

AUVIDEA

SOFTWARE

SETUP GUIDE

SCOPE OF WORK

Help you to flash your Auvideo carrier board system for the first time and get everything up and running.

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SECTION 1 Document revisions and changes

Document version	Changes
1.1	Document overhaul of quick starter guide, internal verification process
1.2	Small fixes
1.3	Fixed spelling, cleaner Headings
1.6	Surpassed QuickStart guide version number to better indicate that the Software_Setup_Guide should be used in the future

SECTION 2 Simple flashing guide (recommended)

This section describes how to flash your Auvideo carrier board system so it can boot and run. With this guide everything you need is included in the download package from Auvideo. This flashing guide is recommended for the Auvideo carrier board series.

2.1 Before you start

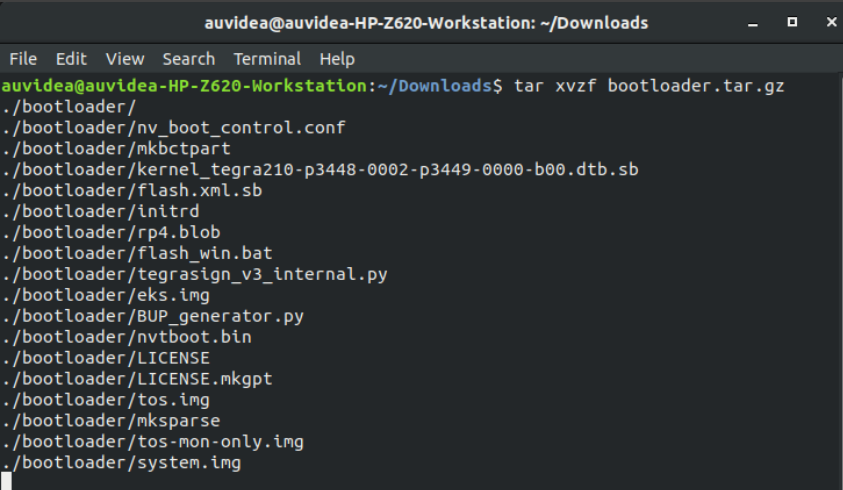
- Please make sure to use a Linux host PC with Ubuntu 18.04 operating system. Please use a native setup (no virtual machine). This Host PC should have a high bandwidth internet connection for the download of 3GByte+ installation file in the following steps.
- You will also need a high-quality standard USB 2.0 Type A to micro-USB 2.0 cable.

2.2 Download installation file from Auvideo

- 1) Download the installation file for your setup from Auvideo
<https://auvideo.eu/firmware/>
- 2) Open a terminal window (CTRL + ALT + T) on your Linux host PC and navigate to your download location.

```
cd <path_to_downloaded_tar>
```

- 3) Extract the tar.gz file you just downloaded.

Command host PC	<code>tar xvzf bootloader.tar.gz</code>
Terminal host PC example	 <pre> auvideo@auvideo-HP-Z620-Workstation: ~/Downloads File Edit View Search Terminal Help auvideo@auvideo-HP-Z620-Workstation:~/Downloads\$ tar xvzf bootloader.tar.gz ./bootloader/ ./bootloader/nv_boot_control.conf ./bootloader/mkbcpart ./bootloader/kernel_tegra210-p3448-0002-p3449-0000-b00.dtb.sb ./bootloader/flash.xml.sb ./bootloader/initrd ./bootloader/rp4.blob ./bootloader/flash_win.bat ./bootloader/tegrasign_v3_internal.py ./bootloader/eks.img ./bootloader/BUP_generator.py ./bootloader/nvtboot.bin ./bootloader/LICENSE ./bootloader/LICENSE.mkgpt ./bootloader/tos.img ./bootloader/mkspare ./bootloader/tos-mon-only.img ./bootloader/system.img </pre>

- 4) Change directory to the extracted bootloader folder.

Command host PC	<code>cd ./bootloader</code>
----------------------------	------------------------------

**Terminal
host PC
example**

```

auvidea@auvidea-HP-Z620-Workstation: ~/Downloads/bootloader
File Edit View Search Terminal Help
./bootloader/t210ref/BCT/P2180_A00_LP4_DSC_204Mhz.cfg
./bootloader/t210ref/BCT/E2220_LP3_DSC_931.2Mhz.cfg
./bootloader/t210ref/BCT/P3448_A00_lpddr4_204Mhz_P987.cfg
./bootloader/t210ref/BCT/P2894_A00_Samsung_3GB_lpddr4_204Mhz_P984_v2.cfg
./bootloader/t210ref/cboot.bin
./bootloader/t210ref/p2371-0000/
./bootloader/t210ref/p2371-0000/u-boot.bin
./bootloader/t210ref/LICENSE.cboot
./bootloader/t210ref/p3541-0000/
./bootloader/t210ref/p3541-0000/u-boot.bin
./bootloader/bmp.blob
./bootloader/tegrasign_v3.py
./bootloader/crc-flash.xml.tmp
./bootloader/mkbootimg
./bootloader/P3448_A00_lpddr4_204Mhz_P987.cfg
./bootloader/LICENSE.tegraopenssl
./bootloader/LICENSE.tos-mon-only.img.arm-trusted-firmware
./bootloader/cboot.bin
./bootloader/kernel_tegra210-p3448-0002-p3449-0000-b00.dtb
./bootloader/nvidia-l4t-bootloader_32.6.1-20210726122000_arm64.deb
./bootloader/tegrahost
./bootloader/LICENSE.mkspase
auvidea@auvidea-HP-Z620-Workstation:~/Downloads$ cd ./bootloader/
auvidea@auvidea-HP-Z620-Workstation:~/Downloads/bootloader$

```

2.3 Connect carrier board to host PC

- 5) Connect the system to the Linux host PC. Please use a USB 2.0 cable (micro-USB on the carrier board).
- 6) After connecting to the host PC power up the system. The system will detect the host PC and automatically enter the flashing state (also called force recovery mode).
- 7) Check that the connection is established with the lsusb command. You should find one entry with Nvidia Corp. as highlighted below.

**Command
host PC**

```
lsusb
```

**Terminal
host PC
example**

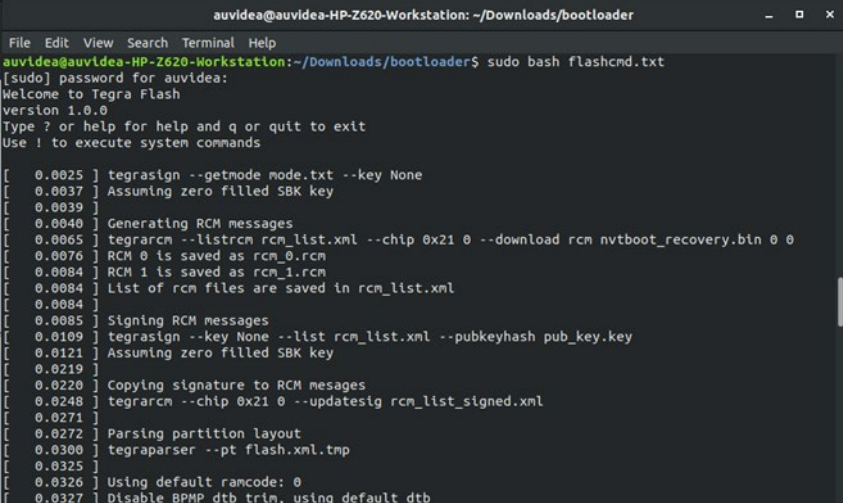
```

auvidea@auvidea-HP-Z620-Workstation: /media/auvidea/Storage/Nvidia/Images/JetPa...
File Edit View Search Terminal Help
auvidea@auvidea-HP-Z620-Workstation:/media/auvidea/Storage/Nvidia/Images/JetPack
4.6_Linux_JETSON_NANO_TARGETS/Linux_for_Tegra$ lsusb
Bus 002 Device 036: ID 0955:7e19 Nvidia Corp.
Bus 002 Device 032: ID 046d:c03e Logitech, Inc. Premium Optical Wheel Mouse (M-B
T58)
Bus 002 Device 031: ID 046a:0023 Cherry GmbH CyMotion Master Linux Keyboard G230
Bus 002 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 002: ID 2109:0815 VIA Labs, Inc.
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 012: ID 067b:2303 Prolific Technology, Inc. PL2303 Serial Port
Bus 003 Device 002: ID 2109:2815 VIA Labs, Inc.
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
auvidea@auvidea-HP-Z620-Workstation:/media/auvidea/Storage/Nvidia/Images/JetPack
4.6_Linux_JETSON_NANO_TARGETS/Linux_for_Tegra$


```

2.4 Flashing of system

- 8) Use the flashcmd script in the extracted bootloader folder to transfer the software into the Jetson compute module and flash it.

Command host PC	<code>sudo bash ./flashcmd.txt</code>
Terminal host PC example	 <pre> auvidea@auvidea-HP-Z620-Workstation: ~/Downloads/bootloader File Edit View Search Terminal Help auvidea@auvidea-HP-Z620-Workstation:~/Downloads/bootloader\$ sudo bash flashcmd.txt [sudo] password for auvidea: Welcome to Tegra Flash version 1.0.0 Type ? or help for help and q or quit to exit Use ! to execute system commands [0.0025] tegrasign --getmode mode.txt --key None [0.0037] Assuming zero filled SBK key [0.0039] [0.0040] Generating RCM messages [0.0065] tegrarc --listrcm rcm_list.xml --chip 0x21 0 --download rcm nvtboot_recovery.bin 0 0 [0.0076] RCM 0 is saved as rcm_0.rcm [0.0084] RCM 1 is saved as rcm_1.rcm [0.0084] List of rcm files are saved in rcm_list.xml [0.0084] [0.0085] Signing RCM messages [0.0109] tegrasign --key None --list rcm_list.xml --pubkeyhash pub_key.key [0.0121] Assuming zero filled SBK key [0.0219] [0.0220] Copying signature to RCM messages [0.0248] tegrarc --chip 0x21 0 --updatesig rcm_list_signed.xml [0.0271] [0.0272] Parsing partition layout [0.0300] tegrarpm --pt flash.xml.tmp [0.0325] [0.0326] Using default ramcode: 0 [0.0327] Disable BPMP dtb trln, using default dtb </pre>

- 9) Please connect a monitor to the system. After the flashing process has completed the should automatically boot and show the Ubuntu desktop.

HDMI monitor dev system	
--	--

You now have a functioning system ready for your needs.

2.5 Installing additional NVIDIA SDK components

- 10) Now you can install additional NVIDIA SDK components. Please connect the system to the Internet. Open a terminal window on the system (CTRL ALT T). Use apt-get to install the components. If this fails, please check the Internet connection of the system.

Command dev system	<pre>sudo apt-get update && sudo apt-get install nvidia-jetpack</pre>
Terminal dev system example	<pre> test@test-desktop: ~ test@test-desktop:~\$ sudo apt-get update && sudo apt-get install nvidia-jetpack [sudo] password for test: Hit:1 http://ports.ubuntu.com/ubuntu-ports bionic InRelease Hit:2 http://ports.ubuntu.com/ubuntu-ports bionic-updates InRelease Hit:3 http://ports.ubuntu.com/ubuntu-ports bionic-backports InRelease Hit:4 http://ports.ubuntu.com/ubuntu-ports bionic-security InRelease Hit:5 https://repo.download.nvidia.com/jetson/common r32.6 InRelease Get:6 https://repo.download.nvidia.com/jetson/t210 r32.6 InRelease [2,547 B] Fetched 2,547 B in 2s (1,554 B/s) Reading package lists... Done Reading package lists... Done Building dependency tree Reading state information... Done The following packages were automatically installed and are no longer required: apt-clone archdetect-deb bogl-bterm busybox-static cryptsetup-bin dpkg-repack gir1.2-timezonemap-1.0 gir1.2-xkl-1.0 grub-common kde-window-manager kinit kio kpackageool5 kwayland-data kwln-common kwin-data kwin-x11 libdebian-installer4 libkdecorations2-5v5 libkdecorations2private5v5 libkf5activities5 libkf5attica5 libkf5completion-data libkf5completion5 libkf5declarative-data libkf5declarative5 libkf5doctools5 libkf5globalaccel-data libkf5globalaccel5 libkf5globalaccelprivate5 libkf5idletime5 libkf5jobwidgets-data libkf5jobwidgets5 libkf5kcmutils-data libkf5kcmutils5 libkf5kiocore5 libkf5kiontln5 libkf5kiowidgets5 libkf5newstuff-data libkf5newstuff5 </pre>

SECTION 3 Advanced flashing guide (experienced users)

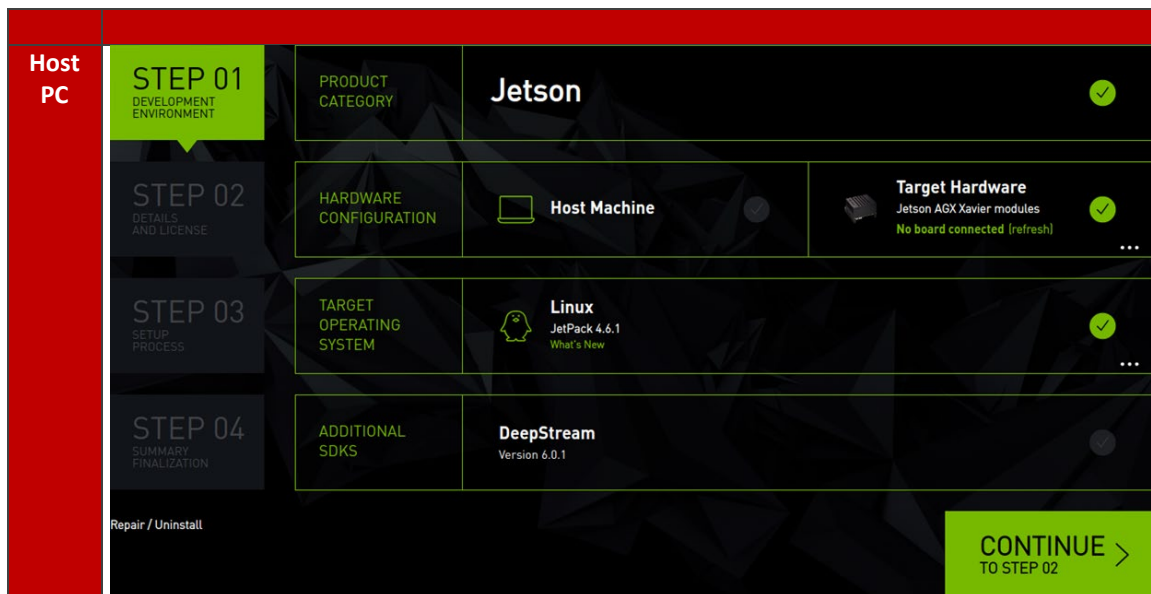
The alternative flashing guide is intended to be used if you encounter problems with the recommended guide. This guide is more general and should also work with boards from other vendors and requires a few more steps. In this guide you will download the core operating system from NVIDIA with the SDK manager and only download the files that need to be changed for your carrier board from Auvidea.

3.1 Before you start

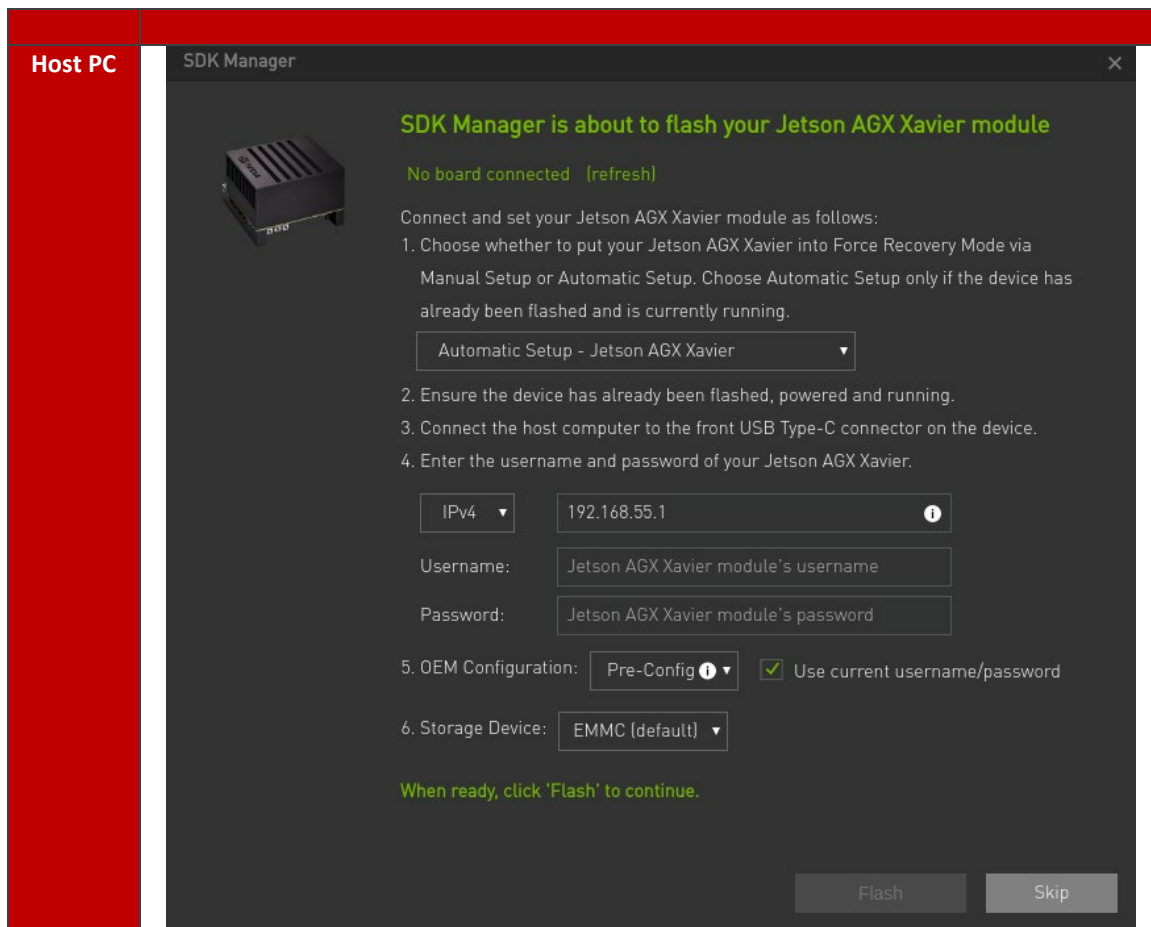
- Please make sure to use a Linux host PC with Ubuntu 18.04 operating system. Please use a native setup (no virtual machine). This host PC should have a high bandwidth internet connection for the download of 2GB+ installation file in the following steps.
- You will also need a high-quality standard USB 2.0 Type A to micro-USB 2.0 cable.

3.2 Install and configure NVIDIA SDK manager

- 1) Download and install the Nvidia SDK manager for Ubuntu
<https://developer.nvidia.com/nvidia-sdk-manager>
- 2) Install Jetpack 4.6 and up for your Jetson module (AGX Xavier)



- 3) Skip the flashing process after installation. This step is necessary to set up the file system and contents of you Host PC. Do not flash with this configuration! Specific steps need to be performed to enable all functionality of you carrier board as described in the following steps.



3.3 Download installation files from Auvideo

- 4) Download our latest firmware for your carrier board

Link	https://auvideo.eu/firmware/			
Auvideo webpage (example)	Date	Product	Version	Description
	Dec 2021	X200/X220/X220-LC/X221/X221-LC/X400 (223 MB) firmware for Jetpack 4.6 (L4T 32.6.1) (sources, kernel, patches and readme)	4.0	supports: X200, X220, X220-LC, X221, X221-LC, X400 carrier boards - 2x USB 3.0 - 2x HDMI - 2x GbE (native and i210) - M.2 SSD (NVME)

- 5) Extract the download tar ball from our website

Command host PC	<code>tar xvf <your_downloaded_tar>.tar.bz2</code>
-----------------	--

- 6) Change directory into the extracted files and extract the "kernel_out.tar.bz2"

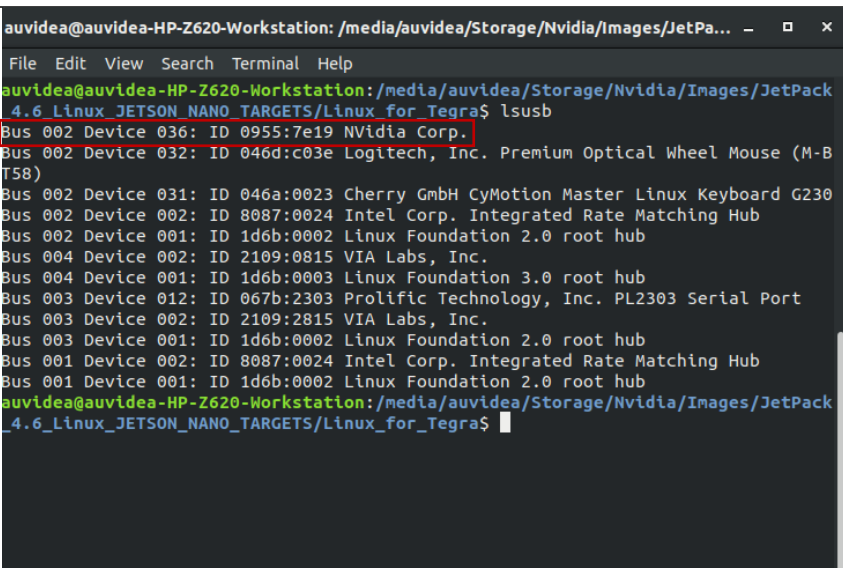
Command host PC	<code>cd <your_extracted_downloaded_tar> tar xvf kernel_out.tar.bz2</code>
-----------------	--

- 7) Copy the extracted kernel_out folder into your jetpack 4.6 or up L4t folder.
 <Jetpack_L4T_folder> is usually located at:
 "/home/<YOUR_USERNAME>/nvidia/nvidia_sdk/JetPack_<Jetpack_version>_Linux_<Jetson_module>/Linux_for_Tegra"

Command host PC	<pre>rsync -axHAWX --numeric-ids --info=progress2 ./kernel_out/<Jetpack_L4T_folder></pre> (Modify for your version/module needs)
------------------------	--

3.4 Flashing of system

- 8) Connect a USB 2 micro USB cable to the Jetson befor powering it up
- 9) After connecting to host PC power up the Xavier AGX. This will put the system in to flashing mode (also force recovery mode) with a connected Host PC.
- 10) Check that the connection is established with the lsusb command. You should find one entry with Nvidia Corp. as highlighted below.

Command host PC	<pre>lsusb</pre>
Terminal host PC example	 <pre> auvidea@auvidea-HP-Z620-Workstation: /media/auvidea/Storage/Nvidia/Images/JetPa... File Edit View Search Terminal Help auvidea@auvidea-HP-Z620-Workstation: /media/auvidea/Storage/Nvidia/Images/JetPack 4.6 Linux_JETSON_NANO_TARGETS/Linux_for_Tegra\$ lsusb Bus 002 Device 036: ID 0955:7e19 NVidia Corp. Bus 002 Device 032: ID 046d:c03e Logitech, Inc. Premium Optical Wheel Mouse (M-B T58) Bus 002 Device 031: ID 046a:0023 Cherry GmbH CyMotion Master Linux Keyboard G230 Bus 002 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub Bus 004 Device 002: ID 2109:0815 VIA Labs, Inc. Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub Bus 003 Device 012: ID 067b:2303 Prolific Technology, Inc. PL2303 Serial Port Bus 003 Device 002: ID 2109:2815 VIA Labs, Inc. Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub Bus 001 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub auvidea@auvidea-HP-Z620-Workstation: /media/auvidea/Storage/Nvidia/Images/JetPack 4.6 Linux_JETSON_NANO_TARGETS/Linux_for_Tegra\$ </pre>

- 11) Open your terminal in the <Jetpack_L4T_folder> folder if you are not already in it.
- 12) You can now flash your system using the following command

Module name:	<your_module>:
Jetson Nano	jetson-nano-emmc
Jetson AGX-Xavier	jetson-xavier
Jetson Xavier NX	jetson-xavier-nx-devkit-emmc
Jetson TX2 NX	jetson-xavier-nx-devkit-tx2-nx
...	...

Command host PC	<pre>sudo ./flash <your_module> mmcblk0p1</pre>
------------------------	---

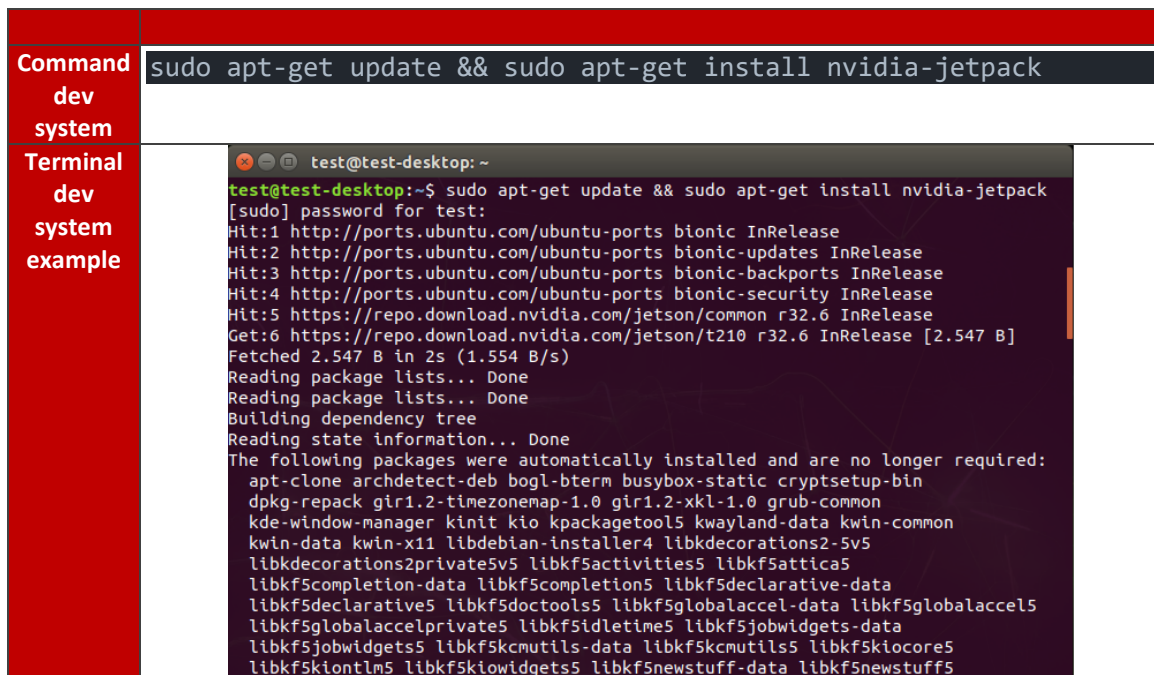
- 13) Please connect a monitor to the system. After the flashing process has completed the system should automatically boot and show the Ubuntu desktop.



You now have a functioning system ready for your needs.

3.5 Installing additional NVIDIA SDK components

- 14) Now you can install additional NVIDIA SDK components. Please connect the system to the internet. Open a terminal window on the system (CTRL ALT T). Use apt-get to install the components. If this fails, please check the Internet connection of the system.



SECTION 4 Disclaimer

Thank you for reading this manual. If you have found any typos or errors in this document, please let us know.

This is the preliminary version of this data sheet. Please treat all specifications with caution as there may be any typos or errors.

The Auvidea Team

Copyright notice

SECTION 5 Trademarks

NVIDIA, the NVIDIA logo, CUDA, Jetson, Maxwell, Tegra, Nano and VisionWorks are registered trademarks and/or trademarks of NVIDIA Corporation in the United States and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

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SECTION 6 END OF DOCUMENT

End of document