Connect Tech

BOARD SUPPORT PACKAGE

For Connect Tech NVIDIA® Jetson AGX Orin™ Carriers

BSP Version: ORIN-AGX-ANVILRX-36.5.0 V003
Last Updated: 2026/06/01

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 (JCB102)
- Stereolabs ZEDX (JCB102/JCB103)
- Allied Vision Alvium (JCB102)
- Econ SturdeCAM31 (JCB102/JCB103)
- Tier4 C1 (JCB103)
- Tier4 C2 (JCB103)

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 dependancies, 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 External Sync Zedx Stereo

To use the PWM as an external sync source for the ZEDx stereo cameras, you need to set the zed_ext_sync v4l2 control to 1:
v4l2-ctl -d /dev/video0 -c zed_ext_sync=1

and then use pwmchip0 as your trigger source.

Example of Syncing at 30fps:
v4l2-ctl -d /dev/video0 -c frame_rate=30000000
v4l2-ctl -d /dev/video0 -c zed_ext_sync=1

Script for triggering pwmchip0 at 30FPS:
echo "setting trigger to 30fps!"
echo 0 > /sys/class/pwm/pwmchip0/export
echo 33333333 > /sys/class/pwm/pwmchip0/pwm0/period

```
echo 1000000 > /sys/class/pwm/pwmchip0/pwm0/duty_cycle
echo 1 > /sys/class/pwm/pwmchip0/pwm0/enable
sleep 3

v4l2-ctl -d /dev/video0 --stream-mmap
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 30.00 fps
```

If you stop the pwm, the frame acquisition will also stop.

3.2.3 ZED X stereo cameras Limitations JCB102

Note that the Anvil-RX's gmsl3 deserializer does not have enough pipes to forward streams from 2 zedx stereo cameras on the same deserializer.

Due to this the configuration is only considered to support 4 cameras (8 sensors total).

When connecting ZEDX stereo cameras to the Anvil-RX, only PHYA of each deserializer will work. Useable connections for this configuration are labelled on the enclosure as 1, 3, 5 and 7 (the lower row of fakra connectors).

3.2.4 ECON SturdeCAM31 Instructions

When using the Econ SturdeCAM31 configuration, internal triggering without frame synchronization is default.

When using gstreamer, you must submit parameters relevant to the mode you wish to use:

```
gst-launch-1.0 v4l2src device=/dev/video$i ! timeoverlay ! \
"video/x-raw, pixelformat=UYVY, width=<mode-width>, height=<mode-height>, \
framerate=<frames_per_second>/1" ! xvimagesink
```

The SturdeCAM31 supports 4 modes as follows:
1920x1536 @ 30fps
1920x1536 @ 60fps
1920x1080 @ 30fps
1920x1080 @ 60fps

Note that it is a known issue from the Sturdecam31 driver's release notes that you cannot run 2 cameras off the same deserializer at 60fps. You will hit a bandwidth cap and your streams may appear interleaved.

You can run one camera at 60fps and the other at 30fps or both at 30fps on the same deserializer.

If you wish to stream with framesync enabled:

#install v4l-utils if you haven't already:
apt-get install v4l-utils

#Set the frame_sync_mode control to 1. Substitute <n> for your video device index:
v4l2-ctl -d /dev/video<n> -c frame_sync_mode=1

#export pwmchip 0:
echo 0 > /sys/class/pwm/pwmchip0/export

#set duty cycle:
echo 1000000 > /sys/class/pwm/pwmchip0/pwm0/duty_cycle

#set period
where <nanoseconds> is 33333333 for 30fps and 16666666 for 60fps:
echo <nanoseconds> > /sys/class/pwm/pwmchip0/pwm0/period

#enable the pwm at pwmchip0:
echo 1 > /sys/class/pwm/pwmchip0/pwm0/enable

Stream using the gstreamer command described at the beginning of this subsection (3.2.4).

3.3 Product Specific Details

AGX206 (Anvil-RX)

- x2 10G ethernet Support.
- x2 2.5G ethernet Support
- CAN Support.
- HDMI Support.
- USB 3.2 Support.
- USB OTG Support.
- I2C Support.
- SPI Support.
- UART Support.
- RS232/485 Support.
- GPIO Support.
- Key E 2230 Wifi/BT.
- TPM Support.
- JCB102 GMSL3 adapter support.
- JCB103 GMSL2 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.

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. 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

4. Updates to snapd have been found to break most browsers (e.g. chromium, firefox),
preventing them from launching normally. Should the error occur for you, run the
following command:
sudo apt install --reinstall snapd

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-ANVILRX-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-ANVILRX-36.5.0-V###.tgz <BSP_ROOT>/Linux_for_Tegra

2. Extract the BSP: tar -xzf CTI-L4T-ORIN-AGX-ANVILRX-36.5.0-V###.tgz
cd <BSP_ROOT>/Linux_for_Tegra
sudo tar -xzf CTI-L4T-ORIN-AGX-ANVILRX-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)

Example:
./flash.sh cti/orin-agx/anvil-rx/base mmcblk0p1
./flash.sh cti/orin-agxi/anvil-tx/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 verisons without reflashing is not currently supported.

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. 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-ANVILRX-36.5.0-V003 June 01, 2026

- Added support of JCB103 GMSL2 adapter with ECON SturdeCAM31, Stereolabs ZEDX stereocam, Tier4 C1 and Tier4 C2 cameras configurations.

Version ORIN-AGX-ANVILRX-36.5.0-V002 Apr. 22, 2026

- Added ECON SturdeCAM31 configuration
- Added cti-diagnostics utility

Version ORIN-AGX-ANVILRX-36.5.0-V001 Mar. 24, 2026

- Initial Release of AGX Orin™ for Anvil-RX on Jetpack 6.2.2 l4t 36.5.0.
- Includes configurations for Leopard IMX390, Stereolabs ZEDX stereocam and Allied Vision Alvium cameras.

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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