



Military Jetson Orin NX IP65 Rugged Computer



User's Manual Revision Date: Aug. 30. 2024

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Revision Date: Aug. 30. 2024



Safety Information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

Statement

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Revision Date: Aug. 30. 2024



Table of Contents

Safety Information	1
Electrical safety	1
Operation safety	1
Statement	1
Specifications	3
Block Diagram	5
Board Visuals	5
Front/Rear IO Visuals	6
List of Connectors & Buttons	7
Definition of each I/O	7
Ordering Information	
Software Information	
Software Configuration	
System Recovery	
Host PC	
JetPack-6 Installation for NV200-2LGS16.	
Including the Kernel Files in Jetson OS Image	
Jetson OS Installation	
Jetson SDK Components Installation	21
Install the driver for GMSL Camera	24
Install the driver for 3G-SDI Camera	25
Check device -Camera is connected	25
Capture Camera stream	25
GMSL Camera:	25
3G-SDI Camera:	25
Appendex-A : Cable Pin Define	26

Revision Date: Aug. 30. 2024



Specifications

System

AI Performance	100 TOPS
GPU	NVIDIA [®] Ampere architecture with 1024 CUDA [®] cores and 32 Tensor Cores, max freq. 915MHz
CPU	8-core Arm [®] Cortex [®] -A78AE v8.2 64-bit CPU, 2MB L2 + 4MB L3, max freq. 2.0GHz
Memory	16GB 128-bit LPDDR5, 3200MHz, 102 GB/s
Expansion Slot	1x M.2 2280 M key (PCIe x4) 1x M.2 2230 M key (PCIe x1) 1x M.2 2030 E Key Optional GMSL2 module with 4x FAKRA connector
Display	
Display	1x HDMI 2.0(max resolution 3840x2160)
Storage	
M.2	1x PCle x1 M.2 2230 M-Key up to 2TB
Ethernet	
Ethernet	2x GbE LAN (10/100/1000 Mbps supported)
Front I/O	
Grounding Screw	1x
Power In	18V~32V DC-IN with D38999 connector
X1	2x 1GbE LAN with D38999 connector
X2	1x CAN + 1x RS232/422/485 + 2x DI + 2x DO with D38999 connector
X3	1x HDMI with D38999 connector
Power Button	1x Power Button with Back light
Rear I/O	
Access Panel	1x Reset Button
	1x Recover Button
	1x USB type-C for Recovery
	2x USB Type-C
	1x Reboot LED
3G-SDI	4x 3G-SDI in with BNC connector
GMSL	2x2 mini-FAKRA GMSL(2) connector

Power Requirement

Revision Date: Aug. 30. 2024



Power Input	18V~32V DC-in
Applications, Operati	ing System
Applications	Energy/Smart Grid/Power Plant Management, Intelligent Automation and
	manufacturing applications/ AI
Operating System	Ubuntu 20.04 with JetPack 6.0
Physical	
Dimension	220 x 300 x 88 mm (W x D x H)
Weight	3kg
Chassis	Aluminum Alloy
Heatsink	Aluminum Alloy, Corrosion Resistant
Finish	Anodic aluminum oxide
Environmental	
Compliance	MIL-STD-810G, IEC-61850-3, IEEE-1613, CE and FCC, RoHS
Operating Temp.	-20 to 50°C
Storage Temp.	-40 to 85°C
Relative Humidity	5% to 95%, non-condensing
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Revision Date: Aug. 30. 2024



Block Diagram



Board Visuals



Bottom Side



Revision Date: Aug. 30. 2024



Front/Rear IO Visuals







Revision Date: Aug. 30. 2024



List of Connectors & Buttons



Definition of each I/O

DC Power IN:



D38999/20FB5PN						
A	Vin+					
В	Vin+					
С	N. C.					
D	Vin-					
E	Vin-					



Revision Date: Aug. 30. 2024



X1: 2x 1GbE LAN



D38999		RJ45-1	WIRE COLOR	D38999		RJ45-2	WIRE COLOR
1	-v-v-	1	WHITE/ORANGE	8	-v-v-	1	WHITE/ORANGE
2		2	ORANGE	9		2	ORANGE
3		3	WHITE/GREEN	10	~~~	3	WHITE/GREEN
4		6	GREEN	11		6	GREEN
5		4	BLUE	12		4	BLUE
6		5	WHITE/BLUE	13	_^_^	5	WHILE/BLUE
15	-v-v-	7	WHITE/BROWN	19	-v-v-	7	WHITE/BROWN
16		8	BROWN	20		8	BROWN
7		SHELL	BLACK	14		SHELL	BLACK
17		SHELL	BLACK	21		SHELL	BLACK
18		SHELL	BLACK	22		SHELL	BLACK

X2: 1x CAN+1x RS232/422/485 + 4x DIO





Revision Date: Aug. 30. 2024

X3: HDMI 2.0



Pin #	Signal	Pin #	Signal
1	HDMI_TX2_P	2	GND
3	HDMI_TX2_N	4	HDMI_TX1_P
5	GND	6	HDMI_TX1_N
7	HDMI_TX0_P	8	GND
9	HDMI_TX0_N	10	HDMI_CLK_P
11	GND	12	HDMI_CLK_N
13	CEC	14	NC
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	+5 V Power
19	Hot Plug Detect	20	GND
21	GND	22	GND
23	GND		



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Revision Date: Aug. 30. 2024

Ordering Information

Model	NV200-2L8	NV200-2L16	NV200-2LG16	NV200-2LGS16	
	1024 NVIDIA® CUDA® cores				
GPU	with 32 Tensor cores, 765 MHz	with 32 Tensor cores, 915 MHz	with 32 Tensor cores, 915 MHz	with 32 Tensor cores, 915 MHz	
Memory	8GB	16GB	16GB	16GB	
AI Performance	70 TOPs	100TOPs	100TOPs	100TOPs	
	six-core Arm® Cortex® A78AE	Eight-core Arm® Cortex® A78AE	Eight-core Arm® Cortex® A78AE	Eight-core Arm® Cortex® A78AE	
CPU	v8.2 (64-bit) (4x 256KB L2 +2MB				
	L3) + 4MB LLC				
Module total module power	10W 15W 20W	10W 15W 25W	10W 15W 25W	10W 15W 25W	
01	1x M.2 2280 (up to 8TB)	1x M.2 2280 (up to 8TB)	1x M.2 2280 (up to 8TB)	N/A	
Storage	1x M.2 2230 (up to 2TB)				
Front I/O					
Power In	18V-32VDC with D38999	18V-32VDC with D38999	18V-32VDC with D38999	18V-32VDC with D38999	
X1	2x GbE LAN	2x GbE LAN	2x GbE LAN	2x GbE LAN	
¥2	1x RS232/422/485 +1x CAN+				
~2	2x DI+2x DO	2x D1+2x DO	2x DI+2x DO	2x DI+2x DO	
X3	1x HDMI	1x HDMI	1x HDMI	1x HDMI	
Rear I/O					
GMSL	N/A	N/A	4x	4x	
3G-SDI	N/A	N/A	N/A	4x	
Access Panel	1x Boot LED	1x Boot LED	1x Boot LED	1x Boot LED	
	1x Reset Button	1x Reset Button	1x Reset Button	1x Reset Button	
	1x Recovery Button	1x Recovery Button	1x Recovery Button	1x Recovery Button	
	2x USB3.1 Type-C	2x USB3.1 Type-C	2x USB3.1 Type-C	2x USB3.1 Type-C	
	1x USB3.1 Type-C for Recovery				
Dimensions	220 x 300 x 88mm(WxDxH)				

Software Information

Software Configuration

JetPack-5.x Installation can be found here:

https://www.forecr.io/blogs/installation/jetpack-5-x-installation-for-dsboard-ornx-lan

System Recovery

You will need a host PC in order to flash your client device with a new system image.

Host PC

Before flashing the image, you should prepare an OTG cable (USB Type-C) for connecting to NV200-2LGS16 (recovery port), and a host PC with USB Type-A running Ubuntu 20.04.

JetPack-6 Installation for NV200-2LGS16.

In this tutorial, we will install JetPack-6 for NV200-2LGS16. First, we will include our BSP files in Jetson OS image. Then, we will install the Jetson OS into the NV200-2LGS16. Finally, we will install the Jetson SDK



components into it.

Attention: This tutorial is compatible for all types of Jetson Orin NX and Orin Nano modules. Only the BSP archive differs.

Including the Kernel Files in Jetson OS Image

Open the NVIDIA SDK Manager (https://developer.nvidia.com/sdk-manager). Select the correct JetPack version for Target Operating System and select the correct module for your installation ("Jetson Orin Nano modules" or "Jetson Orin NX modules"). The "Host Machine" components are not required.

Then, continue to Step 2. (6.0v2)

SDK Manager 2.1.0.11669 x86_64						_ ×
					A Hello Mehmet V	
STEP 01 DEVELOPMENT ENVIRONMENT	PRODUCT CATEGORY	Jetson	0	Data Science		
STEP 02 DEFAILS AND LICENSE	SYSTEM CONFIGURATION	Host Machine Ubuntu 22.04 - x86_64	0	Jetson Orin NX modules Could not detect a boa	rd	
STEP 03	SDK VERSION	JetPack 6.0 See what's new				
STEP 04	ADDITIONAL SDKS	DeepStream DeepStream 7.0				
Repair / Uninstall				CONT TO STEP	CINUE >	
IVIDIA. Copyright © 2024, NVIDIA COR	PORATION, All rights reserved. NVID	IA Developer				

Choose only "Jetson Linux", accept the terms & conditions and continue to Step 3.



Revision Date: Aug. 30. 2024

	JETPACK 6.0 LINUX FOR JETSON ORIN NX MOD ✓TARGET COMPONENTS ✓ Jetson Linux > Jetson Linux image	DULES DOWNLOAD SIZE	STATUS	Expand all
FP 02	✓TARGET COMPONENTS ✓ ✓ Jetson Linux ✓ Jetson Linux image	DOWNLOAD SIZE	STATUS	
EP 02	 Jetson Linux Jetson Linux image 			
	> Jetson Linux image			
FD 02		2,349 MB	Ø Downloaded	
	Flash Jetson Linux	0 MB		
S	Jetson Platform Services - Coming Services -	bon		
Sector Market	> Jetson Platform Services	0 MB		
	Y 🗌 Jetson Runtime Components			
	> CUDA Runtime	2,230 MB		
EP 03	CUDA X-AI Runtime	1,574 MB		
	 Computer Vision Runtime 	42.1 MB		
	NVIDIA Container Runtime	3.5 MB	Downloaded	
	> Multimedia	71.9 MB	Downloaded	
	Jetson SDK Components			
ARY U4		2,227 MB		
	EP 03 Ess EP 04 Arry Artion	 > Jetson Platform Services > CUDA Runtime Components > CUDA Runtime > CUDA X-AI Runtime > CUDA X-AI Runtime > CUDA X-AI Runtime > NVIDIA Container Runtime > Multimedia > Detson SDK Components > CUDA > CUDA > CUDA 	 > Jetson Platform Services > O MB > O Jetson Runtime Components > CUDA Runtime > CUDA X-AI Runtime > MB > COUDA X-AI Runtime > MB > CUDA X-AI Runtime > MB > Multimedia > TI-9 MB > OUDA > CUDA > CUDA	> Jetson Platform Services 0 MB > □ Jetson Runtime Components > CUDA Runtime 2,230 MB > Downloaded > CUDA X-Al Runtime 1,574 MB > Downloaded > CUDA X-Al Runtime 42.1 MB > Downloaded > CuDA X-Al Runtime 3.5 MB > Downloaded > NVIDIA Container Runtime 3.5 MB > Downloaded > Multimedia 71.9 MB > Downloaded > CUDA 2,227 MB > Downloaded > CUDA X-AL 1.574 MD > Downloaded

The SDK Manager will ask the username's password. Fill it and continue.

STEP OS					
STEPS: STEPS: STEPS: STEPS: STEPS: STEPS: STEPS: STEPS: STEPS: STEP:					
STERE OF STRANK STRACK 6.0 LINUX FOR JETSON DRIN XX MODULES Example VIARGET COMPONENTS DOWNLOAD SIZE STATUS VIEL JETSON DRIN XX MODULES O MB VIEL SCONT JETSON DRIN XX MODULES Downloaded VIEL SCONT SOR Manager O Downloaded VIEL SCONT Southoutes O Downloaded VIEL SCONT MULTIND O Downloaded VIEL SCONT SOUNA SOUNA D					
STEP 03 STEP 03 STEP 04					
STEP 02 Minimize contraction Minimize contraction All detson Linux All detson Linux All detson Battorn Services - Coming Soon Jetson F Jetson F Jetson F STEP 03 STEP 03 STEP 03 Step 04 Step 04 <td></td> <td></td> <td></td> <td></td> <td></td>					
STEP 02 ND 1KC xxer * Bash Jetson Linux * Jetson P * Jetson P * SDK Manager * Jetson P * CubA * CubA * CubA * Nume * Nume * Muttme * OutbA * CubA					
STEP 02 STEP 03 STEP 03 STEP 03 STEP 04 STEP 05 STEP 04 STEP 04					
STEP 03 Jetson P SDK Manager Jetson R Jetson R CUDA R	STEP 02				
Notation > Jetson P Sbk Manager > Jetson P Sbk Manager > CubA R Enter your password to perform administrative tasks: In Downtwooled > CubA R Enter your password for ubuntu: In Downtwooled > CubA R Isudo] password for ubuntu: In Downtwooled > RWIDIA C Ox Cancel In Downtwooled > RWIDIA C Station In Downtwooled In Downtwooled	DETAILS				
Jetson R CuDA					
STEP 03 CubA R Enter your password to perform administrative tasks: K Bowntesded STEP 03 Compute M Bowntesded Compute One Cancel M Bowntesded NUTDIAC One Cancel M Bowntesded NUTDIAC One Cancel M Bowntesded STEP 04 Out Cancel M Bowntesded STEP 04 CubA K 2.227 MB M Bowntesded CubA K CubA K CubA K CubA K		 Jetson R 			
STEP 03 2 CUDA X Sudo] password for ubuntu: 0 Compute 0 Compute Step 04 NV/DIA C 0 Concel 0 Concel 0 Concel STEP 04 0 UDA X 2.277 MB 0 Concel Step 04 0 CONCERS 0 Concel 0 Concel		Enter your password	to perform administrative tasks:		
NUTDER Compute NUTDER OK Cancel Nutimet OK OK					
STEP 04 OK Cancel OK • Multimet • Multimet • Downloaded • Jetson SDK Components • 2.227 MB • Downloaded • CUDA 2.227 MB • Downloaded • Prints V.AL • ETAL & ID • Prints V.AL		> Computi			
			OK Cancel		
					TIMUES
System requires up to 1968 (host) and 068 (target) of available disk space during setup.				required) TO STE	HINUE >
System requires up to 19GB (host) and 0GB (target) of available disk space during setup. Download folder: Imodu/objectu/Extraine/dis/folder: change (368 required) CONTINUE To STED reg					
System requires up to 1968 (host) and 068 (target) of available disk space during setup. Download folder: /modu/uturtEvrra/midia/solim_downloads. change (368 required) Target HW Image folder: /honorutuuturturnes.idk change (1668 required)					
System requires up to 1960 (host) and 06B (target) of available disk space during setup. Download folder: /modu/uturtu/Extra/midis/sdkm, downloads change (36B required) Target HW image folder: /modu/uturtu/measurumme.kdk change (166B required) I accept the terms and conditions of the <u>license agreements</u> . Download now. Install later. <(BACK TO STEP 0)					



Revision Date: Aug. 30. 2024



After the Jetson OS has created, the SDK Manager asks the Jetson module's flashing style. Just skip it and exit from the SDK Manager.

SDK Manager 2.1.0.11669 x86_64			_ 8
SDK Manager 2.1.0.11669 x86_64	SDK Manager SDK Manager is abo Could not detoct a board Connect and set your Jets 1. Choose whether to put	o <mark>ut to flash your Jetson Orin NX module</mark> (refresh) son Orin NX module as follows: t your Jetson Orin NX 16GB into Force Recovery Mode via	A Hello Mehmet ~ :
STEP 02 DETAILS AND LICENSE	Manual Setup or Auton already been flashed ar Recovery mode setup: 2. Ensure the device has 3. Connect the host com 4. Enter the connection in	natic Setup. Choose Automatic Setup only if the device has ad is currently running. Automatic Setup - Jetson Orin NX 16GBO already been flashed, powered and running, puter to the front USB Type-C connector on the device. Information of your Jetson Orin NX 16GB.	S oge ready Pending
STEP 03 BROCESS STEP 04 CHAMAGE CHAMAG	IP Address: Username: Password: 5. OEM Configuration: 6. Storage Device: Note: You may need to m there are multiple choice When ready, click 'Flash'	IPv4 192.168.55.1 Target username Target password Pre-Config V SD Card V son your device. son your device. to continue. to continue.	
	ewnload folder: /media/ubuntu/Extra/nvidia/adkm_	Flash. Skip	PAUSE



Revision Date: Aug. 30. 2024



Open the target HW image folder.

For JetPack-6.0

Orin NX: ~/nvidia/nvidia_sdk/JetPack_6.0_Linux_JETSON_ORIN_NX_TARGETS/

For JetPack-6.1

Orin NX: ~/nvidia/nvidia_sdk/JetPack_6.1_Linux_JETSON_ORIN_NX_TARGETS/





Revision Date: Aug. 30. 2024



For JetPack-6.0

Download the BSP files from GitHub link and extract it (Orin NX, Orin Nano).

For JetPack-6.1

Download the BSP files from GitHub link and extract it (Orin NX, Orin Nano).

Hint: The following steps have done for Orin NX, but they are the same for the other Jetson module types (only the BSP files and flashing commands are different).



Copy all files to the target HW image folder.



Revision Date: Aug. 30. 2024



Open a Terminal in the "Linux_for_Tegra" folder.



Create the system binaries with these commands below:

sudo ./tools/l4t_flash_prerequisites.sh

sudo ./apply_binaries.sh





Revision Date: Aug. 30. 2024



ubuntu@ubuntu-desktop: ~/nvidia/nvidia_sdk/JetPack_6.0_Li... Q × device-tree-compiler is already the newest version (1.6.1-1). dosfstools is already the newest version (4.2-1build3). lz4 is already the newest version (1.9.3-2build2). python3-yaml is already the newest version (5.4.1-1ubuntu1). whois is already the newest version (5.5.13). zstd is already the newest version (1.4.8+dfsg-3build1). abootimg is already the newest version (0.6-1build1). lbzip2 is already the newest version (2.5-2.3). sshpass is already the newest version (1.09-1). binutils is already the newest version (2.38-4ubuntu2.6). cpio is already the newest version (2.13+dfsg-7ubuntu0.1). libxml2-utils is already the newest version (2.9.13+dfsg-1ubuntu0.4). nfs-kernel-server is already the newest version (1:2.6.1-1ubuntu1.2). openssl is already the newest version (3.0.2-Oubuntu1.15). rsync is already the newest version (3.2.7-Oubuntu0.22.04.2). udev is already the newest version (249.11-Oubuntu3.12). uuid-runtime is already the newest version (2.37.2-4ubuntu3.4). qemu-user-static is already the newest version (1:6.2+dfsg-2ubuntu6.19). The following packages were automatically installed and are no longer required: libwpe-1.0-1 libwpebackend-fdo-1.0-1 Use 'sudo apt autoremove' to remove them. 0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded. ubuntu@ubuntu-desktop:~/nvio inux_for_Tegra\$ sudo ./apply_binaries.sh

Apply the new BSP files and interface configurations with the following commands below:

cd .. sudo ./replace_bsp_files.sh cd Linux_for_Tegra/



Revision Date: Aug. 30. 2024



Hint: If you want to configure your username-password & hostname with default settings, you can create user without the Ubuntu installation wizard. To do this, the user generation command structure should be:

sudo tools/l4t_create_default_user.sh -u {USERNAME} -p {PASSWORD} -a -n {HOSTNAME} --accept-license

For example (username:"nvidia", password:"nvidia", device-name:"nvidia-desktop"):

sudo tools/l4t_create_default_user.sh -u nvidia -p nvidia -a -n nvidia-desktop --accept-license

Jetson OS Installation

Connect the recovery USB (between installer PC & NV200-2LGS16's recovery USB) and power connection of your NV200-2LGS16.

While the NV200-2LGS16's power connector plugged in,

- · press reset & recovery buttons together
- release reset button
- release the recovery button after 3 seconds later. This will set it to Recovery mode.

Then, type "Isusb" and check the device connected in Recovery mode.

- "0955:7323 NVidia Corp." for Orin NX 16GB
- "0955:7423 NVidia Corp." for Orin NX 8GB

.FI	U	buntu@u	ibuntu	-de	sktop: ~/nvidi	a/nvidia_sdk/JetPac	k_6.0_Li	Q	Ξ			×
ubur	ntu@i	ubuntu-d	leskto	op:-								RGE
			igra\$	lsı	JSD							
Bus	008	Device	001:	ID	1d6b:0003	Linux Foundation	n 3.0 root	hub				
Bus	007	Device	001:	ID	1d6b:0002	Linux Foundation	n 2.0 root	hub				
Bus	006	Device	001:	ID	1d6b:0003	Linux Foundation	n 3.0 root	hub				
Bus	005	Device	001:	ID	1d6b:0002	Linux Foundation	n 2.0 root	hub				
Bus	004	Device	001:	ID	1d6b:0003	Linux Foundation	n 3.0 root	hub				
Bus	003	Device	002:	ID	0b05:18f3	ASUSTek Computer	r, Inc. AU	RA LE	ED Co	ntrol	ler	
Bus	003	Device	001:	ID	1d6b:0002	Linux Foundation	n 2.0 root	hub				
Bus	002	Device	001:	ID	1d6b:0003	Linux Foundation	n 3.0 root	hub				
Bus	001	Device	005:	ID	8087:0029	Intel Corp. AX20	00 Bluetoo	th				
Bus	001	Device	003:	ID	05e3:0610	Genesys Logic, 1	Inc. Hub					
Bus	001	Device	030:	ID	413c:301a	Dell Computer Co	orp. Dell	MS116	5 Opt	ical I	louse	1
Bus	001	Device	029:	ID	1c4f:0026	SiGma Micro Key	poard					
Bus	001	Device	028:	ID	0409:005a	NEC Corp. HighSp	beed Hub					
Bus	001	Device	027:	ID	1a40:0101	Terminus Technol	logy Inc.	Hub				
Bus	001	Device	032:	ID	0955:7323	NVIDIA Corp. AP)	(
Bus	001	Device	001:	ID	1d6b:0002	Linux Foundation	n 2.0 root	hub				
ubur	ntu@i	ubuntu-d	leskto	p:-							X_TA	RGE
			igra\$									

Revision Date: Aug. 30. 2024



Flash the Jetson OS with this command below:

sudo ./ tools/kernel_flash/l4t_initrd_flash.sh --external-device nvme0n1p1 -c

tools/kernel_flash/flash_l4t_external.xml -p "-c bootloader/generic/cfg/flash_t234_qspi.xml" --showlogs --network usb0 jetson-orin-nano-devkit internal



At the end of the script, the device will reboot. Complete your Ubuntu installation wizard (if you have not created a user with tools/l4t_create_default_user.sh script file) from the DSBOARD-ORNX-LAN (language, keyboard type, location, username & password etc.).



[Optional] If you will use the recovery USB port as host (to be able to connect USB-2 & USB-3 devices),

Revision Date: Aug. 30. 2024



please verify that the FDT parameter has been applied in the extlinux.conf file. In JetPack-6 installation, this parameter may not included in it. If this parameter is missing in it, please open it with a text editor and write "FDT" with the DTB file (located in the /boot/dtb/ folder).

F		nvidia@nvid	lia-desktop: ~	Q	≡			×
<mark>nvidia@nvidia-d</mark> TIMEOUT 30 DEFAULT primary	esktop:~\$ cat	/boot/extli	nux/extlinux.c	conf				
MENU TITLE L4T	boot options							
LABEL primary MENU LABE LINUX /bo INITRD /b FDT /boot	L primary kern ot/Image oot/initrd /dtb/kernel te	el gra234-p376	8-0000+p3767-0	0000-nv.d	tb			
APPEND \${	cbootargs} roo	t=PARTUUID=	46585302-0ee0-	-48a2-948	b-8440	89362	2d19	rw.
rootwait rootfs	type=ext4 mmin ware fbcon=man	it_loglevel	=4 console=tty	yTCU0,115 re bbb vi	200 fi deo=ef	.rmwai ifb:	re_cl	ass
ole=tty0			nes-o nospecei					UIIS
# When testing # the original # fallback to t #	a custom kerne kernel and add he original ke	l, it is re a new entr rnel. To do	commended that y to this file this:	t you crea e so that	ate a the c	back levice	up of e can	
# 1, Make a bac	kup of the ori	ginal kerne	ι					
# sudo cp #	/boot/Image /b	oot/Image.b	ackup					
# 2, Copy your	custom kernel	into /boot/	Image					

Then, please open a terminal from the Jetson Orin and type the following command below. This will update its current device-tree and reboot it.

Otherwise, you can use this port for virtual network communication (file transfer etc. between host PC with 192.168.55.1 IP address) in default.

sudo switch_dtb.sh



Revision Date: Aug. 30. 2024



л	nvidia@nvidia-desktop: ~	Q ≡		×
<pre>nvidia@nvidia-desktop:-\$ sudo [sudo] password for nvidia: Base DTB: kernel_tegra234-p376 New DTB: tegra234-p3768-0000+p Done. Rebooting]</pre>	switch_dtb.sh 58-0000+p3767-0000-nv.dtb 53767-0000-nv.dtb			

Jetson SDK Components Installation

[Optional] Delete LibreOffice & ThunderBird packages (if you don't need) and remove the unnecessary packages to increase the free space. To do this, type these commands to the NV200-2LGS16 side:

sudo apt remove -y libreoffice* thunderbird* sudo apt autoremove -y sudo apt clean

Connect the NV200-2LGS16 to the Ethernet. Then, Open the NVIDIA SDK Manager. Select the correct JetPack version for Target Operating System and select the correct module for your installation ("Jetson Orin NX modules"). The "Host Machine" components are not required. (Additional SDKs (DeepStream) are optional).

Then, continue to Step 2.



Revision Date: Aug. 30. 2024

SDK Manager 2.1.0	11669 x86_64					_ X
						A Hello Mehmet ~
ST	CEP 01	PRODUCT CATEGORY	Jetson	0	Data Science	
ST	ILS LICENSE	SYSTEM CONFIGURATION	Host Machine Ubuntu 22.04 - x86_64		Jetson Orin NX modules • Could not detect a bo	ard
ST		SDK VERSION	JetPack 6.0 See what's new			✓
SI	TEP 04	ADDITIONAL SDKS	DeepStream DeepStream 7.0			
Repair / U	Jninstali				CON	
💽 NVIDIA. co	pyright © 2024, NVIDIA CORPI	ORATION. All rights reserved. NVID	IA Developer			

Choose at least "Jetson Runtime Components" ("Jetson SDK Components" are optional. It depends on your use case), accept the terms & conditions and continue to Step 3..

Manag	er 2.1.0.11669 x86_64						
						名 Hello Me	ehmet v
	OTED OI						
	SIEPUI	JETPACK 6.0 LINUX FOR JETSON ORIN NX MOD	DULES			Expand al	
	ENVIRONMENT	✓TARGET COMPONENTS	DOWNL	OAD SIZE		STATUS	
		Y 🗌 Jetson Linux					
						OS image ready	
	STEP 02						
	DETAILS	Y 🗌 Jetson Platform Services - Coming Services	oon				
	AND LICENSE	Jetson Platform Services		MB			
		Jetson Runtime Components					
		> CUDA Runtime	2,230	MB		Downloaded	
	STEP 03	> CUDA X-AI Runtime	1,574	MB		Downloaded	
		Computer Vision Runtime	42.1	MB		Downloaded	
		NVIDIA Container Runtime	3.5	MB		Downloaded	
		> Multimedia	71.9	MB		Downloaded	
	CTED OA	Jetson SDK Components					
	STEP 04	> CUDA	2,227	MB		Downloaded	
		System requires up to 8GB (host) and 16GB (target) of a	wailable disk space duri	ng setup.			
		Download folder: /media/ubuntu/Extra/nvidia/sdkm_d		change		CONTINUE	>
		Target HW image folder: /home/ubuntu/nvidia/nvidia			(OGB required)	IU STEP US	
		I accept the terms and conditions of the license a	greements.	Download n	ow. Install later.	K BACK TO STEP 01	





Revision Date: Aug. 30. 2024



The SDK Manager will ask the username's password. Fill it and continue.

SDK Mana					25
	STEP 02				
		Y 🗹 Jetson R			
		CUDAR Enter your password	to perform administrative tasks:		
		CUDAX [sudo] password for			
		> Compute			
			Citt Cancel		
		Multimer			
				CONTINUE >	
		JETRACK & & LINUX FOR JETSON ORINNX MODULES DOWNLOAD SIZE STATUS VITARGET COMPONENTS DOWNLOAD SIZE STATUS VIIII Jetson Linux 3.349 MB 0.0 Inage reacy Jetson Platform Services - Coming Soon 0.0 MB 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 MB 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Coming Soon 0.0 Index reacy 0.0 Index reacy Jetson Platform Services - Components 0.0 Index reacy 0.0 Index reacy Jetson SDK Components 2.227 MB 0.0 Index reacy VIII Index (VIII) 1.0 Index reacy 0.0 Index reacy System reacy 1.0 Index reacy 0.0 Index reacy System r			

Type the IP address, username and password of Jetson Orin module and install the SDK Components.

SDK Manager 2.1.0.11669 x86_64		
STED 01 SDK Manager		
DEVELOPMENT		
ENVIRONMENT	SDK Manager is about to install SDK components on your	
	Jetson Orin NX module	
	To install SDK components on your Jetson Orin NX module:	
STEP 02	 Complete the Ubuntu: System configuration wizard' on your Jetson Orin NX modules if you have chosen to configure it manually before flashing. 	tail.Pending
DETAILS AND LICENSE	2. Wait for the OS login screen.	tali Panding
	3. If proxy is used on host, also configure apt proxy on your Jetson Orin NX modules.	tall Pending .
	4. Enter the username and password of your Jetson Orin NX modules.	tall Feriding
STED 02	Connection: Ethernet 👻	tali Pending
STEP US	IP Address: IPv4 V 192.168.2.122	Life Breaking
PROCESS	Literename: mildin	tige Pending
CONTRACTOR OF A	Osername. mvida	hall Percenter
	Password:	ne winnig
STEP 04	5. Provy Sattians on Tarant	
SUMMARY FINALIZATION	Do not set proxy	
	 Proxy for apt commands should be defined at target path: /etc/apt/apt.conf.d/proxy.conf Click 'Install' to continue. 	
0.1		
	Install Skip	DALISE
0		FOR A BIT
Download folder: /media/i	ubuntu/Extra/nvidia/sdkm_downloads	
TVIDIA. Convisions 5 2024 NVIDIA CORPORATION All rights reserved I.N		

Revision Date: Aug. 30. 2024



At the end of the installation, the NV200-2LGS16 becomes ready.

To avoid kernel update with "apt upgrade" or "apt-get upgrade" commands, please follow this guide on the Jetson module.

Install the driver for GMSL Camera

unzip fg12-4ch-onxa-r36.3.0.zip

sudo apt-get install qt5-qmake qtbase5-dev

(The default is less QT library "libqt5widgets.so.5", which is required for setting)

cd fg12-4ch-onxa-r36.3.0

chmod 777 fg12.4ch.onx.upgrade.sh

sudo ./fg12.4ch.onx.upgrade.sh

Once the installation is complete, you will be prompted with reboot

cd fg12-4ch-onxa-r36.3.0/fzcam_app/usr/local/bin/

chmod 777 fzcam_ui

sudo ./fzcam_ui

Set the parameters as follows:

- 1. GMSL position 1/2/3/4
- 2. Model IMX390
- 3. Serializer MAX9295A
- 4. Resolution 1920x1080
- 5. Press "Save Configuration" ("保存配置")
- 6. Press "Run Configuration" ("運行配置") -> With four cameras installed, the Link status should be 1-1-1-1





Revision Date: Aug. 30. 2024



Install the driver for 3G-SDI Camera

unzip 20240925_V1350_orin_5.15.136-tegra_r36.3_arm64.zip cd 20240925_V1350_orin_5.15.136-tegra_r36.3_arm64/release chmod +x *.sh sudo ./setup.sh reboot

Check device -Camera is connected

sudo apt-get install v4I-utils

(install the v4L2 utility, if you haven't already)

v4l2-ctl --list-devices

It will show as below.

PS: "SC0710" is SDI camera; And you can check device ID after reboot.

```
elease$ v412-ct1 --list-devices
SC0710:RAW 00.00 0004f71a (PCI Bus 0004:01 12ab0710):
/dev/video0
/dev/video9
/dev/video10
/dev/video11
```

Capture Camera stream

GMSL Camera:

gst-launch-1.0 v4l2src device=/dev/video X(device ID) ! 'video/x-raw,format=UYVY,width=1920,height=1080' ! videoconvert ! fpsdisplaysink video-sink=xvimagesink sync=false\

3G-SDI Camera:

gst-launch-1.0 v4l2src device=/dev/video X(device ID) ! video/x-raw,width=1920,height=1080,format=YV12 ! videoconvert ! xvimagesink



Revision Date: Aug. 30. 2024



Appendex-A : Cable Pin Define

X0: DC-in Power cable:





CON1	RJ45-A	WERE COLOR	CON1		RJ45-B	WIRE COLOR
1	1	WHITE-GRANDE	8	-v-v-	1	NULTE/ORANGE
2	2	ORANGE	9		2	ORANGE
3	3	WHITE/GREEN	10	-v-v-	3	NULTE/GROOM
4	6	GREEN	11	~~~	6	GREEN
5 777	4	BLIE	12	-v-v-	4	BLUE
6	5	WHITE/BLUE	13		5	WHILE/BLIE
15 -	7	HITE/BROWN	19	-v-v-	7	WITTE/BRORN
16	8	BROWN	20		8	BROAN
7	SHELL	BLACK	14		SHELL	BLICK
17	SHELL	BLACK	21		SHELL	BLACK
18	SHELL	BLACK	22		SHELL	BLACK

X2: 1x CAN+1x RS232/422/485 + 4x DIO cable:



CAN_H CAN_L GND

6 7 8