

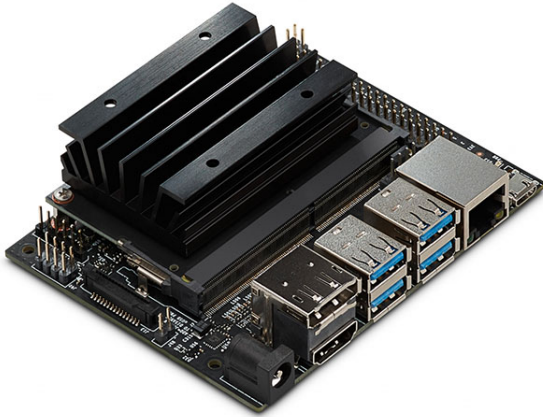
Bring Up NANO Board

Harry Li, Ph.D.



Write Image to MicroSD Card

<https://developer.nvidia.com/embedded/community>



Prerequisite:

1. A micro-SD card (minimum 16GB) and SD card reader with USB interface;
2. A 5V 3A MicroUSB power supply;
3. An Ethernet cable;

Step 1. Down load SD card OS image from Nvidia to your host machine, laptop, the zipped file size is 6.1G, unzip it to get OS image, e.g., *.img file, ref:

<https://developer.nvidia.com/embedded/learn/get-started-jetson-nano-devkit#write>

Harry Li, Ph.D.

```
harry@workstation: /media/harry/easystore/backup-2020-2-15/SJSU/CMPE244
File Edit View Search Terminal Help

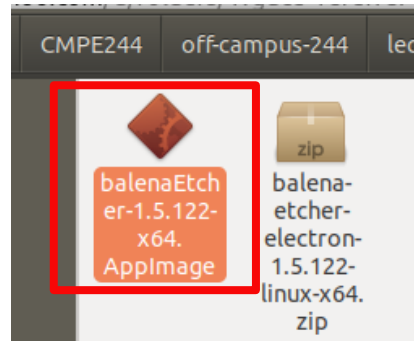
0 directories, 2 files
(base) harry@workstation: /media/harry/easystore/backup-2020-2-15/SJSU/CMPE244/off-campus-244/lec/lec2-bringUp-nano/sd-image-down-load$
├── jetson-nano-jp46-sd-card-image.zip
└── sd-blob-b01.img

0 directories, 2 files
```

Step 2. Write the image to your microSD card by following the instructions from Nvidia, first you will need to down load the writer software “ethcher” to your host machine from this site:

(2.1) for Linux host, Download, install, and launch Etcher.

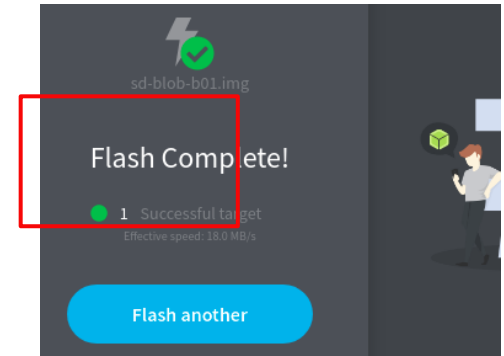
<https://www.balena.io/etcher/>



Use USB card reader to place the SD card into your host machine, then double click “etcher” to start it to write



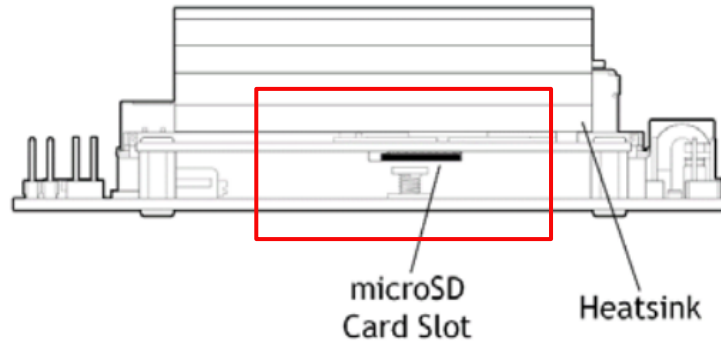
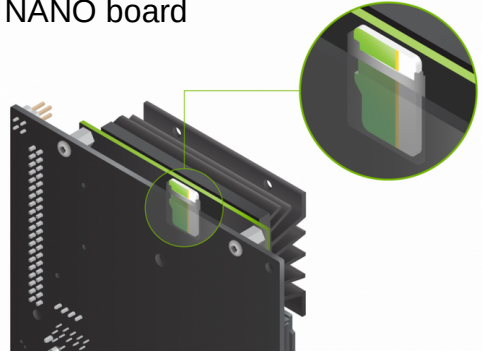
The program “etcher” on your host will take 10-15 minutes to write (flash) to the card, then it will validate the writing.



Prerequisite for the First Boot

<https://developer.nvidia.com/embedded/learn/get-started-jetson-nano-devkit#setup>

1. take the USB card out from your card reader when you done copying OS image with the host machine, then Insert microSD Card to the NANO board



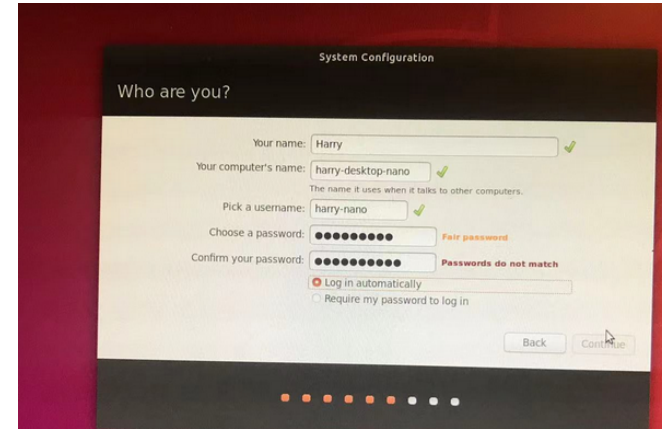
2. Have the user guide ready

**JETSON NANO
DEVELOPER KIT** User Guide

DA_09402_001_01 | March 18, 2019

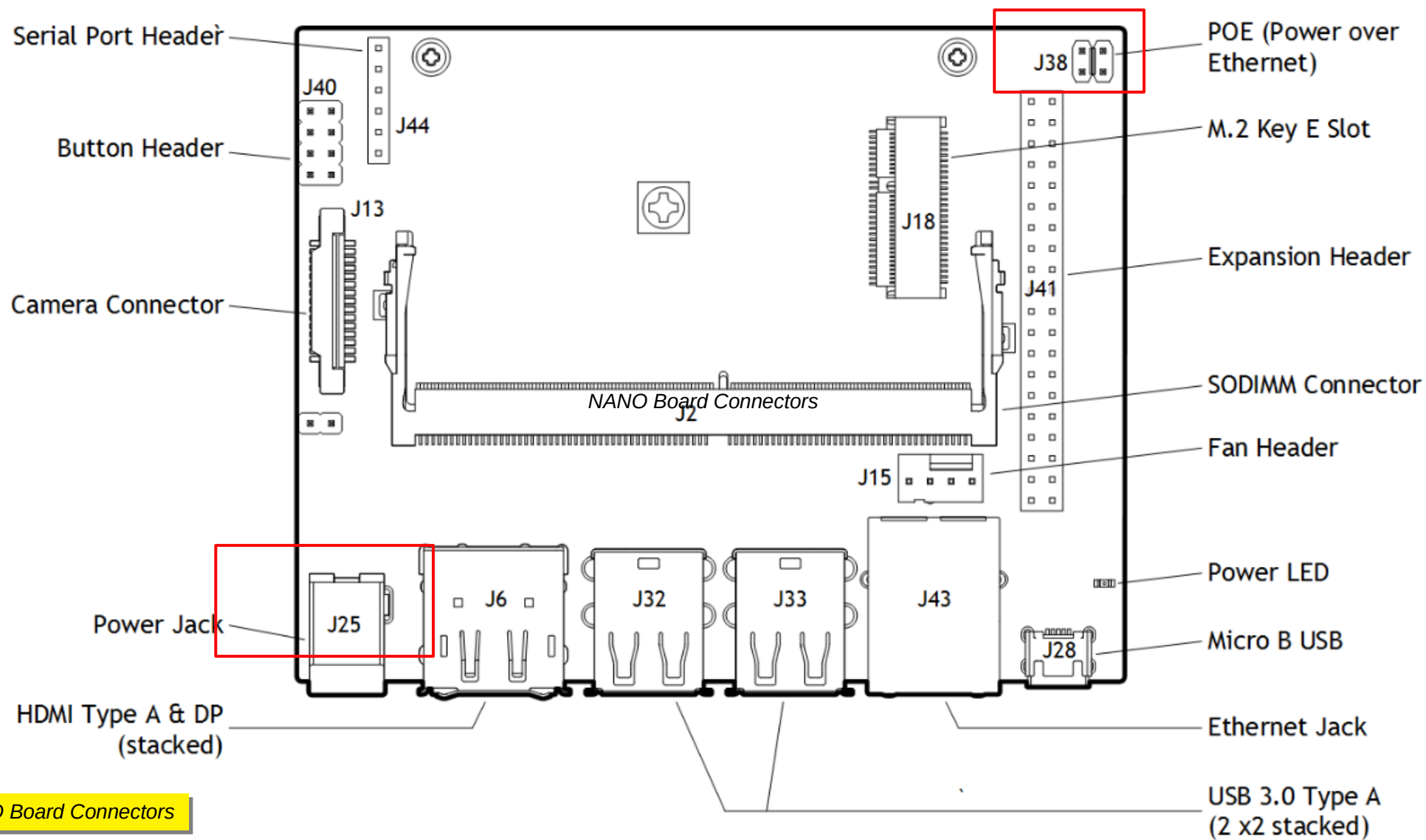
<https://www.youtube.com/watch?v=dVGEtWYkP2c>

Just connect to the power, your system should boot, then you will go through the init process.



```
harry-nano@harry-desktop-nano: /boot/extlinux
harry-nano@harry-desktop-nano: /boot/extlinux$ uname -r
4.9.253-tegra
```

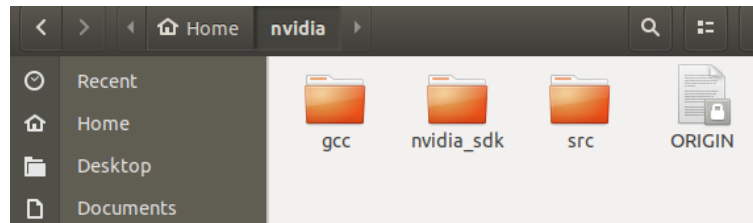
Top View



Toolchain and OS Source Distribution for TX2 and NANO

1

Downloaded and installed in my
home/nvidia directory



2

/home/harry/nvidia/src/public_sources/kernel/kernel-4.4

```
harry@workstation: ~/nvidia
File Edit View Search Terminal Help
(base) harry@workstation:~/nvidia$ tree -L 2
.
├── gcc
│   ├── gcc-4.8.5-aarch64.tgz
│   └── install
├── nvidia_sdk
│   ├── JetPack_4.5.1_Linux
│   └── JetPack_4.5.1_Linux_JETSON_TX2
├── ORIGIN
├── src
│   ├── public_sources
│   └── public_sources.tbz2
└── 7 directories, 3 files
(base) harry@workstation:~/nvidia$
```

\$make nconfig or \$make menuconfig

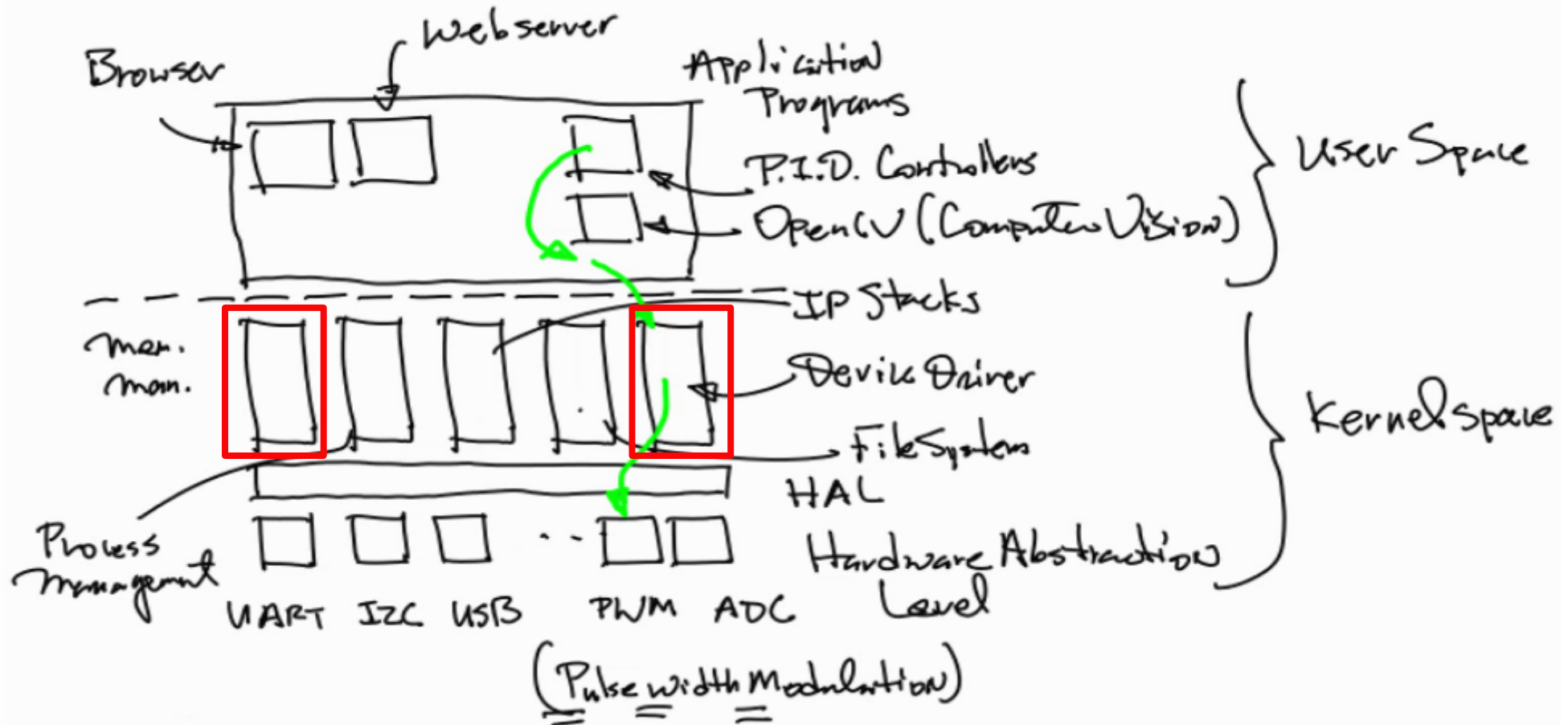
```
harry@workstation: ~/nvidia/src/public_sources/kernel/kernel-4.4
File Edit View Search Terminal Help

.config - Linux/x86 4.4.197 Kernel Configuration
Linux/x86 4.4.197 Kernel Configuration

[*] 64-bit kernel
    General setup --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
    Processor type and features --->
    Power management and ACPI options --->
    Bus options (PCI etc.) --->
    Executable file formats / Emulations --->
[*] Networking support --->
    Harry 2021-7-27 testing Device Drivers ---->
    Firmware Drivers --->
    File systems --->
    Kernel hacking --->
    Security options --->
    *- Cryptographic API --->
[*] Virtualization --->
    Library routines --->

F1 Help F2 SymInfo F3 Help 2 F4 ShowAll F5 Back F6 Save F7 Load F8 SymSearch F9 Exit
```

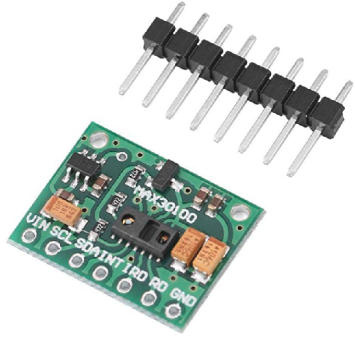
Embedded OS Concept



Max30100 Sensor Interface

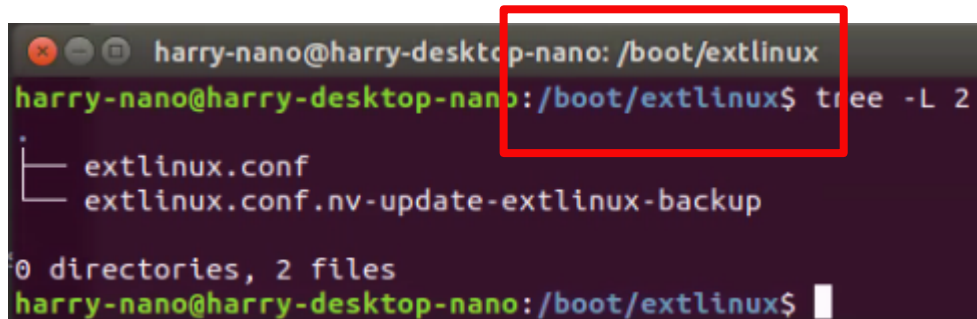
max30100 pulse oximetry and heart-rate monitor sensor

I2C-Compatible Interface



Add Customer Driver

<https://forums.developer.nvidia.com/t/how-to-activate-linux-device-drivers-on-jetson-nano/173243/3>



```
harry-nano@harry-desktop-nano: /boot/extlinux
harry-nano@harry-desktop-nano: /boot/extlinux$ tree -L 2
.
├── extlinux.conf
└── extlinux.conf.nv-update-extlinux-backup

0 directories, 2 files
harry-nano@harry-desktop-nano: /boot/extlinux$
```

<https://developer.nvidia.com/embedded/jetpack-archive> for
downloading OS distribution kernel

(base) harry@workstation:~/nvidia/src/public_sources/kernel/kernel-4.4\$

Profiling Tools

<https://developer.nvidia.com/embedded/develop/tools>

NVIDIA Nsight Systems is a low overhead performance analysis tool designed to provide insights developers need to optimize their software. Unbiased activity data is visualized within the tool to help users investigate bottlenecks, avoid inferring false-positives, and pursue optimizations with higher probability of performance gains. Users will be able to identify issues, such as GPU starvation, unnecessary GPU synchronization, insufficient CPU parallelizing, and even unexpectedly expensive algorithms across the CPUs and GPUs of their target platform. It is designed to scale across a wide range of NVIDIA platforms such as: large Tesla multi-GPU x86 servers, Quadro workstations, Optimus enabled laptops, DRIVE devices with Tegra+dGPU multi-OS, and Jetson. NVIDIA Nsight Systems can even provide valuable insight into the behaviors and load of deep learning frameworks such as PyTorch and TensorFlow; allowing users to tune their models and parameters to increase overall single or multi-GPU utilization.

