BOARD SUPPORT PACKAGE
For Connect Tech NVIDIA Jetson NANO Carriers

BSP Version: NANO-32.7.1 V002
Last Updated: 2022/04/26

Introduction

This Board Support Package adds support for Connect Tech Jetson Nano 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.

More detailed Release Note can be found here:

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

Requirements

- x86 based host machine running Ubuntu 18.04
- Jetpack 4.6.1 installed via Nvidia SDK Manager (from Nvidia Embedded Download Center)
  or via source packages from Nvidia's website
- Production Nano module
- Connect Tech Nano Family Carrier
- USB Cable for flashing

  *L4T version can be found in /etc/nv_tegra_release and will look like this:
  # R32 (release), REVISION: 7.1

Supported Cameras in BSP

- ECON: e-CAM24_CUNANO AR0234
- ECON: e-CAM30_CUNANO AR0330
- ECON: e-CAM50_CUNANO AR0521
- ECON: e-CAM80_CUNANO IMX415
- ArduCam: IMX477
- Raspberry Pi Camera Module v2: IMX219
- Vision Components: IMX297
- Vision Components: IMX327C
- Vision Components: OV9281
- Framos: IMX290
- Framos: IMX296
- Framos: IMX297
- Framos: IMX327
- Framos: IMX334
- Framos: IMX335
- Framos: IMX412
- Framos: IMX415
- Framos: IMX462
- Framos: IMX464
- Framos: IMX477
- Framos: IMX565

Installation (Prefered approach)

- Before Installing the BSP you will need to install Jetpack 4.6.1 on the x86 host system using the Nvidia SDK Manager or from the source packages on Nvidia's website as detailed below.

- Copy the CTI-L4T-NANO-32.7.1-V###.tgz package into ~/nvidia/nvidia_sdk/ JetPack_4.6.1_Linux_JETSON_NANO_TARGETS/Linux_for_Tegra/

- Extract the BSP:

  tar -xzf CTI-L4T-NANO-32.7.1-V###.tgz

- 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 Nano.

- To flash on the Nano use the following (do not add ".conf"):

    CTI Assisted Flashing:
    ./cti-flash.sh

    Manual Flash:
    ./flash.sh cti/nano/photon/base mmcblk0p1

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 "32.7.1 >".

- Download the "L4T Driver Package (BSP)" and "Sample Root Filesystem" files for Nano. Afterwards, you should have the files "Jetson-210_Linux_R32.7.1_aarch64.tbz2" and "Tegra_Linux_Sample-Root-Filesystem_R32.7.1_aarch64.tbz2".

- Create a directory named ~/nvidia/nvidia_sdk/JetPack_4.6.1_Linux_JETSON_NANO_TARGETS/ and copy the "Jetson-210_Linux_R32.7.1_aarch64" file you downloaded into that directory.

- Unzip the tarball:

    "sudo tar jxf Jetson-210_Linux_R32.7.1_aarch64.tbz2"

    You should now have a new directory called Linux_for_Tegra in your "JetPack_4.6.1_Linux_JETSON_NANO_TARGETS" folder. Change directories into that and then copy the "Tegra_Linux_Sample-Root-Filesystem_R32.7.1_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_R32.7.1_aarch64.tbz2"

- You can change directories back to ~/nvidia/nvidia_sdk/JetPack_4.6.1_Linux_JETSON_NANO_TARGETS/Linux_for_Tegra/ and run:

  "sudo ./apply_binaries.sh"

  if you wish to flash one of Nvidia's devkits, or move on to installing CTI's BSP.

- Copy the CTI-L4T-NANO-32.7.1-V###.tgz package into ~/nvidia/nvidia_sdk/ JetPack_4.6.1_Linux_JETSON_NANO_TARGETS/Linux_for_Tegra/

- Extract the BSP:

  tar -xzf CTI-L4T-NANO-32.7.1-V###.tgz

- 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 Nano.

- To flash on the Nano use the following (do not add ".conf"):

  CTI Assisted Flashing:
  ./cti-flash.sh

  Manual Flash:
  ./flash.sh cti/nano/photon/base mmcblk0p1

Flashing Nano

- Connect the Nano 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
- To flash on the Nano use the following (do not add ".conf"):

CTI Assisted Flashing:
./cti-flash.sh

Manual Flash:
./flash.sh cti/nano/photon/base mmcblk0p1

- Once the flashing has completed, the Nano will reboot

Switching Profiles on Nano

1. Open a terminal on the NANO

2. Run "sudo cti-nano-fdt.sh"

3. Select the profile you wish to switch to from the menu

4. Restart the system

Note: This script updates dtb by appending/replacing the FDT variable in extlinux.conf
It also sets root=/dev/mmcblk0p1 by modifying the "APPEND" variable

Product Specific Details

NGX003 (Photon)

- USB 3.0 Support
- USB OTG Support
- MIPI Camera Support
- HDMI Support
- Micro SD Card Support
- NVMe Card Support
- PoE Support
- Wifi/Bluetooth Card Support
- Cellular Card Support
- RGB LED Support
- UART Support
- I2C Support
- GPIO Support

NGX004 (Quark)

- USB 3.0 Support
- USB OTG Support
- MIPI Camera Support
- Micro SD Card
- Ethernet
- GbE PCI Support
- UART Support
- I2C Support
- GPIO Support
- SPI Support
- PWM Support(Note, as of this revision, only works on pin 38 of the I/O header)
- Fan

NGX007 (Boson)

- USB 3.0 Support
- USB OTG Support
- FRAMOS Camera Support
- Display(HDMI)
- Micro SD Card
- GbE Phy Support
- UART Support
- SPI Support
- I2C Support
- PWM Support
- NVMe Card Support

Changes

Version NANO-32.7.1 V002, Apr 26, 2022
- Added Support for Framos IMX296, IMX297, IMX335, IMX464, IMX477 and IMX565 to Boson.
- Added PTN5150 Current advertisement config support for NGX014 to NGX004 dtb (NGX014 = Quark + PTN5150 USB Current Controller)

Version NANO-32.7.1 V001, Apr 12, 2022
- Initial Release for Jetpack 4.6.1 L4T 32.7.1
- Added support for Framos IMX412 to Boson

Version NANO-32.6.1 V005, Jan 20, 2022
- Added support for ECON e-CAM24_CUNANO to Photon and Quark.
- Organized cti configurations to match what is seen in our t194/t186 packages (board name is now a folder).

Version NANO-32.6.1 V004, Dec 10, 2021
- Adding support for FRAMOS IMX290/IMX327/IMX462 to Boson carrier
- Adding support for ECON e-CAM80_CUNANO to Photon and Quark carrier
- New naming convention for conf files to include camera provider

Version NANO-32.6.1 V003, Oct 6, 2021
- Adding support for FRAMOS IMX334 to Boson carrier

Version NANO-32.6.1 V002, Sept 21, 2021
- Adding support for Boson carrier

Version NANO-32.6.1 V001, August 26, 2021
- Initial release on Jetpack 4.6 L4T 32.6.1
- Adds updates addressed in Nvidia's latest release on August 2021

Version NANO-32.5 V001, Feb 19, 2020
- Initial release on Jetpack 4.5 L4T 32.5

Version NANO-32.4.4 V003, Jan 14, 2021
- Added support for IMX477 camera.

Version NANO-32.4.4 V002, Jan 07, 2021
- Added support for ECON AR0330 and AR0521 camera sensor

Version NANO-32.4.4 V001, Oct 29, 2020
- Initial release on Jetpack 4.4 L4T 32.4.4

Version NANO-32.4.3 V003, Oct 21, 2020
- Added support for Vision Components: IMX327c and OV9281

Version NANO-32.4.3 V002, Oct 05, 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-nano-fdt.sh
- Install path: /usr/bin

Version NANO-32.4.3 V001, July 27, 2020
- Initial release on Jetpack 4.4 L4T 32.4.3

Version NANO-32.4.2 V001, June 05, 2020
- Initial release on Jetpack 4.4 L4T 32.4.2

Version NANO-32.3.1 V005, May 29, 2020
- Fixed login loop issue
- Added deb packages

Version NANO-32.3.1 V004, May 06, 2020
- Previous release is broken
- Quark is not supported.
- NVME issue is resolved.
- Fixed install script.

Version NANO-32.3.1 V003, Apr 15, 2020
- Added support for Quark

Version NANO-32.3.1 V001, Feb 28, 2020
- Initial release on Jetpack 4.3

Version NANO-32.2.1 V001, Jan 09, 2020
- Initial release on Jetpack 4.2.2

Version 300, September 11, 2019
- Initial Release for the Nano

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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