

# Rugged NVIDIA® Jetson™ Edge AI Computers

Ready for Edge AI Application Deployments



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# Robust AI-Powered Vision from Roadside to In-vehicle



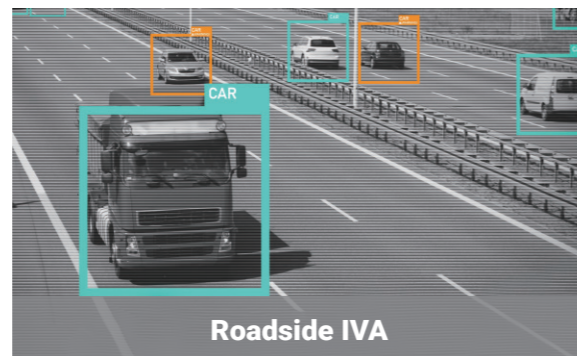
Environmental challenges come into play when deploying systems into the field, challenges such as temperature, dust, vibration, etc. When you throw in other field limitations like unstable power, need for ignition power control in a vehicle, insufficient connectivity/ function/ installation space, etc. These are what users encounter on a daily basis, and can slow down project developments. For a system to operate stably and reliably in the field, a lot of extra resources are spent, time to design, development and tests are done behind the scenes.

Neosys edge AI platforms powered by NVIDIA® Jetson™ system-on-module are fully integrated with Neosys DNA characteristics that are designed to thrive in harsh environments and operate in limited conditions. Neosys systems can easily be implemented into solutions and deployed into the field, saving cost, additional testing and development time.

By supporting various camera interfaces, the platform enables significant AI performance and vision capability for AI-based video analytics or pre-processing applications in vehicles, roadside or robotics.



Edge Inspection



Roadside IVA



Autonomous Mobile Robots



In-vehicle IVA & ADAS

## Ready for Deployment



Rugged, Fanless and Waterproof

Unique and efficient thermal design capable of operating from -40°C and up to 70°C in fanless conditions. Furthermore, the AWP series are waterproof and dustproof for extreme environment deployments.



Versatile Camera Support

Compatible with PoE/ USB3/ GMSL interfaces to support IP, GigE, PTZ, GMSL, and GMSL2 cameras for different vision-based applications that require image acquisition, and low latency in dynamic lighting conditions.



Efficient and Powerful AI

Offers significant AI inference performance up to 275 TOPS while consuming minimum power. This efficiency allows longer battery operating time in AGV/ AMR applications.



Diverse Application Form Factors

We design unique application-driven products that can add-on AI capability to existing x86 PCs. Products such as AI frame grabber, flattop heatsink computer in cabinet, or mission computer on drone, etc.



Ready for In-vehicle/ Mobile Deployments

Featuring damping brackets, screw-lock mechanism, wide-range DC input, ignition control, CAN bus, and wireless module for communication, NRU series is designed to operate reliably in in-vehicle conditions.

# Neusys' Rugged NVIDIA® Jetson™ Computers for Industrial to Extreme Deployments

Neusys' NVIDIA® Jetson™ rugged computers are built for the evolving demands of edge AI. Featuring NVIDIA® Jetson AGX Orin™ and Orin™ NX, they support GMSL2, PoE+/PoE++, USB 3.2 camera connectivity, robust M12 connectors, and IP66-rated waterproof or fanless designs in various form factors. Engineered for reliability, they excel in edge inspection, roadside systems, AMRs, in-vehicle IVA, and ADAS, delivering optimal performance in factories, roadside deployments, mobile robots, and off-road vehicles.

NVIDIA® Jetson AGX Orin™

NVIDIA® Jetson Orin™ NX



**NRU-220S**  
4x PoE+ shared GbE  
2x 2.5GbE

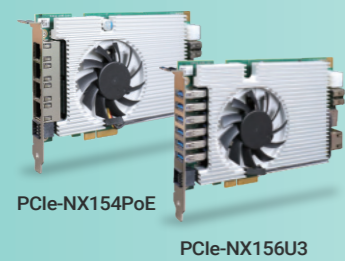
**NRU-222S**  
4x M12 PoE+ shared GbE  
2x M12 2.5GbE



**NRU-240S-AWP**  
4x M12 PoE+ GbE  
1x M12 10GbE

**NRU-230V-AWP**  
4x M12 PoE+ GbE  
8x GMSL2, 1x M12 10GbE

## Edge AI Computer



**PCIe-NX150 Series**  
4x PoE+ 2.5GbE  
6x USB3



**NRU-150-FT Series**  
4x PoE+ 2.5GbE  
6x USB3



**NRU-50 Series**  
4x PoE++ shared GbE  
4x GMSL2



**FLYC-300**  
2x GbE, 2x USB3, 2x GMSL2



**NRU-160-FT Series**  
4x PoE+ GbE  
6x GMSL2



**NRU-170-PPC Series**  
4x PoE+ GbE  
6x GMSL2



**NRU-160-AWP Series**  
4x PoE+ GbE  
6x GMSL2

## Frame Grabber

## Flattop Heatsink Computer

## Edge AI Computer

## AI Panel PC

## Add-on Card

## Flattop Heatsink/ Fanless

## Affordable Waterproof

# Edge Inspection



## Overview

AI overcomes inspection challenges traditional rule-based AOI solutions face, such as defects on transparent, reflective, and complex surfaces. It enables machine/deep learning-based vision inspection for AOI demands from automotive, semiconductor, food, metal treatment, glass industries, to increase the efficiency and accuracy of recognition and identification. However, to add AI computing capabilities to existing AOI-based x86 computers may consume and generate more heat, and is costly.

## Requirements



Wide operating temperature for poor ventilation environments at the edge



Industrial camera connectivity with prioritized independent camera bandwidth



Fanless design and washable sealed chassis for dusty environments

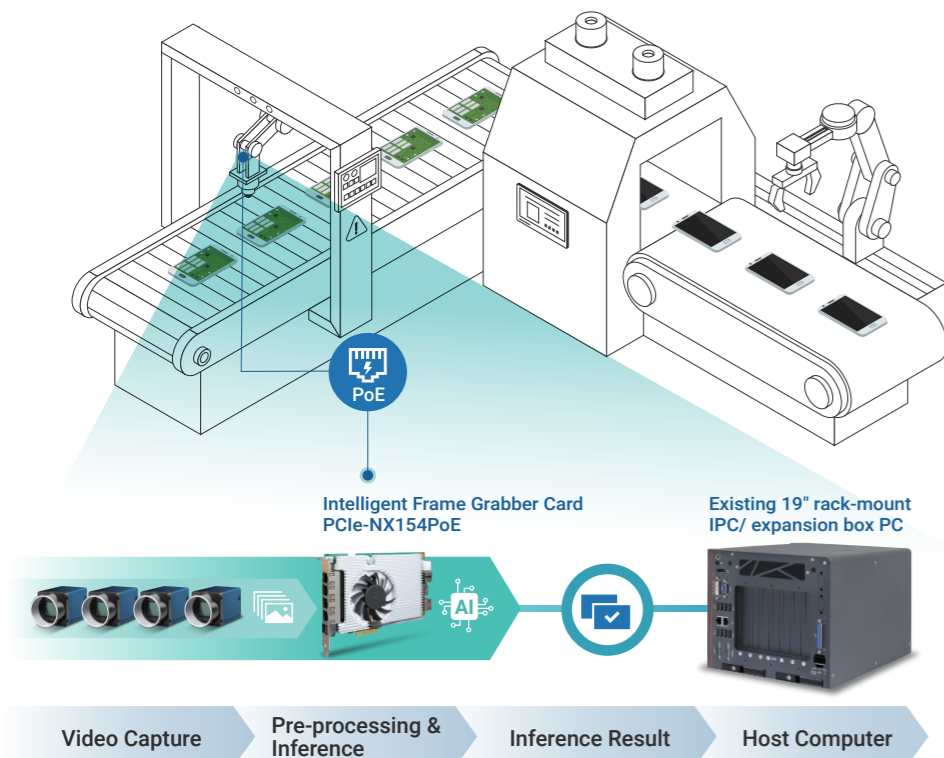


Add-on card to integrate into an existing computer for AI computation

## Solution

### Added AI-powered Inspection to Existing x86 Computers

The intelligent frame grabber card can operate independently and adapt to existing rule-based 19" rack mount IPC for more AI performance and camera connectivity while consuming minimum resources from the host PC.



## Product Selection



### PCIe-NX150 Series

- Intelligent Frame Grabber**
- 6x USB3 or 4x PoE+ 2.5GbE ports
  - Compatible with Windows/ Linux x86 computers



### NRU-150-FT Series

- Flattop Heatsink Computer**
- 6x USB3 or 4x PoE+ 2.5GbE ports
  - In-cabinet conduction cooling, -25°C to 60°C fanless operation



### NRU-172S-PPC

- IP66 Waterproof 10.1" AI Panel PC**
- 4x PoE+ GbE via M12 connectors
  - -25°C to 60°C fanless operation

# Roadside Intelligent Video Analytics



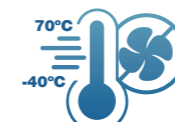
## Overview

Intelligent video analytics at roadside for traffic violation monitoring, traffic flow management or V2X applications are on the rise in smart cities. But due to the lack of camera connectivity, video processing, AI computing, and the ability to operate in harsh environments capabilities have limited deployments. This is where Neosys edge AI computer comes in, featuring power-efficient and true wide-temperature operation to enable real-time inference and analytics in confined cabinets or dusty roadside environments.

## Requirements



Ethernet ports for sensors, IP cameras, and LiDAR



Fanless wide temperature operation and waterproof design



AI performance and video transcoding capability

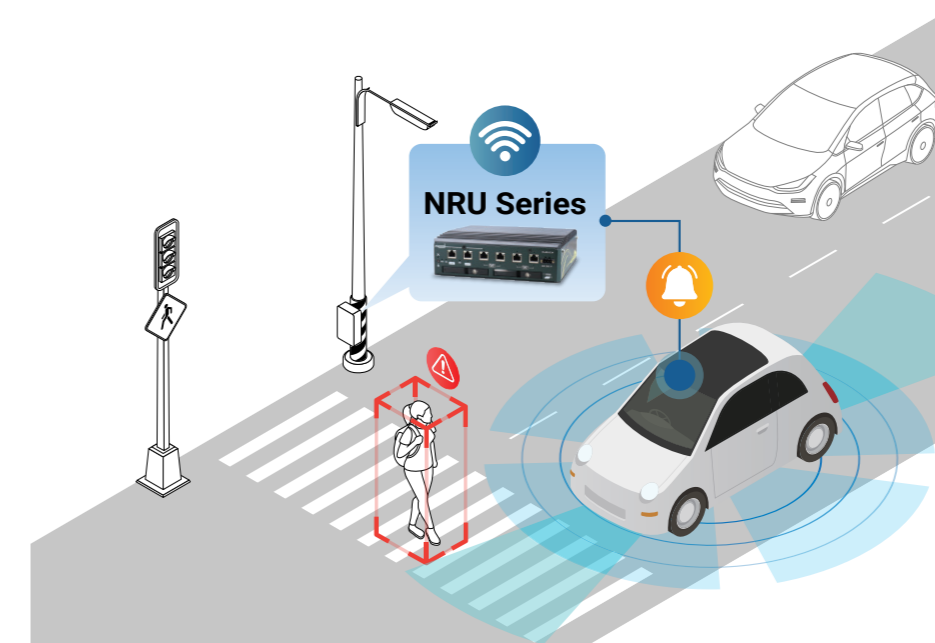


Storage for video and isolated RS485 for communication

## Solution

### Real-time Infrastructure-based Perception and Analytics

The roadside management system is to identify and predict possible dangers between pedestrians, vehicles, or other road users and offer full situation awareness and sends warnings to connected autonomous vehicles approaching the area. Our computer is integrated into the system to connect with IP cameras and sensors receive video and data to enable real-time perception for AI applications such as traffic flow monitoring, traffic violation detection and pedestrian safety.



## Product Selection



### NRU-220S

- Fanless AI NVR**
- 2x 2.5GbE, 4x PoE+ GbE ports
  - 1x Isolated RS485
  - 1x M.2 M NVMe, 2x 2.5" SSD (front-accessible)



### NRU-52S+

- Fanless AI NVR**
- 4x PoE++ GbE ports
  - -25°C to 70°C fanless operation



### NRU-162S-FT

- Flattop Heatsink Computer**
- 4x PoE+ GbE via M12 connectors
  - In-cabinet conduction cooling, -25°C to 70°C fanless operation





# Autonomous Mobile Robot



## Overview

Autonomous mobile robots (AMRs) applications can be found in warehouses, hospitals, hotels, farms, logistics, and airports, in indoor or outdoor environments. In lockdown scenarios, they help reduce infections by limiting human interactions, now its automated technology minimizes manpower and increases efficiency.

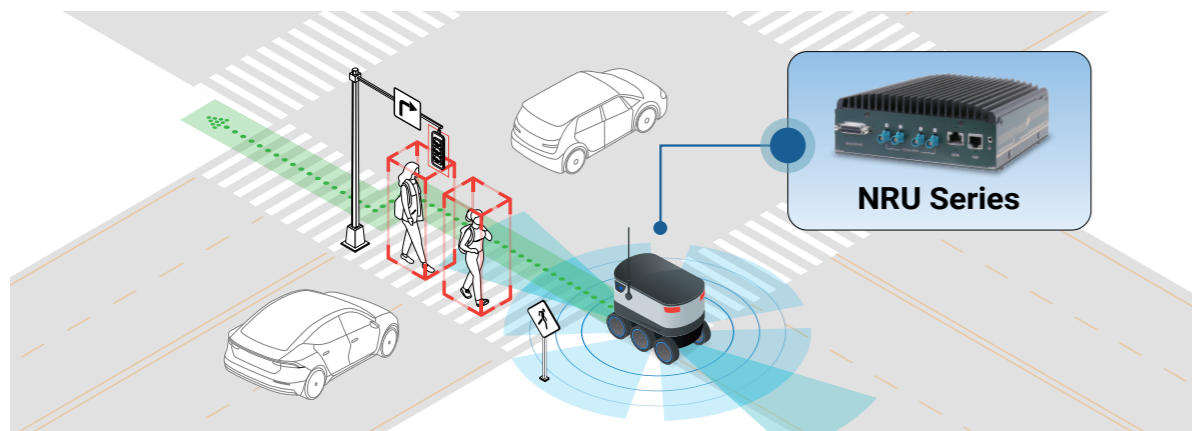
## Requirements

			
IP or GMSL2 cameras connectivity	Low power consumption offers extended battery time for daily operations	Small dimensions for the limited installation space inside robots	Wide-range DC and IGN input for mobile systems

## Solution

### Last-mile Delivery Robot

The autonomous delivery robot with edge AI computing can self-navigation through various traffic from A to B. NRU series supports various interfaces for sensors and cameras, and the AI computation power to sense, identify, learn, and react in real-time for obstacle or pedestrian avoidance and route planning. It is compact, fanless, and power efficient for extended battery operation time. The system can also withstand shock and vibration to survive in-vehicle like conditions.



## Product Selection

		
<b>NRU-51V+</b> Fanless AI Computer · 4x GMSL2, 1x 10GbE, 1x GbE ports · 8V to 35V with ignition power control	<b>NRU-161V-AWP</b> IP66 Waterproof AI Computer · 6x GMSL2, 1x GbE via M12 connector · 8V to 35V with ignition power control	<b>FLYC-300</b> Optimized-SWaP AI Mission Computer · 2x GMSL2, 2x GbE, 2x USB3 ports · 124 x 123 x 30.5mm compact size





# In-Vehicle ADAS & Intelligent Video Analytics



## Overview

Intelligent video analytics in vehicles play a crucial role in implementing collision avoidance, recognition, and detection, thereby enhancing in-vehicle ADAS capabilities and overall safety. These applications extend to areas such as excavator teleoperation, public safety on police cars, blind zone detection on construction vehicles, smart mining trucks, obstruction detection for railways, etc.

## Requirements

			
IP or GMSL2 cameras connectivity	Fanless or waterproof for extreme deployments	Robust M12 connectors, shock and vibration resistance	Wide-range DC and IGN input for car batteries

## Solution

### Teleoperation of Off-road Vehicles

Teleoperation removes the operator from danger, reduces operation costs and increases efficiency for off-road vehicles in mining, agriculture, construction and logistics. With a single operator, it is possible to monitor and control a fleet of vehicles remotely and safely. By deploying NRU series into the vehicles, the GMSL2 protocol can support high-speed, 15-meter cables with low latency for video streaming via 4G/5G wireless network.



## Product Selection

		
<b>NRU-222S</b> Fanless AI NVR · 2x 2.5GbE and 4x PoE+ GbE via M12 connectors · 1x M.2 NVMe, 2x 2.5" SSD (front-accessible)	<b>NRU-230V-AWP</b> IP66 Waterproof AI Computer · 8x GMSL2, 1x 10GbE, · 4x PoE+ GbE via M12 connectors · 8V to 48V with ignition power control	<b>NRU-171V-PPC</b> IP66 Waterproof 10.1" AI Panel PC · 6x GMSL2, 1x GbE via M12 connector · 8V to 35V with ignition power control

# Specification Table



Model Name	NRU-230V-AWP/ NRU-240S-AWP	NRU-220S/ NRU-222S	NRU-171V-PPC/ NRU-172S-PPC	NRU-161V-AWP/ NRU-162S-AWP NRU-161V-FT/ NRU-162S-FT	
<b>Chassis</b>	<b>Dimensions (W x D x H)</b>	225 x 195 x 89 mm	230 x 173 x 66 mm	225 x 136 x 55 mm (NRU-160-AWP) 199 x 136 x 49 mm (NRU-160-FT)	
	<b>Weight</b>	4.4 kg	2.6 kg	3.0 kg (NRU-160-AWP) 1.5 kg (NRU-160-FT)	
	<b>Chassis Construction</b>	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with stainless steel / waterproof	Aluminum alloy with heavy duty metal
	<b>IP Rating</b>	IP66	-	IP66	IP66 (NRU-160-AWP)
<b>System</b>	<b>Processor</b>	NVIDIA® Jetson AGX Orin™	NVIDIA® Jetson AGX Orin™	NVIDIA® Jetson Orin™ NX/ NVIDIA® Jetson Orin™ Nano	NVIDIA® Jetson Orin™ NX/ NVIDIA® Jetson Orin™ Nano
	<b>Chipset</b>	-	-	-	-
	<b>Graphics</b>	-	-	-	-
	<b>Acceleration GPU</b>	-	-	-	-
<b>Memory</b>	32GB/ 64GB LPDDR5 @ 3200 MHz	32GB/ 64GB LPDDR5 @ 3200 MHz	16GB/ 8GB LPDDR5 @ 3200 MHz 8GB/ 4GB LPDDR5 @ 2133 MHz	16GB/ 8GB LPDDR5 @ 3200 MHz 8GB/ 4GB LPDDR5 @ 2133 MHz	
<b>Panel</b>	<b>Size</b>	-	-	10.1" screen, AG (Anti-Glare) and AF (Anti-Fingerprint)	-
	<b>Touch</b>	-	-	Single-finger touch functionality when the screen is wet	-
<b>I/O Interface</b>	<b>GMSL/ GMSL2</b>	8x GMSL2 FAKRA Z connectors (NRU-230V-AWP)	-	6x GMSL2 FAKRA Z connectors (NRU-171V-PPC)	6x GMSL2 FAKRA Z connectors (NRU-161V-AWP, NRU-161V-FT)
	<b>Ethernet/ PoE+</b>	1x 10GbE via M12 X-coded 4x PoE+ GbE via M12 X-coded	2x 2.5GbE 4x PoE+ GbE (NRU-220S: via RJ45 with screw-lock) (NRU-222S: via M12 X-coded)	1x GbE via M12 X-coded 4x PoE+ GbE via M12 X-coded (NRU-172S-PPC)	1x GbE via M12 X-coded 4x PoE+ GbE via M12 X-coded (NRU-162S-AWP, NRU-162S-FT)
	<b>CAN bus</b>	2x isolated CAN 2.0 via M12 A-coded	2x CAN 2.0	1x CAN FD port via M12 A-coded	1x CAN FD port via M12 A-coded
	<b>Video Port</b>	1x DisplayPort via USB Type C	1x DisplayPort	-	1x VGA via M12 A-coded
	<b>Serial Port</b>	1x isolated RS-485, 1x isolated RS-232 port via M12 A-coded	1x isolated RS-485 2x RS-232	1x RS-232 port via M12 A-coded	1x RS-232 port via M12 A-coded
	<b>USB 2.0</b>	2 via M12 A-coded	2	2 via M12 A-coded	2 via M12 A-coded
	<b>USB 3.2/ USB 3.1</b>	1x waterproof USB Type C	1	1x waterproof USB Type C	1x waterproof USB Type C
	<b>Audio</b>	-	-	-	-
	<b>Digital I/O</b>	1x isolated DI via M12 A-coded 1x isolated DO via M12 A-coded	4-CH isolated DI and 4-CH isolated DO	1x isolated GPS PPS input via M12 A-coded	1x isolated GPS PPS input via M12 A-coded
	<b>Storage Interface</b>	<b>SATA HDD</b>	2x 2.5" SSD	2x front-accessible 2.5" 7mm SSD	-
<b>mSATA</b>		-	-	-	-
<b>M.2 (M-key)</b>		1	1	1	1
<b>Mini PCI-E</b>		2	2	1	1
<b>Expansion Bus</b>	<b>M.2 (B-key/ E-Key)</b>	1x M.2 B-key	1x M.2 B-key	1x M.2 B-key	1x M.2 B-key
	<b>SIM</b>	3	2	2	2
	<b>MezIO®</b>	-	-	-	-
	<b>PCI/PCI Express</b>	-	-	-	-
<b>Power Supply</b>	<b>DC Input</b>	8V to 48V DC via M12 L-coded	8V to 48V DC	8V to 35V DC via M12 A-coded	8V to 35V DC via M12 A-coded
	<b>Ignition Control</b>	Built-in	Built-in	Built-in	Built-in
<b>Environmental</b>	<b>Operating Temperature</b>	-25°C to 70°C (30W TDP mode, without 10GbE)  -25°C to 60°C (30W TDP mode)	-25°C to 70°C (30 W TDP mode)	-25°C to 60°C (MAXN TDP mode)	-25°C to 70°C (MAXN TDP mode)
	<b>Certification</b>	CE/ FCC	CE/ FCC	CE/ FCC, EN 50121-3 (NRU-172S-PPC)	CE/ FCC, EN 50121-3 (NRU-162S-AWP)

Model Name	NRU-51V+/ NRU-52S+	PCIe-NX154PoE/ PCIe-NX156U3	NRU-154PoE-FT/ NRU-156U3-FT	FLYC-300	
<b>Chassis</b>	<b>Dimensions (W x D x H)</b>	173 x 144 x 60 mm	167.7 x 111 mm	116 x 171 x 27 mm	124 x 123 x 29.8 mm
	<b>Weight</b>	1.4 kg	0.4 kg	1.4 kg	0.297 kg
	<b>Chassis Construction</b>	Aluminum alloy with heavy duty metal	-	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
<b>System</b>	<b>Processor</b>	NVIDIA® Jetson Orin™ NX	NVIDIA® Jetson Orin™ NX	NVIDIA® Jetson Orin™ NX	NVIDIA® Jetson Orin™ NX
	<b>Chipset</b>	-	-	-	-
	<b>Graphics</b>	-	-	-	-
	<b>Acceleration GPU</b>	-	-	-	-
<b>Memory</b>	8GB/ 16GB LPDDR5 @ 3200 MHz	8GB/ 16GB LPDDR5 @ 3200 MHz	8GB/ 16GB LPDDR5 @ 3200 MHz	8GB/ 16GB LPDDR5 @ 3200 MHz	
<b>I/O Interface</b>	<b>GMSL/ GMSL2</b>	4x GMSL2 FAKRA Z connectors (NRU-51V+)	-	-	2x GMSL2 FAKRA Z connectors
	<b>Ethernet/ PoE+</b>	1x 10GbE, 1x GbE with screw-lock (NRU-51V+) 4x PoE+ GbE with screw-lock (NRU-52S+)	4x PoE+ 2.5GbE, 1x GbE (PCIe-NX154PoE) 1x GbE (PCIe-NX156U3)	1x GbE 4x PoE+ 2.5GbE (NRU-154PoE-FT)	1x GbE 1x 2.5GbE
	<b>CAN bus</b>	1x isolated CAN 2.0	-	-	1x CAN bus 2.0
	<b>Video Port</b>	1x DisplayPort	1x DisplayPort	1x DisplayPort	1x DisplayPort
	<b>Serial Port</b>	1x RS-232 (NRU-51V+) 1x RS-232/422/485 (NRU-52S+)	1x RS-232 1x isolated RS-485	1x RS-232/422/485	-
	<b>USB 2.0</b>	-	2	2	1
	<b>USB 3.2/ USB 3.1</b>	2	6 (PCIe-NX156U3)	6 (NRU-156U3-FT)	2
	<b>Audio</b>	-	-	-	-
	<b>Digital I/O</b>	1x GPS PPS, 3 DI + 4 DO	-	-	Isolated 2 DI + 4 DO
	<b>Storage Interface</b>	<b>SATA HDD</b>	-	-	-
<b>mSATA</b>		-	-	-	-
<b>M.2 (M-key)</b>		2	-	2	-
<b>Expansion Bus</b>	<b>Mini PCI-E</b>	-	-	-	-
	<b>M.2 (B-key/ E-Key)</b>	1x M.2 B-key	-	1x M.2 B-key	1x M.2 B-key
	<b>SIM</b>	2	1	2	1
	<b>MezIO®</b>	-	-	-	1
<b>PCI/PCI Express</b>	-	-	-	-	
<b>Power Supply</b>	<b>DC Input</b>	8V to 35V DC	12V DC	12V DC	12V to 60V DC Support 4S-14S battery pack
	<b>Ignition Control</b>	Built-in	-	Built-in	-
<b>Environmental</b>	<b>Operating Temperature</b>	-25°C ~ 70°C (15W TOP mode with 50W PoE++)  -25°C ~ 70°C with optional fan kit (15W TOP mode with 144W PoE++)	-25°C to 60°C	-25°C ~ 70°C (15W TOP mode with 50W PoE++)  -25°C ~ 70°C with optional fan kit (15W TOP mode with 144W PoE++)	-25°C to 70°C
	<b>Certification</b>	EN50155 (NRU-52S+), CE/ FCC	CE/ FCC	CE/ FCC	CE/ FCC, EN62368-1