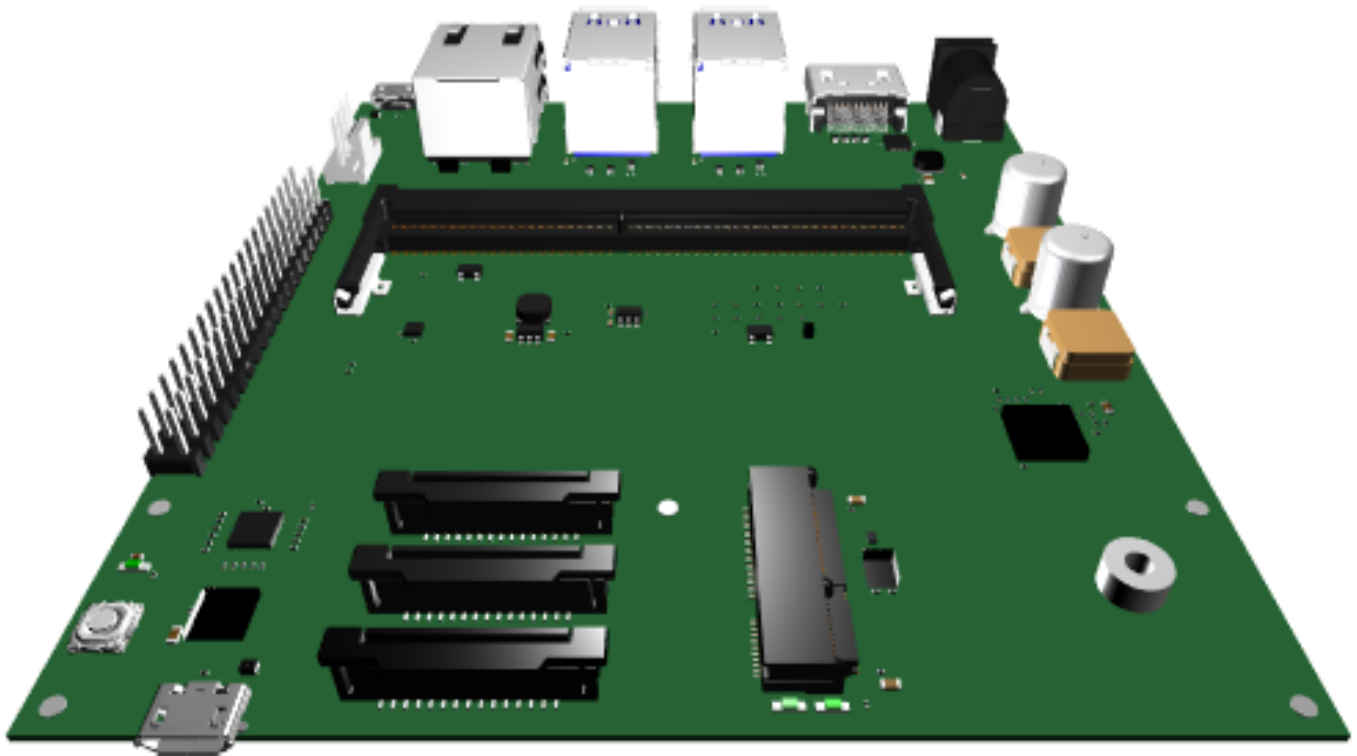


# NVIDIA Jetson Nano Development Board



**This board was designed and built by Geppetto**

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### No Minimum Order

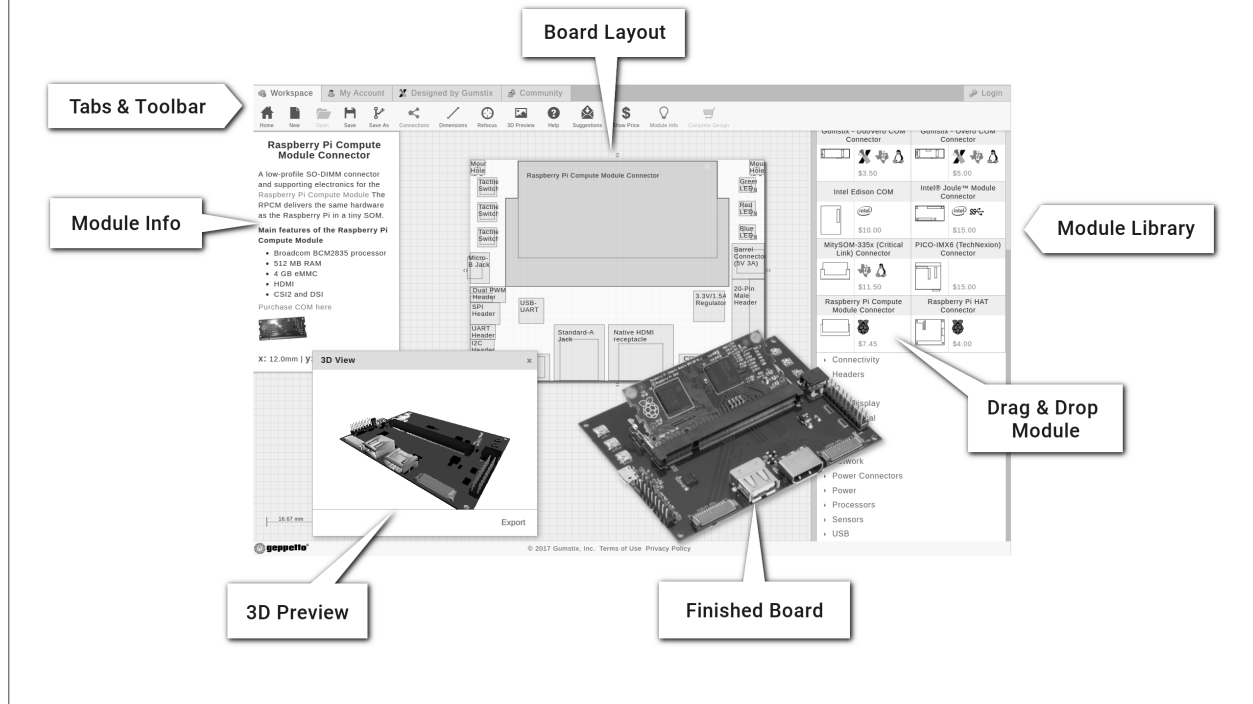
## Automated Supply Chain

## Reduce Cost and Errors

**Thanks for using Geppetto to design this board!**

*One Stop Design-to-Order*

Simply place displays, sensors, processors, and Geppetto connects it all.  
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## Board Description

Uses NVIDIA Jetson Nano COM Connector as its COM/processor.

Functional modules include:

USB Micro-B Jack

4-Port USB 3.0 Hub

HDMI

Dual Stacked USB 3.0 Type A

Dual Stacked USB 3.0 Type A

Ethernet Connector

USB-UART

USB Micro-B Jack

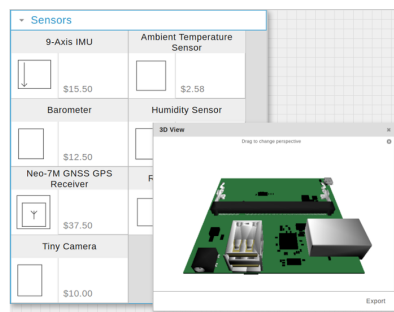
Raspberry Pi Vertical Camera Connector

Powered by a Barrel Connector (20V 3A).

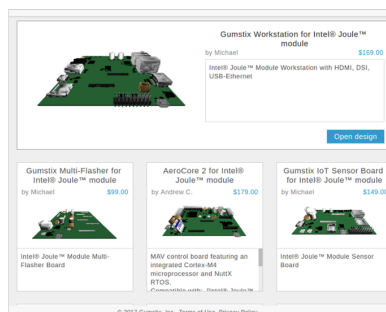
## Board Dimensions

10.5cm x 11.5cm

## Geppetto Makes Hardware Easy



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[illegible]

Takes 5.5 - 36V input from Barrel Connector (20V 3A) (2) and provides up to 5A at 5V to:

- NVIDIA Jetson Nano COM Connector (18)

### 1.1.2 3.3V/1.5A Regulator (v20) (9)

This DC to DC step down regulator provides a 3.3V DC output at 1.5A needed by certain components on this board. It is capable of accepting an input voltage between 3.1 to 16V DC and output is controlled by the TI TPS6211 buck regulator.  
It receives VIN from 5V/5A Regulator (13).

The datasheet for the TPS6211 regulator is available at:

<http://www.ti.com/lit/ds/symlink/tps62110.pdf>

This regulator provides 3.3V to:

- 4-Port USB 3.0 Hub (4)
- Ethernet Connector (8)
- Raspberry Pi Vertical Display Connector (14)
- Raspberry Pi Vertical Camera Connector (12)
- NVIDIA Jetson Nano Developer 40-Pin Header (15)
- NVIDIA Jetson Nano Developer 40-Pin Header (15)
- NVIDIA Jetson Nano Developer 40-Pin Header (15)
- M.2 Key E Connector (19)
- Top-side LED (20)
- TI TCA9548A I2C Switch (22)
- TI TCA9548A I2C Switch (22)
- Raspberry Pi Vertical Camera Connector (23)

### 1.1.3 5V/5A Regulator (v14) (13)

Takes 5.5 - 36V input from Barrel Connector (20V 3A) (2) and provides up to 5A at 5V to:

- HDMI (5)
- Dual Stacked USB 3.0 Type A (6)
- Dual Stacked USB 3.0 Type A (7)
- 3.3V/1.5A Regulator (9)
- NVIDIA Jetson Nano Developer 40-Pin Header (15)
- NVIDIA Jetson Nano Developer 40-Pin Header (15)
- 4-Pin 5V Computer Fan (16)
- 4-Pin 5V Computer Fan (16)

## 1.2 Power Connectors

### 1.2.1 Barrel Connector (20V 3A) (v7) (2)

This power jack is compatible with Gumstix 20V/3A DC power adapter using a barrel connector.

This power jack provides 12V to the following modules:

- 5V/5A Regulator (1)
- 5V/5A Regulator (13)

## 1.3 USB

### 1.3.1 USB Micro-B Jack (v18) (3)

The USB micro-B port module allows your design to connect as a USB device to a USB host.

This module is connected to USB2\_0 on NVIDIA Jetson Nano COM Connector (18).

This module does not supply power.

### 1.3.2 4-Port USB 3.0 Hub (v14) (4)

This USB hub offers four interfaces for USB 3.0 or USB 2.0 ports from USB3\_1 on NVIDIA Jetson Nano COM Connector (18).

### 1.3.3 Dual Stacked USB 3.0 Type A (v12) (6)

A dual type-A USB 3.0 host stacked vertically that allows you to connect USB devices to the board.

It is connected to:

- USBH1 on 4-Port USB 3.0 Hub (4)
- USBH2 on 4-Port USB 3.0 Hub (4)

### 1.3.4 Dual Stacked USB 3.0 Type A (v12) (7)

A dual type-A USB 3.0 host stacked vertically that allows you to connect USB devices to the board.

It is connected to:

- USBH3 on 4-Port USB 3.0 Hub (4)
- USBH4 on 4-Port USB 3.0 Hub (4)



### 1.3.5 USB Micro-B Jack (v18) (11)

The USB micro-B port module allows your design to connect as a USB device to a USB host.

This module is connected to USB\_DEVICE on USB-UART (10).

This module does not supply power.

## 1.4 Monitors

### 1.4.1 HDMI (v21) (5)

The native HDMI receptacle module provides HDMI video and audio signals to an external display and speakers. This module uses the TI TPD12S016UFQN HDMI companion chip with a standard HDMI port to provide ESD-protected display connectivity.

The datasheet for the TPD12S016 IC can be found at:

<http://www.ti.com/lit/ds/symlink/tpd12s016.pdf>

The module transmits high definition video from **HDMI** on **NVIDIA Jetson Nano COM Connector (18)**.

## 1.5 Network and Wireless

### 1.5.1 Ethernet Connector (v5) (8)

This module offers a 10/100 Base-T or 1000 Base-T Ethernet connection.

The module provides ethernet to

1000BaseT on NVIDIA Jetson Nano COM Connector (18)

## 1.6 Converters

### 1.6.1 USB-UART (v21) (10)

Also known as an FTDI, this USB to UART converter allows a USB connection to the board to behave as a virtual RS232 serial connection. It offers direct and complete access to the system from a development machine by way of the FTDI FT232RQ USB – UART IC.

Technical documentation for the FT232RQ is available at:

[http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS\\_FT232R.pdf](http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT232R.pdf)

This USB to UART converter connects a host machine from USB Micro-B Jack (11) to UART2 on NVIDIA Jetson Nano COM Connector (18).

### 1.6.2 TI TCA9548A I2C Switch (v1) (22)

The TI TCA9548A I2C Switch module offers up to 8 muxed I2C buses from a single I2C host.

<http://www.ti.com/lit/ds/symlink/tca9548a.pdf>

This module has the following upstream connections:

- 3.3V to 3.3V from 3.3V/1.5A Regulator (9)
- OUTPUT VOLTAGE to 3.3V from 3.3V/1.5A Regulator (9)
- I2C to I2C CAM from NVIDIA Jetson Nano COM Connector (18)

The TI TCA9548A I2C Switch provides the following outputs:

- I2C0 to Raspberry Pi Vertical Camera Connector (12)
- VLOGIC to Raspberry Pi Vertical Display Connector (14)
- I2C2 to Raspberry Pi Vertical Display Connector (14)
- I2C1 to Raspberry Pi Vertical Camera Connector (23)

## 1.7 Connectors (Signal)

### 1.7.1 Raspberry Pi Vertical Camera Connector (v3) (12)

The Raspberry Pi Vertical camera connector module is a 15-pin ribbon connector that exposes a 2-lane MIPI camera system to an external high-resolution camera module.

The CSI port is connected to CSI0.2 on NVIDIA Jetson Nano COM Connector (18).

I2C communication is connected to I2C0 on TI TCA9548A I2C Switch (22).

GPIO inputs IO0 and IO1 are provided by CAM0 PWDN on NVIDIA Jetson Nano COM Connector (18) and CAM0 MCLK on NVIDIA Jetson Nano COM Connector (18), respectively.

### 1.7.2 Raspberry Pi Vertical Display Connector (v1) (14)

The DSI connector module is a 15-pin ribbon connector that exposes a 2-lane MIPI DSI display bus to an external LCD display.

The DSI port is connected to DSI on NVIDIA Jetson Nano COM Connector (18)

I2C communication is connected to I2C2 on TI TCA9548A I2C Switch (22) .

### 1.7.3 M.2 Key E Connector (v2) (19)

The a M.2, Key E Mini-PCIe Expansion slot includes interface options for WLAN/BT including PCIe (x1), 4-bit SDIO, USB 2.0, UART, I2S and I2C.

The M.2 Key E Connector module receives the following inputs:

- 3.3V from 3.3V/1.5A Regulator (9)
- PCIe from NVIDIA Jetson Nano COM Connector (18)

- PCIe nCLKREQ from NVIDIA Jetson Nano COM Connector (18)
- PCIe nRST from NVIDIA Jetson Nano COM Connector (18)
- PCIe nWAKE from NVIDIA Jetson Nano COM Connector (18)
- SDIO from NVIDIA Jetson Nano COM Connector (18)
- UART from NVIDIA Jetson Nano COM Connector (18)
- I2S from NVIDIA Jetson Nano COM Connector (18)
- I2C from NVIDIA Jetson Nano COM Connector (18)
- SDIO nWAKE from NVIDIA Jetson Nano COM Connector (18)
- USB from NVIDIA Jetson Nano COM Connector (18)
- BT nWAKE from NVIDIA Jetson Nano COM Connector (18)
- BT ENABLE from NVIDIA Jetson Nano COM Connector (18)
- ALERT from NVIDIA Jetson Nano COM Connector (18)
- WLAN ENABLE from NVIDIA Jetson Nano COM Connector (18)
- SDIO nRESET from NVIDIA Jetson Nano COM Connector (18)
- VLOGIC\_1V8 from NVIDIA Jetson Nano COM Connector (18)

#### 1.7.4 Raspberry Pi Vertical Camera Connector (v3) (23)

The Raspberry Pi Vertical camera connector module is a 15-pin ribbon connector that exposes a 2-lane MIPI camera system to an external high-resolution camera module.

The CSI port is connected to CSI2.2 on NVIDIA Jetson Nano COM Connector (18).

I2C communication is connected to I2C1 on TI TCA9548A I2C Switch (22).

GPIO inputs IO0 and IO1 are provided by CAM1 PWDN on NVIDIA Jetson Nano COM Connector (18) and CAM1 MCLK on NVIDIA Jetson Nano COM Connector (18), respectively.

### 1.8 Custom Modules

#### 1.8.1 NVIDIA Jetson Nano Developer 40-Pin Header (v2) (15)

The 40-pin header module offers up to 40 pins that can be used at the customer's discretion.

This module has the following connections:

- OUTPUT LEVEL to 3.3V from 3.3V/1.5A Regulator (9)
- VCC\_3.3\_0 to 3.3V from 3.3V/1.5A Regulator (9)
- VCC\_3.3\_9 to 3.3V from 3.3V/1.5A Regulator (9)
- VCC\_5.0\_1 to 5.0V from 5V/5A Regulator (13)

- VCC\_5.0\_2 to 5.0V from 5V/5A Regulator (13)
- I2C\_3 to I2C1 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_4 to GPIO9 from NVIDIA Jetson Nano COM Connector (18)
- HART\_5 to UART1\_4W from NVIDIA Jetson Nano COM Connector (18)
- I2S\_4\_6 to I2S0 from NVIDIA Jetson Nano COM Connector (18)
- SPI\_7 to SPI1 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_8 to GPIO12 from NVIDIA Jetson Nano COM Connector (18)
- SPI\_10 to SPI0 from NVIDIA Jetson Nano COM Connector (18)
- I2C\_11 to I2C0 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_12 to GPIO1 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_13 to GPIO11 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_14 to GPIO7 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_15 to GPIO13 from NVIDIA Jetson Nano COM Connector (18)

### 1.8.2 4-Pin 5V Computer Fan (v2) (16)

The 4-pin header module offers up to 4 pins that can be used at the customer's discretion. It is commonly used for standard computer fans.

[https://www.molex.com/pdm\\_docs/sd/470531000\\_sd.pdf](https://www.molex.com/pdm_docs/sd/470531000_sd.pdf)

This module has the following connections:

- OUTPUT LEVEL to 5.0V from 5V/5A Regulator (13)
- VCC\_5.0\_0 to 5.0V from 5V/5A Regulator (13)
- GPIO\_2 to GPIO14 from NVIDIA Jetson Nano COM Connector (18)
- GPIO\_1 to NC1 from NC (17)

## 1.9 Headers

### 1.9.1 NC (v17) (17)

No connection

## 1.10 COM Connectors

### 1.10.1 NVIDIA Jetson Nano COM Connector (v3) (18)

The NVIDIA Jetson Nano brings Artificial Intelligence to devices at the edge. Bringing this powerful system to smaller devices allows for advanced robotics, intelligent cameras and complex data analysis, all without needing a connection to the internet.

Check out the full capabilities at <https://developer.nvidia.com/embedded-computing>

The NVIDIA® Jetson™ module connector receives:

- 5.0V from 5V/5A Regulator (1)

The NVIDIA® Jetson™ module connector provides the following outputs:

- USB2\_0 to USB Micro-B Jack (3)
- USB3\_1 to 4-Port USB 3.0 Hub (4)
- HDMI to HDMI (5)
- 1000BaseT to Ethernet Connector (8)
- UART2 to USB-UART (10)
- CSI0.2 to Raspberry Pi Vertical Camera Connector (12)
- CAM0 MCLK to Raspberry Pi Vertical Camera Connector (12)
- CAM0 PWDN to Raspberry Pi Vertical Camera Connector (12)
- DSI to Raspberry Pi Vertical Display Connector (14)
- I2C1 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO9 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- UART1\_4W to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- I2S0 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- SPI1 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO12 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- SPI0 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- I2C0 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO1 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO11 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO7 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO13 to NVIDIA Jetson Nano Developer 40-Pin Header (15)
- GPIO14 to 4-Pin 5V Computer Fan (16)
- PCI0 to M.2 Key E Connector (19)

- PCIE nCLKREQ to M.2 Key E Connector (19)
- PCIE nRST to M.2 Key E Connector (19)
- PCIE nWAKE to M.2 Key E Connector (19)
- SDIO to M.2 Key E Connector (19)
- UART0\_4W to M.2 Key E Connector (19)
- I2S1 to M.2 Key E Connector (19)
- I2C2 to M.2 Key E Connector (19)
- GPIO4 to M.2 Key E Connector (19)
- SYS\_EN to Top-side LED (20)
- nRESET to Tactile Switch (21)
- I2C CAM to TI TCA9548A I2C Switch (22)
- CSI2.2 to Raspberry Pi Vertical Camera Connector (23)
- CAM1 PWDN to Raspberry Pi Vertical Camera Connector (23)
- CAM1 MCLK to Raspberry Pi Vertical Camera Connector (23)
- USB2\_2 to M.2 Key E Connector (19)
- GPIO2 to M.2 Key E Connector (19)
- GPIO3 to M.2 Key E Connector (19)
- GPIO10 to M.2 Key E Connector (19)
- GPIO5 to M.2 Key E Connector (19)
- GPIO6 to M.2 Key E Connector (19)

## 1.11 Lights and Switches

### 1.11.1 Top-side LED (v9) (20)

The top-side LED module contains a 1608 standard size LED of a user-selected color, mounted on the top side of a Geppetto board.

The LED is active-high on SYS\_EN from NVIDIA Jetson Nano COM Connector (18).

### 1.11.2 Tactile Switch (v22) (21)

This 4.9 sq. mm pull-down touch switch provides a user input for the signal nRESET on NVIDIA Jetson Nano COM Connector (18).

## 2 Module Connections Graph

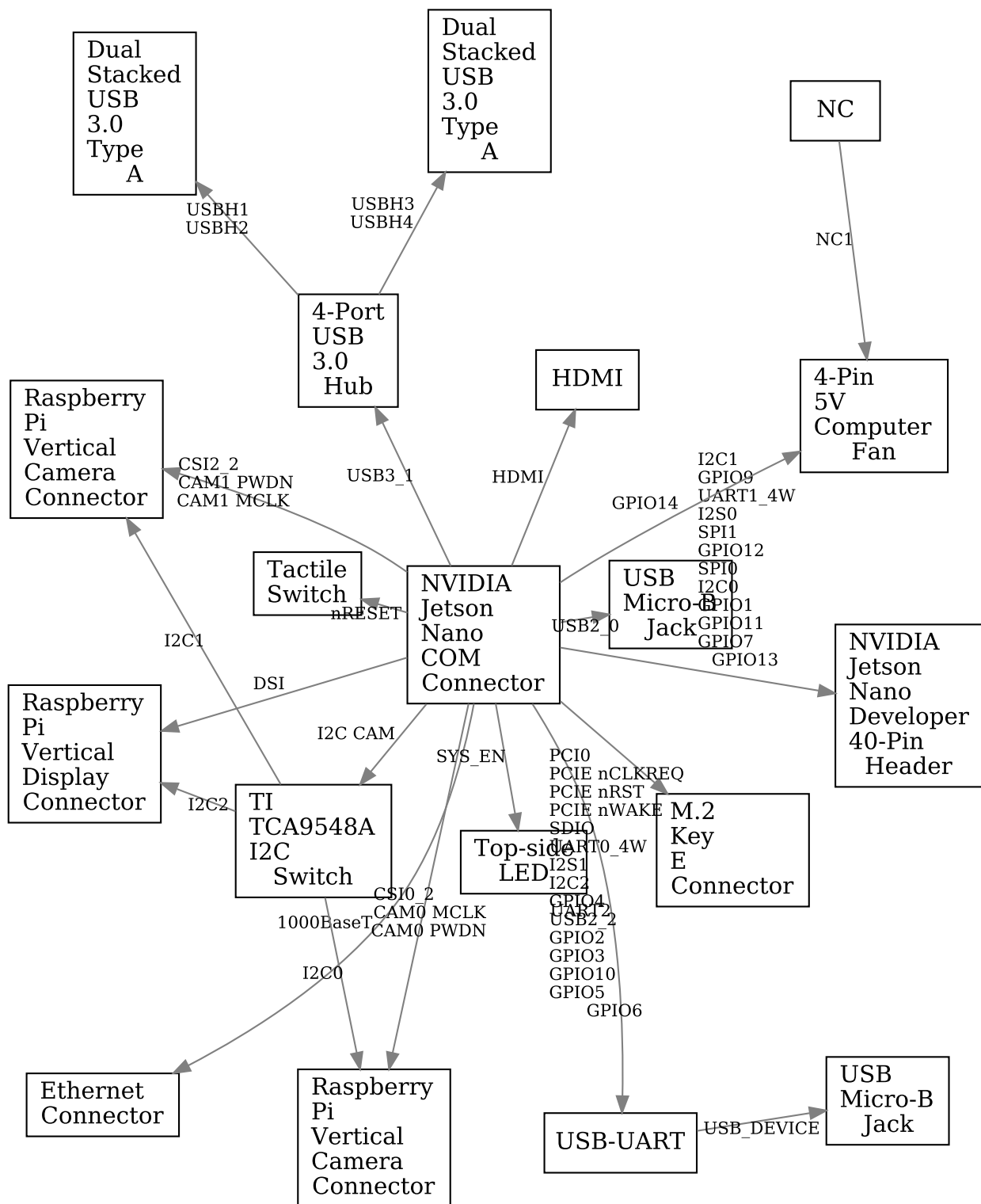


Figure 1: excludes power modules

### 3 Module Power Graph

