User Manual

Nvidia Jetson Series Carrier board
Aetina AN310

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Document Change History

Version	Date	Description	Authors
V1	2018/07/27	Initial Release.	Eric Chu
V2	2018/11/20	Update Software & BSP part	Eric Chu
V3	2019/01/03	Model name change to AN310	Eric Chu
V4	2019/3/26	Change Jetpack manager photo	Eric Chu

1. Introduction

AN310 is a small form factor carrier board. Support for NVIDIA® Jetson™ TX2 and Jetson™ TX1. You can quickly emulate the functionality of your desired end product for software development and hardware verification.
To build a functional prototype of your target system you will need:

- Nvidia TX1/TX2/TX2i module
  (Aetina's P/N: NSO-MD-TX1/NSO-MD-TX2/NSO-MD-TX2i)
- Nano-ITX carrier board (Aetina's P/N: AN310)
- Power adaptor 12-19 DC/5A

Note: Partial support TX2i function.

1.1 Features

- Specifically designed for high performance and low-power envelope AI computing Additional driver to support Embedded peripheral modules for multiple I/O expansion capability
- On-board 1x HDMI, 2x CAN BUS and 1x Mini Card to support rich multimedia.
- Extended temperature range -40°C to 85°C
- Suitable for general robotics, UAV, industrial inspection, medical imaging and deep learning.
- 1x 120pin connector to support Aetina MIPI CSI-II adapter

1.2 Board

- 8-layer printed circuit board(PCB)
- Physical dimensions: 87mm x 70mm
- High-Bandwidth Digital Content Protection (HDCP) support

2. Board Specification

Specification	AN310 Description
Module Compatibility	Nvidia Jetson TX1 / Nvidia Jetson TX2
GPU	Jeston TX1 : - Nvidia Maxwell™, 256 CUDA cores. Jetson TX2/TX2i: - Nvidia Pascal™, 256 CUDA cores.
CPU	Jetson TX1: - Quad ARM® A57/2MB L2 Jetson TX2: - HMP Dual Denver 2/2MB L2 + Quad ARM® A57/2MB L2 Jetson TX2i(Industrial Grade): - HMP Dual Denver 2/2MB L2 + Quad ARM® A57/2MB L2
Dimension	87mm x 70mm
Display	- 1 x HDMI
Audio	- HDMI Integrated
Ethernet	- 1 x Gigabit Ethernet(10/100/1000)
USB	- 2 x USB3.0 Type A - 1 x USB OTG Micro AB
SD CARD	- Micro SD CARD Slot
UART	- 1 x UART
RS232	- 1 x RS232
I2C	- 1 x I2C
GPIO	- 5 x GPIO
CAN Bus	- 2 x CAN (TX2/TX2i support only)
Input Power	- +12-19V / 5A DC input
Operating Temperature	- -40°C to + 85°C (Standard)
Storage Temperature	- -40°C to + 125°C
Warranty	- 14 Months

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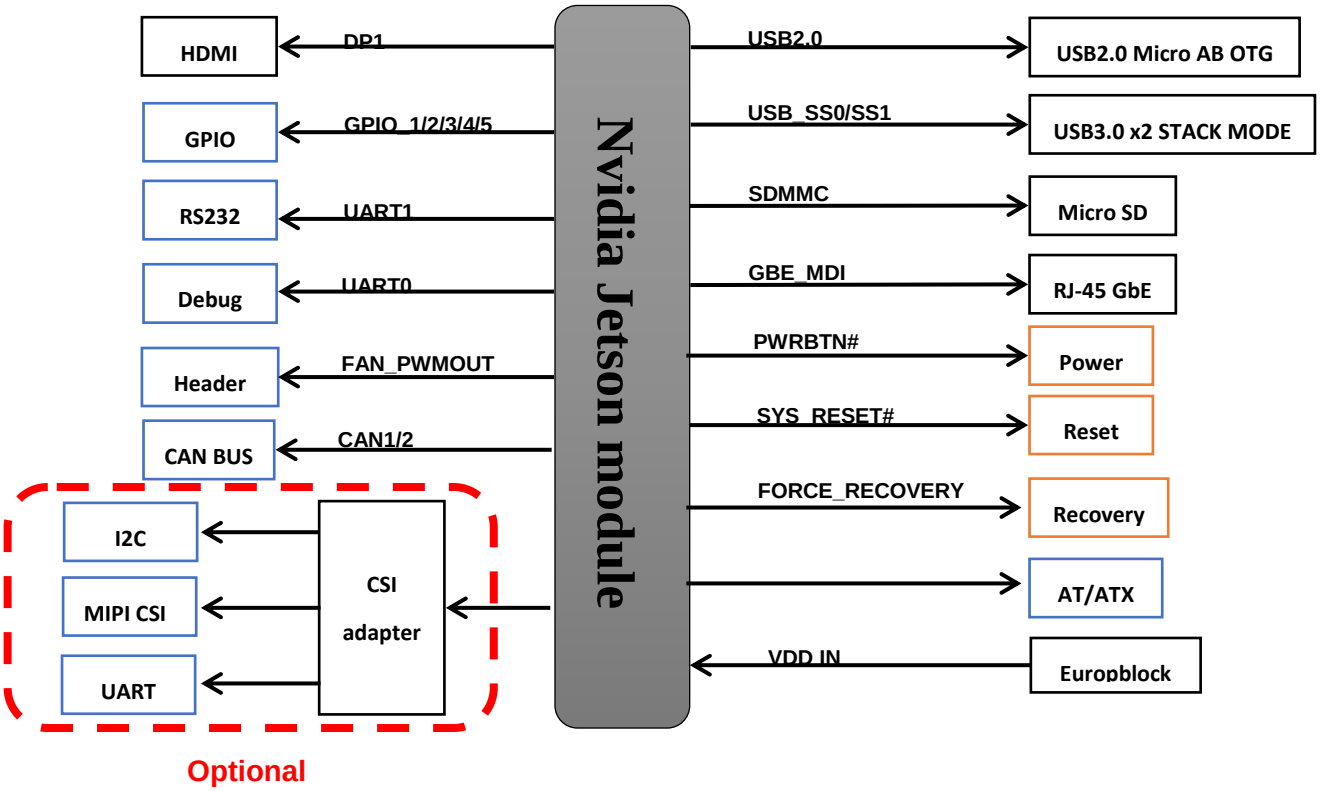
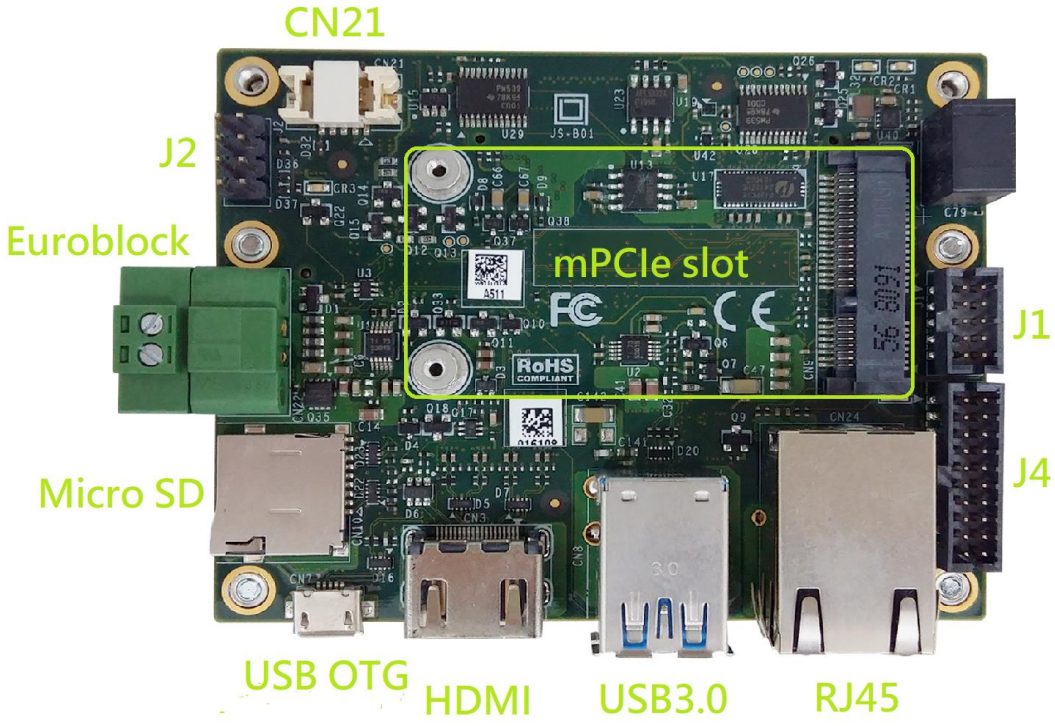
3. Block Diagram



3.1 Board Placement



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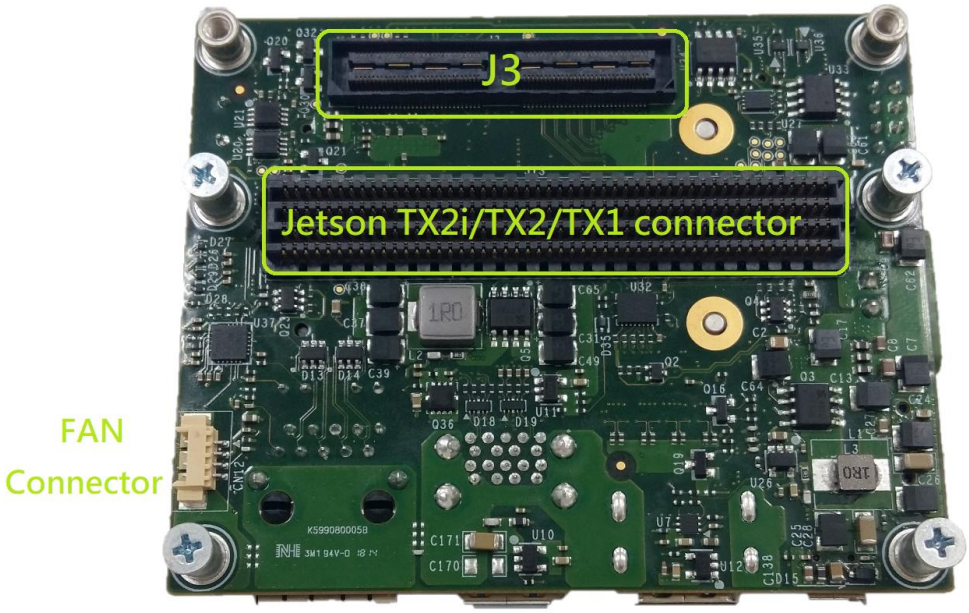
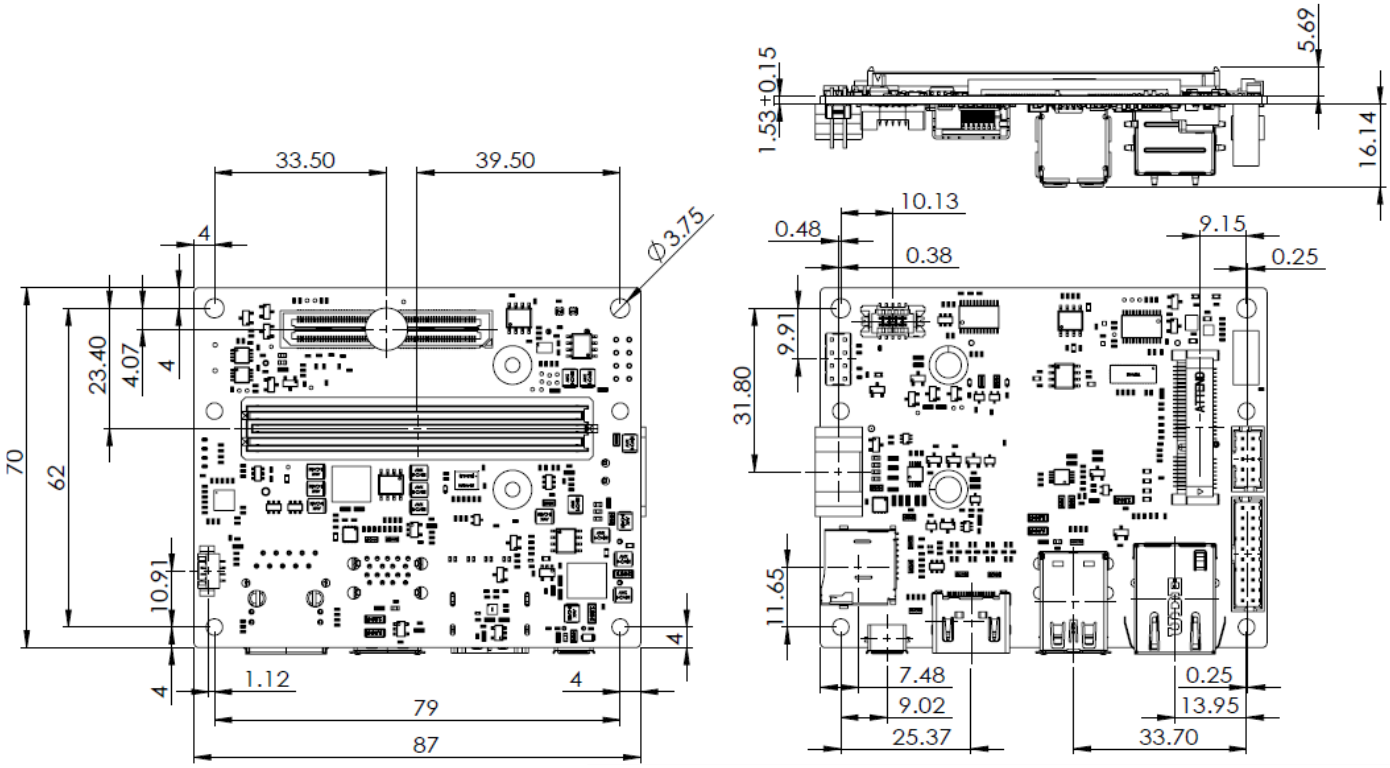


TX1/TX2 Module Connector	Compatible with Jetson TX2i/TX2/TX1
HDMI	Type A
Power Input	Euroblock connector
USB3.0	Type A
USB2.0 OTG	Micro-AB
LAN	RJ45
J3	MIPI CSI2 extension connector
CN9	Compatible with mPCIe and mSATA
J1	Front Panel
J2	I2C / AC OK
J4	Extension IO
CN21	CAN0/1

3.2 Mechanical Dimensions



4. Connectors and Pin-outs

4.1 J1

Pin Define	PIN	PIN	Pin Define
Power On	1	2	GND0
Reset	3	4	GND1
Recovery	5	6	GND2
Sleep	7	8	GND3
LED+	9	10	LED-

*** In order to boot up the system, pleas quickly short-circuit Pin1 and Pin2.**

4.2 J2

Pin Define	PIN	PIN	Pin Define
AC OK	1	2	GND
SOC_LED+	3	4	GND
+3V3	5	6	I2C_GP1_DAT_3V3
GND	7	8	I2C_GP1_CLK_3V3

*** Disable Pin1 and Pin2 can enable Auto power on function.**

4.3 J4

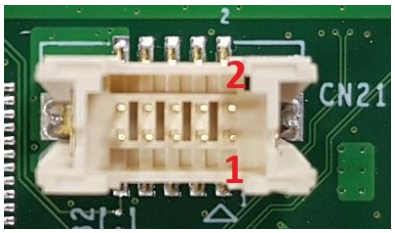
Pin Define	PIN	PIN	Pin Define
UART0_RXD_HDR_3V3	1	2	RS232_RXD
UART0_TXD_HDR_3V3	3	4	RS232_TXD
UART0_RTS_HDR_3V3	5	6	RS232_RTS
UART0_CTS_HDR_3V3	7	8	RS232_CTS
GND0	9	10	GND1
GPIO1	11	12	GND2
GPIO2	13	14	GND3
GPIO3	15	16	GND4
GPIO4	17	18	GND5
GPIO5	19	20	GND6

* **GPIO Pin define.**

H/W	Name	Sysfs GPIO(TX1)	Sysfs GPIO(TX2)
GPIO_1	GPIO15_AP2MDM_READY Motion Interrupt (3.3V)	GPIO173	GPIO488
GPIO_2	GPIO8_ALS_PROX_INT (3.3V)	GPIO187	GPIO388
GPIO_3	GPIO11_AP_WAKE_BT AP Wake Bt GPIO	GPIO63	GPIO389
GPIO_4	GPIO16_MDM_WAKE_AP Modem Wake AP GPIO	GPIO184	GPIO481
GPIO_5	GPIO20_AUD_INT Modem Wake AP GPIO	GPIO38	GPIO397

4.4 CN21

CN21 Pin number	Define
PIN 1	CAN0H
PIN 2	CAN1H
PIN 3	CAN0L
PIN 4	CAN1L
PIN 5	CAN0_STBY
PIN 6	CAN1_STBY
PIN 7	CAN0_ERR
PIN 8	CAN1_ERR
PIN 9	CAN_WAKE
PIN 10	GND



5. Accessary (Optional)

ACE-CAM6C	CA-A01 6xCSI-2 Camera Carrier Board with FPC connector
E7W9000000020	AN310 Cable kit(CAN bus / UART / RS232 / Front panel / GPIO / I2C)
9Z1253232020	TX1/TX2 Active Heat Sink
9Z2XX4141010	TX1/TX2 Passive Heat Sink
7W8000000040	US Power Cord SVT 18AWG Cable 1800mm Black 105 °C
9Z3BC0000020	100-240V 60W 12V 5A Adapter

Active Heat Sink

Passive Heat Sink

Cable kit

6 x MIPI CSI-II Camera Board

12V/5A 60W Adapter

6. Software & BSP.

Before you install OS and patch to Jetson TX2 you must prepare items shown in below.

1. A X86 based platform with Ubuntu OS which will be treat as a Host
2. Use micro USB cable to connect DUT(Jetson TX2) and Host.
3. Let DUT to entry recovery mode.

Now let's get started

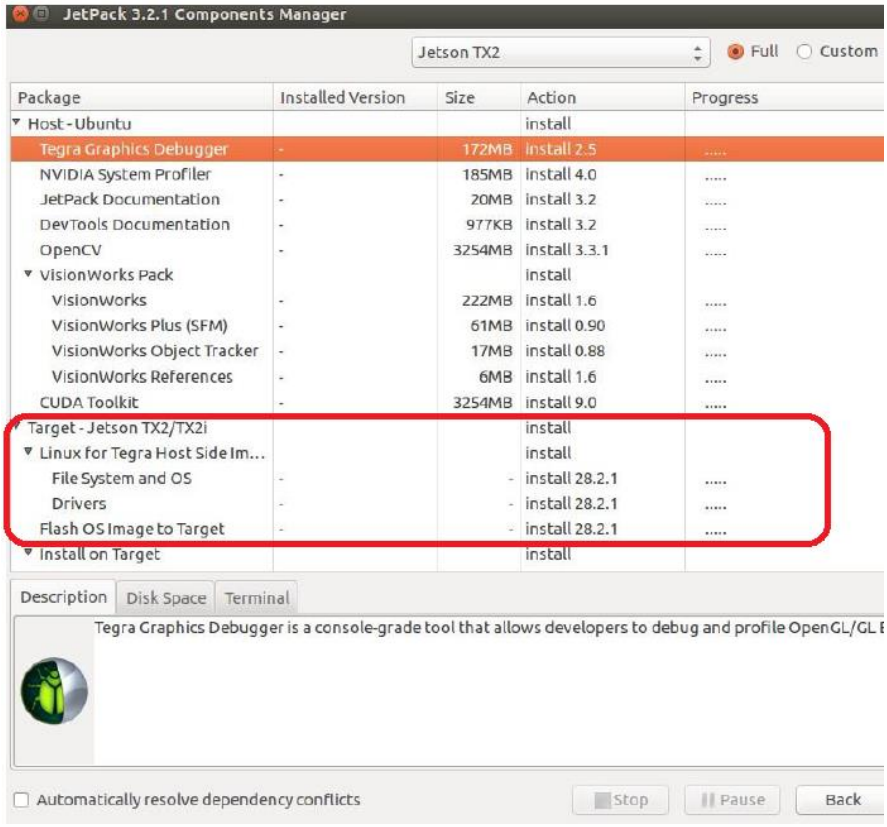
Host side

1. Host should download Jetpack 3.3 from Nvidia website
https://developer.nvidia.com/embedded/downloads

2. Install JetPack-L4T-3.3-linux-x64_b39.run

```
sudo chmod +x JetPack-L4T-3.3-linux-x64_b39.run
./ JetPack-L4T-3.3-linux-x64_b39.run
```

3. Select and install these 3 items. Others depend on you need or not. If you don't need, just left as no action.



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System will auto download “File System” “OS ” and “Drivers”.
After file download, don’t flash the image. Close the tool directly.

4. Copy the patch file (R28_2_1_TX2_N310_1.tar.gz to the same folder with “JetPack-L4T-3.3-linux-x64_b39.run” and extract the file
sudo tar -zxvf R28_2_1_TX2_N310_1.tar.gz

5. Go into the folder with the same name of the patch file then type command shown in below and execute it.
./setup.sh
If success, you can see “DONE” message.

6. Open a terminal under ~/64_TX2/Linux_for_Tegra and type command shown in below then execute it.
sudo ./flash.sh jetson-tx2 mmcblk0p1

7. Wait for 15 mins and finish the flash process.

7. Recovery system

The TX1/TX2 embedded system contains a recovery system and could be triggered by GPIO.

(1) For TX1, shut down the system first and connect the 3V3 pin(J2 Pin5) & GPIO_4 (GPIO 184)
For TX2, shut down the system first and connect the 3V3 pin(J2 Pin5) & GPIO_4(GPIO481)

(2) Boot the device,
It will need about 3 minutes for recovering the system.
After finishing, it will shut down the device.
Remove the connected pins and power on the device.

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