ACCEL-JS800/810

NVIDIA® Jetson AGX Orin/Orin Nano
Medical AI Imaging processing platform

ACCEL-JS800 Series Manual 1st Ed
July, 2024

Copyright Notice

Acknowledgments

Packing List

Before you begin installing your Medical Station, please make sure that the following items have been shipped:

- ACCEL-JS800 or ACCEL-JS810
- Medical Adapter, 84W 12V

If any of these items are missing or damaged, you should contact your distributor or sales representative immediately.

*** Use power cord should follow then specification below:**

Listed, Detachable, Type SJT or above. 125/250 V minimum, 18 AWG/3C mini-mum, 3.0 m long maximum. One end terminates in 125 V, 10 A, with NEMA 5-15P or 250 V, 10 A with NEMA 6-15P, grounding type, the other end with an appliance coupler. Hospital grade.

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Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed 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 could 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. **WARNING: Power supply is specified as a part of ME EQUIPMENT To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth (L'alimentation électrique est spécifiée comme faisant partie de ME EQUIPMENT Avertissement: Pour éviter tout risque de choc électrique, cet appareil doit être connecté à une alimentation secteur avec une prise de terre)**

Warning	Indicates a situation that could result in death or serious injury if not avoided. Indique une situation qui pourrait entraîner la mort ou des blessures graves si elle n'est pas évitée
Caution	Indicates a potentially hazardous situation that could result in minor or moderate injury or damage to equipment if not avoided. Indique une situation potentiellement dangereuse qui pourrait entraîner des blessures mineures ou modérées ou des dommages à l'équipement si elle n'est pas évitée
Note	Indicates supplementary or useful information regarding use.

10. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, unplug the power cord to disconnect it from the power source to avoid damage by transient over-voltage.
13. Never pour any liquid into an opening. This could cause fire or electrical shock.
14. Never open the equipment. For safety reasons, only qualified trained should open the equipment.
15. **Warning: Do not modify this equipment without authorization of the manufacturer.**

(AVERTISSEMENT: ne modifiez pas cet équipement sans l'autorisation du fabricant.)

16. I**f any of the following situations arises, get the equipment checked by qualified trained personnel:**
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.

d. The equipment does not work well, or you cannot get it to work according to the users manual.

e. The equipment has been dropped and damaged.

f. The equipment has obvious signs of breakage.

17. DO NOT LEAVE THIS EQUIPMENT IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4°F) OR ABOVE 60° C (140° F). IT MAY DAMAGE THE EQUIPMENT.

18. External equipment intended for connection to signal input/output or other connectors, shall comply with relevant UL / IEC standard (e.g. UL/IEC 62368 for IT equipment, and IEC 60601, ANSI/AAMI ES 60601-1, CAN/CSA-C22.2 No. 60601-1 for medical equipment. Equipment not complying with IEC 60601, ANSI/AAMI ES 60601-1, CAN/CSA-C22.2 No. 60601-1 shall be kept outside the patient environment, as defined in the standard. Any person who connects external equipment to signal input, signal output, or other connectors has formed a system and is therefore responsible for the system to comply with the standard IEC 60601-1, safety requirements for medical electrical systems. Replacement the battery by inadequately trained personnel could result in a HAZARD (such as excessive temperatures, fire or explosion).

19. Warning : The device intends to be used in the highly sensitive medical environments and these environments are prevented

from access by general hospital staff, and the device should be installed in a suitable and safe location to avoid unauthorized contact. The top cover of device is allowed to be opened by authorized personnel for professional service purpose only.

Avertissement : L'appareil est destiné à être utilisé dans des environnements médicaux hautement sensibles et ces environnements sont interdits d'accès au personnel hospitalier général, et l'appareil doit être installé dans un endroit approprié et sûr pour éviter tout contact non autorisé. Le capot supérieur de l'appareil ne peut être ouvert que par le personnel autorisé à des fins de service professionnel uniquement.

20. ACCEL-JS800/JS810 is applying for the medical instruments main system but without the medication analysis, disease detection, and medical diagnosis function.
21. Patient is not the intended operator, do not touch the device and Patient at the same times.

Classification

1. Degree of production against electric shock: not classified
2. Mode of operation: Continuous
3. Type of protection against electric shock: Class I equipment
4. No Applied Part, No AP/APG

FCC

This device complies with Part 18 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

UL Module Description

CLASSIFIED c UL us	MEDICAL – GENERAL MEDICAL EQUIPMENT WITH RESPECT TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH AAMI ES60601-1:2005/(R)2012 and A1:2012/(R)2012 and A2:2021, CAN/CSA-C22.2 No. 60601-1:14 (Reaffirmed 2022)

Safety Symbol Description

The following safety symbols are the further explanations for your reference.

	*Follow operating instructions.*
	Protective Earth (Ground).
	*Alternating current*
	*Equipotentiality* *To identify the terminals, when connected together, bring the various parts of an equipment or of a system to the same potential.*
	*Stand-by switch* *(PC power button)*

Contents

Appendix A Miscellanea

Chapter 1

General Information

1.1 Introduction

ACCEL-JS800 series supports NVIDIA® Jetson Orin™ NX or Nano which aims it at Medical imaging application for edge computing such Endoscopy.

ACCEL-JS800 series equips Multiple core Arm® Cortex®-A78AE v8.2 64-bit CPU and provides up to 100 TOPS performance, but only consumes maximum 25W power.

This device supports 2 built in speaker in order to set up alerts and alarms for doctor or operator during surgery, allowing surgeon to better care for their patients or to be cautious for device status

More importantly, ACCEL-JS800 series provides SDI video input including 3G and 12G SDI since SDI interface is the most common use in all kind of medical device in operating room. the video input interface can be used to capture image or video to do AI computing and analysis. The unit also support 4K HDMI video output

1.2 Feature

- Nvidia Jetson Orin NX platform with 16GB LPDDR5 or 8GB LPDDR5 and Orin Nano platform with 8GB LPDDR5 or 4GB LPDDR5
- Powerful AI computing performance with up to 100 TOPS
- Support HDMI or SDI video output
- Support HDMI video input
- Support 360 degree no dead angle cleaning
- Medical certified with CE/FCC/UL
- Support built in speaker x 2
- Fanless Design
- Support cable cover design for better cable management

1.3 Specification

System Specifications

Model	ACCEL-JS800	ACCEL-JS810
AI Accelerator	NVIDIA Jetson Orin NX	NVIDIA Jetson Orin Nano
CPU	6-coreArm®Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2+4MBL3 (ACCEL-JS800-N1) 8-coreArm®Cortex®-A78AE v8.2 64-bit CPU 2MB L2+4MB L3 (ACCEL-JS800-N2)	6-coeArm®Cortex®-A78AEv 8.2 64-bit CPU 1.5MB L2 + 4MB L3
GPU	NVIDIA Ampere™ architecture with 1024 NVIDIACUDA® cores and 32 Tensor cores	NVIDIA Ampere™ architecture with 1024 NVIDIACUDA® cores and 32 Tensor cores (ACCEL-JS810-N1) 512-core NVIDIA Ampere architecture GPU with 16 TensorCores (ACCEL-JS800-N2)

System Memory	8 GB 128-Bit LPDDR5 204.8 GB/s or 16 GB 128-bit LPDDR5 204.8 GB/s	8GB 128-bit LPDDR5 68 GB/s or 4GB 64-bit LPDDR5 34 GB/s
Storage	1.M.2 Key M 2280 x 1(PCIe [x4]) or 2. M.2 Key M 2280 x 1(PCIe [x1]) ****if the configuration is 4K video input , only storage item 2 is available**	
Speaker	2 x Build-in Speaker	

Rear I/O	1 x USB 3.1 Type C (5V 1.5A), support USB OTG for OS flash function 4 x USB 3.1 Gen 1 Type A(5V, 0.9A) 1 x RJ-45 Gigabit LAN 1 x HDMI 2.0 1 x COM 1 x DC 12V input 1 x Equipotentiality Pin **Sound:** 1 x Line-out 1 x Mic-in **Function Port** 1 x Recovery Button 1 x Reset Button **Video Input (either one)** 1. 3G SDI or HDMI (Max 1920×1080p@60/50fps) 2. 12G SDI (Max 4096×2160p@60/50fps) 3. HDMI 2.0((Max 4096×2160p@60/50fps)
Front I/O	1 x Power Button
Power LED	1 x Power LED Blue light: Standby state Green light: Power on

Expansion Slot	1. M.2 E Key 2230 x 1 for WiFi + BT 2. M.2 M Key 2280 x 1 PCIe [x4] for Capture card 3. M.2 M Key 2280 x 1 PCIe [x1] for Storage
Power Supply	**ADAPTER Tech; ATM090T-P120** Medical 84W 12V Adapter 100~240VAC.12VDC 100-240Vac, 1.2-0.5A, 50~60Hz ,12V,7A,
OS Support	Jetpack OS, Compliant with Ubuntu 22.04
Wireless communication (Optional)	Support IEEE.802.11a/b/g/n/ac/ax, BT 5.2

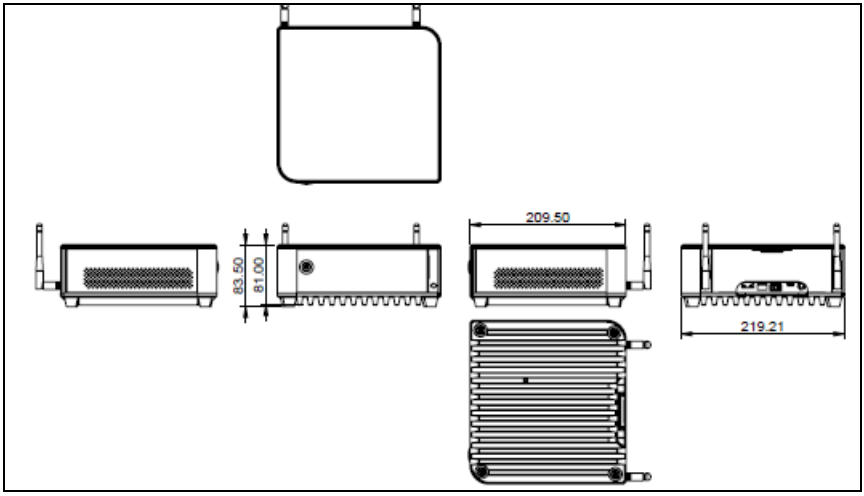
Mechanical Specifications

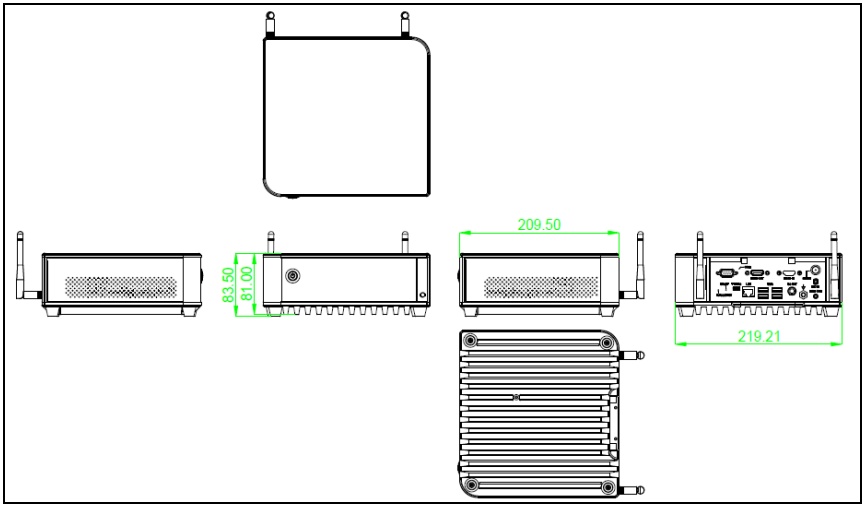
Construction	Metal chassis
Dimension	219mm x 209mm x 83.5mm
Carton Dimension	300(W) x 23.5(L) x 210(H)mm
Net Weight	2.0KG
Gross Weight	2.9KG
Packing Filler	PE foam

Environment Specifications

Operating Environment	0˚C to 35˚C (32 ˚F ~95˚F) 30% ~ 75% @ 40°C, Non-Condensing 700~1060 hPa
Storage / Transport Environment	-20˚C to 60˚C (-4˚F ~140˚F) 10% ~ 90% @ 35°C, Non-Condensing 700~1060 hPa
EMI / Safety	CE: EN 60601-1-2 2015/A1:2021(ed 4.1), EN 60601-1:2006/A1:2013/A12:2014/A2:2021 (ed 3.2) FCC: Part 18 Class B, UL: ANSI AAMI ES 60601-1:2005/A1:2012/A2:2021(ed 3.2) cUL: CAN/CSA-C22.2 No. 60601-1:14/A2:22 (ed 3.2)

1.4 Dimension





Chapter 2

Hardware Introduction

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2.1 Safety Precautions

Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis

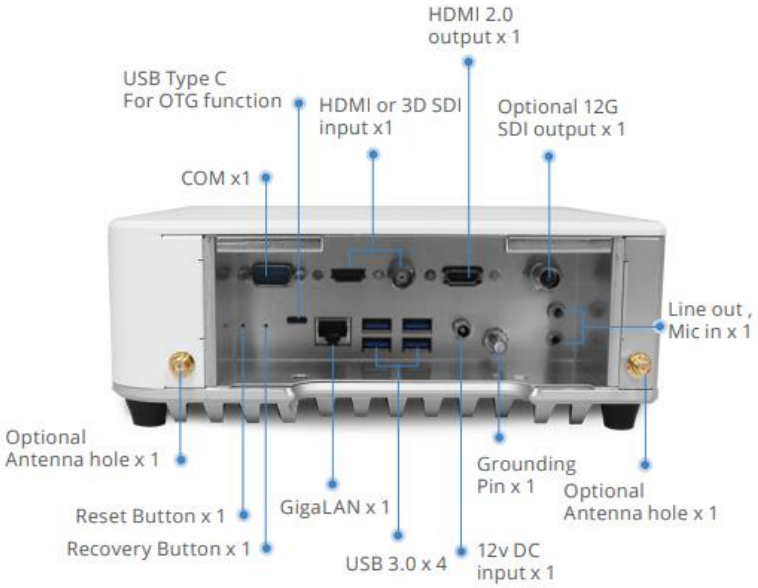
2.2 A Quick Tour of the ACCEL-JS800 Series

Before you start to set up the ACCEL-JS800 series , take a moment to become familiar with the locations and purposes of the controls, drives, connections and ports, which are illustrated in the figures below.

Please place the ACCEL-JS800 series upright on the desktop, its front side appears as shown in Picture 1.1.

Picture 1.1: Front View of the ACCEL-JS800 series

When you turn the ACCEL-JS800 series around and look at its rear side, as shown in Picture 1.2.



Picture 1.2: Rear view of the ACCEL-JS800 series

2.3 Turn On and Boot up into Jetpack OS

This section is for Jetpack OS operating system only. If you are installing a different operating system, please contact your vendor for installation details.

Your ACCEL-JS800 series will begin loading Jetpack OS once you push the power button to turn power on. Initial Login for Jetpack OS is :

Account : 123456
Password: 123456

2.4 Turn off

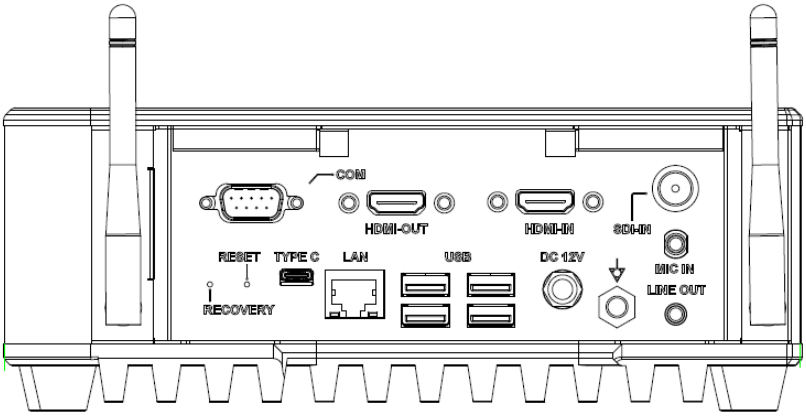
Turning off ACCEL-JS800 series properly is important for system reliability.

1. On the menu, click “shut down” and select “OK”
2. And then the system will shut down automatically.

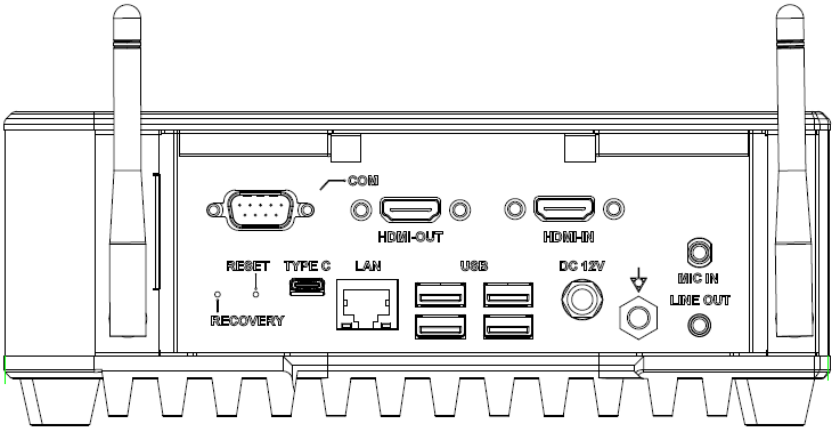
2.5 Front Panel Connectors

2.6 Rear Panel Connectors

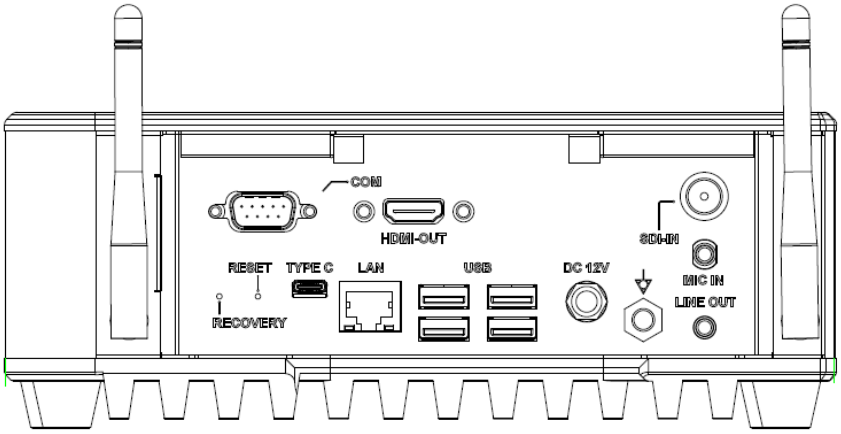
ACCEL-JS800 series with 3G SDI and HDMI Video input



ACCEL-JS800 series with HDMI 2.0 Video input



ACCEL-JS800 series with 12G SDI Video input



Chapter

3

OS Flash Guide

3.1 Before installation

Before starting the process make sure your ACCEL-JS800 series system is turned off and the power in is disconnected. You will need a host PC running Ubuntu 20.04.

Download the compressed OS image file. The file name will follow the format of:

```
Product name}.{Jetpack version}.{Release info}.tar.gz
```

For example:

ACCEL-JS800.Jetpack_R35.3.1.Rev-01.tar.gz

3.2 Connecting to PC/Force Recovery Mode

On Host Computer, open Linux terminal and enter the following command to extract compressed OS image files (*file name may vary*):

```
$ tar -zxvf ACCEL-JS800.Jetpack_R35.31.Rev-01.tar.gz
```

Next, perform the following steps to force the system to start in USB Recovery Mode:

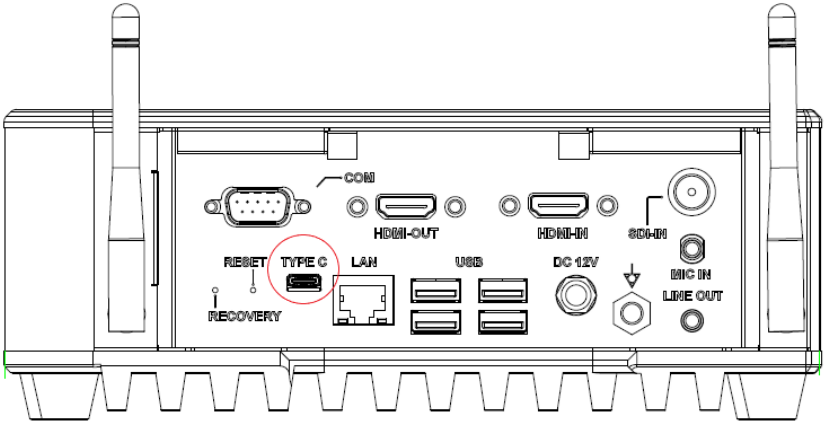
I. Connect the **USB Type C** as below picture red mark indicated plug on the USB cable to the Recovery Port on the ACCEL-JS800 and the other end to an available USB port on the host PC.

II. Connect the ACCEL-JS800 power supply.

III. Press and hold the recovery button, then power on the system. While continuing to hold the recovery button. Release the

recovery button after 3 seconds.

IV. When device is in recovery mode, lsusb command on host PC will list a line of “0955:**7023** Nvidia Corp”



3.3 Flash Image to the unit

Use the following steps to flash the OS to the ACCEL-JS800.

I. Open terminal on Ubuntu host PC, then access the bootloader folder you extracted in the previous section.

II. Enter the following command in terminal to flash the image:

```
$ sudo ./flashall.
```

III. Wait as the image is installed. Once finished you should see the following:

```
[ 200.6713 ] Writing partition rce-fw_b with camera-rtcpu-rce_sigheader.img.encrypt
[ 200.6919 ] [.............................................] 100%
[ 200.7002 ] Writing partition adsp-fw with adsp-fw_sigheader.bin.encrypt
[ 200.7186 ] [.............................................] 100%
[ 200.7222 ] Writing partition adsp-fw_b with adsp-fw_sigheader.bin.encrypt
[ 200.7419 ] [.............................................] 100%
[ 200.7455 ] Writing partition sc7 with warmboot_t194_prod_sigheader.bin.encrypt
[ 200.7637 ] [.............................................] 100%
[ 200.7667 ] Writing partition sc7_b with warmboot_t194_prod_sigheader.bin.encrypt
[ 200.7853 ] [.............................................] 100%
[ 200.7880 ] Writing partition BMP with bmp.blob
[ 200.8069 ] [.............................................] 100%
[ 200.8096 ] Writing partition BMP_b with bmp.blob
[ 200.8287 ] [.............................................] 100%
[ 200.8316 ] Writing partition kernel with boot_sigheader.img.encrypt
[ 200.8506 ] [.............................................] 100%
[ 202.4330 ] Writing partition kernel_b with boot_sigheader.img.encrypt
[ 202.4468 ] [.............................................] 100%
[ 204.0000 ] Writing partition kernel-dtb with tegra194-p2888-0001-p2822-0000_sigheader.dtb.encrypt
[ 204.0143 ] [.............................................] 100%
[ 204.0216 ] Writing partition kernel-dtb_b with tegra194-p2888-0001-p2822-0000_sigheader.dtb.encrypt
[ 204.0428 ] [.............................................] 100%
[ 204.0691 ]
[ 204.0712 ] tegradevflash_v2 --write BCT br_bct_BR.bct
[ 204.0732 ] Bootloader version 01.00.0000
[ 204.1666 ] Writing partition BCT with br_bct_BR.bct
[ 204.1671 ] [.............................................] 100%
[ 204.2240 ]
[ 204.2395 ] tegradevflash_v2 --write MB1_BCT mb1_cold_boot_bct_MB1_sigheader.bct.encrypt
[ 204.2412 ] Bootloader version 01.00.0000
[ 204.3352 ] Writing partition MB1_BCT with mb1_cold_boot_bct_MB1_sigheader.bct.encrypt
[ 204.3368 ] [.............................................] 100%
[ 204.3552 ]
[ 204.3580 ] tegradevflash_v2 --write MB1_BCT_b mb1_cold_boot_bct_MB1_sigheader.bct.encrypt
[ 204.3601 ] Bootloader version 01.00.0000
[ 204.4544 ] Writing partition MB1_BCT_b with mb1_cold_boot_bct_MB1_sigheader.bct.encrypt
[ 204.4552 ] [.............................................] 100%
[ 204.4746 ]
[ 204.4878 ] tegradevflash_v2 --write MEM_BCT mem_coldboot_sigheader.bct.encrypt
[ 204.4890 ] Bootloader version 01.00.0000
[ 204.5823 ] Writing partition MEM_BCT with mem_coldboot_sigheader.bct.encrypt
[ 204.5833 ] [.............................................] 100%
[ 204.5998 ]
[ 204.6018 ] tegradevflash_v2 --write MEM_BCT_b mem_coldboot_sigheader.bct.encrypt
[ 204.6036 ] Bootloader version 01.00.0000
[ 204.6956 ] Writing partition MEM_BCT_b with mem_coldboot_sigheader.bct.encrypt
[ 204.6984 ] [.............................................] 100%
[ 204.7124 ]
[ 204.7125 ] Flashing completed

[ 204.7126 ] Coldbooting the device
[ 204.7147 ] tegrarcm_v2 --ismb2
[ 204.9065 ]
[ 204.9095 ] tegradevflash_v2 --reboot coldboot
[ 204.9117 ] Bootloader version 01.00.0000
[ 205.0073 ]
```

Chapter

4

OS

User Guide

4.1 Introduction

The ACCEL-JS800 ‘s OS, Ubuntu/Linux version, and preinstalled SDK components are as follows:

For JetPack 5.1(L4T)

1. Ubuntu/Linux version :
   A. Ubuntu version : 20.04.4
   B. Jetson Linux 35.2.1
   C. Linux Kernel 5.10.104

2. Built-in Jetson SDK Components
   A. CUDA 11.4.19
   B. TensorRT 8.5.2
   C. cuDNN 8.6.0
   D. VPI 2.2
   E. OpenCV 4.5.4
   F. Vulkan 1.3
   G. Nsight Systems 2022.5
   H. Nsight Graphics 2022.6
   I. Nsight DLD/Compute 2022.2

4.2 Default Login user /Password

User Name: 123456

Password: 123456

Appendix A

Miscellanea

A.1 General Cleaning Tips

You may need the following precautions before you begin to clean the computer. When you clean any single part or component for the computer, please read and understand the details below fully.

1. Never spray or squirt the liquids directly onto any computer component. If you need to clean the device, please rub it with a piece of cloth or the material that mentioned in the A.2 Cleaning tools
2. Be cautious of the tiny removable components when you use a vacuum cleaner to absorb the dirt on the floor.
3. Turn the system off before you start to clean up the component or computer.
4. Never drop the components inside the computer or get circuit board damp or wet.
5. Be cautious of all kinds of cleaning solvents or chemicals when you use it for the sake of cleaning. Some individuals may be allergic to the ingredients.
6. Try not to put any food, drink or cigarette around the computer.

A.2 Cleaning tools

Although many companies have created products to help improve the process of cleaning your computer and peripherals users can also use household items to clean their computers and peripherals. Below is a listing of items you may need or want to use while cleaning your computer or computer peripherals.

Keep in mind that some components in your computer may only be able to be cleaned using a product designed for cleaning that component, if this is the case it will be mentioned in the cleaning tips.

- **Cloth** - A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, we still recommend you to rub it with a piece of cloth.
- **Vacuum cleaner** - Absorb the dust, dirt, hair, cigarette particles, and other particles out of a computer can be one of the best methods of cleaning a computer. Over time these items can restrict the airflow in a computer and cause circuitry to corrode.
- **Cotton swabs** - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas in your keyboard, mouse, and computer.
- **Foam swabs** - Whenever possible it is better to use lint free swabs such as foam swabs.

Note:

We strongly recommended that you should shut down the system before you start to clean any single components.

Please follow the steps below.

1. Close all application programs.
2. Close operating software.
3. Turn off power switch
4. Remove all device
5. Pull out power cable

A.3 Scrap Computer Recycling

If the computer equipments need the maintenance or are beyond repair, we strongly recommended that you should inform us as soon as possible for the suitable solution. For the computers that are no longer useful or work well, please contact with worldwide distributors for recycling

.

The worldwide distributors show on the following website:

http://www.onyx-healthcare.com.tw/Contact.php

Note:

Follow the national requirement to dispose unit