BOARD SUPPORT PACKAGE
For Connect Tech NVIDIA® Jetson XAVIER™ NX Carriers

BSP Version: XAVIER-NX-35.4.1 V001-BASLER
Last Updated: 2023/12/04

1. Introduction

This Board Support Package adds support for the Connect Tech Jetson Xavier™ NX family of carrier boards to Linux4Tegra. It includes any extra files required to use all the features of the 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 5.1.2 / L4T 35.4.1 installed (see Section 4)
- Xavier™ NX module
- Connect Tech Xavier™ NX Carrier
- USB Cable for flashing

  *L4T version can be found in /etc/nv_tegra_release and will look like this:
  # R35 (release), REVISION: 4.1

3. BSP Features

3.1 Supported Modules in BSP

Xavier™ NX
Xavier™ NX 16GB

3.2 Supported Cameras in BSP

BASLER daA2500-60mci and daA4200-30mci mipi cameras

3.3 Product Specific Details

NGX003 (Photon)

- USB 3.0 Support
- USB OTG Support
- HDMI Support
- Micro SD Card Support
- NVMe Card Support
- Wifi/Bluetooth Card Support
- Cellular Card Support
- RGB LED Support
- UART Support
- I2C Support
- GPIO Support
- RTC Battery Support

NGX004 (Quark)

- USB 3.0 Support
- USB OTG Support
- Micro SD Card
- GbE Phy Support
- CAN Support
- UART Support
- I2C Support
- GPIO Support
- SPI Support
- PWM Support
- RTC Battery Support

NGX012 (Hadron)

- USB 3.0 Support
- USB OTG Support
- Micro SD Card

- GbE Phy Support
- NVMe Card Support
- Wifi/Bluetooth support
- CAN Support
- UART Support
- I2C Support
- GPIO Support
- SPI Support
- PWM Support
- RTC Battery Support

3.3 Limitations and Known Issues

1. OTA deb package update is currently not supported in this package.
Please do not run apt-get upgrade nvidia-l4t-kernel, as you can break
the OS.
2. Jetpack 5.0+ deploys a rootfs without any bluetooth plugin support.
When connecting your tegra module to a device you may find it classified
as a generic type. The module will disconnect shortly after connecting,
to fix this you need to setup bluetooth support on your tegra device.

It is up to you to research and implement plugins, when you do
be sure to modify /lib/systemd/system/bluetooth.service.d/nv-bluetooth-service.conf:

remove --noplugin=audio,a2dp,avrcp from the line containing:
ExecStart=/usr/lib/bluetooth/bluetooth -d --noplugin=audio,a2dp,avrcp

3. Quark has been observed to have some issues with the iteration of the console
port during oem install. The issue is itermittent and you may not experience it.
If this happens during your install, please create a default username and password
from your Linux_for_Tegra directory before flashing:

tools/l4t_create_default_user.sh -u < username > -p < password > -a //-a is optional for auto-login

4. Installation

4.1 Obtaining NVIDIA® Jetpack

Before Installing the BSP you will need to install JetPack 5.1.2 on the host
system using the 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 Jetpack. Referred to as <BSP_ROOT>
in these instructions

2. Go to Jetpack Release Page https://developer.nvidia.com/embedded/jetson-linux-r3541

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

4. Put the "L4T Driver Package (BSP)" "Sample Root Filesystem" in <BSP_ROOT>.
Afterwards, you should have the following files in <BSP_ROOT>
- jetson_linux_r35.4.1_aarch64.tbz2
- tegra_linux_sample-root-filesystem_r35.4.1_aarch64.tbz2

5. Extract the "L4T Driver Package" tarball:

cd <BSP_ROOT>
sudo tar -jxf jetson_linux_r35.4.1_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_r35.4.1_aarch64.tbz2

4.2 CTI BSP Installation

1. Copy the CTI-L4T-XAVIER-NX-35.4.1-V###.tgz package into <BSP_ROOT>/Linux_for_Tegra.

If using NVIDIA®'s SDK manager then "<BSP_ROOT>" will be:
~/nvidia/nvidia_sdk/<JetPack_Version>_Linux_JETSON_XAVIER_NX_TARGETS/

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

cp CTI-L4T-XAVIER-NX-35.4.1-V###.tgz <BSP_ROOT>/Linux_for_Tegra

2. Extract the BSP: tar -xzf CTI-L4T-XAVIER-NX-35.4.1-V###.tgz
cd <BSP_ROOT>/Linux_for_Tegra
sudo tar -xzf CTI-L4T-XAVIER-NX-35.4.1-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 Xavier™ NX module.

5. Flashing Xavier™ NX Modules

1. Connect the Xavier™ NX 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. To flash on the Xavier™ NX use the following (do not add ".conf" in <config>):

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

<module> is xavier-nx for all xavier-nx modules

Example:
./flash.sh cti/xavier-nx/photon/base mmcblk0p1

4. Once the flashing has completed, the Xavier™ NX will reboot

6. Installing Pylon SDK (For Basler)

Camera application development support for Basler camera models is provided by
the "pylon Camera Software Suite" by Basler. It can be downloaded from
their website at:
https://www2.baslerweb.com/en/downloads/software-
downloads/#type=pylonsoftware;language=all;version=all

On your NX module, navigate to the webpage above and download the latest version of

the pylon Camera Software Suite which is followed by
"Linux ARM 64 bit - Debian Installer Package" (e.g. "pylon 7.4.0 Camera Software Suite Linux ARM 64 bit - Debian Installer Package").
    After the download is complete, navigate to your Downloads directory using the command
    line and untar the pylon package to a separate folder.

    To install the suite run the following command:
    dpkg -i pylon_<version>-deb0_arm64.deb codemeter-lite_<version>_arm64.deb

replacing <VERSION> with the version number of the respective packages. After installation Basler's
    camera SDK and documentation will reside in the /opt/pylon directory.

    To use the pylon viewer application, enter:
    /opt/pylon/bin/pylonviewer
 over the command line. For additional documentation about the pylon viewer application, please consult:
    https://docs.baslerweb.com/overview-of-the-pylon-viewer

If you wish to develop in Python, you will need to install an additional API by following the procedure
    outlined in the github:
    https://github.com/basler/pypylon

    During testing we verified by installing directly from the git sources:

    git clone https://github.com/basler/pypylon.git
    cd pypylon
    pip install .

    On a headless system like quark, you can run pypylon/samples/save_image.py to collect some
    .png snapshots from the camera.

    python save_image.py

    For further support with camera application development with Basler product cameras,
please consult Basler support at https://www.baslerweb.com/en/sales-support/support-contact/

7. Upgrading to a New Package Release

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

8. Switching Profiles on Xavier™ NX

1. Open a terminal on the Xavier-NX

2. Run "sudo cti-nx-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

9. Change Log

Version XAVIER-NX-35.4.1 V001, Dec 04, 2023
- Initial release of 35.4.1 in basler fork of mainline.
- Added basler mipi camera support for photon, quark and hadron.

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 <u>Connect Tech Resource Center</u> for product manuals, installation guides, device drivers, BSPs and technical tips. Submit your <u>technical support</u> 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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