Jetson.GPIO - Linux for Tegra

Jetson TX1, TX2, AGX Xavier, and Nano development boards contain a 40 pin GPIO header, similar to the 40 pin header in the Raspberry Pi. These GPIOs can be controlled for digital input and output using the Python library provided in the Jetson GPIO Library package. The library has the same API as the RPi.GPIO library for Raspberry Pi in order to provide an easy way to move applications running on the Raspberry Pi to the Jetson board.

Package Components

In addition to this document, the Jetson GPIO library package contains the following:

The lib/python/ subdirectory contains the Python modules that implement all library functionality. The gpio.py module is the main component that will be imported into an application and provides the needed APIs.
The gpio_event.py and gpio_pin_data.py modules are used by the gpio.py module and must not be imported directly in to an application.

The samples/ subdirectory contains sample applications to help in getting familiar with the library API and getting started on an application.
The simple_input.py and simple_output.py applications show how to perform read and write to a GPIO pin respectively, while
the button_led.py, button_event.py and button_interrupt.py show how a button press may be used to blink an LED using busy-waiting, blocking wait and interrupt callbacks respectively.
More Detail, please check following URL.
https://pypi.org/project/Jetson.GPIO/ or https://github.com/NVIDIA/jetson-gpio

BCM	Function	Physical pin		Function	BCM
	3V3	1	2	5V	
2	SDA	3	4	5V	
3	SCL	5	6	GND	
4	D4	7	8	D14(TXD)	14
	GND	9	10	D15(RXD)	15
17	D17	11	12	D18	18
27	D27	13	14	GND	
22	D22	15	16	D23	23
	3V3	17	18	D24	24
10	D10	19	20	GND	
9	D9	21	22	D25	25
11	D11	23	24	D8	8
	GND	25	26	D7	7
0	D0(ID_SD)	27	28	D1(ID_SC)	1
5	D5	29	30	GND	
6	D6	31	32	D12	12
13	D13	33	34	GND	
19	D19	35	36	D16	16
26	D26	37	38	D20	20
	GND	39	40	D21	21

SoC GPIO	Linux GPIO #	Alternate Function	Default Function			Default Function	Alternate Function	Linux GPIO #	SoC GPIO
			3.3 VDC	①	②	5 VDC			
PJ.03	75	GPIO	I2C1_SDA	③	④	5 VDC			
PJ.02	74	GPIO	I2C1_SCL	⑤	⑥	GND			
PBB.00	216	AUD_CLK	GPIO	⑦	⑧	UART1_TXD	GPIO	48	PG.00
			GND	⑨	⑩	UART1_RXD	GPIO	49	PG.01
PG.02	50	UART1_RTS	GPIO	⑪	⑫	GPIO	I2S0_SCLK	79	PJ.07
PB.06	14	SPI1_SCK	GPIO	⑬	⑭	GND			
PY.02	194		GPIO	⑮	⑯	GPIO	SPI1_CS1	232	PDD.00
			3.3 VDC	⑰	⑱	GPIO	SPI1_CS0	15	PB.07
PC.00	16	SPI0_MOSI	GPIO	⑲	⑳	GND			
PC.01	17	SPI0_MISO	GPIO	㉑	㉒	GPIO	SPI1_MISO	13	PB.05
PC.02	18	SPI0_SCK	GPIO	㉓	㉔	GPIO	SPI0_CS0	19	PC.03
			GND	㉕	㉖	GPIO	SPI0_CS1	20	PC.04
PB.05	13	GPIO	I2C0_SDA	㉗	㉘	I2C0_CLK	GPIO	18	PC.02
PS.05	149	CAM_MCLK	GPIO	㉙	㉚	GND			
PZ.00	200	CAM_MCLK	GPIO	㉛	㉜	GPIO	PWM	168	PV.00
PE.06	38	PWM	GPIO	㉝	㉞	GND			
PJ.04	76	I2S0_FS	GPIO	㉟	㊱	GPIO	UART1_CTS	51	PG.03
PB.04	12	SPI1_MOSI	GPIO	㊲	㊳	GPIO	I2S0_DIN	77	PJ.05
			GND	㊴	㊵	GPIO	I2S0_DOUT	78	PJ.06

Environmental configuration

1) Download jetson-gpio :

git clone https://github.com/NVIDIA/jetson-gpio

```
jetson@jetson-desktop:~$ git clone https://github.com/NVIDIA/jetson-gpio
Cloning into 'jetson-gpio'...
remote: Enumerating objects: 168, done.
remote: Counting objects: 100% (168/168), done.
remote: Compressing objects: 100% (97/97), done.
remote: Total 597 (delta 79), reused 135 (delta 48), pack-reused 429
Receiving objects: 100% (597/597), 128.43 KiB | 38.00 KiB/s, done.
Resolving deltas: 100% (267/267), done.
```

2) Moving the downloaded file to the specified directory:

/opt/nvidia

Note: If your directory already has this library, you need to back up the original directory by following command.

```
nano@nano-desktop:/opt/nvidia$ sudo mv jetson-gpio jetson-gpio_bak
[sudo] password for nano:
nano@nano-desktop:/opt/nvidia$ ls
jetson-gpio_bak  l4t-usb-device-mode
nano@nano-desktop:/opt/nvidia$
```

Then, move the downloaded file in the opt/nvidia/ directory.
 Such as for me.
sudo mv ~/jetson-gpio ./

```
jetson@jetson-desktop:/opt/nvidia$ sudo mv ~/jetson-gpio ./
[sudo] password for jetson:
jetson@jetson-desktop:/opt/nvidia$ ls
jetson-gpio  jetson-io  l4t-bootloader-config  l4t-usb-device-mode  vpi  vpi-0.4
jetson@jetson-desktop:/opt/nvidia$ cd ~
```

3) Install pip3 tools:
sudo apt-get install python3-pip

4) Enetr jetson-gpio folder, and install library.
cd /opt/nvidia/jetson-gpio
sudo python3 setup.py install

```
creating dist
creating 'dist/Jetson.GPIO-2.0.12-py3.6.egg' and adding 'build/bdist.linux-aarc
removing 'build/bdist.linux-aarch64/egg' (and everything under it)
Processing Jetson.GPIO-2.0.12-py3.6.egg
Copying Jetson.GPIO-2.0.12-py3.6.egg to /usr/local/lib/python3.6/dist-packages
Adding Jetson.GPIO 2.0.12 to easy-install.pth file

Installed /usr/local/lib/python3.6/dist-packages/Jetson.GPIO-2.0.12-py3.6.egg
Processing dependencies for Jetson.GPIO==2.0.12
Finished processing dependencies for Jetson.GPIO==2.0.12
```

5) Before using, you also need to create a gpio group, add your current account to this group, and give use permission.

sudo groupadd -f -r gpio

sudo usermod -a -G gpio user_name
(!Note: user_name is your user name,for example:nano)

sudo cp /opt/nvidia/jetson-gpio/lib/python/Jetson/GPIO/99-gpio.rules /etc/udev/rules.d/

In order for the new rules to take effect, you need to reboot or reload udev rules by running the following command.
sudo udevadm control --reload-rules && sudo udevadm trigger