

BOARD SUPPORT PACKAGE

For Connect Tech NVIDIA Jetson TX2 Carriers

BSP Version: TX2-32.7.2 V001
Last Updated: 2022/06/01

Introduction

This Board Support Package adds support for Connect Tech Jetson TX2 Family carrier boards to Linux4Tegra. It includes any extra files required to use all the features of the carriers.

Please check the "Product Specific Details" section for what features for your board is supported with this BSP release and the "Changes" section 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:

<http://connecttech.com/resource-center/l4t-board-support-packages/>

Please check the requirements section for minimum requirements.

Consult KDB344 at for TX2 hardware compatibility with your carrier.
<http://connecttech.com/resource-center-category/all-kdb-entries/>

More detailed Release Note can be found here:

<http://connecttech.com/resource-center/cti-l4t-nvidia-jetson-board-support-package-release-notes/>

Supported Cameras in BSP

- Leopard Imaging LI-IMX274-MIPI Camera

Requirements

- x86 based host machine running Ubuntu 18.04
- BSP l4t 32.7.2 installed via Nvidia SDK Manager (from Nvidia Embedded Download Center)
- TX2, TX2i or TX2-4G module
- Connect Tech TX2 Family Carrier
- USB Cable for flashing

*L4T version can be found in /etc/nv_tegra_release and will look like this:
R32 (release), REVISION: 7.2

Installation

- Before Installing the BSP you will need to install Jetpack 4.6.2 on the x86 host system
- Copy the CTI-L4T-TX2-32.7.2-V###.tgz package into
~/nvidia/nvidia_sdk/JetPack_4.6.2_Linux_JETSON_TX2/Linux_for_Tegra/
- Extract the BSP:

```
tar -xzf CTI-L4T-TX2-32.7.2-V###.tgz
```

(replacing ### with your file name)

- Change into the CTI-L4T directory:

```
cd ./CTI-L4T
```

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

```
sudo ./install.sh  
cd ..
```

- The CTI-L4T BSP is now installed on the host system and it should now be able to flash the TX2/TX2i/TX2-4G.

Installing JetPack from SDK Manager

- Please follow installation steps from kdb374 for Jetpack 4.2+ <http://connecttech.com/resource-center/kdb374/>

Installing JetPack from Nvidia's Source packages (Alternate approach)

- Go to <https://developer.nvidia.com/embedded/linux-tegra-archive> and click on the green button labeled "32.7.2 >".
- Download the "L4T Driver Package (BSP)" and "Sample Root Filesystem" files for TX2. Afterwards, you should have the files "Jetson_Linux_R32.7.2_aarch64.tbz2" and "Tegra_Linux_Sample-Root-Filesystem_R32.7.2_aarch64.tbz2".
- Create a directory named `~/nvidia/nvidia_sdk/JetPack_4.6.2_Linux_JETSON_TX2/` and copy the "Jetson_Linux_R32.7.2_aarch64.tbz2" file you downloaded into that directory.
- Unzip the tarball:

```
"sudo tar jxf Jetson_Linux_R32.7.2_aarch64.tbz2"
```
- You should now have a new directory called `Linux_for_Tegra`. Change directories into that and then copy the "Tegra_Linux_Sample-Root-Filesystem_R32.7.2_aarch64.tbz2" file you downloaded into the `rootfs` folder inside.
- Change into the `rootfs` folder and unzip the tarball:

```
"sudo tar jxf Tegra_Linux_Sample-Root-Filesystem_R32.7.2_aarch64.tbz2"
```
- If you wish to flash one of NVIDIA's devkits, or move on to installing CTI™'s BSP, change the directories back to `Linux_for_Tegra/` and run: `"sudo ./apply_binaries.sh"`

Flashing TX2/TX2i/TX2-4G

- Connect the TX2/TX2i/TX2-4G and Carrier (or Dev-Kit) to the computer via USB following the instructions in the appropriate manual.
- Put the system to be flashed into recovery mode, following the instructions in the appropriate manual
- Run `"./cti-flash.sh"` or `"./flash.sh cti/<module>/<board>/<config> mmcblk0p1"` from `Linux_for_Tegra` directory
CTI Assisted Flashing:
`./cti-flash.sh`

Manual Flash:

```
./flash.sh cti/<module>/<board>/<config> mmcblk0p1
```

TX2 Examples:

```
./flash.sh cti/tx2/astro/usb3 mmcblk0p1  
./flash.sh cti/tx2/astro/mpcie mmcblk0p1  
./flash.sh cti/tx2/spacely/li-imx274-3cam mmcblk0p1
```

TX2i Examples:

```
./flash.sh cti/tx2i/astro/usb3 mmcblk0p1  
./flash.sh cti/tx2i/astro/mpcie mmcblk0p1  
./flash.sh cti/tx2i/spacely/li-imx274-3cam mmcblk0p1
```

TX2-4G Examples:

```
./flash.sh cti/tx2-4G/astro/usb3 mmcblk0p1  
./flash.sh cti/tx2-4G/astro/mpcie mmcblk0p1  
./flash.sh cti/tx2-4G/spacely/li-imx274-3cam mmcblk0p1
```

- Once the flashing has completed, the TX2/TX2i/TX2-4G will reboot
- To switch between different boards, you can repeat these steps. Alternatively follow the instructions below for runtime switching profiles on the TX2/TX2i/TX2-4G

Consult KDB344 at for TX2/TX2i hardware compatibility with your carrier.
<http://connecttech.com/resource-center-category/all-kdb-entries/>

Switching Profiles on TX2/TX2i/TX2-4G

- Open a terminal on the TX2/TX2i/TX2-4G
- Run "sudo cti-tx2-dd.sh"
- Select the profile you wish to switch to from the menu
- Restart the system

Upgrading to a New Package Release

Note that using `sudo apt-get upgrade` may break dependencies required by the Nvidia Jetpack.

It is recommended you reflash your module if you wish to update to a newer package version.

Deb Packages are still provided on the CTI deb server, and our source list

is still provided in the release. If you wish to use apt-get upgrade, you can do so at your own risk:

run:

```
apt-get update
```

```
apt-get upgrade nvidia-l4t-core
```

Note that you will need to use the device tree switching script described in the previous section to reselect your configuration.

This will ensure that you are using the updated device tree.

Product Specific Details

TX2i Compatablity Note:

The following carriers require a hardware ECN to be applied in order to work with the TX2i. All new boards sold after April 16th will have the ECN applied. Please contact Connect Tech support if you are unsure if the ECN has been applied.

- Astro pre-Rev H
- Spacely Rev D & E
- Cogswell

TX2-4G Compatibility Note:

The following carriers require a hardware ECN to be applied in order to work with the TX2-4G. All new boards sold after November 8th will have the ECN applied. Please contact Connect Tech support if you are unsure if the ECN has been applied.

- Astro
- Elroy
- Cogswell
- Spacely

ASG001 (Astro)

- USB 3.0 Support
- mPCIe Support
- mSATA Support
- GbE Phy Support
- HD Audio Support
- UART Support
- RS485 Support
- I2C Support

- GPIO Support
- HDMI Support
- Micro SD Card Support

NOTE: Currently NO CSI camera support

ASG002 (Elroy)

- USB 3.0 Support
- mPCIe Support
- mSATA Support
- GbE Phy Support
- UART Support
- RS485 Support
- I2C Support
- GPIO Support
- HDMI Support
- SPI Support
- Micro SD Card Support

NOTE: Currently NO CSI camera support

ASG003 (Orbitty)

- USB 3.0 Support
- GbE Phy Support
- UART Support
- I2C Support
- GPIO Support
- HDMI Support
- Micro SD Card Support

ESG501 (Rosie)

- mPCIe Support
- USB Support
- GbE Phy Support
- UART Support
- HDMI Support

ESG503 (Rudi)

- USB 3.0 Support

- GbE Phy Support
- mPCIe Support
- Cellular Card Support
- mSATA Support
- SD Card Support
- CAN Support
- UART Support
- I2C Support
- GPIO Support
- HDMI Support

ASG006 (Spacely)

- USB 3.0 Support
- GbE Phy Support
- mPCIe Support
- mSATA Support
- Micro SD Card Support
- CAN Support
- UART Support
- I2C Support
- GPIO Support
- SPI Support
- HDMI Support
- Leopard Imaging IMX274 Support

ASG007 (Cogswell)

- USB 3.0 Support
- GbE Phy Support
- mPCIe Support
- mSATA Support
- Micro SD Card Support
- Cellular Card Support
- GPIO Support
- UART Support
- I2C Support
- CAN Support
- HDMI Support

ASG008 (Sprocket)

- USB Support
- UART Support
- I2C Support
- GPIO Support
- Leopard Imaging IMX274 Support

VPG003 (Graphite-VPX)

- USB 3.0 Support
- GbE Phy Support
- mPCIe Support
- SATA Support
- UART Support
- HDMI Support
- Leopard Imaging IMX274 2-cam support

ASG016 (Quasar)

- USB 3.0 Support
- GbE Phy Support
- SATA Support
- Micro SD Card Support
- GPIO Support
- UART Support
- I2C Support
- CAN Support
- Leopard Imaging IMX274 Support
- HDMI Support

Changes

Version TX2-32.7.2 V002, June 01, 2022

- Initial release on L4T 32.7.2.
- Added Fan Tachometer support to CTI TX2 Carriers.

Version TX2-32.7.1 V001, May 03, 2022

- Initial release on L4T 32.7.1.

Version TX2-32.6.1 V001, Nov 22, 2021

- Initial release on L4T 32.6.1.
- Restored support for Astro's audio codec

Version TX2-32.5.2 V001, July 27, 2021

- Initial release on L4T 32.5.2.
- (Note) at the time of release (2021-07-27), there is no jetpack 4.5.2 supported by sdkmanager, sources also need to be manually downloaded (source_sync.sh does not work for 32.5.2 tag).

Version TX2-32.5-V001, March 18, 2021

- Initial Release for L4T 32.5
- As the Leopard IMX185 MIPI camera is EOL, configurations from previous JetPack versions for this camera have been included but not tested with this release.
- Bootloader OTA upgrades supported
- OTA source list does not include previous releases as they are from a different major revision

Version TX2-32.4.4-V003, January 19, 2021

- Updated cti_tegra_defconfig
- Resolves issues to allow ZFS to function properly.

Version TX2-32.4.4-V002, December 09, 2020

- Resolved "disagrees about module_layout" issue for loading external kernel modules.

Version TX2-32.4.4-V001, November 16, 2020

- Initial Release for Jetpack 4.4.1/L4T 32.4.4

Version TX2-32.4.3-V002, September 25, 2020

- Supports apt-get upgrade
- Upgrade support from cti debian server from this version onwards
- Installs a script to enable DTB switching using dd command
- Script: cti-tx2-dd.sh
- Install path: /usr/bin

Version TX2-32.4.3-V001, August 05, 2020

- Initial Release for Jetpack 4.4/L4T 32.4.3

Version TX2-32.4.2-V003, July 06, 2020

- Added missing ASG008 camera support for TX2

Version TX2-32.4.2-V002, June 26, 2020

- Added missing VPG003 support
- Added SPI to Elroy

Version TX2-32.4.2-V001, June 05, 2020

- Initial Release for Jetpack 4.4/L4T 32.4.2

Version TX2-32.3.1-V001, January 27, 2020

- Initial Release for Jetpack 4.3/L4T 32.3.1

Version TX2-32.2.1-V004, November 25, 2019

- Adding TX2-4G support back in

Version TX2-32.2.1-V003, November 20, 2019

- Adding TX2i support back in

Version TX2-32.2.1-V002, November 15, 2019

- Initial Release for Jetpack 4.2.2/L4T 32.2.1
- Limited release for TX2, not including TX2i or TX2-4G
- new naming scheme

Version 126-1, November 11, 2019

- fixed cti-flash script
- added missing .conf files
- added IMX185 & IMX274 support for Sprocket
- added IMX185 & IMX274 support for Quasar
- Fixed TX2i PWM fan issue
- Changed all GPIOs to pull-ups
- Fixed TX2i nvpmode issue

Version 126, August 16, 2019

- Jetpack 4.2.1 Release
- Moved .conf files to cti folder
- Added support for Quasar
- Added support for TX2-4G

Version 125, July 05, 2019

- Fixed issue with Elroy mPCIe
- Added IMX185 support to Spacely

Version 124, July 02, 2019

- Fixed issue where kernel would sometimes hang when run headless
- Added IMX274 support to Spacely

Version 123, May 09, 2019

- Fixed PWM Fan issue

Version 122, May 06, 2019

- Initial Release for Jetpack 4.2/L4T 32.1.0

Version 121, November 09, 2018

- Added 720p support for IMX274 cameras

Version 120, Sept 21, 2018

- Fixed an issue where some monitors would prevent the Jetson from booting if plugged in (28.2+)

Version 119, July 27, 2018

- Fixed a suspend bug

Version 118, June 26, 2018

- Updated for L4T 28.2.1
- Added Astro Audio Codec Support
- Added 3x and 6x IMX185 Camera support for Spacely

Version 117, May 18, 2018

- Added fix for incorrect CAN IDs being read on Rudi/Spacely/Cogswell

Version 116, April 23, 2018

- Fixed issue with ASG006 CAN
- Added CTI assisted flash
- Added Lumera camera support

Version 115, April 16, 2018

- Fixed issue with PCIe in Elroy RevF+ profile
- Added IMX185 support for Sprocket
- Fixed the "pink" IMX274 CSI camera issue
- Added TX2i support

Version 114, April 12, 2018

- Added CAN Support
- Added 3 and 6 IMX274 camera support for Spacely
- Added IMX274 support for sprocket
- Added 2 OV5693 camera support for Elroy
- Fixed issue with USB based mPCIe cards on Elroy

Version 113, March 27, 2018

- Initial release for Jetpack 3.2 (L4T 28.2)

Version 112, March 15, 2018

- Added support for USB only based mPCIe cards on the Elroy

Version 111, February 27, 2018

- Fixes to carrier GPIO states and kernel image

Version 110, November 08, 2017

- Added Rudi GPIO support

Version 109, November 07, 2017

- Fixed an issue where some monitors would prevent the Jetson from booting if plugged in (28.1)

Version 108, November 02, 2017

- IMX274 camera performance improvements

Version 107, October 20, 2017

- Fixed an issue with the Spacely Devicetree not booting on Rev B00 TX2 modules
- Added VPG003 support

Version 106, September 25, 2017

- Added Astro RevG+ and Elroy RevF+ profiles

Version 105, August 21, 2017

- Added Astro and Elroy CSI camera Support

Version 104, August 16, 2017

- Added support for L4T 28.1
- Added support for Spacely and Cogswell

Version 103, June 27, 2017

- Changed Rootfs size to 28GB from 14GB

Version 102, June 26, 2017

- Added second UART support to all carriers

Version 101, June 01, 2017

- Fixed issue with some loadable modules eg. uvcvideo
- Added Elroy CSI camera support

Version 100, May 19, 2017

- Initial Release for the TX2

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>