

User Manual

**Nvidia Jetson Series Carrier board
Aetina ACE-N622**

Document Change History

Version	Date	Description	Authors
V1	2018/05/23	Initial Release.	Eric Chu
V2	2018/06/22	Specification change	Eric Chu

1. Introduction

ACE-N622 is a standard Nano-ITX 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: ACE-N622)
- Power adaptor 12-19 DC/5A

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, 4x GPIO, 1x RS232, 1x I2C and 2x Full-Mini Cards to support rich multimedia and MIPI CSI camera
- Extended temperature range -20°C to 70°C
- Suitable for general robotics, UAV, industrial inspection, medical imaging and deep learning
- 12V / 5V output to support mPCIe extension module.

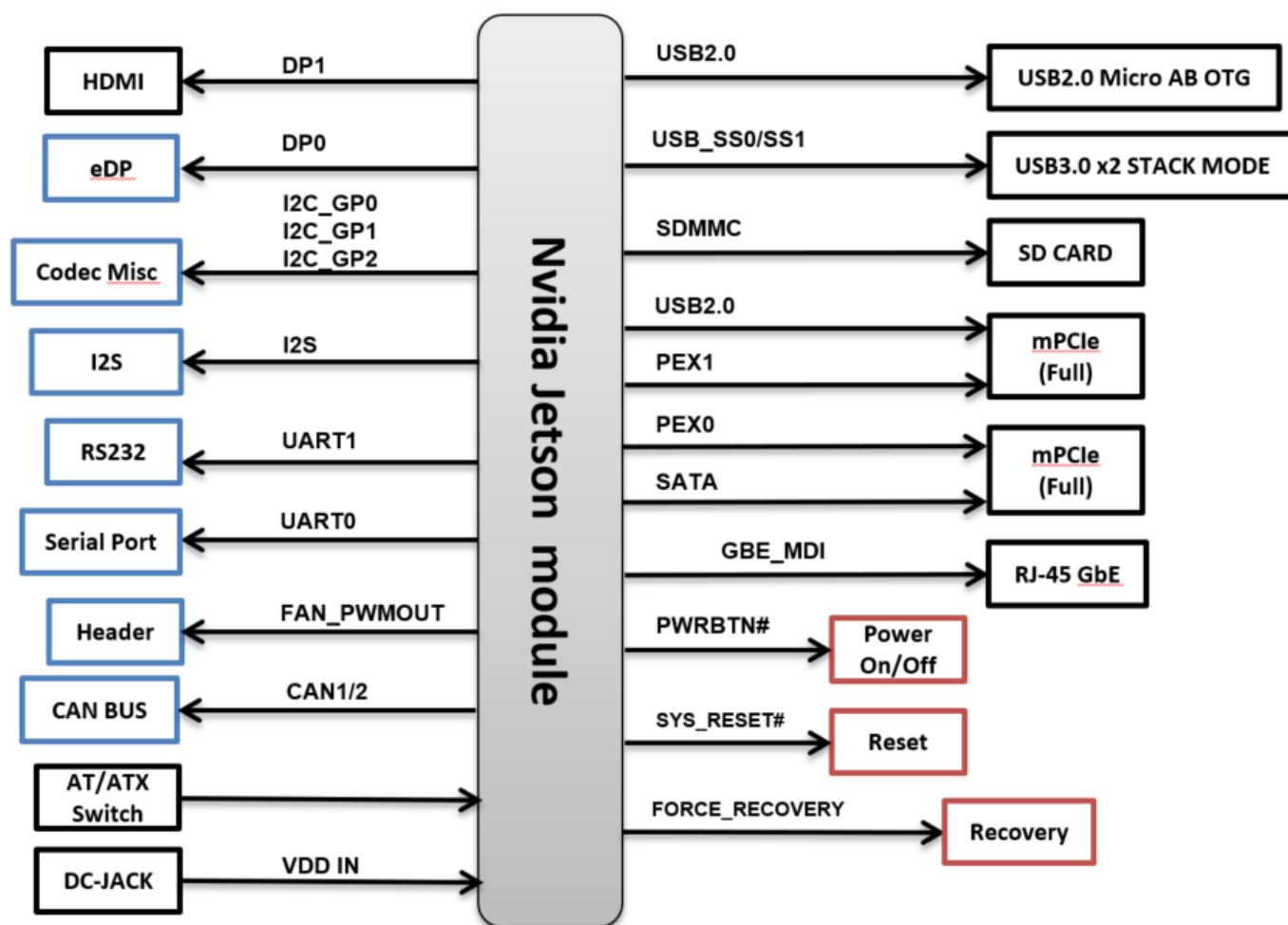
1.2 Board

- 6-layer printed circuit board(PCB)
- Physical dimensions: 120mm x 120mm
- High-Bandwidth Digital Content Protection (HDCP) support

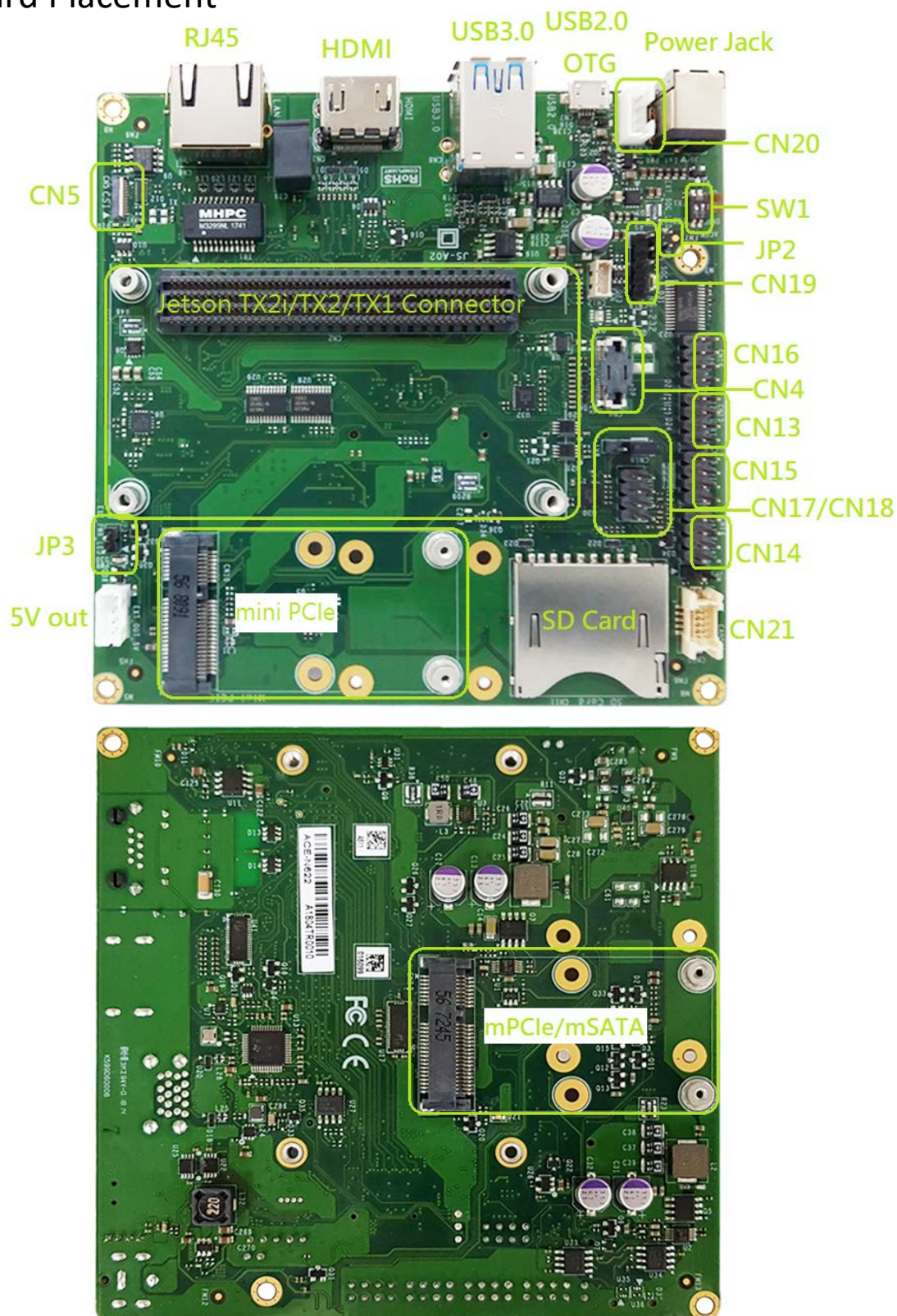
2. Board Specification

Specification	ACE-N622 Description
Module Compatibility	Nvidia Jetson TX1 / Nvidia Jetson TX2 / Nvidia Jetson TX2i
GPU	Jeston TX1 : - Nvidia Maxwell™, 256 CUDA cores. Jetson TX2 : - Nvidia Pascal™, 256 CUDA cores. Jetson TX2i(Industrial Grade) : - 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	120mm x 1200mm
Display	- 1 x HDMI - 1 x eDP
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	- SD CARD Slot
UART	- 1 x UART
RS232	- 1 x RS232
GPIO	- 4 x GPIO
CAN Bus	- 2 x CAN (TX2/TX2i support only)
Input Power	- +12-19V / 5A DC input
Operating Temperature	- 0°C to + 55°C - -20°C to + 70°C (Optional)
Storage Temperature	- -40°C to + 125°C
Warranty	- 14 Months

3. Block Diagram

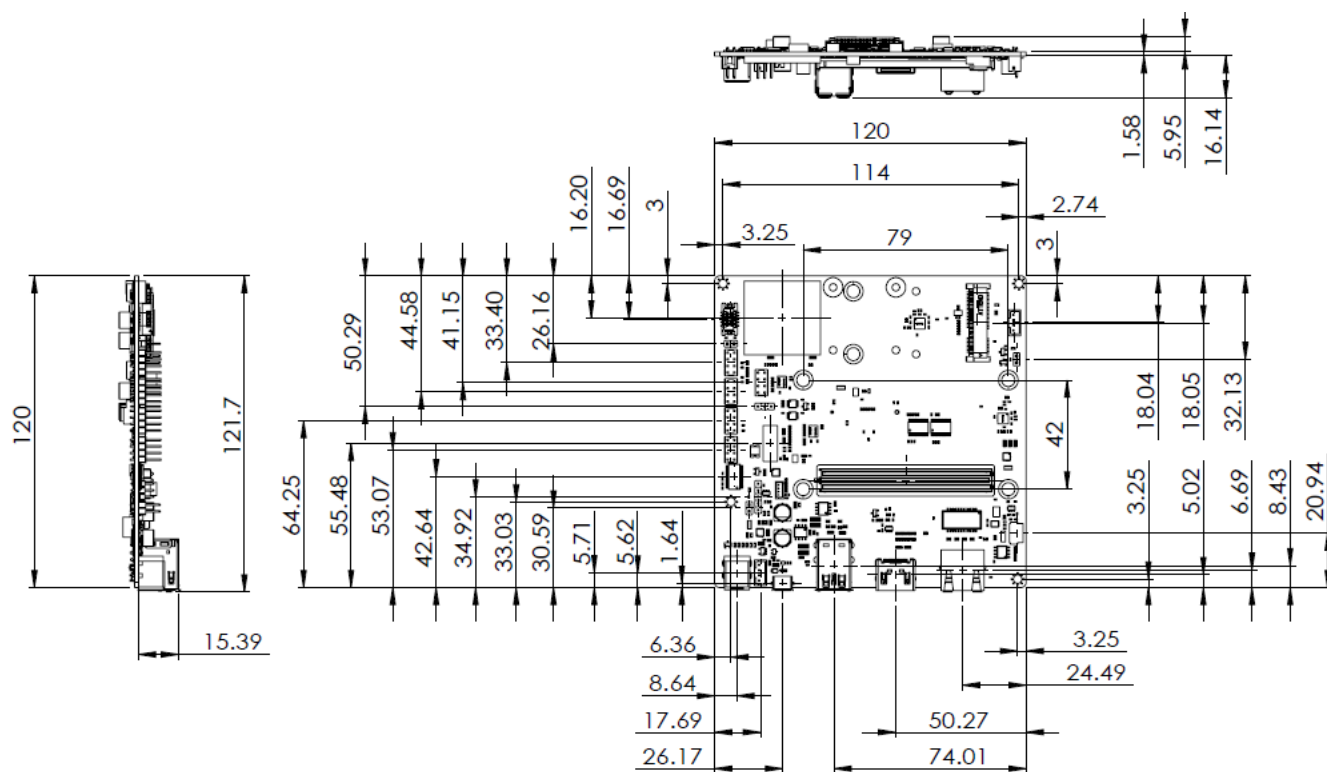


3.1 Board Placement



TX1/TX2 Module Connector	Compatible with Jetson TX2i/TX2/TX1
HDMI	Type A
Power Input	DC Jack
USB3.0	Type A
USB2.0 OTG	Micro-AB
LAN	RJ45
SW1	TX1/TX2 switch / AC OK switch
CN4	eDP
CN5	MIPI CSI2 2lanes x1
CN9	Compatible with mPCIe and mSATA
CN10	mPCIe
CN13	I2C/UART
CN14	Front panel
CN15	GPIO x4
CN16	I2S
CN17	SPI
CN18	SPI voltage 3.3V/1.8V
CN19	RS232
CN20	12V output
CN21	CAN0/1
JP2	EXT SOC LED
JP3	EXT Power LED
SW1	TX1/TX2 function switch

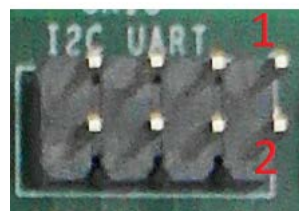
3.2 Mechanical Dimensions



4. Connectors and Pin-outs

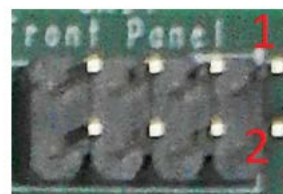
4.1 I2C/UART

CN13 Pin number	Define
PIN 1	UART1_TXD_HDR_3V3
PIN 2	UART1_RTS_HDR_3V3
PIN 3	UART1_RXD_HDR_3V3
PIN 4	UART1_CTS_HDR_3V3
PIN 5	VDD_3V3_SYS
PIN 6	I2C_GP1_DAT_3V3
PIN 7	GND
PIN 8	I2C_GP1_CLK_3V3



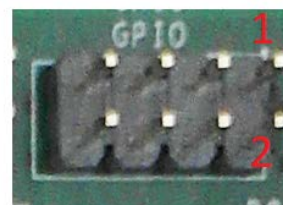
4.2 Front Panel

CN14 Pin number	Define
PIN 1-2	Power
PIN 3-4	Reset
PIN 5-6	Force Recovery
PIN 7-8	Sleep



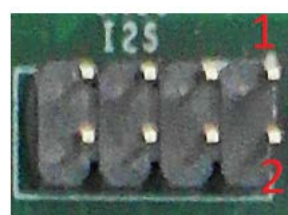
4.3 GPIO

CN15 Pin number	Define	Sysfs TX1	Sysfs TX2
PIN 1	GPIO_1	GPIO186	GPIO298
PIN 3	GPIO_2	GPIO187	GPIO388
PIN 5	GPIO_3	GPIO63	GPIO389
PIN 7	GPIO_4	GPIO184	GPIO481
PIN 2/4/6/8	GND		



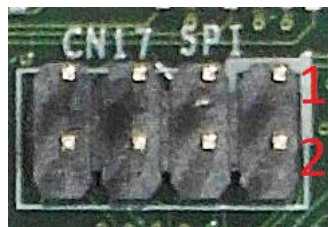
4.4 I2S

CN16 Pin number	Define
PIN 1	AUDIO_I2S_MCLK
PIN 2	AUDIO_I2S_SFSYNC
PIN 3	AUDIO_I2S_SOUT
PIN 4	AUDIO_I2S_SIN
PIN 5	AUD_RST
PIN 6	AUDIO_CDC_IRQ
PIN 7	AUDIO_I2S_SRCLK
PIN 8	GND



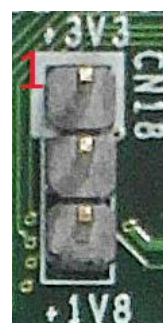
4.5 SPI

CN17 Pin number	Define
PIN 1	SPI1_SCK_3V3
PIN 2	N/A
PIN 3	SPI1_MISO_3V3
PIN 4	SPI1_MOSI_3V3
PIN 5	SPI1_CS0_3V3
PIN 6	SPI1_CS1_3V3
PIN 7	N/A
PIN 8	GND



4.6 SPI voltage option

CN18 Pin number	Define
1-2	+3.3V
2-3	+1.8V
No Jumper	Floating



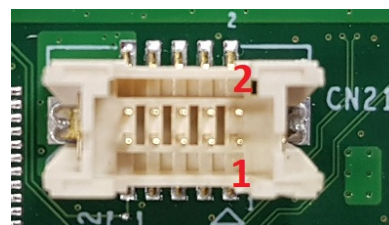
4.7 RS232

CN19 Pin number	Define
PIN 1	RS232_RXD
PIN 2	RS232_TXD
PIN 3	RS232_RTS
PIN 4	RS232_CTS
PIN 5	GND



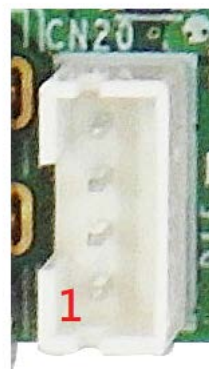
4.8 CAN bus

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



4.9 12V output

CN20 Pin number	Define
PIN 1	+12V
PIN 2	+12V
PIN 3	GND
PIN 4	GND



4.10 Function Switch

Function	SW1	ON	OFF
TX1/TX2 Switch	Switch 1	TX1	TX2
AC OK Switch	Switch 2	AC OK ON	AC OK OFF



5. Accessory (Optional)

7W9000000020	ACE-N622 Cable Kit(CAN bus / 5V output / 12V output)
9Z1253232020	TX1/TX2 Active Heat Sink
9Z2XX4141010	TX1/TX2 Passive Heat Sink
7W8000000040	Power cord.
9Z3BC0000020	100-240V 60W 12V 5A Adapter

9Z2XX4141010



9Z1253232020



Cable kit



9Z3BC0000020



6. Software & BSP.

When customer use Nvidia standard BSP, some I/O function may not work. In order to support Aetina ACE-N622 system I/O config, please follow below method.

1. Download Jetpack3.1 from Nvidia website.
<https://developer.nvidia.com/embedded/downloads>
2. Install JetPack-L4T-3.1-linux-x64.run
=>"Sudo Chmod +x JetPack-L4T-3.1-linux-x64.run"
=>"Sudo ./JetPack-L4T-3.1-linux-x64.run"
3. Select 3 items of Target-jetson TX2, others select "No Action" and go next step.
System will auto download "File System" "OS R28.1" and "Drivers".
After file download, don't flash the image. Close the tool directly.
4. Copy the file to the same folder with "JetPack-L4T-3.1-linux-x64.run" and extract the file
"sudo tar -zxvf R28.1_2.tar.gz -C . --numeric-owner"
5. Run "Sudo ./setup.sh tx2 N622".
If success, you can see "DONE" message. (64_TX2, 64_TX2_patch, setup.sh should be in the same layer of folder"
6. Power on system and enter Recovery mode.
7. Run "Sudo ./flash.sh Jetson-tx2 mmcblk0p1"
8. Wait for 15 mins and finish the flash process.

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 & GPIO_4 (GPIO 184)

For TX2, shut down the system first and connect the 3V3 pin & GPIO_4 (GPIO 481)

(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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安提國際股份有限公司

/ 新北市汐止區大同路一段237號2樓之1
2F-1, No.237, Sec.1, Datong Rd., Xizhi
Dist., New Taipei City 221, Taiwan

Aetina Corporation

/ Tel +886-2-7709-2568
/ Fax +886-2-7746-1102
/ www.aetina.com.tw
/ Email sales@aetina.com.tw