Integrated IoT Solutions & Services

Realize Ubiquitous Connectivity and IoT Applications



Enabling an Intelligent Planet

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Advantech Integrated IoT Solutions & Services

Realize Ubiquitous Connectivity and IoT Applications

Embedded devices all around us are being transformed into "Interconnected Smart Devices." All these devices need communication bridges to pass raw data through the network to reach central servers for processing. For devices installed at remote, unattended and harsh environments, a stable and reliable communication bridge between the end device and the central server is a must. As a global leader in the embedded computing market, Advantech is committed to collaborating with our partners and customers to help you develop the IoT world.

With years of experience, Advantech provides comprehensive embedded product ranges and customer-centric design-in services to help customers develop reliable and innovative intelligent embedded computing solutions. To address the market for IoT applications, Advantech is dedicated to accelerating the development and deployment of IoT by connecting legacy devices to the cloud and applying intelligent analytics to help transform businesses. Advantech provides a full selection of embedded products and services to fulfill application needs in many vertically-focused markets.

The IoT Era is Here...

The term Internet of Things (IoT) is a hot topic in the industry. All of us are looking for advanced connectivity and the implementation of devices, systems and services that go beyond traditional M2M that cover a variety of protocols, domains and applications. According to Gartner, the IoT installed base will grow to 26 billion units by 2020, and according to IDC, the global IoT market will hit \$7.1 trillion. So, knowing how to seize all these opportunities will be a key challenge for each industry.

Technology & Development





Modular Design & Turnkey Solutions





Manageability, Connectivity, Security

WISE-Cloud

SUSIÂCCESS

Solutions & Services Coverage



IoT Software Solutions

Advantech provides complete IoT software services. SUSIAccess makes it easier for embedded developers to securely connect, manage, and control data from the sensor, gateway, system and cloud layers. SUSIAccess as a service platform provides IoT software tools that help fulfill the different requirements of each layer, and also act as a bridge with standard protocol communications to simplify development, integration, and deployment.

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IoT Gateway & Systems

Advantech embedded IoT gateways & intelligent systems analyze and transmit data from end devices, accelerating decision making that results in increased efficiencies. This helps customers acquire the intelligence to drive new design innovations, making business transformation a profitable action rather than a challenge.

WPAN Gateway & Nodes

The most import element in IoT solutions is data acquisition. Advantech provides a wide range of reliable wireless sensor solutions for M2M communications including IEEE 802.15.4, Zigbee, UHF RFID and SubG (900MHz, 860MHz and 433MHz) RF technologies. All sensor nodes support multiple sensor interfaces and power inputs, and flexible configuration for diverse applications.



Environmental Monitoring Air Pollution Soil Moisture Water Quality



Logistics Item Location Fleet Tracking • Shipment Condition Quality



Factory Warehouse Smart Production
 • M2M Applications

Embedded IoT Applications

Although IoT has been talked about for many years, it has not been until recently that enterprises have begun to pursue IoT solutions. What are the market and technology factors that have turned IoT into reality and why now?

- · Governments and businesses are driving the development of smart cities
- Key segments like industrial automation, energy & utilities, transportation, building automation, and medical services are requiring new approaches to improvements in efficiency and reduction of cost
- Lower manufacturing costs are driving the proliferation of smart devices in the market
- Advancement in computing power is providing the backbone to process massive quantities of data from IoT devices
- The prevalence of wired and wireless communications is making interconnectivity possible



Smart Parking Parking Space Availability • Way Finding

• Toll Management



Smart Building Light Control
 Indoor Air Quality



Structural Healthcare Crack Detection Accelerometer Detection

Linear Displacement

Environmental Monitoring

Smart Road





 Transportation

 • Smart Roads
 • Traffic Management & Control



Home Automation • Energy & Water Use • Intrusion Detection Systems



Intelligent Retail • Interactive Multimedia • Supply Chain Control • Smart Product Management

Application Scenarios



What Your Truck Fleet Can Tell You

UTX-3115 Intel® Atom™ Dual Core E3826

It's a challenge for truck logistics companies to ensure that products such as pharmaceuticals or fresh food goods are stored in optimal conditions during transportation and are punctually delivered. A damaged refrigeration unit, an open door, or mechanical problems with the vehicle can prove to be catastrophic for a refrigerated shipment. Building an effective system to closely monitor storage temperatures during transit is crucial to business success.

- Advantech's UTX-3115 embedded, wide-range temperature box computer, bundled with Intel® Gateway Solutions for IoT works perfectly as a gateway solution to filter, transport and analyze data collected from sensors like cargo temperature, door and hitch.
- SUSIAccess remote management software makes remote monitoring and managing data from sensors to gateways easier, increasing operational efficiencies.



How to Take Full Control in Food Production Lines

ARK-1123L Intel® Atom Dual Core E3825 SoC

Food sanitation and safety are top priority issues for food manufacturers. Traditionally, manufacturers check key status points during each phase of the production process. However, in order to improve food/beverage quality, the key is to find an ideal gateway solution that can operate in harsh environments whilst monitoring sensors communicate temperature, humidity, and other values on the production line. This ensures production lines are ready to run at start-up.

- The ARK-1123L embedded fanless box PC is an ideal gateway solution to enable seamless and secure data flow between sensors and the cloud. ARK-1123L offers affordable computing and rich network communication through WiFi, 3G or physical GbE LAN. And, with palm-size computers and a variety of mounting options (VESA, DIN Rail, Wall mount), ARK-1123L can be easily installed in a NEMA chassis to fulfill this space-critical application.
- Built-in Advantech SUSIAccess remote management software for real-time remote monitoring and system security enhances maintenance efficiency.



How Safe Is The Bridge You're Crossing

Network Gateway UBC-200 Freescale i.MX6 Cortex-A9 Dual/Quad 1GHz

Bridges are one of the key links in transportation infrastructures. Increasing seismic activity around the world has been identified as a threat to the strength of bridges. Although we can minimize seismic effects on bridges with refined construction specifications and materials, we also need a real-time monitoring system on standby to monitor the health of the bridge. Some of the bridges are located in remote areas and therefore the monitoring system must have remote management, Wi-Fi and/or 3G communications capabilities.

- Advantech UBC Communication Gateway Series (UBC-200 & UBC-220) can collect multiple raw data from the bridge sensors and send it to the control center in the cloud to process into useful information.
- The UBC-200/UBC-220 is efficient for 24/7 operations and equipped with Wi-Fi or 3G module options for remote management support.



How Retailers Can Keep up with Customers

Intel® Celeron® N2930

The retail industry is undergoing a major transformation, changing how customers shop and how retailers run business. More and more retailers continue to invest in enhancing operations by optimizing the personal experience of their customers. And given the fact that 70% of buying decisions are made on the spot, RFID is fast becoming a key technology to bolster retail effectiveness, enabling increases in revenue of between 12 ~ 25%.

- Advantech's RFID Reader WISE-3142R can capture real-time data for stock manageability and traceability.
- WISE-3142R can interact with Advantech's DS-570 signage player, which is equipped with rich I/O and superb graphics capability, and incorporates built-in software that detects when a shopper picks up an item which triggers related ads and recommendations on nearby displays. It can also collect data for customer preference analysis.

Advantech IoT Gateways & Systems

Share Filter and Transport Data from the Edge to the Cloud

The shift from isolated systems to connected intelligent platforms requires not only performance and connectivity, but also the creative design of smaller, rugged edge devices. In this new era of connected computing technology, intelligent systems add value as standalone systems. They have evolved from their roots in M2M concepts to fully-fledged networks that communicate with each other and the cloud. For devices installed in remote, unattended and harsh environments, a stable and reliable communication bridge between the end device and central server is crucial. Embedded IoT Gateways can fulfill that requirement. They are efficient, stable, operate 24/7, and are built with extremely reliable hardware that's easy to integrate with back-end maintenance/ operating systems. Advantech embedded IoT gateways not only transport data but also analyze it as well from end devices, accelerating decision making and resulting in increased efficiency. This helps customers acquire the intelligence to drive new design innovations, making business transformation a profitable action rather than a challenge.



IoT Gateway Features

Network connectivity

IoT gateways should have sufficient networking ability to link I/O sensors, acting as a bridge between the sensors and the cloud, with the objective of collecting data and passing it from the I/O sensor to the cloud.

Low power consumption

There are many of IoT devices in real world applications, creating a huge requirement for power. That's why IoT gateways should be designed with low power consumption in mind.

Intelligent data analysis

IoT gateways offer instant responses and actions as part of their solution. More than a communication bridge, IoT gateways should also be able to share specific workloads from the cloud server.

Easy implementation

IoT gateways are usually installed in different environments with multiple missions, which explains why they should be easily adaptable and able to be implemented anywhere.

x86-based Gateways

In general, many developers consider x86-based IoT gateways to perform better in terms of processing capability, rich operating system(OS) support, and low-power consumption, as well as being lower in cost. Years of x86-based hardware development has established a large pool of design resources and a set of specifications adhered to by key companies that deliver x86-based solutions. These design specifications, spanning the boundaries of hardware and software, include I/O peripherals common to x86 platforms. Many of these development resources are available off-the-shelf, enabling development teams to quickly build working proof-of-concept applications at minimal cost with minimal effort. These readily available technology resources also translate to lower production costs for the final product.



RISC-based Gateways

The ARM-based architecture has been widely adopted in building IoT applications because of its low-power and low-cost benefits, with limited processing resources and minimal system and storage requirements. Compared with x86-based platforms, RISC-based gateways offer customers an alternative for applications that require basic data analysis capability while enjoying lower power consumption.

x86 & RISC-based Gateway Comparison

CPU Architecture	Computing Power	Power Consumption	Connectivity	Recommended Models
				UTX-3115 Wide-Temperature Embedded Box PTCRB, GCF certified
x86	Can process data from 2,000+ I/O sensors	5~10 Watts	HDMI, micro HDMI, VGA, USB3.0, USB2.0, micro USB2.0, Audio, DCIN, Reset, antenna	ARK-1123L Ultra-small Fanless Embedded Box PC (-30 ~ 70 °C)
				DS-570 Digital Signage Player
RISC	Can process data from 100-2,000 I/O sensors	Under 2 Watts	HDMI, USB2.0, Audio-out GbE, Reset, antenna	UBC-200 RISC Compact Box



Intel[®] Gateway Solutions for the Internet of Things

Embedded IoT gateways offer pre-integrated Intel® Gateway Solutions for the IoT, an integrated solution based on Intel® Quark[™] SoC X1000 Series and Atom[™] processors, which bundles together Wind River IDP2.0 technology, McAfee security functionality, and a wide variety of connectivity protocols, developer tools, and programming environments. By providing pre-integrated, pre-validated hardware and software building blocks, the gateways connect legacy and new systems, and enable seamless and secure data flow between edge devices and the cloud. Currently UTX-3115*, UBC-200*, ARK-1123L* are bundled with Intel® Gateway Solutions for the IoT.

Key Benefits



Delivers an integrated, pre-validated, and flexible open-computing gateway platform, including foundational hardware, software, and security building blocks to allow fast solution development and deployment.



Enables building scalable solutions with standardsbased interfaces to securely connect and aggregate data from the edge to the cloud.



Enables business innovation on proven technologies across computing, communications, manageability, and security.

* Check Page 13 for Product Info.

Advantech Wireless IoT Solutions

The Next Generation of Wireless Data Acquisition Solutions

Under the IoT Framework, interconnection and communication from Machine to Machine (M2M) are the key elements. Advantech WISE Series provide WPAN gateways and node devices with corresponding web services and remote management capability for Smart City/IoT applications. To help customers easily and quickly build wireless IoT environments, Advantech integrates WPAN RF solutions with value-added SUSIAccess IoT software for centralized monitoring and intelligent communication capabilities. Wireless network technologies include IEEE 802.15.4e Smartmesh, Zigbee, Bluetooth Low Energy (BLE), SubG (433MHz, 868MHz, etc.), WiFi, Cellular and GPS protocols. The first of Advantech's WISE Series is targeted toward IEEE 802.15.4e Smartmesh solutions with a client-server structure for controller and node devices.



Advantech WPAN Controllers, WISE-3000 Series

Advantech WISE-3000 Gateway series deliver wire-like data reliability and performance in a low power cost-effective design that's ideal for IoT applications. Being 6LowPAN-compliant (IPv6 over Low power Wireless Personal Area Networks), WISE-3000 series are all IP-based devices that allow universal TCP/IP adoption to fulfill IoT demands for cloud computing and big data applications.



WISE-3000 Series

WISE-3000 series are an ARM-based platform with an integrated 6LowPAN manager module for node management. WISE-3310 provides 200-node management capability and WISE-3320 supports 100 nodes. With an optional multiple-RF design, WISE-3000 series are able to serve as an IoT data gateway through Ethernet, WiFi, or cellular protocols for cloud connectivity. Advantech also provides a standalone gateway controller, WISE-3301, which uses an external USB connection to any x86 platform. With Advantech's WISE-3301 WPAN agent software package, a customer's x86 system can become an IoT data gateway and be able to remotely monitor data and devices.

Time SynchronizedLow power routers

Channel Hopping

Low power routers
 No packet collisions
 Longer effective range
 Better link stability

Centrally Managed

- Quality of Service guarantees
- Forensic data

Advantech WPAN Nodes

Advantech WISE-3000 series node devices have a 6LowPAN communication carry board plus a functional board with different enclosures for different application environment demands. Functional-wise, WISE-3000 series node devices provide:

• Ultra Low Power

Time Synchronized Mesh Protocol (TSMP) wireless nodes only turn on for the periods of scheduled communication in order to maintain low power consumption.

 Designed with Diverse Housings Indoor, outdoor, rugged and waterproof designs for different environmental needs

Sensor Nodes

Sensor nodes, including bundling sensors together for specific applications, and M12 sensor interfaces for external sensor connectivity.

Our application focus



Gas CO, CO2, NH3, NO2, SH2, O2, O3, H2, CH4, Isobutane, Ethanol, Hydrocarbons



Water pH, ORP, DO, conductivity, nitrates, phosphates, liquid flow, level sensor



Structural Health Crack detection, accelerometer, displacement, soil moisture



Check Page 14 for Product Info.

Smart Roads Magnetic field, light sensor (LDR), actuator relay, ultrasound, crack sensor, water and ice detection

Check Page 14 for Product Info.

I/O Nodes

I/O nodes provide analog, digital, UART, RS-422/485, Modbus, CANBus; varies by model.

Our application focus

• DI/DO with power relay • 16-bit Analog input • RS-422/485

Advantech WISE-Cloud (PaaS)

With the maturation of web technology and emergence of the Internet of Things (IoT), a web interface for managing applications through cloud technology has become an essential technology. To satisfy the real needs of enterprises, Advantech proactively invests in relevant research and development. Advantech's WISE-Cloud (Wireless IoT Sensing Embedded) Platform as a Service (PaaS) is a cloud platform that provides the infrastructure for building, deploying, and managing applications and services. By adopting Advantech's WISE-Cloud, IoT solution developers can rapidly build and deploy applications, or expand cloud applications into Software-as-a Service (SaaS) applications, ensuring a faster time to market.

WISE-Cloud IoT



SUSIAccess as a Core Engine

SUSIAccess is the core engine that delivers software packages for developing the WISE-Cloud platform according to the demands of various IoT solutions. By ensuring interoperability among hardware/software components, systems, and platforms, SUSIAccess enables machine-to-machine communication. The three main offerings of SUSIAccess are as follows: (1) Sensor and Device Management, for connecting sensors and devices to the cloud using standard MQTT, TR-069, OMA, and OSGi protocols; (2) Cloud Services, for providing web services and adopting an open infrastructure for big data analytics; and (3) IoT SDK, for simplifying application and service development. Thus, SUSIAccess enables IoT solution developers to easily and effectively construct IoT cloud solutions.

Software Services



Product Selection Guide

Advantech IoT Gateway & Systems

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	Wide Temperature Embedded Box	Ultra-Small Fanless Embedded Box PC	RISC Compact Box	RISC Compact Box	Intel Quark Compact Box	Digital Signage Player
Model Name	UTX-3115	ARK-1123L	UBC-200	UBC-220	UBC-221	DS-570
CPU	Intel® Atom™ Dual Core E3826 processor	Intel Atom E3825 Dual Core SoC processor	Freescale ARM Cortex-A9 i.MX6 Dual/Quad 1 GHz processor	Freescale ARM Cortex-A9 i.MX6 Dual/Quad 1 GHz processor	Intel X1000 400 MHz	Intel® Celeron® N2930 low power Quad-Core™ SoC processor
Connectivity	1 x Half-size Mini PCIe slot for WiFi/3G module 1 x Full-size Mini PCIe slot for WiFi/3G/mSATA module 2 x GbE PTCRB, GCF certified	1 x Full-size Mini PCle, Supports WiFi or WWAN module 1 x Half-size Mini PCle, Supports mSATA module 1 x Intel GbE	1 x mini-PCle w/ SIM socket for WIFI/3G module supported 1 x GbE 1 x SD socket	2 x mini-PCle w/ SIM socket for WIFI/3G module supported 1 x GbE 1 x SD socket	1 x mini-PCle w/ SIM socket for WIFI/3G module supported 2 x Fast Ethernet (One w/ PoE) 1 x SD socket	Highly expandable via internal mini-PCle interface (e.g. WLAN, 3G or TV tuner)
Operating Temperature	-20 ~ 60° C	-30 ~ 70° C	0 ~ 60° C	0 ~ 40° C	0 ~ 40° C	0 ~ 40° C (32 ~ 104° F) (w/ HDD); -10 ~ 70° C (14 ~ 158° F) (w/ extended temp. memory & SSD)
Software Support	Bundled with Intel Gateway Solutions for IoT & SUSIAccess	Bundled with Intel Gateway Solutions for IoT & SUSIAccess	Bundled with SUSI Web base Solutions for IoT	Bundled with SUSI Web base Solutions for IoT	Bundled with Intel Gateway Solutions for IoT & SUSIAccess	Bundled with SUSIAccess for Signage
Dimensions (WxHxD)	138.5 x 35.98x 116.4 mm	133.8 x 43.1 x 94.2 mm	108 x 79 x 30 mm	120 x 89 x 30 mm	120 x 89 x 30 mm	220 x 44.2 x 150 mm

WPAN Controller – WISE-3000 Series

	WPAN Gateway	WPAN Gateway	WPAN Control-Box
Model Name	WISE-3310	WISE-3320	WISE-3301
CPU/MCU	Freescale i.MX6 Dual Cortex-A9 1.0GHz and Linear/ Dust LTC5800 Cortex M3	TI Sitera AM3352 Dual Cortex-A8 1.0GHz and Linear/ Dust LTC5800 Cortex M3	Linear/Dust LTC5800 Cortex M3
Network Standard	IEEE 802.15.4e Mesh Network	IEEE 802.15.4e Mesh Network	IEEE 802.15.4e Mesh Network
Wireless Node	Up to 200 wireless nodes	Up to 100 wireless nodes	Up to 100 wireless nodes
PoE Support	-	One 3af PSE/ One 3at PD	-
Operating Temperature	-10 ~ 60 °C	-20 ~ 70 °C	-40 ~ 85 °C
Dimensions (WxHxD)	178 x 30 x 117 mm	178 x 30 x 117 mm	80 x 25 x 60 mm

WPAN Node Selection

Sensor Node	WPAN Node	WPAN Parking Node	WPAN Node with MCU
Model Name	WISE-1020	WISE-3010-Parking	WISE-3021
MCU	Linear/Dust LTC5800 Cortex M3	Linear/Dust LTC5800 Cortex M3 and TI MSP430	Linear/Dust LTC5800 Cortex M3 and TI MSP430
Network Standard	IEEE 802.15.4e Mesh Network	IEEE 802.15.4e Mesh Network	IEEE 802.15.4e Mesh Network
Interface	AI x 4/ UART x 1/ DIDO x 7	-	M12 Connector
Default Sensor	-	Low-field magnetic sensor Temperature Sensor	-
Operating Temperature	-40 ~ 85 °C	-40 ~ 85 °C	-40 ~ 85 °C
Dimensions (WxHxD)	178 x 117 x 30 mm	TBD	TBD
Suggested Sensor Integration	Communication Platform	Vehicle Detection, Ground Temperature	pH, ORP, DO, conductivity, nitrates, phosphates, liquid flow, level sensor







I/O Node	WPAN Analog I/O Node	WPAN RS422/485 I/O Node	WPAN DIO and Relay Node
Model Name	WISE-3150	WISE-3151	WISE-3152
MCU	Linear/Dust LTC5800 Cortex M3 and TI MSP430	Linear/Dust LTC5800 Cortex M3 and TI MSP430	Linear/Dust LTC5800 Cortex M3 and TI MSP430
Network Standard	IEEE 802.15.4e Mesh Network	IEEE 802.15.4e Mesh Network	IEEE 802.15.4e Mesh Network
Channels	6 (Differential/ Non-Isolation)	-	6
Power Input	unregulated 10~30VDC	unregulated 10~30VDC	unregulated 10~30VDC
Voltage Resolution		16 bit; ± 150 mV, ± 500 mV, ± 1 V, ± 5 V, ± 10 V	
Current Resolution		15 bit; ±20 mA, 14 bit; 0 \sim 20 mA 13.5 bit; 4 \sim 20 mA	
Isolation Voltage	-	4,000 VDC	2,000 VDC
Interface Connectors	-	2 x plug-in terminal blocks (RS-422/485)	-
Contact Rating (Resistive)	-	-	250 VDC @5A, 30 VDC @3A
Operating Temperature	-40 ~ 85 °C	-40 ~ 85 °C	-40 ~ 85 °C
Dimensions (WxHxD)	119 x 37 x 78 mm	119 x 37 x 78 mm	119 x 37 x 78 mm

Embedded Wireless Modules









Wireless Standard IEEE 802.11 a/b/g/n (2.4 and 5 GHz) IEEE 802.11 b/g/n (2.4 GHz) IEEE 802.11 b/g/n (2.4 GHz) IEEE 802.11 a/b/g/n (2.4 GHz) Tx/Rx 2Tx/ 2Rx MIMO 2Tx/ 2Rx MIMO 1Tx/ 1Rx 2Tx/ 2Rx MIMO Data Rate Up to 300 Mbps Up to 300 Mbps Up to 150 Mbps Up to 300 Mbps MiniPCie card Interface PCle signal PCle signal Operating: 0 to +70 °C Operating: 0 to +80 °C Temperature Range 0perating: -10 to +70 °C Operating: 0 to +70 °C Operating: 0 to +80 °C Operating: 0 to +70 °C	Model Name	EWM-W135H	EWM-W142H	EWM-W150H	EWM-W151H	EWM-W158F
Tx/Rx 2Tx/ 2Rx MIMO 2Tx/ 2Rx MIMO 1Tx/ 1Rx 2Tx/ 2Rx MIMO Data Rate Up to 300 Mbps Up to 150 Mbps Up to 150 Mbps Up to 300 Mbps MiniPCie card Interface PCle signal PCle signal PCle signal PCle signal Temperature Range Operating: 0 to +70 °C Operating: 0 to +70 °C Operating: 0 to +80 °C Operating: 0 to +70 °C	Wireless Standard	IEEE 802.11 a/b/g/n (2.4 and 5 GHz)	IEEE 802.11 b/g/n (2.4 GHz)	IEEE 802.11 b/g/n (2.4 GHz)	IEEE 802.11 b/g/n (2.4 GHz)	IEEE 802.11 a/b/g/n (2.4 and 5 GHz)
Data Rate Up to 300 Mbps Up to 300 Mbps Up to 150 Mbps Up to 150 Mbps Up to 300 Mbps MiniPCie card Interface PCle signal PCle signal USB signal PCle signal PCle signal Temperature Range Operating: -10 to +70 °C Operating: 0 to +70 °C Operating: 0 to +80 °C Operating: 0 to +70 °C Operating: 0 to +80 °C	Tx/Rx	2Tx/ 2Rx MIMO	2Tx/ 2Rx MIMO	1Tx/ 1Rx	1Tx/ 1Rx	2Tx/ 2Rx MIMO
MiniPCie card Interface PCle signal PCle signal PCle signal PCle signal Temperature Range Operating: -10 to +70 °C Operating: 0 to +60 °C Operating: 0 to +70 °C Operating: 0 to +80 °C Operating: -40 to +85	Data Rate	Up to 300 Mbps	Up to 300 Mbps	Up to 150 Mbps	Up to 150 Mbps	Up to 300 Mbps
Temperature Range Operating: -10 to +70 °C Operating: 0 to +60 °C Operating: 0 to +70 °C Operating: 0 to +80 °C Operating: -40 to +85	MiniPCie card Interface	PCIe signal	PCIe signal	USB signal	PCIe signal	PCIe signal
	Temperature Range	Operating: -10 to +70 °C	Operating: 0 to +60 °C	Operating: 0 to +70 °C	Operating: 0 to +80 °C	Operating: -40 to +85 °C

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