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Rugged NVIDIA® Jetson™ Edge AI Computers

Ready for Edge AI Application Deployments

www.neousys-tech.com

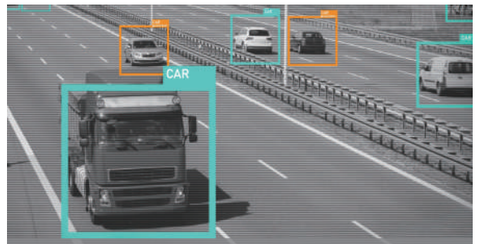
Robust AI-Powered Vision from Roadside to In-vehicle

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.

Neousys edge AI platforms powered by NVIDIA® Jetson™ system-on-module are fully integrated with Neousys DNA characteristics that are designed to thrive in harsh environments and operate in limited conditions. Neousys 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

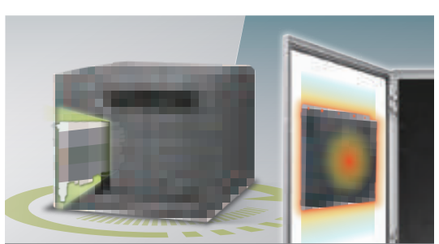
Unique and efficient thermal design capable of operating from -40°C and up to 70°C in fanless conditions. Furthermore, the AWP series are waterproof and dustproof for extreme environment deployments.

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, 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.

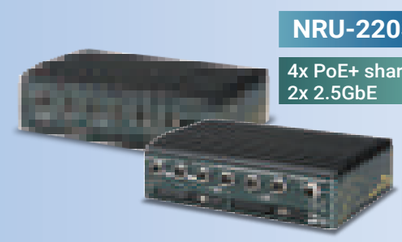
Neousys' Rugged NVIDIA® Jetson™ Computers for Industrial to Extreme Deployments

Neousys' 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

Edge AI Computer

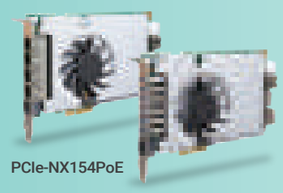


NRU-220S
4x PoE+ shared GbE
2x 2.5GbE

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

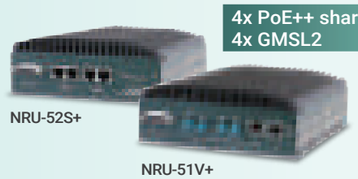


PCIe-NX154PoE

PCIe-NX156U3

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

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



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

NRU-52S+

NRU-51V+

NRU-171V-PPC

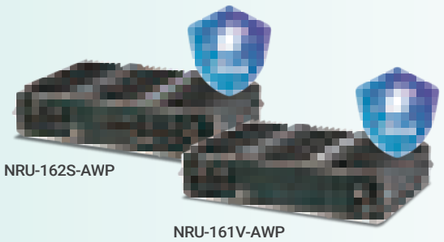
NRU-172S-PPC

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

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

NRU-154PoE-FT

NRU-156U3-FT



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

NRU-162S-AWP

NRU-161V-AWP

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.

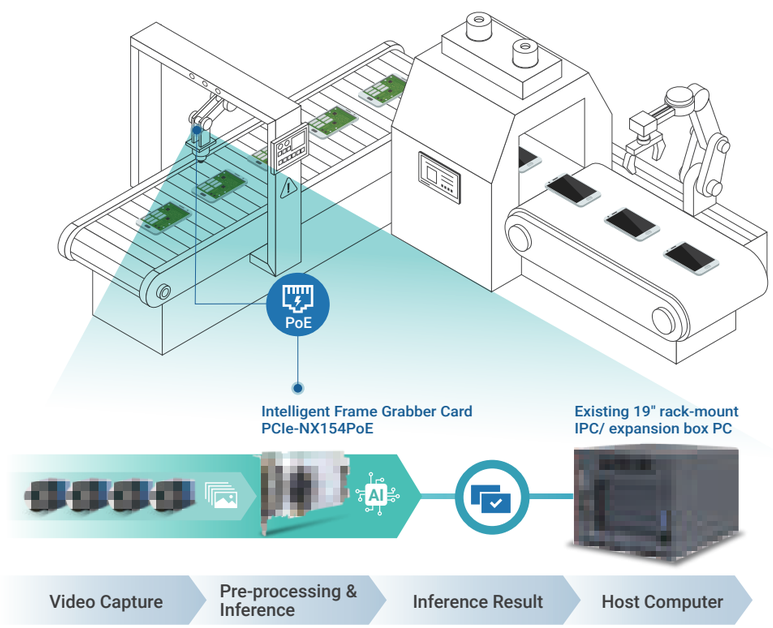
Requirements

- 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

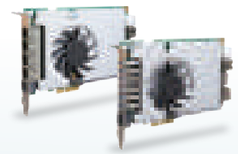
Solution

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 2.5GbE (PoE+ capable)
- Compatible with Windows/ Linux x86 computers

NRU-150-FT Series

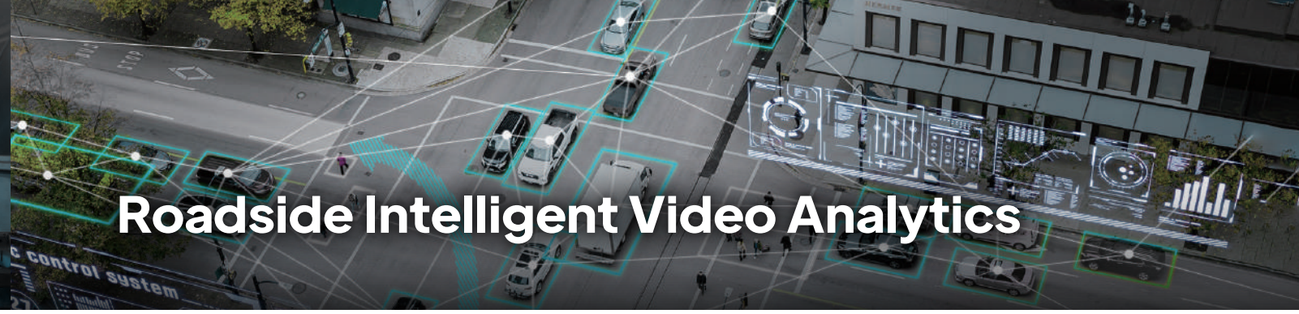
Flattop Heatsink Computer

- 6x USB3 or 4x 2.5GbE (PoE+ capable)
- In-cabinet conduction cooling, -25°C to 60°C fanless operation

NRU-172S-PPC

IP66 Waterproof 10.1" AI Panel PC

- 4x GbE (PoE+ capable)
- -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 Neousys 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.

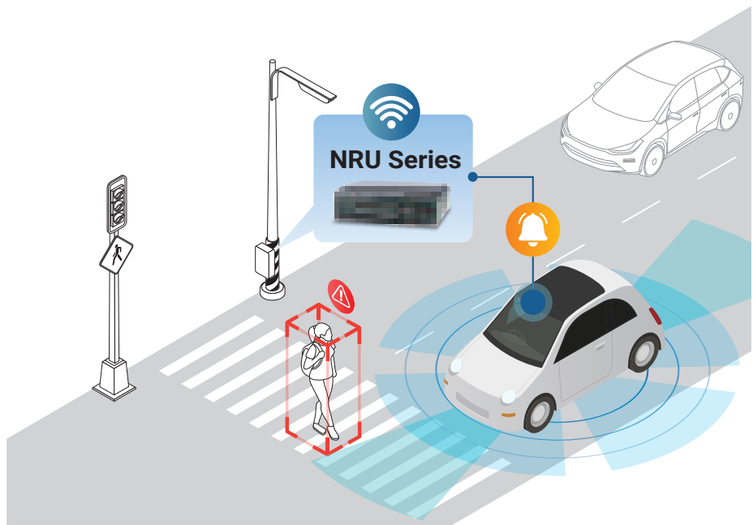
Requirements

- 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 GbE (PoE+ capable)
- 1x Isolated RS485
- 1x M.2 M NVMe, 2x 2.5" SSD (front-accessible)

NRU-52S+

Fanless AI NVR

- 4x GbE ports (PoE++ capable)
- -25°C to 70°C fanless operation

NRU-240S-AWP

IP66 Waterproof AI Computer

- -40°C to 70°C fanless operation (JAOi)
- 1x 10GbE, 4x GbE (PoE+ capable)

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.

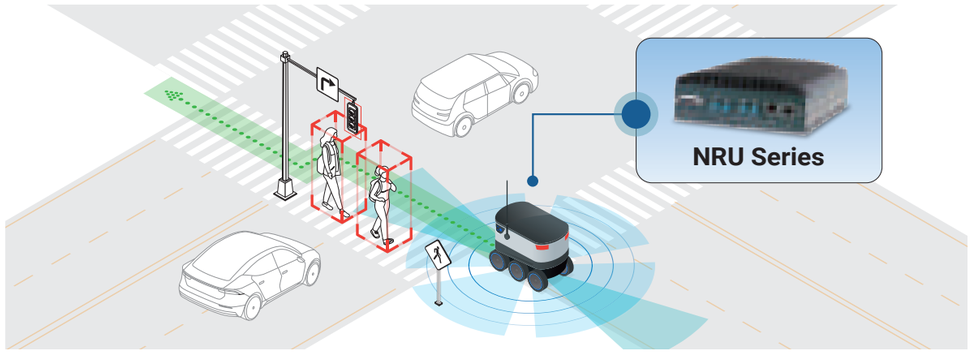
Requirements

- 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

NRU-51V+

Fanless AI Computer

- 4x GMSL2, 1x 10GbE, 1x GbE
- 8V to 35V with ignition power control

NRU-161V-AWP

IP66 Waterproof AI Computer

- 6x GMSL2, 1x GbE
- 8V to 35V with ignition power control

FLYC-300

SWaP-optimized AI Mission Computer

- 2x GMSL2, 2x GbE, 2x USB3
- 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.

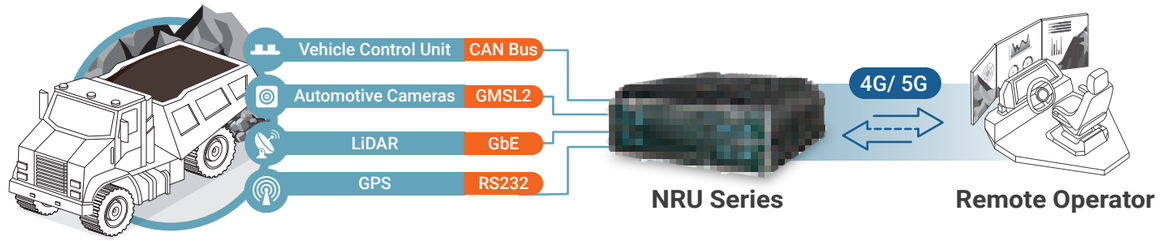
Requirements

- 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

NRU-222S

Fanless AI NVR

- 2x 2.5GbE and 4x GbE (PoE+ capable) in M12 connectors
- 1x M.2 NVMe, 2x 2.5" SSD (front-accessible)

NRU-230V-AWP

IP66 Waterproof AI Computer

- 8x GMSL2, 1x 10GbE, 4x GbE (PoE+ capable)
- 8V to 48V with ignition power control

NRU-171V-PPC

IP66 Waterproof 10.1" AI Panel PC

- 6x GMSL2, 1x GbE
- 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-AWPNRU-162S-AWP
Chassis	**Dimensions (W x D x H)**	225 x 195 x89 mm	230 x 173 x 66 mm	257 x 65 x 176 mm	225 x 136 x 55 mm
	Weight	4.4 kg	2.6 kg	3.8 kg	3.0 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with stainless steel / waterproof	Aluminum alloy with heavy duty metal
	IP Rating	IP66	IP66	IP66	IP66
System	**Processor**	NVIDIA® Jetson AGX Orin™	NVIDIA® Jetson AGX Orin™	NVIDIA® Jetson Orin™ NX/ NVIDIA® Jetson Orin™ Nano	NVIDIA® Jetson Orin™ NX/ NVIDIA® Jetson Orin™ Nano
	Chipset	-	-	-	-
	Graphics	-	-	-	-
	Acceleration GPU	-	-	-	-
	Memory	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
Panel	**Size**	-	-	10.1" screen, AG (Anti-Glare) and AF (Anti-Fingerprint)	-
	Touch	-	-	Single-finger touch functionality when the screen is wet	-
I/O Interface	**PoE/ GMSL/ GMSL2**	4x GbE IEEE 802.3at (25.5W) GbE PoE+ ports 8x GMSL2 ports (NRU-230V-AWP only)	IEEE 802.3bt PoE+PSE for 4 GbE ports	6x waterproof GMSL2 (NRU-171V-PPC) IEEE 802.3bt PoE+PSE for 4 GbE ports (NRU-172S-PPC)	6x waterproof GMSL2 (NRU-161V-AWP) IEEE 802.3bt PoE+PSE for 4 GbE ports (NRU-162S-AWP)
	Ethernet	1x 10GbE Ethernet via M12 X-coded 4x GbE by Intel® I350 via M12 X-coded	2x 2.5GbE by Intel® I225 4x GbE (NRU-220S: via RJ45) (NRU-222S: via M12)	1x GbE Ethernet via M12 X-coded 4x GbE by Intel® I350-AM4 via M12 X-coded (NRU-172S-PPC only)	1x GbE Ethernet via M12 X-coded 4x GbE by Intel® I350-AM4 via M12 X-coded (NRU-162S-AWP only)
	CAN bus	2x isolated CAN 2.0 port and 1x isolated DI via M12 A-coded	2x CAN 2.0 port	1x CAN FD port via M12 A-coded	1x CAN FD port via M12 A-coded
	Video Port	1x DisplayPort via USB Type C	1x DisplayPort	-	1x VGA via M12 A-coded
	Serial Port	1x isolated RS-485, 1x isolated RS-232 and 1 isolate DO 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
	USB 2.0	2	2	2 via M12 A-coded	2 via M12 A-coded
	USB 3.2/ USB 3.1	1x waterproof USB Type C	1	1x waterproof USB Type C	1x waterproof USB Type C
	Audio	-	-	-	-
	Digital I/O	1x isolated DI via M12 A-coded 1x isolated DO via M12 A-coded	4 DI + 4 DO	1x isolated GPS PPS input via M12 A-coded	1x isolated GPS PPS input via M12 A-coded
Storage Interface	**SATA HDD**	2x 2.5" SSD	2x front-accessible 2.5" 7mm SSD	-	-
	mSATA	-	-	-	-
	M.2 (M-key)	1	1	1	1
Expansion Bus	**Mini PCI-E**	2	2	1	1
	M.2 (B-key/ E-Key)	1x M.2 B-key	1x M.2 B-key	1x M.2 B-key	1x M.2 B-key
	SIM	3	2	2	2
	MezIO®	-	-	-	-
	PCI/PCI Express	-	-	-	-
Power Supply	**DC Input**	8V to 48V DC	8V to 48V DC	8V to 35V DC via M12 A-coded	8V to 35V DC via M12 A-coded
	Ignition Control	Built-in	Built-in	Built-in	Built-in
Environmental	**Operating Temperature**	-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)
	Certification	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
Chassis	**Dimensions (W x D x H)**	173 x 144 x 60 mm	167.7 x 111 mm	116 x 171 x 27 mm	124 x 123 x 29.8 mm
	Weight	1.4 kg	0.4 kg	1.4 kg	0.297 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
System	**Processor**	NVIDIA® Jetson Orin™ NX (NRU-51V+) NVIDIA® Jetson Orin™ NX (NRU-52S+)	NVIDIA® Jetson Orin™ NX	NVIDIA® Jetson Orin™ NX	NVIDIA® Jetson Orin™ NX
	Chipset	-	-	-	-
	Graphics	-	-	-	-
	Acceleration GPU	-	-	-	-
	Memory	NRU-51V+: 8GB/ 16GB LPDDR5 @ 3200 MHz NRU-52S+: 8GB/ 16GB LPDDR5 @ 3200 MHz	-	8GB/ 16GB LPDDR5 @ 3200 MHz	8GB/ 16GB LPDDR5 @ 3200 MHz
I/O Interface	**PoE/ GMSL/ GMSL2**	4x GMSL2 ports (NRU-51V+) IEEE 802.3bt PoE++ for 4GbE ports (NRU-52S+)	4x PoE+ 2.5GbE, 1x GbE (PCIe-NX154PoE) 1x GbE (PCIe-NX156U3)	IEEE 802.3at PoE+ PSE for 4 GbE ports	2x GMSL2 ports
	Ethernet	1x 10GBASE-T 10GbE 1x 1GBASE-T 1 GbE (NRU-51V+) 4x GbE ports (NRU-52S+)	-	1x GbE 4x 2.5GbE ports by Intel® I225 (NRU-154PoE-FT)	1x Gb by NVIDIA® 1x 2.5Gb by Intel® I225-IT
	CAN bus	1x isolated CAN 2.0 port	-	-	1x CAN bus 2.0
	Video Port	1x DisplayPort	1x DisplayPort	1x DisplayPort	1x DisplayPort
	Serial Port	1x RS-232 (NRU-51V+) 1x RS-232/422/485 (NRU-52S+)	1x RS-232 1x isolated RS-485	1x RS-232/422/485	-
	USB 2.0	-	2	2x USB 2.0 ports	1
	USB 3.2/ USB 3.1	2	6 (PCIe-NX156U3)	2x USB 3.2 Gen2(NRU-156U3-FT) 4x USB 3.2 Gen1(NRU-156U3-FT)	2
	Audio	-	-	-	-
	Digital I/O	1x GPS PPS, 3 DI + 4 DO	-	-	Isolated 2 DI + 4 DO
Storage Interface	**SATA HDD**	-	-	-	-
	mSATA	-	-	-	-
	M.2 (M-key)	-	1x M.2 M-key	-	1 (Gen4 x4)
Expansion Bus	**Mini PCI-E**	2	-	2	-
	M.2 (B-key/ E-Key)	1x M.2 B-key	-	1x M.2 B-key	1x M.2 B-key
	SIM	2	-	2	1
	MezIO®	-	-	-	1
	PCI/PCI Express	-	-	-	-
Power Supply	**DC Input**	8V to 35V DC	12V DC input	12V DC	12V to 60V DC & Supports 4S-14S battery pack
	Ignition Control	Built-in	-	Built-in	-
Environmental	**Operating Temperature**	-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
	Certification	EN50155 (NRU-52S+), CE/ FCC	CE/ FCC	CE/ FCC	CE/ FCC, EN62368-1