NRU-161V-FT / NRU-162S-FT

NVIDIA® Jetson Orin™ NX/ Nano Fanless Flattop Heatsink Edge AI Computer with 6x GMSL2 or 4x PoE+ GbE

NRU-161V-FT

NRU-162S-FT

Key Features

- Powered by NVIDIA® Jetson Orin™ NX or Orin™ Nano SoM bundled with JetPack
- 199 x 136 x 49 mm low-profile design with flattop heatsink
- -25°C to 70°C fanless operation (no throttling at 70°C with 25W TDP mode) *
- Supports 6x GMSL2 automotive cameras via FAKRA Z connectors (NRU-161V-FT)
- 4x PoE+ GbE via M12 X-coded connectors (NRU-162S-FT)
- 1x CAN FD and 1x RS232 via M12 A-coded connectors
- 8V to 35V wide-range DC input with built-in ignition power control

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* The system was tested while mounted on a 60 (W) × 60 (D) × 0.3 (H) cm aluminum plate in an elevated-temperature environment to simulate in-cabinet conditions.

Introduction

The NRU-160-FT is a Jetson Orin™ NX/Orin™ Nano Edge AI computer with a flattop heatsink optimized for conduction cooling when mounted inside waterproof enclosures for smart agriculture, dustproof cabinets for factories, junction boxes for roadside deployment, or robot chassis for outdoor AMRs.

Powered by NVIDIA® Jetson Orin™ NX/ Orin™ Nano, the NRU-160-FT series delivers up to 100 sparse TOPS (INT8) of AI inference and can transcode up to eighteen 1080p video streams simultaneously with only 25W of power consumption. Designed to connect with a variety of cameras and sensors for autonomy, ADAS, or AI inspection, the NRU-160-FT comes in two models: the NRU-161V-FT, which supports six GMSL2 automotive cameras with pre-built drivers for selected IMX390, ISX031, and IMX490 CMOS sensors; and the NRU-162S-FT, which offers four PoE+ GbE ports for IP or industrial GigE cameras. An additional M12 GbE port is provided for data transmission to other computers or LiDAR.

The NRU-160-FT is designed for edge deployment in cabinets or robots, particularly in mobile applications. Its flattop heatsink not only leverages the metal enclosure as a heatsink extension but also allows the NRU-160-FT to operate at out-cabinet temperatures, typically 10–15 °C lower than in-cabinet temperatures, while its compact 199 × 136 × 49 mm low-profile footprint makes it ideal for confined spaces. All M12 and FAKRA connectors provide reliable shock and vibration resistance. The system supports an 8–35 V wide DC input range, ignition power control, one CAN FD bus port, and one RS-232 port. It also features a mini-PCIe socket for CAN/COM/Wi-Fi modules and an M.2 B-key socket for 4G LTE/5G NR mobile communication modules.

The integration of a flattop heatsink, Orin™ NX/ Orin™ Nano AI performance, and versatile onboard camera connectivity strikes a balance between ruggedness, performance, and cost. It is a ready-to-deploy edge AI platform designed to be mounted against the inner wall of a sealed cabinet for smart agriculture, mining, construction, roadside applications, and edge inspection.

Specifications

System Core		
Processor	NVIDIA® Jetson Orin™ NX system-on-module (SOM), comprising NVIDIA® Ampere GPU and ARM Cortex CPU	NVIDIA® Jetson Orin™ Nano system-on-module (SOM), comprising NVIDIA® Ampere GPU and ARM Cortex CPU
Memory	16GB/ 8GB LPDDR5 @ 3200 MHz on SOM	8GB/ 4GB LPDDR5 @ 2133 MHz on SOM
eMMC	N/A	

Panel I/O Interface	
GMSL2	**NRU-161V-FT** **6x GMSL2 FAKRA Z** connectors, supporting multiple configurations: Configuration A. 6x AC-IMX390 (2MP@30FPS) Configuration B. 6x AC-ISX031 (3MP@30FPS) Configuration C. 4x AC-IMX490 (5MP@30FPS)
Ethernet Port	**NRU-161V-FT** 1x Gigabit Ethernet port via M12 X-coded 8-pin connector **NRU-162S-FT** Port 0: 1x Gigabit Ethernet port via M12 X-coded 8-pin connector Port 1 to Port 4: 4x GbE ports by Intel® I350-AM4 via M12 X-coded 8-pin connector
PoE+	**NRU-162S-FT** IEEE 802.3at PoE+ PSE for Port 1 to Port 4 with 50W total power budget
USB	2x USB 2 ports via M12 A-coded 8-pin connector 1x USB Type C port (
Video Port	1x VGA, supporting 1920x1080 at 60Hz via M12 A-coded 17-pin connector
Serial Port	1x RS-232 port via M12 A-coded 8-pin connector
CAN bus	1x CAN FD port via M12 A-coded 8-pin connector
Isolated DIO	1x isolated GPS PPS input via M12 A-coded 8-pin connector

Internal I/O Interface	
Mini PCI Express	1x full-size mini PCI Express socket (PCIe + USB 2.0 signal)

Internal I/O Interface	
M.2	1x M.2 3042/3052 B key (USB 3.2 Gen1 + USB 2.0 signal) for LTE/ 5G module with dual micro SIM support

Storage	
M.2 NVMe	1x M.2 2242 M key socket (PCIe Gen 3x1) for NVMe SSD

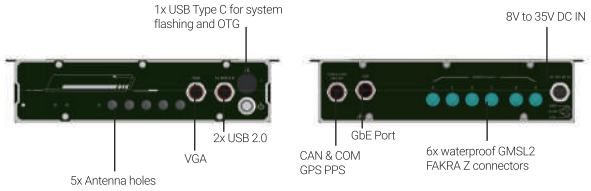
Power Supply	
DC Input	8V to 35V DC input and ignition power control via M12 A-coded, 5-pin connector (IGN/ GND/ V+) [1]

Mechanical	
Dimension	199 mm (W) x 136 mm (D) x 49 mm (H)
Weight	1.5 kg
Mounting	Wall-mount (standard) [4]

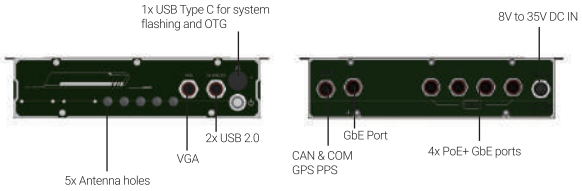
Environmental	
Operating Temperature	-25°C to 70°C with passive cooling (25W TDP mode) [2][3]
	With full CPU+GPU stressing: Non-throttling at 70°C with 25W TDP mode
Storage Temperature	-40°C to 85°C
Humidity	10% to 90%, non-condensing
Vibration	MIL-STD-810H, Method 514.8, Category 4
Shock	MIL-STD-810H, Method 516.8, Procedure I
EMC	CE/ FCC Class A, according to EN 55032 & EN 55035

[1]The required DC input range is 8V to 35V when the system load is under 60W. The required DC input range is 12V to 35V when the system load is between 60W to 96W. The required DC input range is 20V to 35V when the system load is between 96W to 160W.
[2]For sub-zero and over 60°C operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.
[3] The system was tested while mounted on a 60 (W) × 60 (D) × 0.3 (H) cm aluminum plate in an elevated-temperature environment to simulate in-cabinet conditions.
[4] Wall-mount bracket is integrated as part of the chassis design.

Appearance



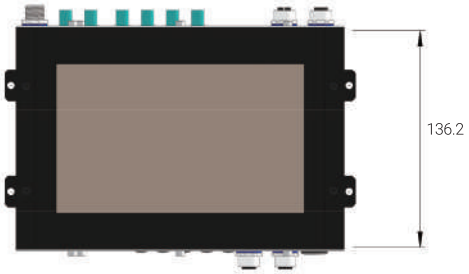
NRU-161V-FT

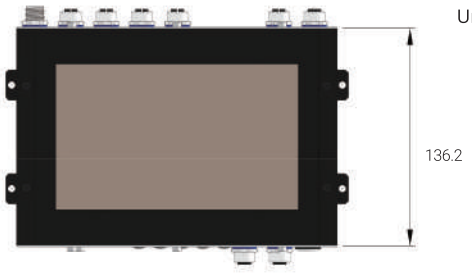


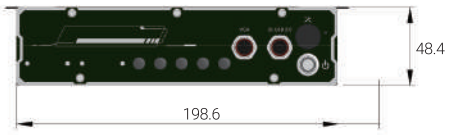
NRU-162S-FT

Dimensions

Unit : mm







NRU-161V-FT

NRU-162S-FT

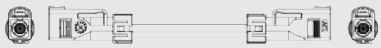
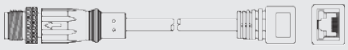
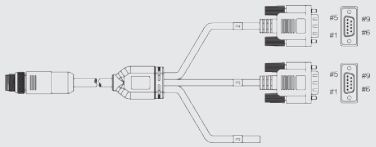
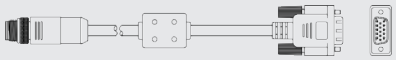
Ordering Information

Model No.	Product Description
NRU-161V-FT	NVIDIA® Jetson Orin™ NX/ Nano Fanless Flattop Heatsink Edge AI Computer with 6x GMSL2
NRU-162S-FT	NVIDIA® Jetson Orin™ NX/ Nano Fanless Flattop Heatsink Edge AI Computer with 4x PoE+ GbE
Jetson Module Option	Options for Different Jetson Orin™ NX and Jetson Orin™ Nano SKUs
NVMe Option	Options for Different Capacities of M.2 2242 NVMe Storage

Optional Accessories

GMSL2 cameras	The system compatible with a wide range of GMSL2 2D and 3D cameras with pre-built driver, including TIER IV, e-con, StereoLabs, Intel RealSense. For the complete list, please click on this link (https://www.neousys-tech.com/en/gmsl2-camera-support-with-pre-built-driver)
PA-60W-OW	60W AC/DC power adapter 12V/5A; cord end terminals for terminal block, operating temperature: -30 to 60°C
PA-160W-OW	160W AC/DC power adapter 20V/8A; 18AWG/120cm; cord end terminals for terminal block, operating temperature: -30 to 70°C

NRU-160-FT Series

Type	Model Name	Description
	Cbl-FAKRA-ZFM-ZFM-12M	Waterproof FAKRA Z-code Female to Waterproof FAKRA Z-code Female, Length: 12M
	Cbl-M12X8M-RJ45F-100CM	Waterproof M12 (8-pole-X-coded) to RJ45 Female, CAT6A, Length: 100CM
	Cbl-M12A8M-2U2TA-180CM1	Waterproof M12 (8-pole-A-coded) to 2x USB 2.0 type A (female), Length: 180CM
	Cbl-M12A8M-2DB9M_OW2-180CM1	M12 A-Code Male 8P to x2 DB9 Male+2P, Length: 180CM
	Cbl-M12A17M-VGA-180CM2	M12 (17-pole-A-coded-S) to VGA (male), Length : 180CM

Cable Kit

NRU-160-FT Series cable kit		
Cblkit-NRU-161V-FT	6xCbl-FAKRA-ZFM-ZFM-12M	1xCbl-M12X8M-RJ45F-100CM
	1xCbl-M12A8M-2U2TA-180CM1	1xCbl-M12A8M-2DB9M_OW2-180CM1
	1xCbl-M12A17M-VGA-180CM2	
Cblkit-NRU-162S-FT	5xCbl-M12X8M-RJ45F-100CM	1xCbl-M12A8M-2U2TA-180CM1
	1xCbl-M12A8M-2DB9M_OW2-180CM1	1xCbl-M12A17M-VGA-180CM2