

BOARD SUPPORT PACKAGE

For Connect Tech NVIDIA® Jetson AGX Orin™ Carriers

BSP Version: ORIN-AGX-35.3.1 V005
Last Updated: 2023/09/11

1. Introduction

This Board Support Package adds support for the Connect Tech Jetson AGX Orin™ family of carrier boards to Linux4Tegra. It includes any extra files required to use all the features of Connect Tech carriers.

Please check Section 3. For supported features for your board and Section 7 for the changes made between versions. You can check which version of the BSP you have installed by running:

```
cat /etc/cti/CTI-L4T.version
```

Check for the Latest Version of the CTI-L4T BSP at:
<https://connecttech.com/resource-center/l4t-board-support-packages/>

2. Requirements

- x86/x64 based host machine running Ubuntu 18.04 or 20.04
- JetPack™ 5.1.1 / L4T 35.3.1 installed (see Section 4)
- AGX Orin™ module
- Connect Tech AGX Orin™ Carrier
- USB Cable for flashing

*L4T version can be found in /etc/nv_tegra_release and will look like this:
R35 (release), REVISION: 3.1

3. BSP Features

3.1 Supported Modules in BSP

- AGX Orin™ 32GB
- AGX Orin™ 64GB

3.2 Supported Cameras in BSP

- Econ NileCAM21
- Econ NileCAM82
- Econ NeduCAM25
- Econ e-Cam82
- LI HAWK
- Tier4 C2
- Tier4 C1
- Stereolabs ZED X (ZED X mini not verified)
- LI IMX390
- FLIR Boson ADK

3.2.1 Installing ZED X camera SDK

The ZED SDK is required to operate the ZED X camera. To use the SDK, NVIDIA®'s CUDA must first be installed (It is not installed automatically with this BSP). To install CUDA, follow the instructions here after flashing your AGX Orin™: <https://connecttech.com/resource-center/kdb374/>

Next, you will need to install some additional dependencies on the AGX Orin™ with the command:

```
"sudo apt install zstd libqt5network5 libqt5opengl5 libqt5sql5 libqt5xml5"
```

The ZED SDK can then be downloaded onto the AGX Orin™ from the Stereolabs website here: <https://www.stereolabs.com/developers/release/>

Click on "SDK Downloads", then the link for "ZED SDK for JetPack™ 5.1.1 (L4T 35.3)".
Note: ZED X drivers are already included in this BSP and do not need to be downloaded.

Once you have downloaded the executable onto your AGX Orin™ system, follow the rest of the instructions under "Download and Install the ZED SDK" at this link: <https://www.stereolabs.com/docs/installation/jetson/>

Additional questions about the SDK and camera applications can be answered by Stereolabs at <https://support.stereolabs.com/hc/en-us/>

3.3 Product Specific Details

AGX201 (Forge)

- 10G and 1G ethernet Support.
- CAN Support.
- Display Port Support.
- USB 3.2 Support.

- USB OTG Support.
- I2C Support.
- SPI Support.
- UART Support.
- RS232/485 Support.
- GPIO Support.
- M.2 pcie Support.
- Key E 2230 Wifi/BT.
- Key B 3042/3052 LTE/5G with micro SIM.
- Micro SD support.
- Oculink support
- MIPI Camera support
- Endpoint Mode not Supported
- JCB002 GMSL adapter support.
- JCB006 FPDLink adapter support.

AGX202 (Rogue for Orin™)

- x2 10G ethernet Support.
- CAN Support.
- HDMI Support.
- USB 3.2 Support.
- USB OTG Support.
- I2C Support.
- SPI Support.
- UART Support.
- RS232/485 Support.
- GPIO Support.
- M.2 pcie Support.
- Key E 2230 Wifi/BT.
- Micro SD support.
- MIPI Camera support.
- JCB002 GMSL adapter support.
- JCB006 FPDLink adapter support.

3.4 Limitations and Known Issues

1. Due to firmware and bootloader limitations there is no way to move a module flashed from one AGX Orin™ carrier to another without reflashing. This includes the NVIDIA® Devkit. This means a module flashed for the AGX Orin™. Devkit cannot be used with a CTI carrier without reflashing the module.

4. Installation

4.1 Obtaining NVIDIA® JetPack™

Before installing the BSP you will need to install JetPack™ 5.1.1 on the host system using NVIDIA® SDK Manager (section 4.1.1) or from the NVIDIA® Embedded Download Center (section 4.1.2)

4.1.1 Installing JetPack™ from SDK Manager

Please follow installation steps from kdb373 for JetPack™ 4.2+ <https://connecttech.com/resource-center/kdb373/>

4.1.2 Installing JetPack™ from NVIDIA® Embedded Download Center

1. Create a new directory for installing the JetPack™. Referred to as <BSP_ROOT> in these instructions.
2. Go to JetPack™ Release Page <https://developer.nvidia.com/embedded/jetson-linux-r3531>
3. Download the "L4T Driver Package (BSP)" and "Sample Root Filesystem" files for AGX Orin™.

4. Put the "L4T Driver Package (BSP)" and "Sample Root Filesystem" in <BSP_ROOT>. Afterwards, you should have the following files in <BSP_ROOT>

- jetson_linux_r35.3.1_aarch64.tbz2
- tegra_linux_sample-root-filesystem_r35.3.1_aarch64.tbz2

5. Extract the "L4T Driver Package" tarball:

```
cd <BSP_ROOT>
sudo tar -jxf jetson_linux_r35.3.1_aarch64.tbz2
```

6. You should now have a new directory called Linux_for_Tegra in your <BSP_ROOT> folder. Extract the "Sample Root Filesystem" into Linux_for_Tegra/rootfs.

```
sudo tar -C Linux_for_Tegra/rootfs/ -xjf tegra_linux_sample-root-filesystem_r35.3.1_aarch64.tbz2
```

4.2 CTI BSP Installation

1. Copy the CTI-L4T-ORIN-AGX-35.3.1-V####.tgz package into <BSP_ROOT>/Linux_for_Tegra.

If you are using NVIDIA®'s SDK manager then "<BSP_ROOT>" will be:

```
~/nvidia/nvidia_sdk/<JetPack_Version>_Linux_JETSON_AGX_ORIN_TARGETS/
```

Otherwise if manually installing from the NVIDIA® Embedded Download Center <BSP_ROOT> will be the folder created previously

```
cp CTI-L4T-ORIN-AGX-35.3.1-V###.tgz <BSP_ROOT>/Linux_for_Tegra
```

```
2. Extract the BSP: tar -xzf CTI-L4T-ORIN-AGX-35.3.1-V###.tgz
cd <BSP_ROOT>/Linux_for_Tegra
sudo tar -xzf CTI-L4T-ORIN-AGX-35.3.1-V###.tgz
```

```
3. Change into the CTI-L4T directory:
cd <BSP_ROOT>/Linux_for_Tegra/CTI-L4T
```

4. Run the install script (as root or sudo) to automatically install the BSP files to the correct locations:

```
sudo ./install.sh
#return to Linux_for_Tegra
cd ..
```

5. The CTI-L4T BSP is now installed on the host system and it should now be able to flash the AGX Orin™ module.

5. Flashing AGX Orin™ Modules

1. Connect the AGX Orin™ and Carrier to the computer via USB, following the instructions in the appropriate manual.

2. Put the system to be flashed into recovery mode, following the instructions in the appropriate manual

3. There are two options for flashing Jetson modules:

Using CTI's automated script:
./cti-flash.sh

Follow the menu and select your desired configuration. Once selected,

the device will start to flash.

Using the Manual Method:

Note do not add the ".conf" file extension to the <config> parameter:

Manual Flash: `./flash.sh cti/<module>/<boardname>/<config> mmcblk0p1`

<module> is orin-agx for all orin-agx modules

Example:

`./flash.sh cti/orin-agx/forge/base mmcblk0p1`

4. Once the flashing has completed, the AGX Orin™ will reboot

6. Upgrading to a New Package Release

Upgrading L4T or CTI-BSP versions without reflashing is not currently supported.

Support for upgrades via apt and OTA packages will be added in the future

7. Switching Profiles on AGX Orin™

1. Open a terminal on the AGX Orin™
2. Run `"sudo cti-orin-agx-fdt.sh"`
3. Select the profile you wish to switch to from the menu
4. Restart the system

Note: This script updates the dtb by appending/replacing the FDT variable in `extlinux.conf`

8. Change Log

Version ORIN-AGX-35.3.1 V005, September 11, 2023

- Added support for FLIR Boson ADK using JCB002 for Forge and Rogue for Orin

Version ORIN-AGX-35.3.1 V004, September 5, 2023

- Added support for Leopard Imaging IMX390 using JCB002 for Forge and Rogue for Orin

Version ORIN-AGX-35.3.1 V003, July 31, 2023

- Added support for ECON NeduCAM25 using JCB006 on Forge and Rogue for Orin.

Version ORIN-AGX-35.3.1 V002, Jun 8, 2023

- Added support for the Tier4 C2 sensor
- Added support for the Stereolabs ZED X sensor

Version ORIN-AGX-35.3.1 V001, May 10, 2023

- Initial Release for L4T 35.3.1

Contact Connect Tech

If you have any problems, questions or suggestions regarding the Board Support Package and hardware, please feel free to contact Connect Tech Inc.

Contact Information	
Support	<p>Please go to the Connect Tech Resource Center for product manuals, installation guides, device drivers, BSPs and technical tips.</p> <p>Submit your technical support questions to our support engineers. Technical Support representatives are available Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time.</p>
Contact Information	<p>support@connecttech.com sales@connecttech.com www.connecttech.com</p> <p>Toll Free: 800-426-8979 (North America only) Telephone: +1-519-836-1291 Facsimile: 519-836-4878 (on-line 24 hours)</p>