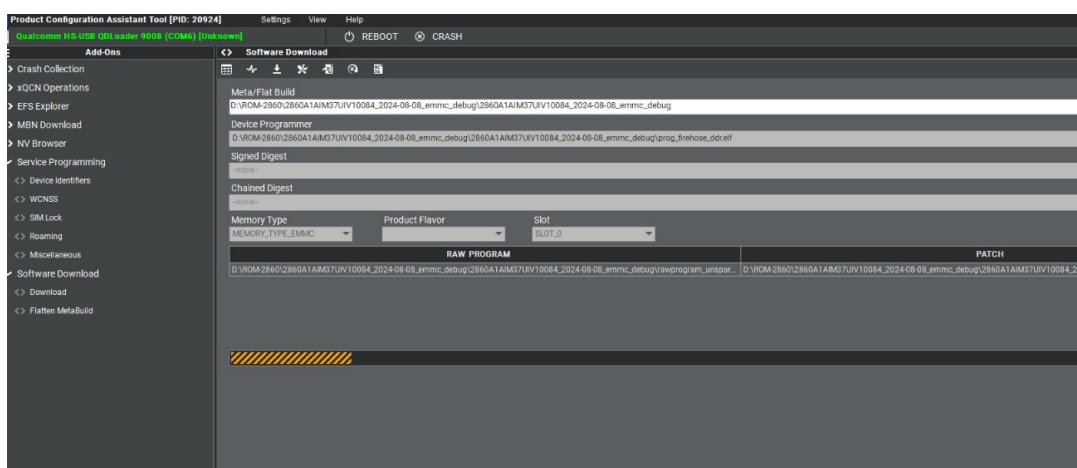
6. Select eMMC folder.



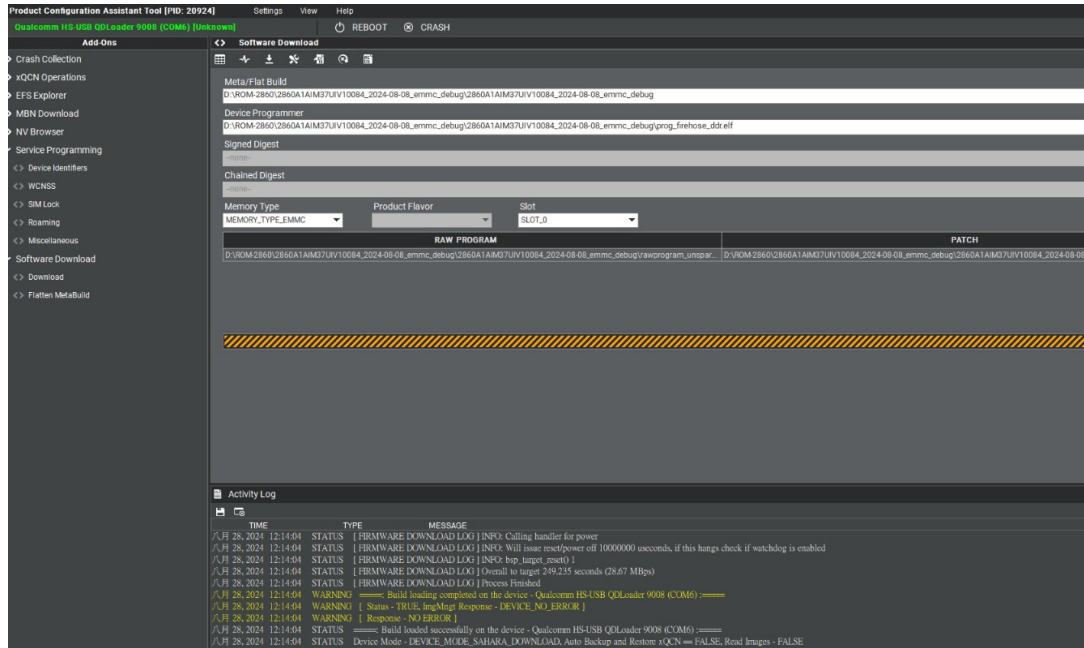
7. Make sure the setting, then press "Download" button.



8. eMMC download status.



9. eMMC Download completed.



10. When the eMMC installation finished . Close the PCAT tool,
11. Please remove the mirco usb cable, turn off the power.
 - eMMC boot up: SW1 switch to 1-off, 2-on
 - Forced Recovery: The SW2 switch to 1-off, 2 - off.
12. Connect debug cable and open the terminal, turn on the power.
13. If you have done “Reformat”, the message will show “DDR: Start of DDR Training Init”
14. When the systm boot up, you need to type “qcs6490-rom2860a1 login: root”, “Password: oelinux123”
15. After type the login and password, and you also can check the image information about date, kernel version etc.

```
[ 12.159373] [T1069] [drm:dsi_display_find_mode [msm_drm]] *ERROR* [msm-dsi-er
ror]: [qcom_mdss_dsi_ext_bridge_4k30p] failed to find mode for v_active 1080 h_a
ctive 1920 fps 60 pclk 0
[ 12.407749] [T1069] [drm:dsi_display_find_mode [msm_drm]] *ERROR* [msm-dsi-er
ror]: [qcom_mdss_dsi_ext_bridge_4k30p] failed to find mode for v_active 1080 h_a
ctive 1920 fps 60 pclk 0
[ OK ] Stopped QTEE Supplcant Service.
[FAILED] Failed to start QTEE Supplcant Service.
See 'systemctl status qteesupplicant.service' for details.
[ 12.652622] [T1069] [drm:dsi_display_find_mode [msm_drm]] *ERROR* [msm-dsi-er
ror]: [qcom_mdss_dsi_ext_bridge_4k30p] failed to find mode for v_active 1080 h_a
ctive 1920 fps 60 pclk 0
[ 12.872293] [T1069] [drm:sde_connector_get_panel_vfp:2215] [sde error]Failed
get panel vfp 0
[ OK ] Stopped PulseAudio Sound Service.
Starting PulseAudio Sound Service.
[FAILED] Failed to start PulseAudio Sound Service.
See 'systemctl status pulseaudio.service' for details.
[ 14.149605] boottimes.sh[1334]: hwclock: ioctl(RTC_RD_TIME) to /dev/rtc0 to r
ead the time failed: Invalid argument
[ 14.152683] boottimes.sh[1335]: hwclock: ioctl(RTC_RD_TIME) to /dev/rtc0 to r
ead the time failed: Invalid argument
[ 14.195852] boottimes.sh[860]: Boot Times:2, Seconds:1651167755, Cost:-83

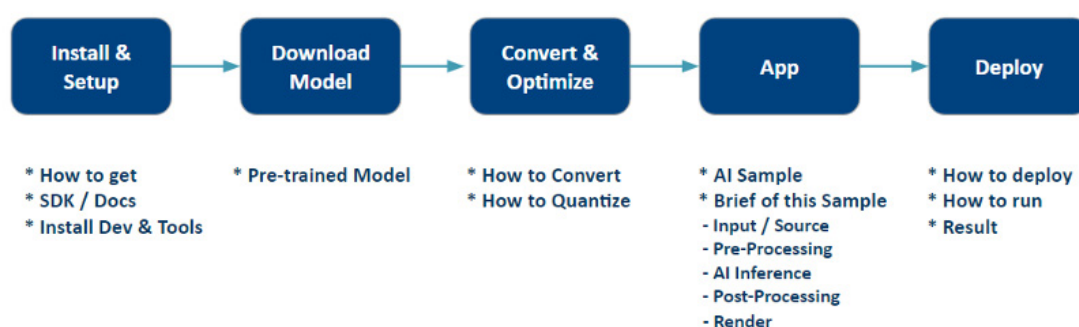
QCOM Reference Distro with Mayland 1.0 qcm6490 ttyMSM0
qcm6490 login: root
Password:
Last login: Thu Apr 28 17:45:49 UTC 2022 on ttyMSM0
root@qcm6490:~# uname -a
Linux qcm6490 6.6.28-01890-g350dfd604d2f-dirty #1 SMP PREEMPT Wed Jun 19 20:29:11 UTC 2024 aarch64 aarch64 aarch64 GNU/Linux
root@qcm6490:~#
```

3.4.2 Install Edge AI

The Edge AI Workflow is designed to help developers kickstart AI application development on Advantech's edge AI platforms and accelerator cards. This introductory guide provides step-by-step instructions covering from environment and tool installation, model download, conversion, quantization, application development, deployment to the target platform, and execution. It's a comprehensive starter guide aimed at making the development and deployment of AI applications more accessible and efficient.

1. LAN port connect to ethernet.
2. Open terminal.
3. Execute unpack and .run.

```
#tar -zxvf Edge_AI_SDK-installer-3.3.0-test-2.tar.gz
#./Edge_AI_SDK-installer.run
```



3.4.2.1 To Start EdgeAISDK

1. Open terminal.
2. Install Edge AI and press Y.

```
root@qcs6490ds011a1:/mnt/usb# ./Edge_AI_SDK-installer.run
Verifying archive integrity... 100% MD5 checksums are OK. All good.
Uncompressing EdgeAISDK archives 100%
non_root_en file exist
non_ending_msg_en file exist
Are you sure you want to install EdgeAISDK? [Y/n]
```

3. Accept the terms in the License Agreement and press Y.

```
be invalid, illegal or unenforceable, the validity, legality and
enforceability of any of the remaining provisions shall not in any way be
affected or impaired and a valid, legal and enforceable provision of similar
intent and economic impact shall be substituted therefore.

ENTIRE AGREEMENT:

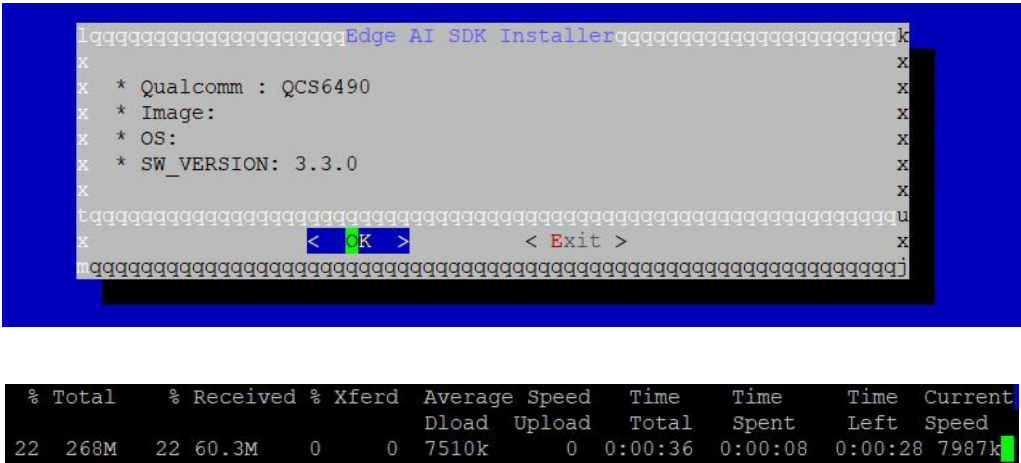
This License Agreement sets forth the entire understanding
and agreement between you and ADVANTECH CO, LTD., supersedes all prior
agreements, whether written or oral, with respect to the Software, and may be
amended only in a writing signed by both parties.

ADVANTECH Co., Ltd.

ADVANTECH Building, No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Ta
ipei 11491, Taiwan, R.O.C.

1, May, 2013
I accept the terms in the License Agreement [y/n]
```

4. Press OK and wait for installation successfully.



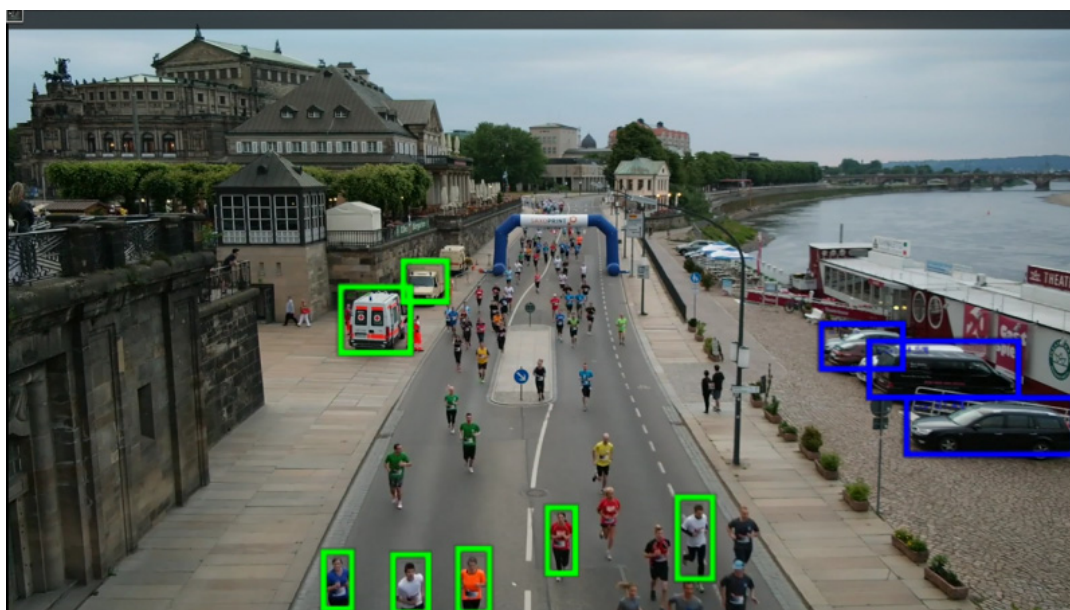
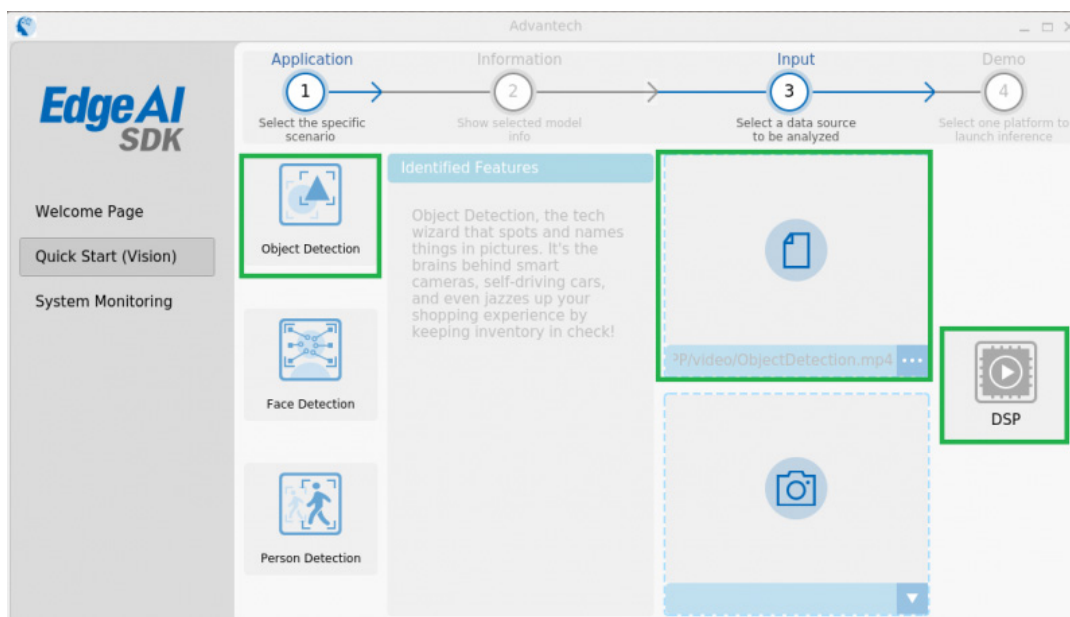
5. Execute script: /opt/Advantech/EdgeAISuite/MainAPP/QCS6490/app.sh.



Quick Start/Application/Video or WebCam/DSP

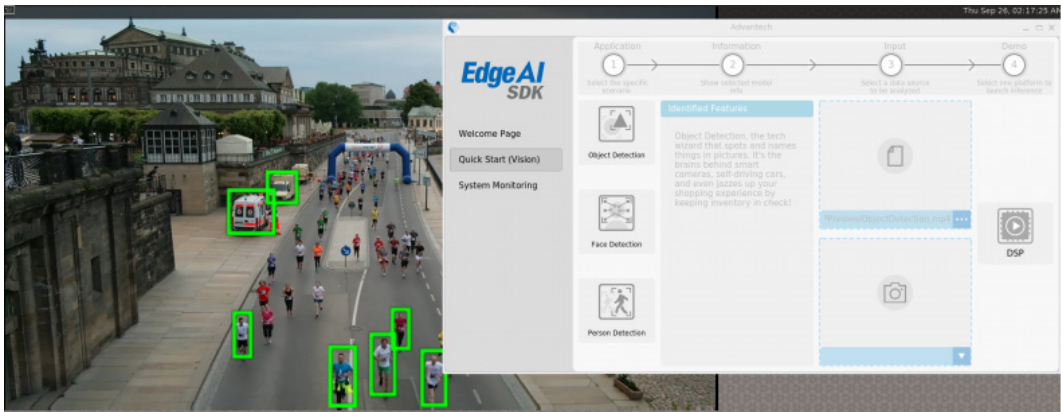
Table 3.2: Quick Start/Application/Video or WebCam/DSP	
Application	Model
Object Detection	yolov5x (quantized)
Face Detection	yolov5n-face (quantized)
Person Detection	yolov5x (quantized)

1. Go to the "Quick start VisionAI" page as show below.
2. Choose one application.



Close AI Inference Application

- 1. EdgeAISDK (GUI) show in the top.
- 2. Press Key “Esc”.



Benchmark

It can quickly evaluate computing performance for the DSP, and provides runtime results inferred with ML.

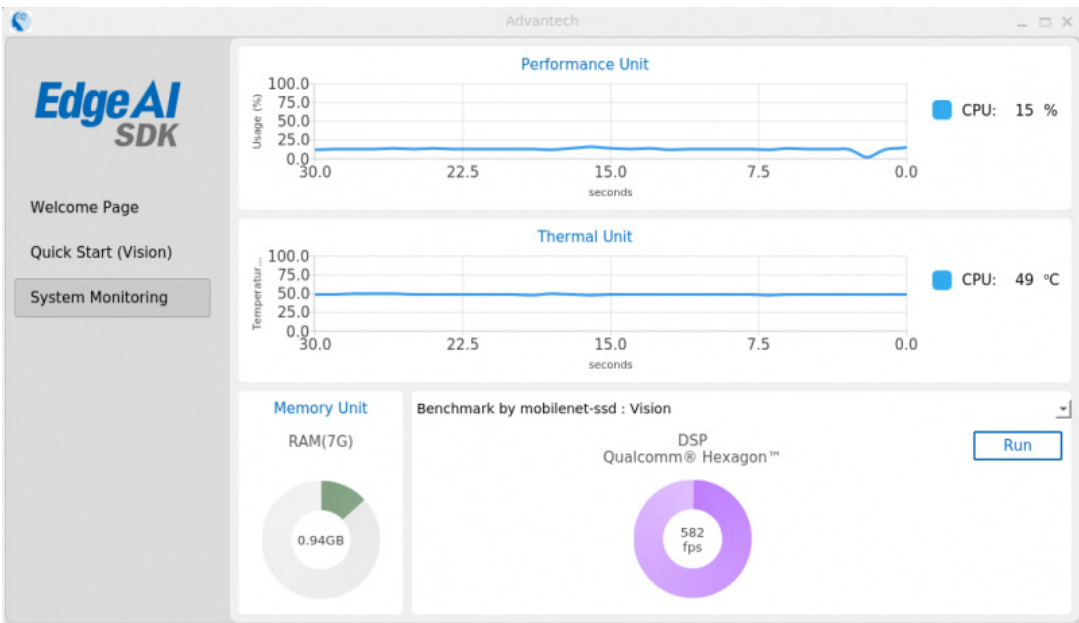


Table 3.3: Benchmark

Device	Command	FPS
Run on DSP	snpe-throughput-net-run --duration 5 --perf_profile burst --use_dsp --userbuffer_auto --container /opt/Advantech/EdgeAISuite/QCS6490/VisionAI/model/ssd-soc-quant.dlc	582

System Monitoring

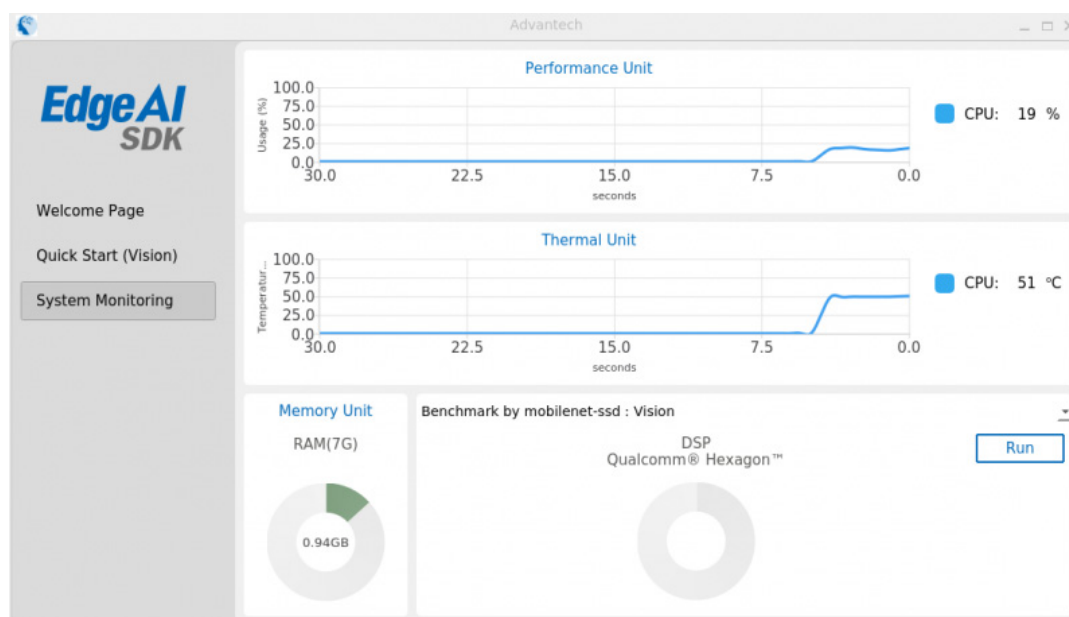


Table 3.4: System Monitoring

Usage	Temperature
CPU (only)	CPU (only)

Limitation

1. (Ignore) The video playback interface cannot drag the position and close the video option.
2. (Ignore) The number of cameras displayed in the Edge AI SDK is inconsistent with the actual number of cameras plugged in through the USB hub.
3. (Ignore) Executing the app.sh process displays two error messages: Locale "C" detected, character encoding "ANSI_X3.4-1968" and QIODevice::read (QFile, "...EAS.ini"): The device is not open.
4. The LEARN MORE link in the Welcome Page is not supported by Yocto.



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www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

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