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Backplane Systems Technology

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NRU-110V Series

NVIDIA® Jetson AGX Xavier™ Edge AI Platform Supporting 8x GMSL Automotive Cameras and 10GbE Ethernet

⚡ *Key Features*

· **Powered by NVIDIA® Jetson AGX Xavier™ SOM bundled with JetPack 4.4**
· **Support 8x GMSL automotive cameras via FAKRA Z connectors**
· **1x 10GBASE-T 10G Ethernet port**
· **1x M.2 2280 M key socket for NVMe SSD**
· **1x mini PCIe socket for WIFI/ 4G module**
· **1x isolated CAN bus port and 1x RS232 port with flow control**
· **1x GPS PPS input, 3-CH isolated DI and 4-CH isolated DO**
· **8V to 35V wide-range DC input with built-in ignition power control**

Preliminary

CE FC

Introduction

NRU-110V series is a low-power edge AI computing platform that supports eight automotive cameras. It is a turnkey solution that includes computing core, on-board GMSL deserializers, and a pre-installed board support package (BSP) to support selected cameras. Powered by NVIDIA® Jetson AGX Xavier™, NRU-110V offers 11 TFLOPS FP16 or 22 TOPS INT8 GPU computing with 30W power consumption. The power-efficient design not only extends operation time for battery-powered machines, such as autonomous mobile robots (AMR), but also reduces operating costs for mass deployed applications, such as intelligent V2X.

The video input of NRU-110V takes advantages of commercial off the shelf (COTS) automotive cameras, from water-proof ability, high dynamic range, auto white balance, to LED flickering mitigation. In other words, your AI applications will always obtain high-quality images regardless of lighting conditions, from rainy, bright sunny days, to pitch-black nights. NRU-110V supports multiple automotive camera sensors, including SONY ISX019, On Semi AR0147, and AR0231. With the unique onboard trigger system, NRU-110V can simultaneously capture images from eight GMSL cameras within millisecond channel-to-channel skew.

By incorporating 10G Ethernet, NRU-110V can acts as a camera sensor hub by streaming real-time images to another CPU/GPU powerful computer. In addition to the support of eight automotive cameras, it also has one isolated CAN bus for in-vehicle communication, one RS-232 for GPS input and isolated DIOs for connecting sensors/actuators. NRU-110V supports GPS pulse-per-second (PPS) input to support time synchronization among multiple platforms. For data storage, in addition to 32GB eMMC on the Xavier module, NRU-110V includes an M.2 2280 NVMe socket for fast SSD read/write performance. It also has one mini-PCIe socket for the WIFI or 4G module.
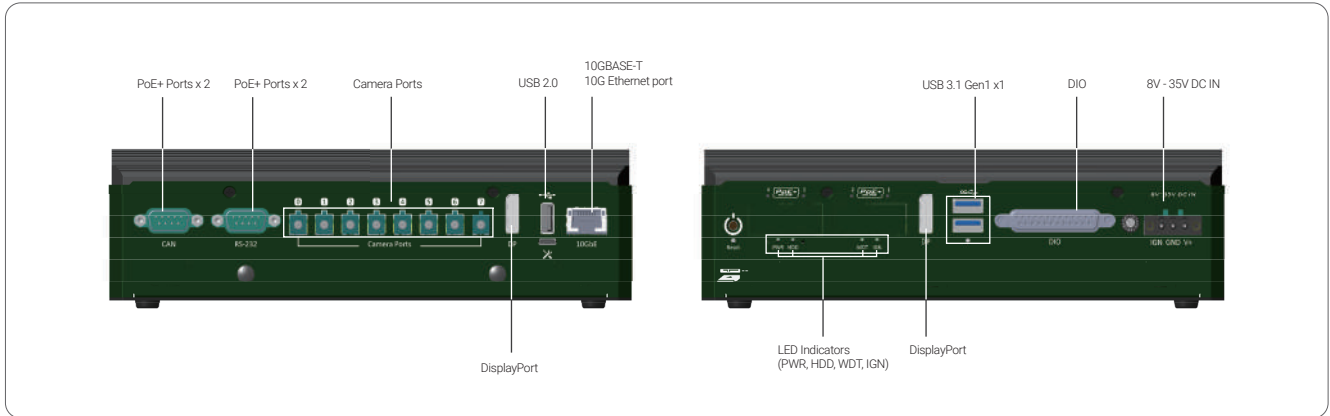
Combining its eight GMSL automotive camera support, significant TFLOPS for inference, power-efficient design, and 10GbE data transmission, NRU-110V is ideal for AI-based vision applications that require continuous interaction with surroundings, such as AMR, ADAS, intelligent V2X, etc.
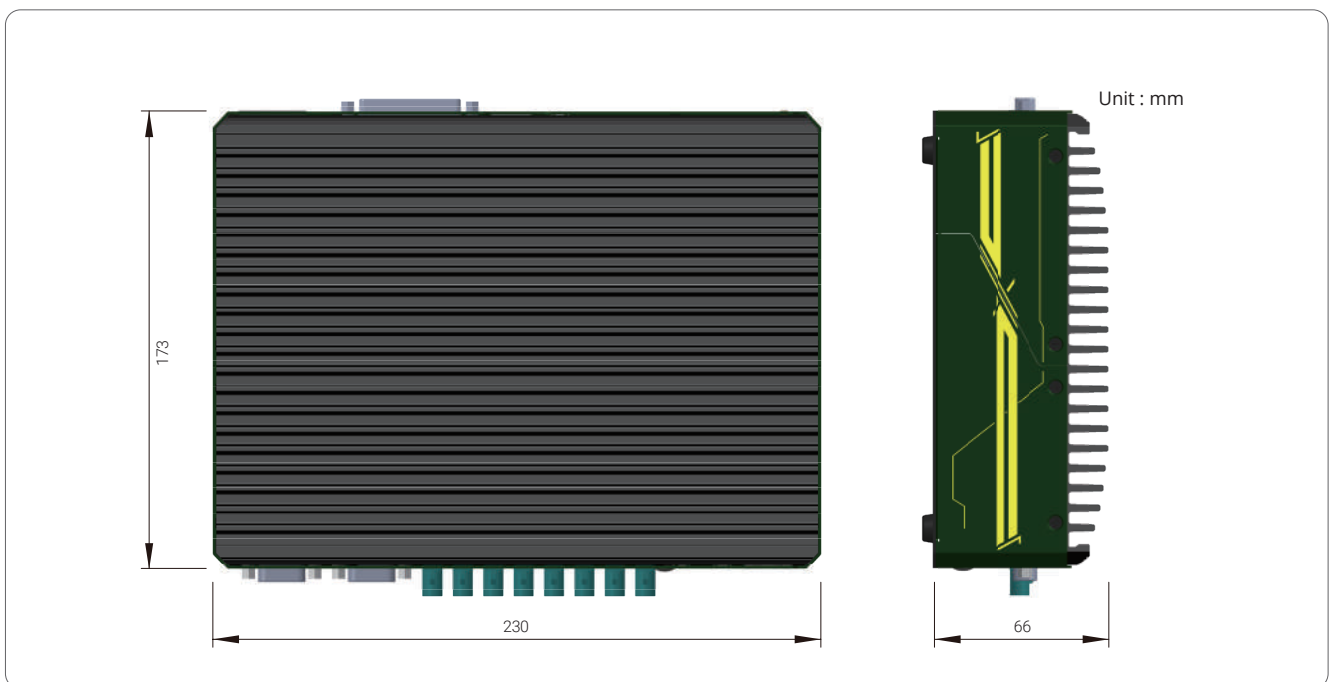
Specifications

System Core

Processor	Supporting NVIDIA® Jetson AGX Xavier™ system-on-module, comprising of NVIDIA® Volta GPU and Carmel CPU
Memory	32GB LPDDR4x @ 2133 MHz on SOM
eMMC	32GB eMMC 5.1 on SOM

I/O Interface

Ethernet port	1x 10GBASE-T 10G Ethernet port by Intel® X550-AT controller
CAN	1x isolated CAN 2.0 port
Isolated DIO	1x GPS PPS input. 3-CH isolated DI and 4-CH isolated DO
USB	3x USB 3.1 Gen1 (5 Gbps) ports
Video Port	2x DisplayPort, supporting 3840x2160 at 60Hz
Serial Port	1x RS-232 port with flow control

Storage Interface

M.2 NVMe	1x M.2 2280 M key socket (PCIe Gen3 x2) for NVMe SSD

Internal Expansion Bus

Mini PCI Express	1x full-size mini PCI Express socket with internal SIM socket

Power Supply

DC Input	1x 3-pin pluggable terminal block for 8V to 35V DC input (IGN/ GND/ V+)

Mechanical

Dimension	230 mm (W) x 173 mm (D) x 66 mm (H)
Weight	2.7 kg (excluding damping bracket)
Mounting	Wall-mount with damping brackets (Standard)

Environmental

Operating Temperature	-25°C ~ 50°C with passive cooling (MAX TDP mode) * -25°C ~ 70°C with passive cooling (30W TDP mode) * -25°C ~ 70°C with optional fan kit (all modes) *
Storage Temperature	-40°C ~ 85°C
Humidity	10% ~ 90%, non-condensing
Vibration	Operating, MIL-STD-810G, Method 514.6, Category 4
Shock	Operating, MIL-STD-810G, Method 516.6, Procedure I, Table 516.6-II
EMC	CE/FCC Class A, according to EN 55032 & EN 55024

* For sub-zero and over 60°C operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.

Appearance

PoE+ Ports x 2 | PoE+ Ports x 2 | Camera Ports | USB 2.0 | 10GBASE-T 10G Ethernet port

CAN | RS-232 | Camera Ports | DP | 10GbE

DisplayPort

USB 3.1 Gen1 x1 | DIO | 8V - 35V DC IN

8V-35V DC IN

IGN GND V+

LED Indicators
(PWR, HDD, WDT, IGN) | DisplayPort

Dimensions

Unit : mm

173

230

66

Ordering Information

Model No.	Product Description
NRU-110V	NVIDIA® Jetson AGX Xavier™ edge AI platform supporting 8x GMSL automotive cameras and 10G Ethernet
NRU-110V-F	NVIDIA® Jetson AGX Xavier™ edge AI platform supporting 8x GMSL automotive cameras and 10G Ethernet with fan kit

Optional Accessories

PA-120W-OW	120W AC/DC power adapter, 20V/6A; 18AWG/120cm; cord end terminals for terminal block, operating temperature : -30 to 70°C.
Fan kit	Fan kit with 92mm x 92mm fan for NRU-110V series
AC-AR0231-H30	On Semi AR0231 CMOS sensor camera; 1280x720 @22fps; HFOV 27, IP64; male FAKRA connector
AC-AR0231-H60	On Semi AR0231 CMOS sensor camera; 1280x720 @22fps; HFOV 61, IP67; male FAKRA connector
AC-AR0231-H120	On Semi AR0231 CMOS sensor camera; 1280x720 @22fps; HFOV 121, IP67; male FAKRA connector
AC-AR0231-H180	On Semi AR0231 CMOS sensor camera; 1280x720 @22fps; HFOV 180, IP67; male FAKRA connector
AC-AR0147-H30	On Semi AR0147 CMOS sensor camera; 1280x720 @30fps; LFM; HFOV 30, IP64; male FAKRA connector
AC-AR0147-H60	On Semi AR0147 CMOS sensor camera; 1280x720 @30fps; LFM; HFOV 59, IP67; male FAKRA connector
AC-AR0147-H120	On Semi AR0147 CMOS sensor camera; 1280x720 @30fps; LFM; HFOV 125, IP64; male FAKRA connector
AC-ISX019-H90	SONY ISX019 CMOS sensor camera; 1280x720 @30fps; HOV 89, IP67+IP69K; female FAKRA connector
AC-ISX019-H120	SONY ISX019 CMOS sensor camera; 1280x720 @30fps; HOV 128, IP67; female FAKRA connector
FK-FF-CABLE-7M	7M FAKRA cable for cameras with male FAKRA connector
FK-FM-CABLE-7M	7M FAKRA cable for cameras with female FAKRA connector

*Note: * Combined use of different FOV with the same CMOS sensor is verified on NRU series. Combined use of different FOV with varying CMOS sensors is not guaranteed. Please consult Neousys for feasibility.*