Connect Tech

BOARD SUPPORT PACKAGE

For Connect Tech NVIDIA® Jetson AGX Orin™ Carriers

BSP Version: ORIN-AGX-36.5.0 V001
Last Updated: 2026/05/26

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 9 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 20.04 or 22.04
- JetPack 6.2.2 / L4T 36.5.0 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:
R36 (release), REVISION: 5.0

3. BSP Features

3.1 Supported Modules in BSP

- AGX Orin™ 32GB
- AGX Orin™ 64GB

- AGX Orin™ Industrial

3.2 Supported Cameras in BSP

- Leopard IMX390
- Stereolabs ZEDX
- Leopard OWL
- ECON NileCam82
- Leopard AR0234CSC/AR0234CSM
- FRAMOS GMSL IMX568
- TIER4 C1
- TIER4 C2
- TIER4 C3
- D3 IMX390 GMSL
- D3 AR0234 GMSL
- D3 ISX031 GMSL
- Technexion AR0234 FPD Link
- Allied Vision Alvium Cameras
- 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, along with a few other dependencies, must first be installed (It is not installed automatically with this BSP). Stereolabs's install script handles these dependencies.

The ZED SDK can 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 6.2.2 (L4T 36.5)".
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/development/zed-sdk/jetson

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

3.2.2 Installing and Configuring D3 Cameras

The D3 GMSL cameras do not have a dedicated configuration for flashing. Instead you should flash the base configuration ("Base" in the cti-flash.sh menu, or "base" with the manual method) and then install the D3 camera overlays after. The D3

camera driver are already included in the BSP and do not need to be installed.

To install D3 overlays, once your system is up, run this command on it:
"sudo cti-d3-overlay-install.sh"

After the command successfully completes, run "d3-select-cameras-boot" to configure which camera models are on which port. The hardware to port numbering for JCB002's Quad Fakra connectors is as follows:

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
- Endpoint Mode not Supported
- JCB002/JCB022 GMSL adapter support.
- JCB003 adapter support.
- JCB005 MIPI adapter support.
- JCB006 FPDLink adapter support.

AGX202/AGX203 (Rogue-Orin/ Rogue-RX)

- x2 10G ethernet Support.
- CAN Support.
- HDMI Support.
- USB 3.2 Support.

- USB OTG Support.
- I2C Support.
- SPI Support.
- UART Support.
- GPIO Support.
- M.2 pcie Support.
- Key E 2230 Wifi/BT.
- Micro SD support.
- JCB002/JCB022 GMSL adapter support.
- JCB003 adapter support.
- JCB005 MIPI adapter support.
- JCB006 FPDLink adapter support.

AGX205 (Rogue-Essential)

- 1G ethernet Support.
- M.2 pcie Support.
- UART Support.

AGX901 (USES)

- 1G ethernet Support.
- M.2 pcie Support.
- UART Support.
- USB OTG 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.

2. It has been observed sometimes after flash that the oem setup may fail to launch on the display interface. If this happens, a simple work around is setting a default username and password from Linux_for_Tegra before flashing.
run tools/l4t_create_default_user.sh -u <username> -p <password>
to achieve this.
Running the oem-setup through the console port, by disconnecting the display port and connecting to the console port before booting the device is also an acceptable workaround.

3. Master mode (internal trigger) for the Leopard OWL and Hawk is currently running at 45FPS, even though the streaming mode is set to 30FPS in the device tree. By default we are shipping configs for Hawk and OWL to use trigger mode so that the appropriate FPS can be achieved.

example. set the pwm on pwmchip3 to 30FPS on boards with JCB002 before streaming
cd /sys/class/pwm/pwmchip3
echo 0 > export
echo 33333333 > pwm0/period
echo 1000000 > pwm0/duty_cycle

example. set the pwm on pwmchip0 to 30FPS on boards with JCB022 before streaming
cd /sys/class/pwm/pwmchip0
echo 0 > export
echo 33333333 > pwm0/period
echo 1000000 > pwm0/duty_cycle

You may also use this technique to achieve a custom trigger rate.

4. Some Intel WiFi cards may fail to detect intermittently due to a memory access issue with PCIe controller C7

5. Mode 0 on NileCAM82 has been observed to instantly close with some gstreamer commands that work with mode 1 on the camera. The command
"gst-launch-1.0 nvarguscamerasrc sensor-id=<x> sensor-mode=0 ! "video/x-raw(memory:NVMM),
height=2160, width=3840, framerate=26/1" ! nvvidconv ! xvimagesink"
was found to successfully stream mode 0.

6. With the Framos GMSL cameras, you must set the data_rate v4l2 control to 891mbps or 594mbps.
i.e. v4l2-ctl -d /dev/videoX -c data_rate=1 # set 891mbs data_rate

7. With the Framos GMSL cameras, streaming all 8 cameras simultaneously provokes an issue with nvargus. You may stream up to 7 cameras simultaneously before the issue takes effect.

8. Please be patient with the C1, C2 and C3 cameras, they can take a moment to fully initialize this is expected behaviour per the Tier4 drivers.

9. It is observed that there is a lag in camera streaming when streaming using Gstreamer after cold boot. To resolve the issue turn off the frame sync by setting sync=0 in Gstreamer command.
example: gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=0 ! nvvidconv ! xvimagesink sync=0

10. With the D3 cameras, while it is possible to configure two different camera models (e.g. AR0234 and ISX031) on the same deserializer (ports 0 and 1, 2 and 3, 4 and 5, or 6 and 7) camera streaming often failed in this setup. To avoid this, place sensors of different types on ports connected to different deserializer chips (e.g. ports 0 and 2).

11. The D3 IMX390 camera was observed to have issues switching modes between streams.

Streaming a second time with the same mode was found to fix the errors observed.

4. Installation

4.1 Obtaining NVIDIA® Jetpack

Before Installing the BSP you will need to install JetPack 6.2.2 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-r365

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_r36.5.0_aarch64.tbz2
- tegra_linux_sample-root-filesystem_r36.5.0_aarch64.tbz2

5. Extract the "L4T Driver Package" tarball:

```
cd <BSP_ROOT>
sudo tar -jxf jetson_linux_r36.5.0_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_r36.5.0_aarch64.tbz2
```

4.2 CTI BSP Installation

1. Copy the CTI-L4T-ORIN-AGX-36.5.0-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-36.5.0-V###.tgz <BSP_ROOT>/Linux_for_Tegra

2. Extract the BSP: tar -xzf CTI-L4T-ORIN-AGX-36.5.0-V###.tgz
cd <BSP_ROOT>/Linux_for_Tegra
sudo tar -xzf CTI-L4T-ORIN-AGX-36.5.0-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 or orin-agxi (orin-agx industrial)

If you are using a JCB022, select a jcb002 board config and proceed the flash command with JCB022_OVERLAY=1.

Examples:
./flash.sh cti/orin-agx/forge/base mmcblk0p1

//standard jcb002 config
./flash.sh cti/orin-agxi/forge/jcb002-li-imx390 mmcblk0p1

//JCB022 variant of the configuration in the example above
JCB022_OVERLAY=1 ./flash.sh cti/orin-agxi/forge/jcb002-li-imx390 mmcblk0p1

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

6. Upgrading to a New Package Release

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

7. Changing Profiles and Overlays on AGX Orin™

cti-orin-agx-fdt.sh is used primarily for switching carrier/camera configurations and adding/removing overlays.

It modifies the bootloader file at /boot/extlinux/extlinux.conf

cti-orin-agx-fdt.sh is a script that can be run from any directory in the terminal.
i.e:
root@tegra-ubuntu:/home/nvidia# cti-orin-agx-fdt.sh

In the main menu you will see a list of supported carriers along with an option to add/remove overlays below them. Follow the menus based off of what configuration you would like to switch to.

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
         SCRIPT TO MODIFY EXTLINUX CONF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
This script updates extlinux.conf with selected
Device Trees and Device Tree Overlays

When you are done, exit the program and reboot
Your device for the changes to take affect
Select the carrier
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
1.  Forge (AGX201)
2.  Rogue for Orin (AGX202)
3.  Rogue Essential (AGX205)
4.  Uses (AGX901)
5.  Add/Remove Overlay
x.  Exit
Enter choice:
```

Ex. If you would like to switch to a ZEDX config on the Forge+AGX Orin Industrial you would make the following selections after finding them in the submenus:
Carrier menu: Forge (AGX201) > Forge Menu: jcb002 + ZEDX > \
Module-type menu: orin-agxi
After selecting all necessary parameters, you will receive a log indicating a successful update followed by a return to the main menu.

Special Case involving JCB022:

If you switch to using a JCB022 from a different adapter type and or you have not flashed with JCB022_OVERLAY=1, you will need to set the overlay under the Add/Remove Overlay menu option:
select "JCB022" > Apply

and when moving to another adapter type from JCB022 you should remove the overlay:
select "JCB022" > Remove

Note that JCB022 uses JCB002 device tree configurations in additon to the JCB022 overlay. If you require the JCB022 overlay, you will need to select a JCB002 configuration as well. Without a configuration selected, the overlay will not load. The Script will throw a warning if it detects an Overlay without a configuration selected :

Warning! An OVERLAYS variable is set in your extlinux.conf
Without an FDT variable. OVERLAYS needs the FDT (device tree)
Variable set in order to load. Please select a carrier and a
Configuration using this script, if you wish to use Overlays!
Press any key to exit...

If you receive this warning, you will exit the program after selecting any key. Relaunch the script to set a proper configuration.

If at any point you make an invalid selection, you will return to the main menu.

When you are done using the script
Select 'x'.

Changes will take affect after reboot.
i.e:
sync
reboot

You can view your extlinux.conf file by opening it in your preferred texted viewer i.e.:
vim /boot/extlinux/extlinux.conf
or cat
cat /boot/extlinux/extlinux.conf

root@tegra-ubuntu:/home/nvidia# cat /boot/extlinux/extlinux.conf
TIMEOUT 30
DEFAULT primary

MENU TITLE L4T boot options

LABEL primary
MENU LABEL primary kernel
LINUX /boot/Image
INITRD /boot/initrd
FDT /boot/tegra234-orin-agxi-cti-AGX201-JCB002-ZEDX.dtb
OVERLAYS /boot/tegra234-orin-agx-cti-JCB022-overlay.dtbo
APPEND ${cbootargs} root=/dev/mmcblk0p1 rw rootwait rootfstype=ext4 \
mminit_loglevel=4 console=ttyTCU0,115200 console=ttyAMA0,115200 \
firmware_class.path=/etc/firmware fbcon=map:0 video=efifb:off console=tty0

cti-orin-agx-fdt.sh will modify the "FDT" and "OVERLAYS" variables depending on the configuration and overlays you select. Above is an example of selecting:

Carrier menu: Forge (AGX201) > Forge Menu: jcb002 + ZEDX > \
Module-type menu: orin-agxi
and

Add/Remove Overlay menu option:
select "JCB022" > Apply

8. Non-volatile Jumper blocks

Included with this BSP is a program called "ds4520". This program will allow you

to set the jumper settings for the 3 onboard nonvolatile jumper blocks.

Program usage is as follows:
ds4520 -b [i2c bus#] -a [0xXX i2c address] 0=[0/1/f] 1=[0/1/f] ... 8=[0/1/f] #Set IOs
ds4520 -b 6 -a 0x53 0=0 1=f 2=1 #Set IO0 to low, set IO1 to float, set IO2 to HIGH
ds4520 -b 6 -a 0x53 -g #Print out current GPIO states
ds4520 -b 6 -a 0x53 -w 0 #save states to NV memory and lock
ds4520 -b 6 -a 0x53 -w 1 #unlock eeprom, allow modification

9. Change Log

Version ORIN-AGX-36.5.0-V001 May 26, 2026

- Initial Release of AGX Orin™ on Jetpack 6.2.2 l4t 36.5.0.

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	Please go to the Connect Tech Resource Center for product manuals, installation guides, device drivers, BSPs and technical tips. 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.
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