User Manual

Nvidia Jetson Series Carrier board
Aetina AX720

Document Change History

Version	Date	Description	Authors
V1.0	2020/07/7	Initial Release.	Eric Chu
V1.1	2020/09/29	Update U555 component description.	Stany Tsai
V1.2	2021/01/19	Correct CN22 image.	Stany Tsai

1. Introduction

Support for NVIDIA® Jetson™ AGX Xavier and Jetson™ AGX Xavier 8GB. 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 Xavier / Xavier 8GB module
  (Aetina's P/N: NSO-MD-Xavier/NSO-MD-XavierL)
- Carrier board (Aetina's P/N: AX720)
- Power adaptor 12-20 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 2x HDMI, 1x M.2 M Key, 1x M.2 E Key and 3x RJ45 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 board to board connector to support MIPI CSI-II adapter

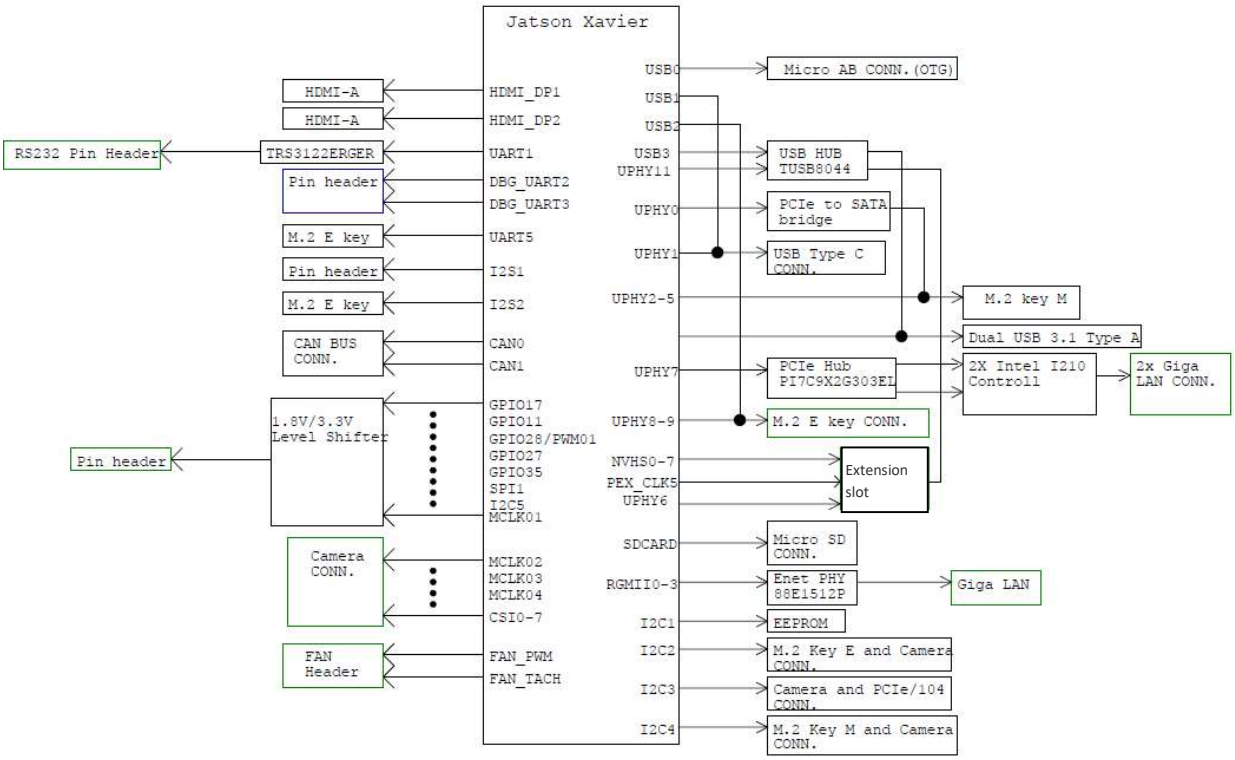
1.2 Board

- 8-layer printed circuit board(PCB)
- Physical dimensions: 131mm x 120 x 30.5mm

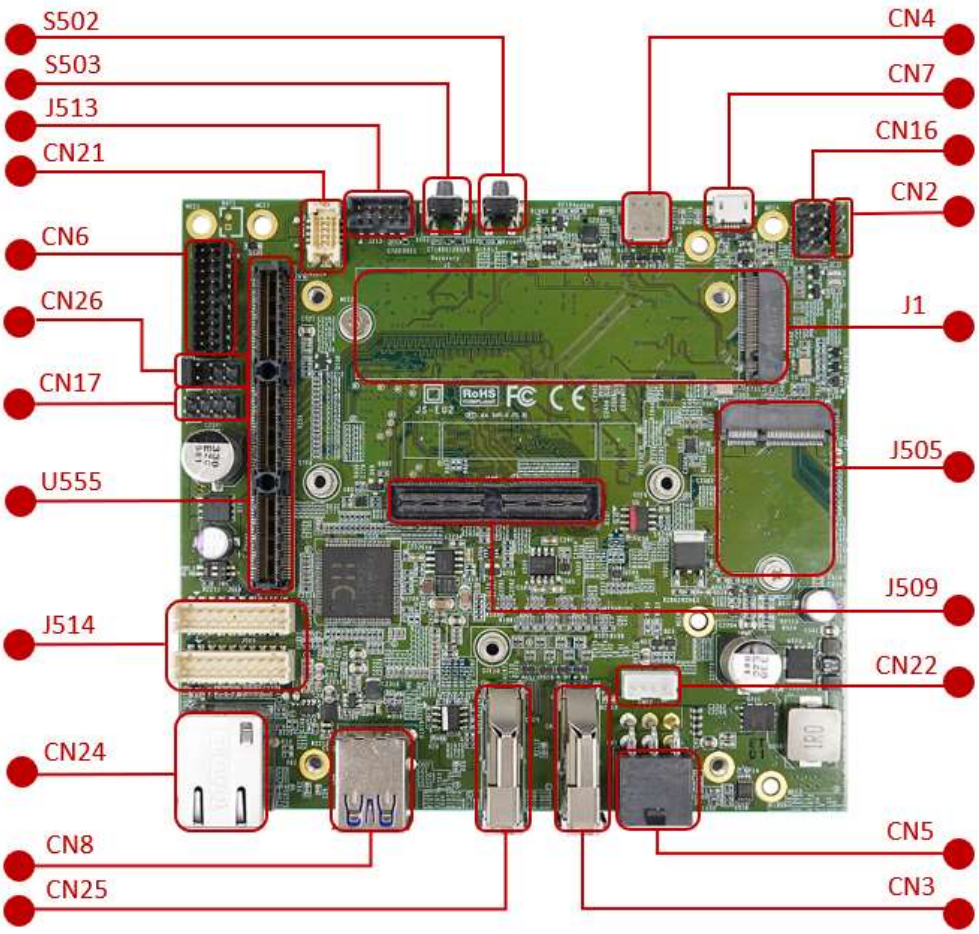
2. Board Specification

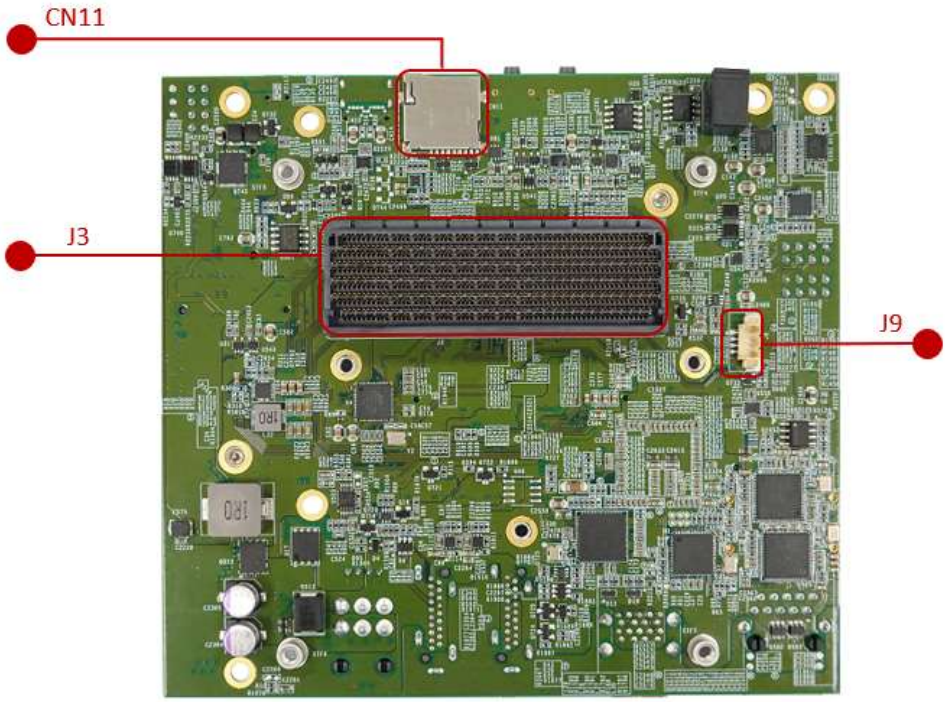
Specification	AX720 Description
Module Compatibility	Nvidia Jetson AGX Xavier / Nvidia Jetson AGX Xavier 8GB
GPU	Jetson AGX Xavier : - Nvidia Volta™, 512 CUDA cores/64 Tensor cores. Jetson AGX Xavier 8GB: - Nvidia Volta™, 384 CUDA cores/48 Tensor cores.
CPU	Jetson AGX Xavier: - HMP Quad ARM® V8.2 CPU/2MB L2/4MB L3 Jetson AGX Xavier 8GB: - HMP Triple ARM® V8.2 CPU/2MB L2/4MB L3
Dimension	- 131mm x 120 x 30.5mm
Display	- 2 x HDMI
Audio	- HDMI Integrated / I2S
Ethernet	- 3 x Gigabit Ethernet(1x internal and 2x daughter board)
USB	- 2 x USB3.2 Gen1 Type A - 1 x USB3.2 Gen2 TypeC - 1 x USB OTG Micro AB
SD CARD	- Micro SD CARD Slot
UART	- 3 x UART
RS232	- 1 x RS232
I2C	- 1 x I2C
GPIO	- 5 x GPIO
CAN Bus	- 2 x CAN Bus
Input Power	- 9-20V DC input
Operating Temperature	- -40°C to + 85°C
Storage Temperature	- -40°C to + 85°C
Warranty	- 14 Months

3. Block Diagram



3.1 Board Placement

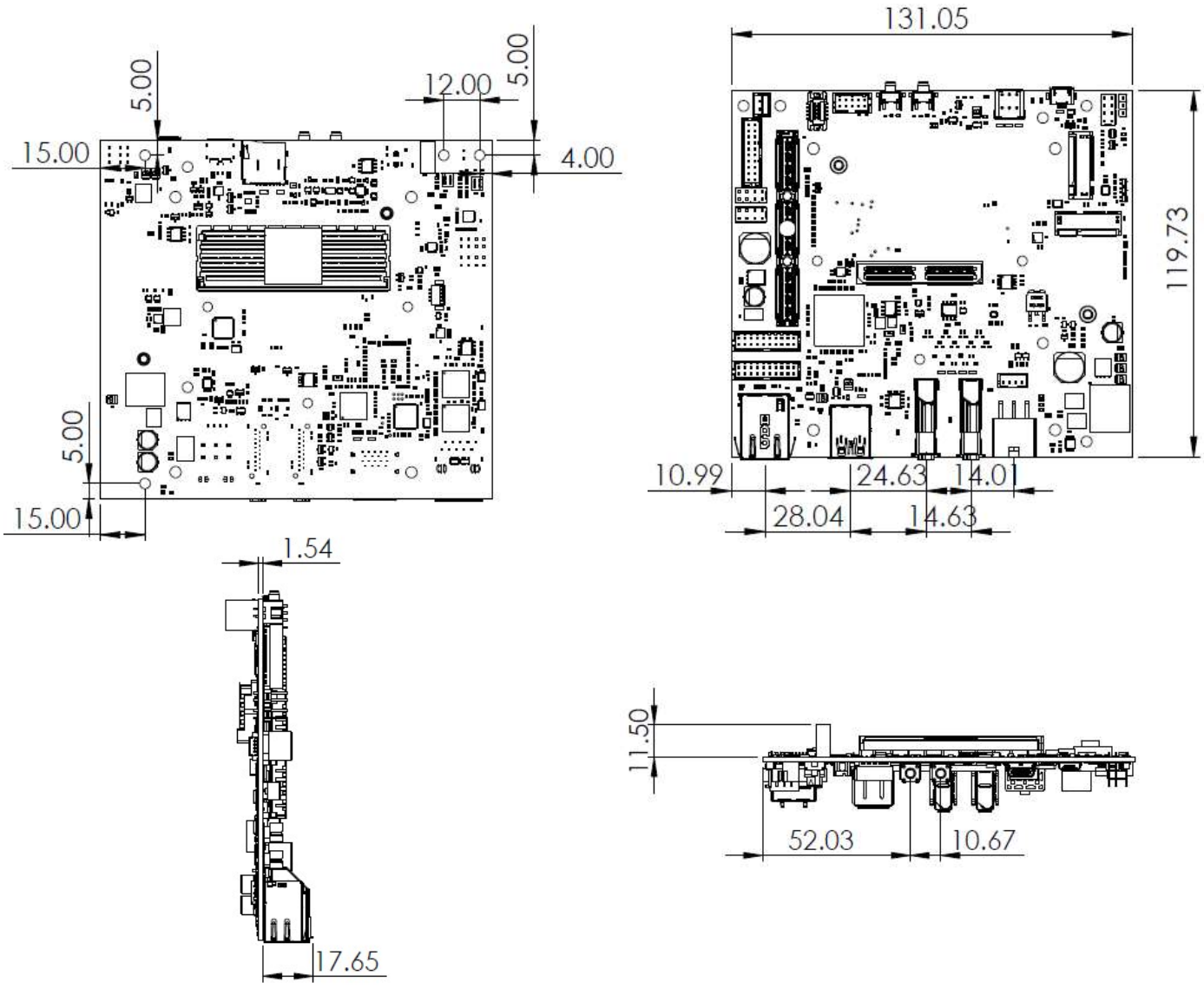




J3	Compatible with Jetson AGX Xavier 32G / Xavier 8GB
CN3 / CN25	HDMI 2.0b Type A
J1	M.2 2280 M Key, support PCIe/mSATA function device
J505	M.2 2230 E Key, support PCIe/USB2.0 function device
CN8	USB3.2 Gen1 Type A x2
J509	120 pin board to board connector for MIPI CSI-2
CN7	Support OTG function only
CN4	USB3.2 Gen2 Type C
CN24	RJ45 x1, support 10/100/1000M Ethernet
J514	Support Dual RJ45 Extension board
U555	Extension slot. *(Pinout not compatible with PCIe/104)
CN16	Support I2S function.
CN17	Support SPI function.
CN21	Support CAN BUS function
CN26	AC OK/I2C

J513	Front Panel
CN22	DC output
CN5	6 pins connector for Power input.
CN2	Debug UART
S502	Reset Button
S503	Recovery Button

3.2 Mechanical Dimensions



4. Connectors and Pin-outs

4.1 J513

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-

Re

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

4.2 CN26

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 CN6

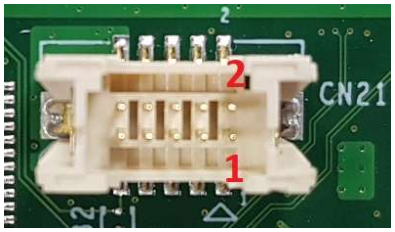
Pin Define	PIN	PIN	Pin Define
UART0_RXD_HDR_3V3	1	2	RS232_RXD
UART0_TXD_HDR_3V3	3	4	RS232_TXD
UART0_RTS_HDR_3V3	5	6	RS232_RTS
UART0_CTS_HDR_3V3	7	8	RS232_CTS
GND0	9	10	GND1
GPIO0	11	12	GND2
GPIO1	13	14	GND3
GPIO2	15	16	GND4
GPIO3	17	18	GND5
GPIO4	19	20	GND6

* **GPIO Pin define.**

H/W	Sysfs GPIO(Xavier/Xavier 8GB)
GPIO_0	GPIO17
GPIO_1	GPIO11
GPIO_2	GPIO28
GPIO_3	GPIO27
GPIO_4	GPIO35

4.4 CN21

CN21 Pin number	Define
PIN 1	CAN0H
PIN 2	CAN1H
PIN 3	CAN0L
PIN 4	CAN1L
PIN 5	CAN1_STBY
PIN 6	CAN1_STBY
PIN 7	CAN0_EN
PIN 8	CAN1_EN
PIN 9	CAN_WAKE
PIN 10	GND

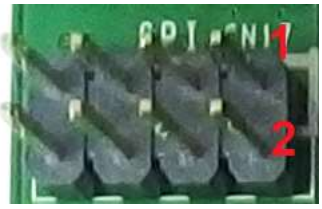


4.5 CN16

Pin Define	PIN	PIN	Pin Define
MCLK01_1V8	1	2	I2S1_FS_1V8
I2S1_DOUT_1V8	3	4	I2S1_DIN_1V8
SYS_RST_IN#	5	6	AUDIO_CDC_IRQ
I2S1_SCLK_1V8	7	8	GND

4.6 CN17

Pin Define	PIN	PIN	Pin Define
SPI1_SCK_3V3	1	2	N/A
SPI1_MISO_3V3	3	4	SPI1_MOSI_3V3
SPI1_CS0_3V3	5	6	SPI1_CS1_3V3
VDD_3V3	7	8	GND

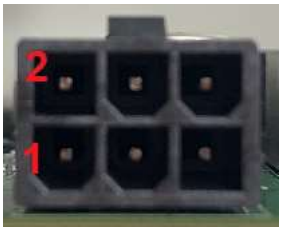


4.7 CN22

Pin Define	PIN
VCC_SRC	1
VCC_SRC	2
GND	3
GND	4

4.8 CN5

Pin Define	PIN	PIN	Pin Define
VCC_SRC	1	2	GND
VCC_SRC	3	4	GND
VCC_SRC	5	6	GND



4.9 CN2

Pin Define	PIN
UART3_RXD_HDR3V3	1
UART3_TXD_HDR3V3	2
GND	3

4.10 J9

Pin Define	PIN
GND	1
VDD_5V	2
FAN_TACH_CON	3
FAN_PWM_Q	4

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