Connect Tech

BOARD SUPPORT PACKAGE

For Connect Tech NVIDIA® Jetson THOR Carriers

BSP Version: THOR-38.2.1 V003
Last Updated: 2025/12/15

1. Introduction

This Board Support Package adds support for the Connect Tech Jetson Thor™ 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 8 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 22.04 or 24.04
- JetPack 7.0 / L4T 38.2.1 installed (see Section 4)
- Jetson Thor™ module
- Connect Tech carrier for Jetson Thor™
- USB Cable for flashing

*L4T version can be found in /etc/nv_tegra_release and will look like this:
R38 (release), REVISION: 2.1

3. BSP Features

3.1 Supported Modules in BSP

- Thor T5000

3.2 Supported Cameras in BSP

- D3 IMX390 GMSL
- D3 AR0234 GMSL
- D3 ISX031 GMSL
- Stereolabs Zedx Stereocam

3.2.1 Streaming ZEDX stereocams Using Argus in Jetpack 7

The ZedX Stereocam is working with argus, but we were not able to load the ZedX cameras with the current Jetpack 7 Beta release of Zed SDK API.

The following is an example pipeline for streaming a ZedX Stereo camera using gstreamer and nvargus:

```
for (( i=0; i<2; i++ )); do
gst-launch-1.0 nvarguscamerasrc sensor-id=$i ! nv3dsink &
done
```

3.2.2 Jetpack 7 Camera Configuration Files

Note that configuration files are relevant to cameras using nvargus. The issues described here should not affect cameras that directly use v4l2.

In earlier Jetpack versions the default configuration file type was .isp.
NVIDIA® has introduced as part of their latest nvidia-l4t-camera package .nito files.
When nvargus detects these files present in /var/nvidia/nvcam/settings/ it will change the default configuration file type to .nito even if .isp files are present.

We may migrate to .nito files in the future, but for the current release we are using isp files since they are currently what is available for the cameras which we support.

All default .nito files meant for cameras supported by the devkit were removed, so that nvargus defaults to .isp files.

Unlike isp files which are optional, if nvargus fails to find the .nito file for a camera you wish to stream, the stream will fail.
If you wish to maintain both .nito files and .isp files in /var/nvidia/nvcam/settings/ for different cameras, you will need a workaround for streaming cameras that require isp files.

Stop nvargus-daemon, set your desired setting in the NVCAMERA_NITO_PATH variable and start nvargus-daemon.

```
systemctl stop nvargus-daemon
export NVCAMERA_NITO_PATH=<setting>
```

systemctl start nvargus-daemon

Where <setting> is:
CONFIG // when you want to use isp files by default
// NULL when you want to use the default configuration file type,
which is nito when there are nito files present, isp when there are not.
<path> // you can also set a direct path to a nito file.

When streaming using the gstreamer API as an example, a failed launch of a stream due to a missing .nito file will not be obvious.

You can catch the log that shows a failure to find a nito file by doing the following:

Open a second terminal different from the one you are attempting to stream in.

stop nvargus-daemon:
systemctl stop nvargus-daemon

enable elevated logging for nvargus:
export enableCamPclLogs=5
export enableCamScfLogs=5

manually run the nvargus-daemon executable:
/usr/sbin/nvargus-daemon

From the other terminal run the appropriate stream command:
ex.
gst-launch-1.0 nvarguscamerasrc sensor-id=0 ! nv3dsink

A failure to load the .nito file will result in the following log in the terminal running nvargus-daemon:

```
|=====================================================================|
| You have encountered an error.                                      |
| NITO file is made the default in this Jetpack release.              |
| User is expected to provide a NITO file for the camera module in    |
| the directory /var/nvidia/nvcam/settings                            |
| If the NITO file is in a different location, please provide the     |
| path using the environmental variable NVCAMERA_NITO_PATH            |
| For example:                                                        |
| $ export NVCAMERA_NITO_PATH=/home/ubuntu/yournitofile.nito          |
| If the NITO file is not supported, you can still use the legacy     |
| Configuration file and migrate to NITO file using the instructions|
| provided in the documentation.                                      |
| Please refer to readme.txt in the Camera Partner Toolkit.           |
| Here is the environmental variable value for switching to           |
| the Configuration file.                                             |
| $ export NVCAMERA_NITO_PATH=CONFIG                                  |
|=====================================================================|
```

3.3 Product Specific Details

AGX301 (Gauntlet)

- 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.
- JCB022 GMSL adapter support.
- JCB003 adapter support.

3.4 Limitations and Known Issues

1. 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).

2. 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.

3. The Zedx SDK for Jetpack 7 is a beta release. We have not been able load cameras using Zed_Explorer at this time. Streaming using argus in gstreamer currently works.

4. Installation

4.1 Obtaining NVIDIA® Jetpack

Before Installing the BSP you will need to install JetPack 7.0 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 https://developer.nvidia.com/embedded/jetpack/downloads and under "Jetson Linux Downloads and Documents" locate the table for "Jetson Linux 38.2.1".

3. Download the "L4T Driver Package (BSP)" and "Sample Root Filesystem" files.

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_r38.2.1_aarch64.tbz2
- tegra_linux_sample-root-filesystem_r38.2.1_aarch64.tbz2

5. Extract the "L4T Driver Package" tarball:

cd <BSP_ROOT>
sudo tar -jxf jetson_linux_r38.2.1_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_r38.2.1_aarch64.tbz2

4.2 CTI BSP Installation

1. Copy the CTI-L4T-THOR-38.2.1-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_THOR_TARGETS

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

cp CTI-L4T-THOR-38.2.1-V###.tgz <BSP_ROOT>/Linux_for_Tegra

2. Extract the BSP: tar -xzf CTI-L4T-THOR-38.2.1-V###.tgz
cd <BSP_ROOT>/Linux_for_Tegra
sudo tar -xzf CTI-L4T-THOR-38.2.1-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 Jetson Thor™ module.

4.3 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). The D3 camera driver is already included in the BSP.

Use the below command to install D3 camera overlay,

sudo apt update
sudo cti-d3-overlay-install.sh

After successfully installing all the packages, run "d3-select-cameras-boot" to configure

which camera models are on which port and reboot the device. The hardware to port numbering for JCB022's Quad Fakra connectors is as follows:

5. Flashing Jetson Thor™ Modules

1. Connect the Jetson Thor™ 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: ./l4t_initrd_flash.sh cti/<module>/<boardname>/<config> external

<module> is thor

Example:
./l4t_initrd_flash.sh cti/thor/gauntlet/base external

4. Once the flashing has completed, the Jetson Thor™ 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 Jetson Thor™

1. Open a terminal on the Jetson Thor™

2. Run "sudo cti-thor-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 THOR-38.2.1-V003 Dec 15, 2025

- Fixed the auxilary fan's tachometer.
- Added Stereolabs Zedx Stereocam.

Version THOR-38.2.1-V002 Nov 18, 2025

- Added support for JCB003 adapter

Version THOR-38.2.1-V001 Nov 11, 2025

- Initial release for Gauntlet with D3-AR0234, D3-IMX390 and D3-ISX031 camera support.

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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