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# INDUSTRIAL EDGE COMPUTING SOLUTIONS

Scalable Platforms for AI, Automation, and Embedded Applications

1H2026 Vol.01

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# INDUSTRIAL EDGE COMPUTING SOLUTIONS

Scalable Platforms for AI, Automation,  
and Mission-Critical Deployment

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## ABOUT SHUTTLE

Established in 1983, Shuttle is an international supplier of commercial mini-PCs and industrial computing solutions. Drawing on more than 40 years of engineering experience, Shuttle offers dependable, scalable, and high-performance platforms customized for edge computing, automation, artificial intelligence, and industry-focused applications. Our range includes everything from compact edge devices to modular industrial PCs and dedicated medical platforms, all created to address the changing needs of today's connected environments.

# APPLICATIONS ACROSS INDUSTRIES

## Enabling Intelligent Operations in Every Environment

Shuttle industrial platforms are designed to support a wide range of real-world applications, from factory automation and AI-powered vision systems to smart retail and healthcare environments. Built for adaptability, our solutions integrate seamlessly into diverse industries, delivering real-time processing, intelligent decision-making, and reliable system control.



# APPLICATIONS

# ENGINEERED FOR REAL-WORLD DEPLOYMENT

Reliability, Longevity, and Integration at the Core

Industrial computing demands more than performance — it requires long-term reliability, deployment flexibility, and seamless system integration.

Shuttle's industrial computing platforms are designed to operate in demanding environments, supporting continuous operation, wide temperature ranges, and flexible I/O configurations.

Our product portfolio spans from ultra-compact edge systems to modular industrial platforms and certified medical solutions, enabling businesses to deploy with confidence and select the right solution for diverse application needs.

## BUILT TOUGH

EMC and Safety Certifications ensure electromagnetic compatibility and operational safety  
Rugged aluminum chassis provides superior heat dissipation and protection  
Industrial-grade durability withstands harsh operating conditions; specialized compliance for medical, military, and transportation applications

## ULTIMATE CONNECTIVITY

Customizable I/O Modular Design meets specific application requirements  
Multiple expansion options support legacy and modern interfaces  
Industrial protocol support for specialized equipment

## NONSTOP PERFORMANCE

Industrial-grade products deliver stable and unstopable operation  
Fanless models ensure lower maintenance and higher reliability  
Advanced thermal dissipation technology maintains optimal performance across extreme temperatures

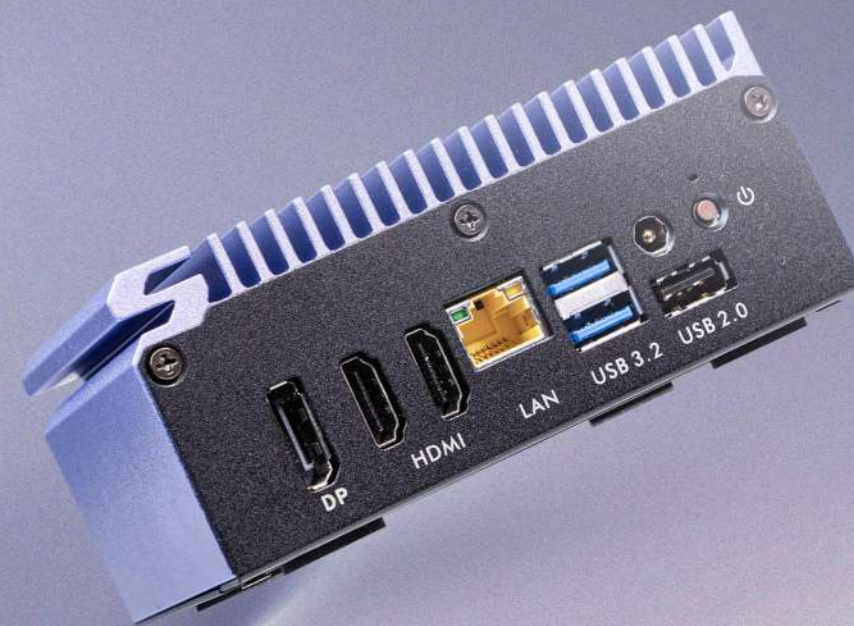
## EXTREME READY

Flexible Voltage Range accommodates unstable power conditions  
Enhanced IP rating design protects against dust and water ingress  
Wide Temperature Range Support for demanding applications

# SHUTTLE IPC

# FROM SENSOR-LEVEL NODES TO AI EDGE INTELLIGENCE

Shuttle IoT Edge Computing systems are designed to bring intelligence closer to where data is generated. With options ranging from ultra-compact embedded nodes to high-performance AI-enhanced platforms, these systems are purpose-built to address diverse workload demands, deployment environments, and scalability requirements, delivering optimal performance, reliability and integration for real-time analytics, autonomous decision-making, and distributed processing across industrial and commercial environments.



IOT EDGE PC

EDGE AI  
READY

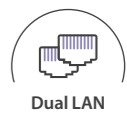
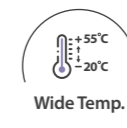
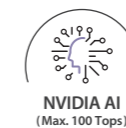
# SPCNV13

## HIGH-PERFORMANCE EDGE AI COMPUTING

Built for Real-Time Inference and Autonomous Systems

The SPCNV13 is a high-performance edge AI system designed for compute-intensive workloads and real-time processing in space-constrained deployments. Powered by NVIDIA® Jetson Orin NX modules, it is available in 8GB and 16GB configurations, with the 16GB version delivering up to 100 TOPS of AI performance for advanced inference and multi-sensor workloads. Its active cooling architecture ensures thermal stability and sustained performance under continuous operation.

Housed in a compact 0.45L rugged aluminum chassis, SPCNV13 supports flexible mounting options such as VESA and DIN rail for easy industrial integration. Rich I/O, including LAN, serial, and digital I/O, enables seamless system connectivity. Ideal for computer vision, robotics, and industrial automation, it provides a scalable and reliable platform for edge AI deployments.



### Features

- NVIDIA® Jetson Orin NX module options : 8GB (70 TOPs) and 16GB (100 TOPs) with Ampere architecture GPU
- Dual LAN ports (Intel® 2.5GbE + Realtek 1GbE)
- Extensive I/O including HDMI, USB 3.2, RS-232/422/485, and digital I/O
- Ensures thermal stability with fan cooling (-20°C to 55°C)
- VESA, DIN Rail, and Ear mount support for industrial environments
- Ubuntu 20.04 for advanced development



# SPCNV03

## COMPACT FANLESS EDGE AI PLATFORM

Optimized for Low-Power Inference and Vision Workloads

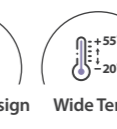
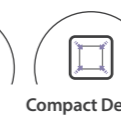
The SPCNV03 is a compact, fanless edge AI system designed for reliable and energy-efficient AI deployment in industrial environments. Powered by NVIDIA® Jetson Orin Nano, it is available in 4GB and 8GB configurations, delivering up to 40 TOPS of AI performance for real-time inference and vision-based workloads.

Housed in a rugged 0.45L aluminum chassis, its fanless thermal design enhances durability and minimizes maintenance in harsh or dust-prone environments. The system features flexible I/O, including LAN, optional 2.5GbE LAN with PoE, serial, and digital I/O, enabling seamless integration with field devices. Ideal for intelligent surveillance, smart retail, and industrial automation, SPCNV03 provides a stable and efficient platform for scalable edge AI deployments.



### Features

- NVIDIA® Jetson Orin Nano module options : 4GB (20 TOPs) and 8GB (40 TOPs) with NVIDIA® Ampere architecture GPU
- M.2 2280 M-Key slot with 128GB PCIe SSD (PCIe only)
- Rugged aluminum chassis compliant with international safety standards
- Dual LAN ports (Intel® 2.5GbE + Realtek 1GbE), featuring Wake on LAN support
- Ultra-compact 120mm x 75mm x 51mm form factor weighing just 0.7kg
- Comprehensive I/O with HDMI 1.4, USB 3.2, RS-232/422/485, and Digital I/O





# SPCELO2 , SPCELO3



## ULTRA-COMPACT EDGE COMPUTING PLATFORM

Enabling IoT Device Integration and On-site Deployment

Shuttle's SPCELO2/03 redefines compact edge computing with its ultra-small 0.45L form factor, combining rugged design, fanless operation, and reliable performance. Powered by Intel® Elkhart Lake processors, it supports DDR4-3200 memory, M.2 storage, and optional wireless connectivity for efficient IoT processing. The system features a default single LAN configuration, with an optional second LAN port available, including a PoE PD version for flexible deployment, alongside COM and digital I/O for device integration. Flexible mounting options such as DIN rail and VESA enable easy deployment in space-constrained environments. Ideal for IoT gateways, automation, control systems, and video surveillance.



### Features

- Intel® Elkhart Lake CPU options with integrated Graphics : Celeron® J6412 (SPCELO2), and Atom® x6413E (SPCELO3)
- M.2 M-Key expansion for SATA SSD and E-Key for additional WLAN module
- Multiple I/O including USB 3.2 Gen2, COM, Digital I/O
- 4K / UHD support via 1 x HDMI 2.0
- Fanless operating temperature :  
 SPCELO2 0°C~40°C / SPCELO3 -20°C~60°C
- In compliance with EN50155 and MIL-STD-810G standards
- Up to dual 2.5GbE LAN with BIOS Wake-on-LAN support


# SPCEL12 SPCEL13

## TRIPLE-DISPLAY EDGE COMPUTING SYSTEM


Enhancing Real-Time Content Delivery Across Diverse Applications


Shuttle's SPCEL12/13 combines ultra-compact 0.45L design with reliable edge computing performance for multi-display and content-driven applications. Powered by Intel® Elkhart Lake processors, it supports triple-display output via HDMI and DisplayPort, enabling real-time content processing and synchronized visual delivery across retail, transportation, and enterprise environments. The fanless design and rugged aluminum chassis ensure stable operation, while flexible mounting options simplify deployment in space-constrained scenarios. The SPCEL13 further extends capability with wide temperature operations (-20°C to 60°C), allowing stable operation in demanding commercial and industrial scenarios.

SPCEL13




SPCEL12







Triple Displays



DDR4



Din Rail



M.2 x 2



### Departures

Time	Destination	Gate	Status
07:30	Washington	A17	Delayed to 15:00
10:55	Munich	A21	Boarding
11:05	Shannon	A20	Flight closing
11:05	Brussels	A18	Go to Gate
11:20	Lisbon	A24	Go to Gate
11:20	Edinburgh	B38	Go to Gate
11:25	Istanbul	B42	Gate shown 10:45
11:30	Frankfurt	B31	Boarding
11:30	Singapore	B31	Go to Gate
11:40	Houston	B31	Gate shown 11:05
11:50	Zagreb	B31	Gate shown 11:10
11:50	Rijeka	B31	Gate shown 11:10
13:05	Montreal	A17	Gate shown 12:05
13:25	Dublin	A17	Gate shown 12:35
13:30	Frankfurt	A17	Gate shown 12:45
13:35	Singapore	A17	Gate shown 12:25
13:40	Houston	A17	Gate shown 12:40
13:45	Zurich	A17	Gate shown 13:00
13:45	Lisbon	A17	Gate shown 13:00
13:50	Cork	A17	Gate shown 13:00
13:50	Munich	A17	Gate shown 13:05
13:50	Stockholm	A17	Gate shown 13:20
14:05	Stuttgart	A17	Gate shown 13:35
14:05	Copenhagen	A17	Gate shown 13:10
14:10	Vancouver	A17	Gate shown 13:10
14:10	San Francisco	A17	Gate shown 13:25
14:15	Dublin	A17	Gate shown 13:45
14:30	Geneva	A17	Gate shown 13:50
15:20	Vienna	OS462	Gate shown 14:00
15:20	Chicago	LH9356	Gate shown 14:00
15:25	Aberdeen	NZ442	Gate shown 14:00
15:30	Frankfurt	LH905	Gate shown 14:00
15:35	Oslo	SK8	Gate shown 14:00
15:50	Dublin	E11	Gate shown 14:00
16:00	Newark	U	Gate shown 14:00
16:15	Edmonton	U	Gate shown 14:00
16:15	Auckland	U	Gate shown 14:00
16:20	Munich	U	Gate shown 14:00
16:20	Washington	U	Gate shown 14:00
16:25	Edinburgh	U	Gate shown 14:00
16:30	Istanbul	U	Gate shown 14:00
16:35	Athens	U	Gate shown 14:00
16:45	Frank	U	Gate shown 14:00
16:50	Dub	U	Gate shown 14:00
17:00	Za	U	Gate shown 14:00
17:00	C	U	Gate shown 14:00
17:05		U	Gate shown 14:00

### Features

- Intel® Elkhart Lake CPU options with integrated Graphics : Celeron® J6412 (SPCEL12), and Atom® x6413E (SPCEL13)
- 4K / UHD triple-display support with 2 x HDMI 2.0 and 1 x DP 1.4
- Up to dual 2.5Gbe LAN with BIOS Wake-on-LAN support
- Multiple installation support : DIN rail, VESA, Ear Mount
- In compliance with EN50155 and MIL-STD-810G standards
- M.2 M-Key, B-Key expansion for SATA / SSD / 4G / LTE card and E-Key for additional WLAN module
- Fanless operating temperature :
  - SPCEL02 0°C~40°C / SPCEL03 -20°C~60°C

		SPCNV03	SPCNV13	SPCELO2	SPCELO3	SPCEL12	SPCEL13	
<b>COOLING SYSTEM</b>		Fanless	Smart Modular Fan	Fanless	Fanless	Fanless	Fanless	
<b>PROCESSOR</b>		<ul style="list-style-type: none"> <li>JETSON Orin™ Nano 8GB</li> <li>JETSON Orin™ Nano 4GB</li> </ul>	<ul style="list-style-type: none"> <li>JETSON Orin™ NX 16GB</li> <li>JETSON Orin™ NX 8GB</li> </ul>	Intel® Celeron® J6412	Intel® Atom® x6413E	Intel® Celeron® J6412	Intel® Atom® x6413E	
<b>CHIPSET</b>		Integrated in SoC	Integrated in SoC	Integrated in CPU	Integrated in CPU	Integrated in CPU	Integrated in CPU	
<b>GRAPHICS</b>		<ul style="list-style-type: none"> <li>1024-core NVIDIA® Ampere architecture GPU (8GB)</li> <li>512-core NVIDIA® Ampere architecture GPU (4GB)</li> </ul>	1024-core NVIDIA® Ampere architecture GPU with 32 Tensor Cores	Intel® UHD Graphics for 10 <sup>th</sup> Gen Intel® Processors		Intel® UHD Graphics for 10 <sup>th</sup> Gen Intel® Processors	Intel® UHD Graphics for 10 <sup>th</sup> Gen Intel® Processors	
<b>DISPLAY RESOLUTION MAX.</b>		HDMI : 1920 x 1080@60Hz	HDMI : 1920 x 1080@60Hz	HDMI : 4096 x 2160@60Hz	HDMI : 4096 x 2160@60Hz	HDMI : 4096 x 2160@60Hz	HDMI : 4096 x 2160@60Hz	
<b>DISPLAY OUTPUT</b>		1 Display	1 Display	1 Display	1 Display	3 Displays	3 Displays	
<b>VIDEO DECODER</b>		H.265 (HEVC), H.264, VP9, VP8, AV1, MPEG-4, MPEG-2, and VC-1		H.265 / HEVC, VP9, H.264, VP8, WMV9 / VC1, MPEG-2, VC-1, JPEG / MJPEG		H.265 / HEVC, VP9, H.264, VP8, WMV9 / VC1, MPEG-2, VC-1, JPEG / MJPEG		
<b>MEMORY</b>		<ul style="list-style-type: none"> <li>8GB 128-bit LPDDR5 @2133 MT/s, 68 GB/s</li> <li>4GB 64-bit LPDDR5 @2133 MT/s, 34 GB/s</li> </ul>	<ul style="list-style-type: none"> <li>16GB 128-bit LPDDR5 @2133 MT/s, 102.4 GB/s</li> <li>8GB 128-bit LPDDR5 @2133 MT/s, 102.4 GB/s</li> </ul>	1 x DDR4 up to 3200 MT/s, Max. 32GB	1 x DDR4 up to 3200 MT/s, Max. 32GB	1 x DDR4 up to 3200 MT/s, Max. 32GB	1 x DDR4 up to 3200 MT/s, Max. 32GB	
<b>STORAGE</b>		1 x M.2 2280, M-Key (PCIe 3.0 x 4 NVMe)	1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe)	<ul style="list-style-type: none"> <li>1 x M.2 2280/2240, M-Key (SATA)</li> <li>1 x micro SD card slot</li> </ul>	<ul style="list-style-type: none"> <li>With M.2 E-Key WLAN sku, only 2242 can support</li> </ul>	<ul style="list-style-type: none"> <li>1 x M.2 2280/2240, M-Key (SATA)</li> <li>1 x micro SD card slot</li> </ul>	<ul style="list-style-type: none"> <li>With M.2 E-Key WLAN sku, only 2242 can support</li> </ul>	
<b>VIDEO OUTPUT</b>	HDMI Port	1 x HDMI 1.4	1 x HDMI 1.4	1 x HDMI 2.0	1 x HDMI 2.0	2 x HDMI 2.0	2 x HDMI 2.0	
	DisplayPort	-	-	-	-	1 x DP 1.4	1 x DP 1.4	
	VGA Port	-	-	-	-	-	-	
<b>I/O PORT</b>	USB	1 x USB 3.2 Gen2 / 1 x USB OTG 3.2 Gen2	1 x USB 3.2 Gen2 / 1 x USB OTG 3.2 Gen2	2 x USB 3.2 Gen2 / 1 x USB 2.0	2 x USB 3.2 Gen2 / 1 x USB 2.0	2 x USB 3.2 Gen2 / 1 x USB 2.0	2 x USB 3.2 Gen2 / 1 x USB 2.0	
	Serial Ports	1 x RS232/422/485 (DB-9) / 1 x DI/DO	1 x RS232/422/485 (DB-9) / 1 x DI/DO	1 x RS232/422/485 (DB-9) / 1 x DI/DO	1 x RS232/422/485 (DB-9) / 1 x DI/DO	-	-	
	Audio	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in	-	-	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in	
	SIM slot	-	-	-	-	1 x SIM Card	1 x SIM Card	
	LAN	<ul style="list-style-type: none"> <li>1 x RJ-45 (Realtek 1GbE LAN)</li> <li>1 x RJ-45 (Intel® 2.5GbE LAN)</li> </ul>	<ul style="list-style-type: none"> <li>1 x RJ-45 (Realtek 1GbE LAN)</li> <li>1 x RJ-45 (Intel® 2.5GbE LAN)</li> </ul>	2 x RJ-45 (Intel® 2.5GbE LAN)	2 x RJ-45 (Intel® 2.5GbE LAN)	2 x RJ-45 (Intel® 2.5GbE LAN)	2 x RJ-45 (Intel® 2.5GbE LAN)	
<b>NETWORK</b>	WLAN	<ul style="list-style-type: none"> <li>1 x M.2 2230, E-Key</li> <li>Intel® WiFi Module (802.11 a/b/g/n/ac) + BT 5.0</li> <li>Realtek RTL8821CE (802.11 a/b/g/n/ac) + BT 5.0 (Optional)</li> </ul>	<ul style="list-style-type: none"> <li>External antenna (Dipole)</li> </ul>	<ul style="list-style-type: none"> <li>1 x M.2 2230, E-Key</li> <li>Intel® WiFi Module (802.11 a/b/g/n/ac) + BT 5.0</li> <li>Realtek RTL8821CE (802.11 a/b/g/n/ac) + BT 5.0 (Optional)</li> </ul>	<ul style="list-style-type: none"> <li>External antenna (Dipole)</li> </ul>	<ul style="list-style-type: none"> <li>1 x M.2 2230 E-Key</li> <li>Intel® WiFi Module (802.11 a/b/g/n/ac) + BT 5.0</li> <li>Realtek RTL8821CE (802.11 a/b/g/n/ac) + BT 5.0 (Optional)</li> </ul>	<ul style="list-style-type: none"> <li>External antenna (Dipole)</li> </ul>	
	WWAN	-	-	-	-	1 x M.2 3042, B Key	4G / LTE (Optional)	
	<b>MOUNTING</b>	VESA 100 x 100 mm / Din Rail Mount 50 x 50 mm / Din Rail clip / Ear Mount (Optional)		VESA 100 x 100 mm / Din Rail Mount 50 x 50 mm / Din Rail / Ear Mount (Optional)		VESA 100 x 100 mm / Din Rail Mount 50 x 50 mm / Din Rail / Ear Mount (Optional)		VESA 100 x 100 mm / Din Rail Mount 50 x 50 mm / Din Rail / Ear Mount (Optional)
<b>DIMENSION (L/W/H) mm</b>		120 x 75 x 51	120 x 75 x 51	120 x 75 x 51	120 x 75 x 51	120 x 75 x 51	120 x 75 x 51	
<b>WEIGHT</b>	NW (kg)	0.7	0.7	0.7	0.7	0.7	0.7	
	GW (kg)	1.2	1.2	1.2	1.2	1.6	1.6	
<b>CERTIFICATION</b>		<ul style="list-style-type: none"> <li>Safety : cTUVus, CB, CEC, BSMI, UKCA</li> </ul>	<ul style="list-style-type: none"> <li>EMC : FCC Class A, CE Mark, VCCI, BSMI, RCM, UKCA</li> </ul>	<ul style="list-style-type: none"> <li>Safety : cTUVus, CB, CEC, BSMI, UKCA</li> </ul>	<ul style="list-style-type: none"> <li>EMC : FCC Class A, CE Mark, VCCI, BSMI, RCM, UKCA</li> </ul>	<ul style="list-style-type: none"> <li>Safety : cTUVus, CB, CEC, BSMI, UKCA</li> </ul>	<ul style="list-style-type: none"> <li>EMC : FCC Class A, CE Mark, VCCI, BSMI, RCM, UKCA</li> </ul>	
<b>OPERATING TEMPERATURE (°C)</b>		-20°C~55°C	-20°C ~ 55°C	0°C ~ 40°C	-20°C ~ 60°C	0°C ~ 40°C	-20°C ~ 60°C	
<b>CHASSIS</b>		Rugged aluminum chassis	Rugged aluminum chassis	Rugged aluminum chassis	Rugged aluminum chassis	Rugged aluminum chassis	Rugged aluminum chassis	
<b>POWER SUPPLY</b>	Power Input	DC 12~24V, 3-pin terminal block	DC 12~24V, 3-pin terminal block	DC 12~24V, 3-pin terminal block	DC 12~24V, 3-pin terminal block	DC 12~20V, 3-pin terminal block	DC 12~20V, 3-pin terminal block	
	Power Adapter	19V / 65W adapter (Optional)	19V / 65W adapter (Optional)	19V / 65W adapter (Optional)	19V / 65W adapter (Optional)	19V / 65W adapter	19V / 65W adapter	
<b>OPERATING SYSTEM</b>		Linux Ubuntu 22.04	Linux Ubuntu 22.04	Windows 11 IoT Enterprise 64bit OS / Linux		Windows 11 IoT Enterprise 64bit OS / Linux	Windows 11 IoT Enterprise 64bit OS / Linux	

EMBEDDED BOX PC



## SCALABLE EMBEDDED COMPUTING FOR INDUSTRIAL EDGE

The BPC Series provides embedded box PCs designed for industrial edge applications. From AI-enabled platforms to energy-efficient control systems, it covers multiple performance tiers. With modular I/O, fanless design, and wide temperature support, it ensures flexible deployment and reliable long-term operation. This scalable portfolio supports efficient deployment across automation control, monitoring, and edge environments.



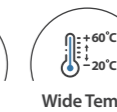
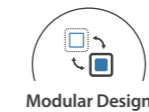
# FOR VISION PROCESSING AND REAL-TIME ANALYSIS



## AI-Accelerated Embedded Systems

The BPCAR02 and BPCAR03 are AI-ready rugged computers powered by Intel® Core™ Ultra (Arrow Lake-U) processors. These fanless systems feature an integrated NPU to support AI acceleration at the edge with efficient performance. Both support up to 64GB DDR5 memory and are built with a rugged aluminum chassis. BPCAR02 is designed for standard industrial environments (0°C to 40°C), while BPCAR03 supports extended temperature operation (-20°C to 60°C) for harsher conditions. With HDMI 2.1 and versatile I/O connectivity, they provide a reliable and adaptable solution for AI-enabled industrial applications. The platform enables scalable deployment across automation control, machine vision, interactive kiosk and real-time image processing.

# BPCAR02 BPCAR03



## Features

- Intel® Core™ Ultra 7/5 (Arrow Lake-U) processors built on 3nm architecture, with integrated NPU for AI acceleration
- Up to quad displays via default / optional HDMI ports
- Modular I/O configurations to meet diverse application needs
- Operating Temperature : **BPCAR02** 0°C to 40°C with 90W adapter / **BPCAR03** -20°C to 60°C with 150W adapter
- Rich connectivity including dual Intel® 2.5GbE LAN, multiple USB 3.2 Gen2, and serial ports
- Multiple installation support : VESA, Ear Mount, DIN rail

# BPCRL02 BPCRL03

## INDUSTRIAL COMPUTING WITH FLEXIBLE INTEGRATION

For Control, Monitoring and System Deployment

The BPCRL02 and BPCRL03 are fanless industrial computers powered by 13<sup>th</sup> Gen Intel® Raptor Lake-U processors. Built with a rugged aluminum chassis, they support up to 64GB DDR5 memory for demanding multitasking workloads. Designed for power-efficient operation, these systems feature versatile I/O and wide-range 9–36V DC input for flexible deployment across diverse environments. BPCRL02 is suited for standard industrial conditions (0°C–40°C), while BPCRL03 supports extended temperature operation (-20°C to 60°C) for harsher environments. They are ideal for industrial automation, machine control, edge monitoring, and industrial kiosk systems requiring reliable and efficient performance.



### Features

- 13<sup>th</sup> Gen Intel® Raptor Lake-U processors (Core™ i7/i5/i3 U/UE, Core™ 7/5, Intel® Processor U300)
- Intel® Iris® Xe Graphics with 4K HDR and AI-enhanced media
- Modular expansion : optional video output modules (up to 4 independent displays), additional USB and COM ports
- Storage options : 1 × M.2 2280/2242 M-Key (NVMe / SATA), 1 × 2.5" SATA bay
- Rugged fanless aluminum chassis with TPM 2.0 security
- Operating Temperature : **BPCRL02** 0°C to 40°C with 90W adapter / **BPCRL03** -20°C to 60°C with 150W adapter

# BPCAL02 , BPCAL03

## RELIABLE COMPUTING FOR INDUSTRIAL OPERATIONS

Built for Continuous Performance and Long-Term Use

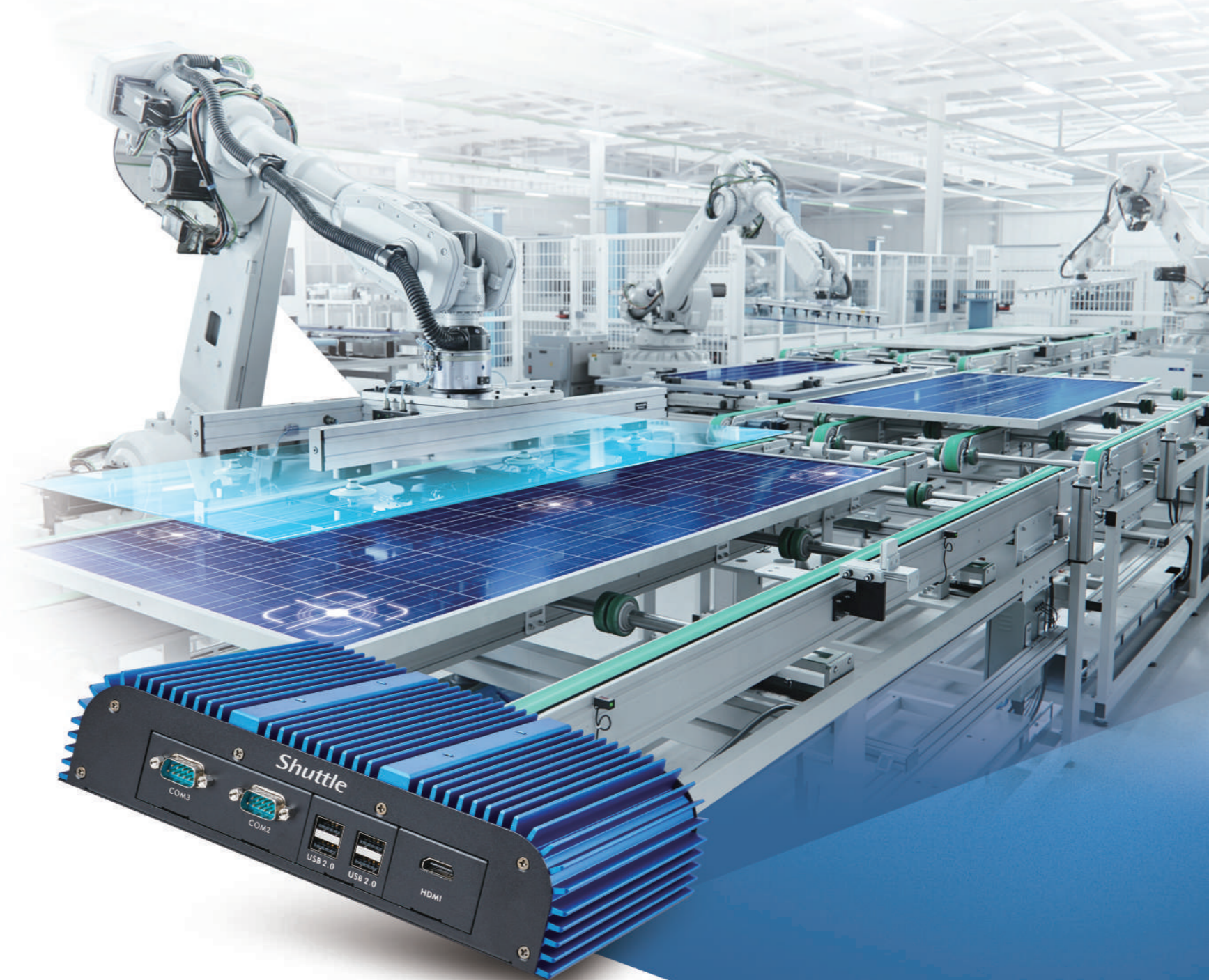
The BPCAL02 and BPCAL03 are fanless industrial computers powered by Intel® 12<sup>th</sup> Gen Alder Lake-U processors, featuring a hybrid architecture with Performance-cores and Efficient-cores for balanced computing efficiency. Built with a rugged aluminum chassis, they support up to 64GB DDR5 memory and up to triple-display output via HDMI and DisplayPort. These systems offer comprehensive connectivity, including dual LAN and USB 3.2 Gen 2, for flexible industrial integration. BPCAL02 is designed for standard operating conditions (0°C–40°C), while BPCAL03 supports extended temperature operation (-20°C to 60°C) for harsher environments. They are ideal for industrial automation, monitoring systems, HMI applications, and standardized edge deployments.



### Features

- 12<sup>th</sup> Gen. Intel® Alder Lake U-series (15W Core™ and Celeron® options)
- Multiple installation support : VESA, Ear Mount, DIN rail
- Dual Intel® LAN, 4 x USB 3.2 Gen2, 4 x USB 2.0, 3 x RS232, M.2 2280 M-Key, and M.2 2230 E-Key
- Max four independent displays via HDMI 2.0 and optional video output expansion kits
- Modular I/O configurations to meet diverse application needs
- Operating Temperature : **BPCAL02** 0°C~40°C / **BPCAL03** -20°C~60°C

\* Intel® Iris® Xe graphics for Core i5 / i7 models only





# BPCEL02 , BPCEL03 , BPCEL07



## ENERGY-EFFICIENT EMBEDDED COMPUTING

Ideal for Industrial Control and Distributed Applications

The BPCEL02, BPCEL03, and BPCEL07 are rugged fanless computers powered by Intel® Elkhart Lake processors. Designed for IoT and embedded edge applications, they support up to 32GB DDR4 memory and feature flexible connectivity, including dual LAN and multiple display outputs. Their robust aluminum chassis ensures reliable operation across various environments: BPCEL02 for standard conditions, BPCEL03 for wide-temperature operation (-20°C to 60°C), and BPCEL07 for extreme environments (-30°C to 70°C). These systems are well suited for industrial automation, smart city monitoring, healthcare devices, and embedded control applications, delivering a balance of low power consumption and reliable processing.

### Features

- Intel® Elkhart Lake processors : Pentium® J6426 / Celeron® J6412/ Atom® x6425E
- 4 x USB 3.2 Gen 1, 4 x USB 2.0, 3 x RS232, M.2 2280 M-Key, and M.2 2230 E-Key
- Dual Intel® 2.5GbE LAN supports Wake On LAN
- Dual independent displays via HDMI (Support up to triple displays through optional video output expansion kit)
- Multiple installation support : VESA, Ear Mount, DIN rail
- Dual DDR4 3200 MT/s memory, up to 32GB



Modular Design



Flex Voltage Support  
(Optional)



Wide Temp.  
(BPCEL07 only)



Dual LAN



Fanless



		BPCEL02	BPCEL03	BPCEL07
SYSTEM	Processor	Intel® Elkhart Lake SKUs : Pentium J6426, Atom® x6425E, Celeron® J6412		Intel® Elkhart Lake Atom® x6425E
	Memory	<ul style="list-style-type: none"> <li>• 2 x 260 pin SO-DIMM up to 32GB</li> <li>• Dual Channel DDR4 3200 MT/s</li> </ul>		
	BIOS	AMI UEFI 64 Mbit		
GRAPHICS	Chipset	Intel® UHD Graphics		
	Display Interface	2 x HDMI 2.0: 4096 x 2160@60Hz		
	Display Output	Supports up to 3 independent or clone displays		
	Video Decoder	MPEG-2, WMV9 / VC1, H.264, JPEG / MJPEG, H.265 / HEVC, VP8, VP9		
STORAGE	Internal	1 x M.2 2280 / 2240, M-Key (PCIe 3.0 x 4 NVMe / SATA)		
AUDIO	Audio Codec	Realtek ALC888S-VD 2-channel		
NETWORK	Ethernet	<ul style="list-style-type: none"> <li>• 2 x Intel® 2.5GbE LAN</li> <li>• Support Wake On LAN</li> </ul>		
	WLAN	<ul style="list-style-type: none"> <li>• 1 x M.2 2230, E-Key</li> <li>• Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional)</li> <li>• External antenna (Dipole) x 2 (Optional)</li> </ul>		
	WWAN	4G / LTE (Optional)		
I/O INTERFACE	Serial Ports	<ul style="list-style-type: none"> <li>• 1 x RS-232 (DB-9)</li> <li>• 2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) &amp; 12V (with specific optional board)</li> </ul>		
	USB	<ul style="list-style-type: none"> <li>• 4 x USB 3.2 Gen1 (Type-A)</li> <li>• 4 x USB 2.0</li> </ul>		
	Audio	1 x Line-out / 1 x Mic-in		
POWER	Bundled Adapter	19V / 4.74A 90W external adapter	19V / 7.89A 150W external adapter	19V / 7.89A 150W external adapter
	Option	With optional wide range board, MB support 9-36V DC-in		
WATCHDOG TIMER	Watchdog	Support watchdog		
OS SUPPORT	OS Support	Windows 11 64bit / Linux 64bit		
MECHANISM	Mounting	VESA Mount 75 x 75 mm / Ear Mount 256 x 100 mm / Din Rail		
	Dimension (L/W/H) mm	245 x 169 x 57	245 x 169 x 57	245 x 169 x 57
	Weight	2.85kg		2.85kg
ENVIRONMENT	Operating Temperature	0°C ~ 40°C	-20°C ~ 60°C	-30°C ~ 70°C
	Relative Humidity	10% - 90% RH (non-condensing)	10% - 90% RH (non-condensing)	10% - 90% RH (non-condensing)
	EMC	CE, FCC, VCCI, BSMI, RCM, UKCA	CE, FCC, VCCI, BSMI, RCM, UKCA	CE, FCC, VCCI, BSMI, RCM, UKCA
	Safety	cTUVus, CB, CEC, BSMI, UKCA	cTUVus, CB, CEC, BSMI, UKCA	cTUVus, CB, CEC, BSMI, UKCA

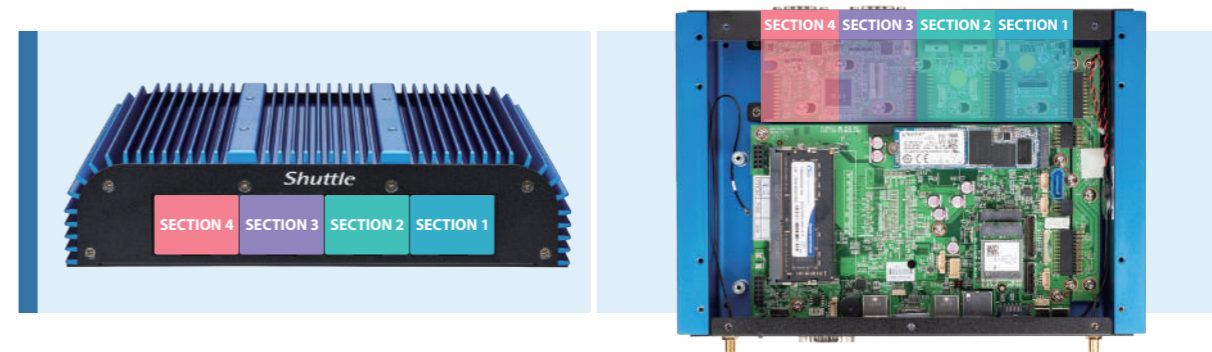
## Modular I/O. Built for Your Application

Customize ports without redesigning your system.

Shuttle's Embedded Box PCs offer a flexible I/O design, enabling easy customization and optimization of IoT applications for maximum efficiency.


The front panel is divided into 4 sections, each designed to accommodate optional expansion kits equipped with daughter boards, allowing for the addition of I/O ports.

\*Expansion must begin with Section 1, with subsequent kits occupying Section 2, and so on.




## Guidance for Video Output Port Customized Configuration

BACK PANEL

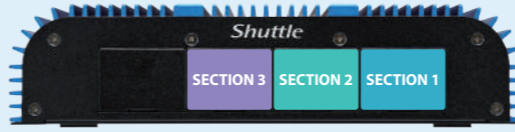


DEFAULT VIDEO OUTPUT









HDMI







FRONT PANEL



VIDEO OPTIONS | BPCAL/RL SERIES

SECTION 1+2	SECTION 3
   	 

VIDEO OPTIONS | BPCEL/WL SERIES

SECTION 1	SECTION 2
   	 

# TOUCH PANEL PC



## RUGGED FANLESS PANEL PC WITH FRONT IP65 PROTECTION

Shuttle's Industrial HMI / Panel PCs are built with a rugged aluminum housing and are available in 15.6 and 21.5 inches screen size. They feature durable IP65 front protection, multi-touch technology, and flexible computing options. Additionally, the I/O interfaces can be customized to meet specific requirements, ensuring seamless integration into industrial applications.

# P21AR01

# P15AR01



P21AR01



P15AR01

## INTEL® ARROW LAKE PANEL PC

### Enabling Advanced Industrial Intelligence

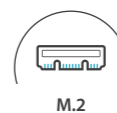
Shuttle P21AR01 and P15AR01 are a new series of Industrial Touch Panel PCs that deliver powerful computing performance. Engineered for advanced industrial environments that require reliable processing capabilities, these robust fanless systems are powered by Intel® Core™ Ultra 5/7 processors based on Arrow Lake architecture. Available in 15.6" (P15AR01) or 21.5" (P21AR01) FHD multi-touch displays with IP65-rated front panel protection, they offer comprehensive I/O options, including multiple USB 3.2 Gen2 ports, HDMI 2.1 (7680 × 4320@60Hz), and dual Intel® 2.5 Gigabit LAN. With support for versatile mounting options and wide-range power input, these panels are ideal for factory equipment control, process automation, machine vision-assisted inspection, and real-time data monitoring, ensuring reliable and continuous operation.



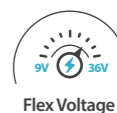
DDR5

IP65  
(Front Panel)

COM x 2



M.2

Easy Swap  
StorageFlex Voltage  
Support

Fanless

### Features

- Intel® Core™ Ultra 7/5 processors (225U, 235U vPro, 255U, 265U vPro), 15W TDP
- True-flat capacitive touchscreen with IP65-rated front panel
- Storage : M.2 2280 M-Key (NVMe / SATA) and 2.5" SATA SSD drive bay (P21AR01 Only)
- Connectivity : 4 x USB 3.2 Gen2, configurable RS-232/422/485, dual Intel® 2.5GbE LAN, and more options
- Rugged design : fanless, aluminum chassis, IP65 front panel, hidden switch
- Operating temperature : 0–40°C ; optional 9–36V DC input
- Dual DDR5-6400 memory up to 64GB
- Intel® vPro® support (select SKUs)



P21RL01



P15RL01

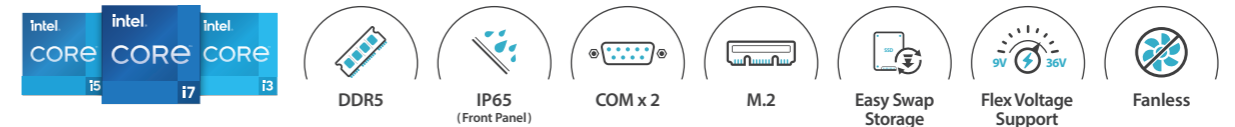


# P21RL01 , P15RL01

## INTEL® RAPTOR LAKE PANEL PC

Versatile Performance for Industrial Applications

Shuttle P21RL01 and P15RL01 are durable industrial-grade Touch Panel PCs powered by the Intel® 13<sup>th</sup> Gen Raptor Lake processors. Featuring nine U-series processor options, they deliver reliable computing performance to meet diverse industrial applications' needs. Featuring an IP65-rated front panel and FHD multi-touch display, these systems are designed for reliable operation in dusty and semi-harsh environments. Moreover, their comprehensive I/O include multiple USB 3.2 Gen2 ports, configurable RS232 serial connections, and dual Intel® 2.5GbE LAN, making it ideal for industrial automation systems, interactive Kiosks, smart retail, and manufacturing control interfaces.



### Features

- 13<sup>th</sup> Gen Intel® Raptor Lake-U processors (Core™ i7/i5/i3 U/UE, Core™ 7/5, Intel® Processor U300), 15W TDP
- True-flat capacitive touchscreen, 15.6" (P15RL01) / 21.5" (P21RL01), with IP65-rated front panel
- Dual DDR5 memory up to 64GB
- Operating temperature : 0–40°C ; optional 9–36V DC input
- Rugged design : fanless, aluminum chassis, IP65 front panel, hidden switch
- Connectivity : 4 x USB 3.2 Gen2, 2 x COM (RS-232/422/485), dual Intel® 2.5GbE LAN, and more options

# P21AL01 P15AL01



P21AL01



P15AL01



## INTEL® ALDER LAKE PANEL PC

### Balancing Performance and Efficiency

The Shuttle P21AL01 and P15AL01 are industrial-grade fanless Panel PCs powered by 12<sup>th</sup> Gen Intel® Alder Lake-U/UE processors, featuring a hybrid architecture that combines performance and efficiency cores for responsive multitasking and optimized power usage.

Equipped with Full HD multi-touch displays and IP65-rated front panel protection, they ensure durability and intuitive operation in demanding environments. With support for DDR5 memory up to 64GB, dual-display capability, and flexible I/O configurations, these systems enable seamless integration across diverse applications.

Designed for industrial automation, smart retail, and interactive systems, they deliver stable performance and long-term reliability in continuous operation.



### Features

- 12<sup>th</sup> Gen Intel® Alder Lake-U/UE processors
- 15.6" / 21.5" Full HD capacitive 10-point multi-touch display with IP65-rated front panel
- Dual independent display via HDMI 2.0 (4096 x 2160 @60Hz) and VGA
- Connectivity : 4 x USB 3.2 Gen 2 (Type-A), 2 x COM (RS-232), 1 x Intel® 2.5GbE LAN, and more options
- Expansion : 2 x M.2 slots (SSD and WLAN)
- Rugged design : fanless, aluminum chassis, IP65 front panel, hidden switch
- Operating temperature : 0–40°C ; optional 9–36V DC input
- Storage : M.2 2280 M-Key ( NVMe / SATA ) and 2.5" SATA SSD drive bay (P21AL01 Only)



# P21EL01 , P15EL01

## INTEL® ELKHART LAKE PANEL PC

### Optimizing IoT and Industrial Efficiency

Shuttle P21EL01 and P15EL01 are sleek and fanless Panel PCs in 21.5-inch and 15.6-inch sizes, designed to deliver efficient and reliable performance for IoT and industrial computing tasks. With CPU options including Intel® Pentium® J6426, Intel® Atom® x6425E, and Intel® Celeron® J6412, they support dual-channel DDR4-3200 MT/s memory up to 32GB.

Featuring an IP65-rated front panel and customizable I/O configurations, these panel PCs ensure durability and flexibility in demanding environments. With HDMI 2.0 for 4K graphics and seamless connectivity via a 2.5GbE LAN port, they are well-suited for applications such as self-service kiosks, information terminals, equipment control interfaces, and production monitoring systems, delivering stable and energy-efficient performance across a wide range of industrial environments.



### Features

- Intel® Elkhart Lake processors : Pentium® J6426, Atom® x6425E, Celeron® J6412
- 15.6" / 21.5" Full HD capacitive 10-point multi-touch display with IP65-rated front panel
- Connectivity : 4 x USB 3.2 Gen 1 (Type-A), 1 x COM (RS-232), 2 x COM (RS-232/422/485), 1 x Intel® 2.5GbE LAN, and more options
- Dual independent display via HDMI 2.0 and optional DVI-I / VGA
- Expansion : 2 x M.2 slots (SSD and WLAN)
- Storage : M.2 2280 M-Key (NVMe / SATA) and 2.5" SATA SSD drive bay (P21EL01 Only)
- Operating temperature : 0–40°C ; optional 9–36V DC input
- Rugged design : fanless, aluminum chassis, IP65 front panel, hidden switch



P21EL01



P15EL01

		P21AR01	P21RL01	P21AL01	P21EL01
SYSTEM	Processor	Intel® Arrow Lake SKUs : Core™ Ultra 5 225U, Ultra 5 235U, Ultra 7 255U, Ultra 7 265U	• 13 <sup>th</sup> Gen. Intel® Raptor Lake SKUs : Core™ i3-1315U, i3-1315UE, i5-1335U, i5-1345UE, i7-1355U, i7-1365UE, U300 • Intel® Raptor Lake Refresh SKUs : Core™ 5-120U, Core™ 7-150U	12 <sup>th</sup> Gen. Intel® Alder Lake SKUs : Core™ i3-1215U, i3-1215UE, i5-1235U, i5-1245UE, i7-1255U, i7-1265UE, Celeron® 7305E	Intel® Elkhart Lake SKUs : Pentium J6426, Atom® x6425E, Celeron® J6412
	BIOS	• 2 x 262 pin SO-DIMM up to 64GB • Dual Channel DDR5 Max to 6400 MT/s	• 2 x 262 pin SO-DIMM up to 64GB • Dual Channel DDR5 5200 MT/s	• 2 x 262 pin SO-DIMM up to 64GB • Dual Channel DDR5 4800 MT/s	• 2 x 262 pin SO-DIMM up to 32GB • Dual Channel DDR4 3200 MT/s
	Memory	AMI UEFI 64bit	AMI UEFI 64bit	AMI UEFI 64bit	AMI UEFI 64bit
DISPLAY AND TOUCH SCREEN	Display	21.5" 1920 x 1080 Full HD TFT LED with 10-Point Projected Capacitive Multi-Touch		21.5" 1920 x 1080 Full HD TFT LED with 10-Point Projected Capacitive Multi-Touch	
	Viewing Angle (H/V°)	89 (left), 89 (right), 89 (up), 89 (down)	89 (left), 89 (right), 89 (up), 89 (down)	89 (left), 89 (right), 89 (up), 89 (down)	89 (left), 89 (right), 89 (up), 89 (down)
	Brightness Contrast Backlight Lifetime	500 cd/m2 1000 : 1 30,000 hrs	500 cd/m2 1000 : 1 30,000 hrs	500 cd/m2 1000 : 1 30,000 hrs	500 cd/m2 1000 : 1 30,000 hrs
GRAPHICS	Chipset	Intel® Graphics	Intel® UHD or Iris® Xe Graphics	Intel® UHD or Iris® Xe Graphics	Intel® UHD Graphics
	Display Interface	• Supports up to 2 external displays • 1 x HDMI 2.1 : 7680 x 4320@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)	• Supports up to 2 external displays • 1 x HDMI 2.0 : 4096 x 2160@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)	• Supports up to 2 external displays • 1 x HDMI 2.0 : 4096 x 2160@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)	• Supports up to 2 external displays • 1 x HDMI 2.0 : 4096 x 2160@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)
	Video Decoder	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1	MPEG-2, WMV9 / VC1, H.264, JPEG / MJPEG, H.265 / HEVC, VP8, VP9
STORAGE	Internal	• 1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA) • 1 x Swappable 2.5" SSD drive bay (SATA) (compatible 7mm)	• 1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA) • 1 x Swappable 2.5" SSD drive bay (SATA) (compatible 7mm)	• 1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA) • 1 x Swappable 2.5" SSD drive bay (SATA) (compatible 7mm)	• 1 x M.2 2280, M-Key (PCIe 3.0 x 4 NVMe / SATA) • 1 x Swappable 2.5" SSD drive bay (SATA) (compatible 7mm)
AUDIO	Audio Codec	Realtek ALC888S-VD 2-channel	Realtek ALC888S-VD 2-channel	Realtek ALC888S-VD 2-channel	Realtek ALC888S-VD 2-channel
NETWORK	Ethernet	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN
	WLAN	• 1 x M.2 2230 E-Key • Realtek RTL8852BE Wi-Fi 6 (802.11a/b/g/n/ac/ax) + Bluetooth 5.2 • External antenna (Dipole) x 2 (Optional)	• 1 x M.2 2230, E-Key • Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional) • External antenna (Dipole) x 2 (Optional)	• 1 x M.2 2230, E-Key • Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional) • External antenna (Dipole) x 2 (Optional)	• 1 x M.2 2230, E-Key • Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional) • External antenna (Dipole) x 2 (Optional)
I/O INTERFACE	Serial Ports	• 1 x RS-232 (DB-9) • 2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) & 12V (with specific optional board))	• 1 x RS-232 (DB-9) (optional board)	• 1 x RS-232 (DB-9) • 2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) & 12V (with specific optional board))	• 1 x RS-232 (DB-9) (optional board)
	USB	• 4 x USB 3.2 Gen2 (Type-A) • 4 x USB 2.0 (optional board)	• 4 x USB 3.2 Gen2 (Type-A) • 4 x USB 2.0 (optional board)	• 4 x USB 3.2 Gen2 (Type-A) • 4 x USB 2.0 (optional board)	• 4 x USB 3.2 Gen1 (Type-A) • 4 x USB 2.0 (optional board)
	Audio	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in
POWER	Bundled Adapter	19V / 4.74A 90W external adapter	19V / 4.74A 90W external adapter	19V / 4.74A 90W external adapter	19V / 4.74A 90W external adapter
	Option	With optional wide range board, MB support 9-36V DC-in	With optional wide range board, MB support 9-36V DC-in	With optional wide range board, MB support 9-36V DC-in	With optional wide range board, MB support 9-36V DC-in
WATCHDOG TIMER	Watchdog	Support watchdog	Support watchdog	Support watchdog	Support watchdog
OS SUPPORT	OS Support	Windows 11 64bit / Linux 64bit	Windows 11 64bit / Linux 64bit	Windows 11 64bit / Linux 64bit	Windows 11 64bit / Linux 64bit
MECHANISM	IP Rating	IP65 Front Panel Protection	IP65 Front Panel Protection	IP65 Front Panel Protection	IP65 Front Panel Protection
	Mounting	VESA Mount 100 x 100 mm	VESA Mount 100 x 100 mm	VESA Mount 100 x 100 mm	VESA Mount 100 x 100 mm
	Dimension (L/W/H) mm GW (kg)	543 x 334 x 49.9 7.6kg	543 x 334 x 49.9 7.6kg	543 x 334 x 49.9 7.6kg	543 x 334 x 49.9 7.6kg
ENVIRONMENT	Operating Temperature	0°C ~ 40°C	0°C ~ 40°C	0°C ~ 40°C	0°C ~ 40°C
	Storage Temperature	-20°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C
	Relative Humidity	10% - 90% RH (non-condensing)	10% - 90% RH (non-condensing)	10% - 90% RH (non-condensing)	10% - 90% RH (non-condensing)
	EMC	CE, FCC, VCCI, BSMI, UKCA	CE, FCC, VCCI, BSMI, UKCA	CE, FCC, VCCI, BSMI, UKCA	CE, FCC, VCCI, BSMI, UKCA
	Safety RF	CB, CEC, cTUVus, BSMI US, EU, Taiwan	CB, CEC, cTUVus, BSMI US, EU, Taiwan	CB, CEC, cTUVus, BSMI US, EU, Taiwan	CB, CEC, cTUVus, BSMI US, EU, Taiwan

		P15AR01	P15RL01	P15AL01	P15EL01
SYSTEM	Processor	Intel® Arrow Lake SKUs : Core™ Ultra 5 225U, Ultra 5 235U, Ultra 7 255U, Ultra 7 265U	• 13 <sup>th</sup> Gen. Intel® Raptor Lake SKUs : Core™ i3-1315U, i3-1315UE, i5-1335U, i5-1345UE, i7-1335U, i7-1365UE, U300 • Intel® Raptor Lake Refresh SKUs : Core™ 5-120U, Core™ 7-150U	12 <sup>th</sup> Gen. Intel® Alder Lake SKUs : Core™ i3-1215U, i3-1215UE, i5-1235U, i5-1245UE, i7-1255U, i7-1265UE, Celeron® 7305E	Intel® Elkhart Lake SKUs : Pentium J6426, Atom® x6425E, Celeron® J6412
	BIOS	• 2 x 262 pin SO-DIMM up to 64GB • Dual Channel DDR5 6400 MT/s	• 2 x 262 pin SO-DIMM up to 64GB • Dual Channel DDR5 5200 MT/s	• 2 x 262 pin SO-DIMM up to 64GB • Dual Channel DDR5 4800 MT/s	• 2 x 262 pin SO-DIMM up to 32GB • Dual Channel DDR4 3200 MT/s
	Memory	AMI UEFI 64bit	AMI UEFI 64bit	AMI UEFI 64bit	AMI UEFI 64bit
DISPLAY AND TOUCH SCREEN	Display	15.6" 1920 x 1080 Full HD LED with 10-Point Capacitive Multi-Touch	15.6" 1920 x 1080 Full HD LED with 10-Point Capacitive Multi-Touch	15.6" 1920 x 1080 Full HD LED with 10-Point Capacitive Multi-Touch	15.6" 1920 x 1080 Full HD LED with 10-Point Capacitive Multi-Touch
	Viewing Angle (H/V°)	85 (left), 85 (right), 85 (up), 85 (down)	85 (left), 85 (right), 85 (up), 85 (down)	85 (left), 85 (right), 85 (up), 85 (down)	85 (left), 85 (right), 85 (up), 85 (down)
	Brightness	350 cd/m2	350 cd/m2	350 cd/m2	350 cd/m2
	Contrast	1000 : 1	1000 : 1	1000 : 1	1000 : 1
Backlight Lifetime	50,000 / 15,000 hrs	50,000 / 15,000 hrs	50,000 / 15,000 hrs	50,000 / 15,000 hrs	
GRAPHICS	Chipset	Intel® Graphics	Intel® UHD or Iris® Xe Graphics	Intel® UHD or Iris® Xe Graphics	Intel® UHD Graphics
	Display Interface	• Supports up to 2 external displays • 1 x HDMI 2.1 : 7680 x 4320@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)	• Supports up to 2 external displays • 1 x HDMI 2.0 : 4096 x 2160@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)	• Supports up to 2 external displays • 1 x HDMI 2.0 : 4096 x 2160@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)	• Supports up to 2 external displays • 1 x HDMI 2.0 : 4096 x 2160@60Hz • 1 x HDMI 2.0 / VGA (optional board) • 1 x DVI-I (optional board)
	Video Decoder	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1	MPEG-2, WMV9 / VC1, H.264, JPEG / MJPEG, H.265 / HEVC, VP8, VP9
STORAGE	Internal	• 1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA) • Optional : 1 x M.2 2280 M-Key (SATA), fixed design	• 1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA) • Optional : 1 x M.2 2280 M-Key (SATA), fixed design	• 1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA) • Optional : 1 x M.2 2280 M-Key (SATA), fixed design	• 1 x M.2 2280, M-Key (PCIe 3.0 x 4 NVMe / SATA) • Optional : 1 x M.2 2280 M-Key (SATA), fixed design
AUDIO	Audio Codec	Realtek ALC888S-VD 2-channel	Realtek ALC888S-VD 2-channel	Realtek ALC888S-VD 2-channel	Realtek ALC888S-VD 2-channel
NETWORK	Ethernet	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN	• 1 x Intel® 2.5GbE LAN / 1 x 2nd LAN (Optional) • Support Wake On LAN
	WLAN	• 1 x M.2 2230, E-Key • Realtek RTL8852BE Wi-Fi 6 (802.11a/b/g/n/ac/ax) + Bluetooth 5.2 • External antenna (Dipole) x 2 (Optional) • Internal antenna x 2 (Default)	• 1 x M.2 2230, E-Key • Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional) • External antenna (Dipole) x 2 (Optional) • Internal antenna x 2 (Default)	• 1 x M.2 2230, E-Key • Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional) • External antenna (Dipole) x 2 (Optional) • Internal antenna x 2 (Default)	• 1 x M.2 2230, E-Key • Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional) • External antenna (Dipole) x 2 (Optional) • Internal antenna x 2 (Default)
I/O INTERFACE	Serial Ports	• 1 x RS-232 (DB-9) • 2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) & 12V (with specific optional board))	• 1 x RS-232 (DB-9) (optional board)	• 1 x RS-232 (DB-9) • 2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) & 12V (with specific optional board))	• 1 x RS-232 (DB-9) (optional board)
	USB	• 4 x USB 3.2 Gen2 (Type-A) • 4 x USB 2.0 (optional board)	• 4 x USB 3.2 Gen2 (Type-A) • 4 x USB 2.0 (optional board)	• 4 x USB 3.2 Gen2 (Type-A) • 4 x USB 2.0 (optional board)	• 4 x USB 3.2 Gen1 (Type-A) • 4 x USB 2.0 (optional board)
	Audio	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in	1 x Line-out / 1 x Mic-in
POWER	Bundled Adapter	19V / 4.74A 90W external adapter	19V / 4.74A 90W external adapter	19V / 4.74A 90W external adapter	19V / 4.74A 90W external adapter
Option	With optional wide range board, MB support 9-36V DC-in	With optional wide range board, MB support 9-36V DC-in	With optional wide range board, MB support 9-36V DC-in	With optional wide range board, MB support 9-36V DC-in	
WATCHDOG TIMER	Watchdog	Support watchdog	Support watchdog	Support watchdog	Support watchdog
OS SUPPORT	OS Support	Windows 11 64bit / Linux 64bit	Windows 11 64bit / Linux 64bit	Windows 11 64bit / Linux 64bit	Windows 11 64bit / Linux 64bit
MECHANISM	IP Rating	IP65 Front Panel Protection	IP65 Front Panel Protection	IP65 Front Panel Protection	IP65 Front Panel Protection
	Mounting	VESA Mount 100 x 100 mm	VESA Mount 100 x 100 mm	VESA Mount 100 x 100 mm	VESA Mount 100 x 100 mm
	Dimension (L/W/H) mm GW (kg)	394 x 256 x 48.9 4.6kg	394 x 256 x 48.9 4.6kg	394 x 256 x 48.9 4.6kg	394 x 256 x 48.9 4.6kg
ENVIRONMENT	Operating Temperature Storage Temperature Relative Humidity EMC Safety RF	0°C ~ 40°C -20°C ~ 60°C 10% - 90% RH (non-condensing) CE, FCC, VCCI, BSMI, UKCA CB, CEC, cTUVus, BSMI US, EU, Taiwan	0°C ~ 40°C -20°C ~ 60°C 10% - 90% RH (non-condensing) CE, FCC, VCCI, BSMI, UKCA CB, CEC, cTUVus, BSMI US, EU, Taiwan	0°C ~ 40°C -20°C ~ 60°C 10% - 90% RH (non-condensing) CE, FCC, VCCI, BSMI, UKCA CB, CEC, cTUVus, BSMI US, EU, Taiwan	0°C ~ 40°C -20°C ~ 60°C 10% - 90% RH (non-condensing) CE, FCC, VCCI, BSMI, UKCA CB, CEC, cTUVus, BSMI US, EU, Taiwan

## COMPLIANT WITH MEDICAL SAFETY STANDARDS

Shuttle's medical-grade panel PCs feature a rugged aluminum chassis with an antibacterial coating and an IP65-rated front panel that aids in hygiene and infection control. The series is well-suited for any healthcare center and has safety IEC/EN 60601-1, CE, and FCC medical certificates. It also boasts a customizable modular design to enhance system versatility.



*MEDICAL PANEL PC*



# M21AL11

# M15AL11



M21AL11



M15AL11

## MEDICAL TOUCH PANEL PC

Powered by Intel® Raptor Lake for Clinical Imaging and Diagnostic Support

Shuttle M21AL11 and M15AL11 are medical-grade Touch Panel PCs powered by the Intel® 13th-Gen Raptor Lake platform, designed for clinical environments requiring both performance and adherence to medical safety standards. With antimicrobial housing, IP-65 rated front panels, and IEC/EN 60601-1 certification, they support hygienic operation and safe deployment in healthcare settings.

Supporting DDR5 memory up to 64GB, flexible storage, high-brightness displays (500 nits for M21AL11 and 350 nits for M15AL11), and dual 2.5GbE LAN, these systems enable efficient integration with PACS, diagnostic equipment, and clinical workflows. Ideal for radiology departments, operating rooms, nursing stations, and other clinical environments requiring stable and continuous operation.



Medical Certified



Antibacterial

IP65  
(Front Panel)

POAG Grounding



Fanless



DDR5

### Feature

- 13<sup>th</sup> Gen Intel® Raptor Lake-U processors ( Core™ i7/i5/i3 U/UE, Core™ 7/5, Intel® Processor U300 )
- Dual DDR5-5200 memory slots supporting up to 64GB
- Versatile storage : M.2 2280 M-Key (NVMe / SATA) and an additional 2.5" SATA SSD drive bay (M21AL11 Only)
- Up to 2 x 2.5GbE LAN (one set by default; optional second set available), for high-speed and reliable data transmission
- POAG grounding port for guaranteed electrical safety in sensitive medical settings
- IEC / EN 60601-1, CE, and FCC certified
- Triple display support : built-in Panel + HDMI 2.0 (Default) + HDMI 2.0 or VGA (Optional)

# M21AL01 M15AL01



## MEDICAL TOUCH PANEL PC

Featuring Intel® Alder Lake for Clinical Workflows and Patient Care

Shuttle M21AL01 and M15AL01 medical-grade Touch Panel PCs are designed to support daily clinical workflow with intuitive operation and reliable performance. Powered by Intel® 12th Gen Alder Lake processors, these Panel PCs feature glove-touch capability, allowing operation while wearing protective equipment.

Featuring antimicrobial coating, an IP65-rated front panel, and IEC/EN 60601-1 standards, M21AL01 and M15AL01 support infection control and safe use in clinical environments. With flexible I/O configurations and seamless integration into existing healthcare IT infrastructure, these systems provide reliable access to medical data at the point of care.

They are ideal for nurse station, patient monitoring, EMR access and medical management systems.



M21AL01



M15AL01

### Features

- 12<sup>th</sup> Gen Intel® Alder Lake-U/UE Processors
- IP65-rated front panel and IEC / EN 60601-1 medical certification
- Medical-grade antimicrobial white coating on true-flat capacitive touchscreen displays : 15.6" (M15AL01) or 21.5" (M21AL01)
- POAG grounding port designed for enhanced electrical safety
- Versatile storage : M.2 2280 M-Key (NVMe / SATA) and 2.5" SATA SSD drive bay (M21AL01 Only)
- 4 x USB 3.2 Gen2 ports, RS232/422/485 serial ports, and more options
- Up to Dual Intel® LAN (2.5GbE + optional 2nd LAN)
- Triple display supports : Built-in Panel + HDMI 2.0 + optional expansion of DVI-I

		M21AL11	M21AL01	M15AL11	M15AL01	
SYSTEM	Processor	<ul style="list-style-type: none"> <li>13<sup>th</sup> Gen. Intel® Raptor Lake SKUs : Core™ i3-1315U, i3-1315UE, i5-1335U, i5-1345UE, i7-1355U, i7-1365UE, U300</li> <li>Intel® Raptor Lake Refresh SKUs : Core™ 5-120U, Core 7-150U</li> </ul>	12 <sup>th</sup> Gen. Intel® Alder Lake SKUs : Core™ i3-1215U, i3-1215UE, i5-1235U, i5-1245UE, i7-1255U, i7-1265UE, Celeron® 7305E	<ul style="list-style-type: none"> <li>13<sup>th</sup> Gen. Intel® Raptor Lake SKUs : Core™ i3-1315U, i3-1315UE, i5-1335U, i5-1345UE, i7-1355U, i7-1365UE, U300</li> <li>Intel® Raptor Lake Refresh SKUs : Core™ 5-120U, Core 7-150U</li> </ul>	12 <sup>th</sup> Gen. Intel® Alder Lake SKUs : Core™ i3-1215U, i3-1215UE, i5-1235U, i5-1245UE, i7-1255U, i7-1265UE, Celeron® 7305E	
	Memory	<ul style="list-style-type: none"> <li>2 x 262 pin SO-DIMM up to 64GB</li> <li>Dual Channel DDR5 5200 MT/s</li> </ul>	<ul style="list-style-type: none"> <li>2 x 262 pin SO-DIMM up to 64GB</li> <li>Dual Channel DDR5 4800 MT/s</li> </ul>	<ul style="list-style-type: none"> <li>2 x 262 pin SO-DIMM up to 64GB</li> <li>Dual Channel DDR5 5200 MT/s</li> </ul>	<ul style="list-style-type: none"> <li>2 x 262 pin SO-DIMM up to 64GB</li> <li>Dual Channel DDR5 4800 MT/s</li> </ul>	
	BIOS	AMI UEFI 64bit	AMI UEFI 64bit	AMI UEFI 64bit	AMI UEFI 64bit	
DISPLAY AND TOUCH SCREEN	Display	21.5" 1920x1080 Full HD TFT LED with 10-Point Projected Capacitive Multi-Touch		15.6" 1920x1080 Full HD LED with 10-Point Capacitive Multi-Touch		
	Viewing Angle (H/V°)	89 (left), 89 (right), 89 (up), 89 (down)		85 (left), 85 (right), 85 (up), 85 (down)		
	Brightness	500 cd/m2		350 cd/m2		
	Contrast	1000 : 1		1000 : 1		
Backlight Lifetime	30,000 hrs		30,000 hrs		50,000 / 15,000 hrs	
GRAPHICS	Chipset	Intel® UHD or Iris® Xe Graphics		Intel® UHD or Iris® Xe Graphics		
	Display Interface	<ul style="list-style-type: none"> <li>Supports up to 2 external displays</li> <li>1 x HDMI 2.0 / VGA (optional board)</li> </ul>	<ul style="list-style-type: none"> <li>1 x HDMI 2.0 : 4096 x 2160@60Hz</li> <li>1 x DVI-I (optional board)</li> </ul>	<ul style="list-style-type: none"> <li>Supports up to 2 external displays</li> <li>1 x HDMI 2.0 / VGA (optional board)</li> </ul>	<ul style="list-style-type: none"> <li>1 x HDMI 2.0 : 4096 x 2160@60Hz</li> <li>1 x DVI-I (optional board)</li> </ul>	
	Video Decoder	WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1		WMV, AVC / H264, JPEG / MJPEG, HEVC / H265, VP9, AV1		
STORAGE	Internal	<ul style="list-style-type: none"> <li>1 x M.2 2280, M-Key (PCIe 4.0 x4 NVMe / SATA)</li> <li>1 x Swappable 2.5" SSD drive bay (SATA) (compatible 7mm)</li> </ul>		<ul style="list-style-type: none"> <li>1 x M.2 2280, M-Key (PCIe 4.0 x 4 NVMe / SATA)</li> <li>Optional : 1 x M.2 2280 M-Key (SATA), fixed design</li> </ul>		
AUDIO	Audio Codec	Realtek ALC888S-VD 2-channel		Realtek ALC888S-VD 2-channel		
NETWORK	Ethernet	<ul style="list-style-type: none"> <li>1 x Intel®2.5 GbE LAN</li> <li>1 x 2nd LAN (Optional)</li> </ul>	Support Wake On LAN	<ul style="list-style-type: none"> <li>1 x Intel®2.5 GbE LAN</li> <li>1 x 2nd LAN (Optional)</li> </ul>	Support Wake On LAN	
	WLAN	<ul style="list-style-type: none"> <li>1 x M.2 2230, E-Key</li> <li>Internal antenna x 2 (Default)</li> </ul>	<ul style="list-style-type: none"> <li>Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional)</li> <li>External antenna (Dipole) x 2 (Optional)</li> </ul>	<ul style="list-style-type: none"> <li>1 x M.2 2230, E-Key</li> <li>Internal antenna x 2 (Default)</li> </ul>	<ul style="list-style-type: none"> <li>Realtek RTL8821CE 802.11a/b/g/n/ac + Bluetooth 5.0 (Optional)</li> <li>External antenna (Dipole) x 2 (Optional)</li> </ul>	
I/O INTERFACE	Serial Ports	<ul style="list-style-type: none"> <li>1 x RS-232 (DB-9)</li> <li>2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) &amp; 12V (with specific optional board))</li> </ul>		<ul style="list-style-type: none"> <li>1 x RS-232 (DB-9)</li> <li>2 x RS-232/422/485 (DB-9) (RS-232 with power supply : ring in / 5V (standard) &amp; 12V (with specific optional board))</li> </ul>		
	USB	<ul style="list-style-type: none"> <li>4 x USB 3.2 Gen2 (Type-A)</li> <li>4 x USB 2.0 (optional board)</li> </ul>	<ul style="list-style-type: none"> <li>4 x USB 3.2 Gen2 (Type-A)</li> <li>4 x USB 2.0 (optional board)</li> </ul>	<ul style="list-style-type: none"> <li>4 x USB 3.2 Gen2 (Type-A)</li> <li>4 x USB 2.0 (optional board)</li> </ul>	<ul style="list-style-type: none"> <li>4 x USB 3.2 Gen2 (Type-A)</li> <li>4 x USB 2.0 (optional board)</li> </ul>	
	Audio	1 x Line-out / 1 x Mic-in		1 x Line-out / 1 x Mic-in		
	POAG	1 x POAG		1 x POAG		
POWER	Bundled Adapter	19V / 4.74A 90W medical adapter		19V / 4.74A 90W medical adapter		
WATCHDOG TIMER	Watchdog	Support watchdog		Support watchdog		
OS SUPPORT	OS Support	Windows 11 64bit / Linux 64bit		Windows 11 64bit / Linux 64bit		
MECHANISM	IP Rating	IP65 Front Panel Protection		IP65 Front Panel Protection		
	Mounting	VESA Mount 100 x 100 mm		VESA Mount 100 x 100 mm		
	Dimension (L/W/H) mm	543 x 334 x 49.9		394 x 256 x 48.9		
ENVIRONMENT	Operating Temperature	0°C ~ 40°C		0°C ~ 40°C		
Storage Temperature	-20°C ~ 60°C		-20°C ~ 60°C		-20°C ~ 60°C	
Relative Humidity	10% - 90% RH (non-condensing)		10% - 90% RH (non-condensing)		10% - 90% RH (non-condensing)	
EMC	CE, UKCA, VCCI, FCC Part 18		CE, UKCA, VCCI, FCC Part 18		CE, UKCA, VCCI, FCC Part 18	
Safety	cTUVus, CB		cTUVus, CB		cTUVus, CB	
RF	US, EU		US, EU		US, EU	

# FULL PRODUCT COMPARISON MATRIX

● Standard feature | ○ Optional | - Not available  
 \* See individual spec. sheet pages for full specifications

	EDGE IOT PC				EMBEDDED BOX PC				TOUCH PANEL PC				MEDICAL PANEL PC	
MODEL	SPCNV13	SPCNV03	SPCEL02 SPCEL03	SPCEL12 SPCEL13	BPCAR02 BPCAR03 <small>* Latest AI platform</small>	BPCRL02 BPCRL03	BPCAL02 BPCAL03	BPCEL02/BPCEL03 BPCEL07	P21AR01 P15AR01 <small>* Latest AI platform</small>	P21RL01 P15RL01	P21AL01 P15AL01	P21EL01 P15EL01	M21AL11 M15AL11	M21AL01 M15AL01
POSITIONING	High-performance Edge AI	Compact Edge AI Inference	Embedded Edge Computing	Embedded Edge Computing	Industrial Edge AI PC	Mainstream Embedded Edge Box PC	Mainstream Embedded Edge Box PC	Mainstream Embedded Edge Box PC	AI-ready Interactive Panel PC	Mainstream Industrial HMI / Panel PC	Mainstream Industrial HMI / Panel PC	Mainstream Industrial HMI / Panel PC	Medical Panel PC	Medical Panel PC
FORM FACTOR	0.45L	0.45L	0.45L	0.45L	245 × 169 × 57 mm	245 × 169 × 57 mm	245 × 169 × 57 mm	245 × 169 × 57 mm	21.5" / 15.6"	21.5" / 15.6"	21.5" / 15.6"	21.5" / 15.6"	21.5" / 15.6"	21.5" / 15.6"
CPU PLATFORM	NVIDIA® Jetson Orin NX	NVIDIA® Jetson Orin Nano	Intel® Elkhart Lake	Intel® Elkhart Lake	Intel® Arrow Lake-U	Intel® Raptor Lake-U (Optional Intel® vPro® support)	Intel® Alder Lake-U (Optional Intel® vPro® support)	Intel® Elkhart Lake	Intel® Arrow Lake-U	Intel® Raptor Lake-U (Optional Intel® vPro® support)	Intel® Alder Lake-U (Optional Intel® vPro® support)	Intel® Elkhart Lake	Intel® Raptor Lake-U (Optional Intel® vPro® support)	Intel® Alder Lake-U (Optional Intel® vPro® support)
AI ACCELERATION	●	●	-	-	●	-	-	-	●	-	-	-	-	-
FANLESS	-	●	●	●	●	●	●	●	●	●	●	●	●	●
COM / DIO	● / ●	● / ●	● / ●	- / -	● / ○	● / ○	● / ○	● / ○	● / ○	● / ○	● / ○	● / ○	● / ○	● / ○
WIDE TEMP. SUPPORT	●   -20~55°C	●   -20~55°C	●   -20~60°C	●   -20~60°C	●   -20~60°C	●   -20~60°C	●   -20~60°C	●   -30~70°C	-	-	-	-	-	-
MULTI-DISPLAY SUPPORT	-	-	-	3	Up to 4	Up to 4	Up to 4	Up to 3	3	3	3	3	3	3
TOUCH CAPABILITY	-	-	-	-	-	-	-	-	●   10-point	●   10-point	●   10-point	●   10-point	●   10-point	●   10-point
FRONT IP65	-	-	-	-	-	-	-	-	●	●	●	●	●	●
MEDICAL CERTIFICATION	-	-	-	-	-	-	-	-	-	-	-	-	IEC/EN 60601-1, CE	IEC/EN 60601-1, CE
INDUSTRIAL DURABILITY	MIL-STD-810G	○	MIL-STD-810G EN50155 (SPCEL03)	○	-	-	-	-	-	-	-	-	-	-
MAX RAM	16GB LPDDR5	8GB LPDDR5	32GB DDR4	32GB DDR4	64GB DDR5	64GB DDR5	64GB DDR5	32GB DDR4	64GB DDR5	64GB DDR5	64GB DDR5	32GB DDR4	64GB DDR5	64GB DDR5

# FLEXIBLE CHOICES : EXPANSION & CONFIGURATION

	Occupied Sections (Brackets)	EDGE IOT PC	EMBEDDED BOX PC	TOUCH PANEL PC	MEDICAL PANEL PC		
		SPCNCV03 SPCNCV13 SPCELO2 SPCELO3 SPCEL12 SPCEL13	BP CAR02 BP CAR03 BP CRL02 BP CRL03 BP CAL02 BP CAL03 BP CEL02 BP CEL03 BP CEL07	P21AR01 P21RL01 P21AL01 P21EL01 P15AR01 P15RL01 P15AL01 P15EL01	M21AL11 M21AL01 M15AL11 M15AL01		
<b>VIDEO OUTPUT</b>	1 x HDMI 1.4	1	•	•	•	•	1 x HDMI 1.4
	1 x HDMI 2.0	1	•	•	•	•	1 x HDMI 2.0
	1 x DisplayPort	1	•	•	•	•	1 x DisplayPort
	1 x DVI-I	1	•	•	•	•	1 x DVI-I
	1 x VGA	1	•	•	•	•	1 x VGA
<b>I/O INTERFACE</b>	1 x COM (RS232)	1	•	•	•	•	1 x COM (RS232)
	1 x COM (RS232/RS422/RS485)	1	•	•	•	•	1 x COM (RS232/RS422/RS485)
	2 x COM (RS232/RS422/RS485)	2	•	•	•	•	2 x COM (RS232/RS422/RS485)
	4 x COM (RS232/RS422/RS485)	2	•	•	•	•	4 x COM (RS232/RS422/RS485)
	6 x COM (4 x RS232 + 2 x RS232/RS422/RS485)	3	•	•	•	•	6 x COM (4 x RS232 + 2 x RS232/RS422/RS485)
	4 x USB 2.0	1	•	•	•	•	4 x USB 2.0
	2 x USB 3.2	2	•	•	•	•	2 x USB 3.2
	1x USB 2.0	1	•	•	•	•	1x USB 2.0
	1 x DIO	1	•	•	•	•	1 x DIO
	2nd LAN module	-	•	•	•	•	2nd LAN module
Dual LAN module (M.2)	1	•	•	•	•	Dual LAN module (M.2)	
<b>NETWORK</b>	WiFi module kit (RTL8821CE)	-	•	•	•	•	WiFi module kit (RTL8821CE)
	WiFi antenna set	-	•	•	•	•	WiFi antenna set
	4G/LTE connection module (M.2)	2	•	•	•	•	4G/LTE connection module (M.2)
<b>BOARD</b>	Wide voltage range board (9~36V)	-	•	•	•	•	Wide voltage range board (9~36V)
	SATA port + M.2 2280 daughter board	-	•	•	•	•	SATA port + M.2 2280 daughter board
<b>MOUNT KIT</b>	VESA monut	-	•	•	•	•	VESA monut
	Ear mount	-	•	•	•	•	Ear mount
	Din rail	-	•	•	•	•	Din rail
	Stand	-	•	•	•	•	Stand
<b>OTHERS</b>	Dummy bracket	1	•	•	•	•	Dummy bracket
	150W power adapter (Wide temp.)	-	•	•	•	•	150W power adapter (Wide temp.)
	65W power adapter	-	•	•	•	•	65W power adapter
	65W power adapter (Wide temp.)	-	•	•	•	•	65W power adapter (Wide temp.)
	eDP cable (for 3rd video output)	-	•	•	•	•	eDP cable (for 3rd video output)
	External antenna back cover	-	•	•	•	•	External antenna back cover
	POAG	-	•	•	•	•	POAG