ADVANTECH AMD SOLUTIONS EBOOK
Your Guide to Advantech’s E-IoT Computing Platforms based on the Latest AMD CPUs Designed Specifically for High Performance Edge Computing
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WHY ADVANTECH

Advantech is a leading provider of innovative products, services, and solutions. We offer comprehensive system integration, hardware, software, customer-centric design services, embedded systems, and global logistics support. We work closely with our partners to provide complete solutions for a wide range of applications in different vertical segments.
Est. 1983
Founder and CEO: K.C. Liu
Headquarters: Taipei, Taiwan

INDUSTRY SERVED
Telecom, Industry 4.0, IoT, Gaming, Retail, iLogistics, Mil/Aero, Broadcasting, Agriculture, Healthcare
(We work with 27 of the top 30 healthcare companies worldwide)

2000+
STANDARD PRODUCT OFFERINGS

CUSTOM PRODUCT CAPABILITY
72% of what we build is "the brand behind the brand" for our partners

WORLDS LARGEST IPC COMPANY
32% market share

$2.09B
2021 REVENUE

KEY ECO-SYSTEM PARTNERS

QUALITY SYSTEMS IN PLACE
✔ OHSAS 81001
✔ ISO-170256
✔ IECQ QC 080000
✔ Sony GP
✔ IECEx QAR
✔ FDA

MARKET CAP
$9.1B
2022

WORLDWIDE OFFICES
Design Centers 6
Manufacturing Centers 3
CTOS Centers 13
Logistics Centers 4
On-Site Service 2
Repair Centers 14
Sales Offices 19

8500+
EMPLOYEES

MANUFACTURING PLANTS
✔ Vertically Integrated manufacturing (Self-contained)
✔ Full Manufacturing redundancy (Risk Mitigation)
✔ Full BOM and lifecycle control (End-to-End control over quality)

1MILLION+ sq. ft.
In-house manufacturing Kunshan, China, Ten SMT Lines

Linkou, Taiwan
Kunshan, China
Advantech, a leading IPC company, leverages the latest AMD platform technology to deliver superior business value. Accelerating the adoption of IoT edge applications requires technology breakthroughs that support diverse mission critical applications. AMD platform technology provides excellent performance, graphics, embedded features, and design-in services.

Why Advantech & AMD for Embedded

- **5G & Networking**: High performance computing for 5G and communication infrastructure
  - 64-CORE

- **Machine Vision**: Empower precision and expandability to upgrade productivity
  - 4 PCIe x16

- **Medical Imaging**: Deliver stable computing power for high-definition image analysis
  - QFCS

- **Infotainment**: AMD Radeon graphics and integration of 4 x 4K independent displays
  - Radeon GFX
How Advantech & AMD Benefit Industrial Applications

**Leading Computing**
- AMD Zen 3 architecture
- Advanced 7nm process
- Up to 64 cores
- PCIe Gen 4 and USB 3.2 Gen 2
- Best performance per Watt

**Excellent Graphics**
- AMD Radeon graphics up to 8 x GPU cores
- 4 x Display pipes up to 4K resolution
- HVEC and H.264 (10-bit) codec, VP9 decode

**Software Utility & OS**
- DeviceOn / iManager
- Redhat RHEL 8.3
- CentOS 8.3
- Windows Server 2019 & 10 Enterprise LTSC
- Ubuntu 20.04

**Embedded Features & Service**
- 5 and 10 years Longevity
- BIOS customization services
- Advanced thermal solutions
- Intelligent management (IPMI 2.0)
- Design-in services
Advantech Product Roadmap – Embedded Boards

2022

- SOM-E780  Q4 22
  - EPYC™ 7003 Series
  - COM/IPC/SERVER E

- AIMB-592  Q1 23
  - EPYC™ 7003 Series
  - MicroATX MB

2023

- Zen 4
  - GENOA SP5

- Zen 4
  - Raphael

High-performance

RYZEN

EMBEDDED

AIMB-522  Q3 22
- Ryzen™ 5000 (AM4)
- Micro ATX MB

Mainstream

RYZEN

EMBEDDED

SOM-6872
- Ryzen™ V2000 Zen 2
- COM Express Compact, T4

Low Power

RYZEN

EMBEDDED

AIMB-229
- Ryzen™ V2000 Zen 2
- Mini ITX

MIO-5376  Q4 22
- Ryzen™ R2000 Zen 2
- 3.5” SBC

Available  Developing  2022  2023
Advantech Product Roadmap – System Solutions

**Embedded System**
- **EPC-T3229 Q3 22**
  - Ryzen™ V2000
  - 1U Thin Embedded PC
- **EPC-B5592 Q3 23**
  - EPYC™ 7003 Series
  - 4U System, 1200W PSU
- **EBC-B3522 Q3 22**
  - Ryzen™ 3000 (AM4)
  - 3U System, 550W PSU

**Gaming**
- **DPX®-E440 Q4 22**
  - Ryzen™ V1000/R1000
  - Radeon RX, 4 DP out
- **DPX®-J100 Q4 22**
  - Ryzen™ V1000/R1000
  - 72 + 20 Pin JAMMA Harness Connectors
- **DPX®-S451 Q4 22**
  - Ryzen™ R2000 Zen 2
  - Radeon RX, 4 DP out

**Digital Signage**
- **DS-082**
  - Ryzen™ V1000/R1000
  - 4/3 x HDMI 2.0, 1 x LAN, 1 x COM & 4 x USB

**Zen 4**
- Raphael
- 4/8 CPU

**Zen +**
- R2000

**Availability:**
- **Available**
- **Developing**

**Timeline:**
- 2022
- 2023
SOM-E780
EPYC™ 7003 Series

Beyond High-performance COM
• COM-HPC Proprietary Pinout – Size E (200 x 160 mm)
• Proprietary pinout for higher TDP & support for more PCIe
• EYPC 7003 REAL server grade CPU (64C/128T/225W) and socket type CPU

Maximum CPU Cores, High Speed I/O, & RAM
• Single CPU with headroom for the most enterprise workloads
• 512GB large memory size with 4 x DDR4 long DIMM
• 79 x PCIe Gen 4.0 lanes for various add-on cards — NIC, GPU, and FPGA

Cost & Energy Efficient Performance
• Supports more VM per server
• Parallelized cores ideal for NFV & SDN
• High performance-per-watt reduces energy & operation cost

Advanced Network Solution with Security & Service
• Supports IPMB for BMC remote control
• TPM support for advanced security
• Supports security boot or fast boot by customized BIOS

The Most Powerful COM HPC Server Module With 64-Core AMD EPYC CPU
Accelerating the Edge Server Revolution

Phase In: December 2022
Longevity: June 2031

Application
Data Center
High End Test Equipment
Networking
Maximize AI Computing with Latest High-speed Technology
- 4 x PCIe Gen 4.0 x16 slots empower Machine Learning & Deep Learning
- Supporting 2 x double-deck AI-accelerated PCIe x16 card by steel & durable slot
- High-speed PCIe 4.0 onboard SSD by M.2 M-Key connector

Ultimate Performance Powers Workloads at the Edge
- 64 Core AMD Milan EPYC 7003, Zen 3 core 7nm CPU
- Up to 768GB DDR4-3200, 6 x channel memory

High Throughput Connectivity to Cloud
- Dual 10GbE LAN high-bandwidth connectivity empowers big data cloud services
- Dual 1GbE LAN simplifies private cloud deployment

Remote Management
- WISE-DeviceOn features remote access and efficient OTA operations
- IPMI 2.0 centralized management
Superior Computing Power for AI Applications

- AMD EPYC 7003 Milan Server Grade CPU
- 6-channel DDR4 up to 3200MHz for heavy computing workloads
- Dual 10G LAN for smooth data stream
- Integrated with NVIDIA Quadro RTX A6000

Industrial Grade System Design

- ESD protection is designed to sustain IEC Level 4 discharge
- EMC protection is designed for both industrial & residential environments
- 1200W 80+ GOLD power supply to support up to two NVIDIA Quadro GPU cards

Hyper-converged Infrastructure - VMmark® 3.1.x vSAN

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<th>Score</th>
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VSI - Login VSI™ Pro v4.1.40.1 average

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Database - TPC Benchmark™ Express HS

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High Performance Computing - ANSYS® LS-DYNA® cress

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Integer Performance - SPECrate® 2017_int_base

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<tr>
<td>2 x Inle® Gold 6250R</td>
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ASMB-830
EPYC™ 7003 Series

Single Socket Motherboard
Best Choice for High-density GPU-based AI Accelerators

Phase In: March 2022
Longevity: March 2027

Excellent Performance
• AMD EPYC™ 7003 Series—the world’s fastest x86 server processors
• 9 x SATA3 (8 via Mini SAS HD + 1 SATA 7P)
• 2 x M.2 connectors (SATA / PCIe 4.0 compatible)
• Field-proven high-reliability features from Advantech

Cost & Energy Efficient Performance
• EPYC CPUs help minimize environmental impacts from data center operations while advancing your company’s sustainability objectives.
• High performance-per-watt reduces energy & operation cost

High Availability and Serviceability
• 8 x DDR4 memory RDIMM/LRDIMM for up to 2TB capacity
• 5 x PCIe 4.0 x16 + 2 x PCIe 4.0 x8 expansion slots
• Support up to 4 Double-Deck GPU cards

Advanced Network Solution with Security & Service
• Support dual 10GbE ports
• Support IPMI for BMC remote control
AMD Infinity Guard offer the advanced capabilities required to help defend against internal and external threats and keep your data safe with virtually zero impact to system performance.

Application
AOI  IEM  Data Center  Edge Computing
Extreme Computing Performance
• Up to 64 Cores
• Single Socket, AMD EPYC™ 7003 Series
• Up to 2TB memory capacity

Flexible PCIe Configuration
• Up to 8 x PCIe slots
• 2 x double deck PCIe for GPGPU and FPGA accelerator
• OPC 3.0 for PCIe 4.0 expansion

Variety of Storage Offering
• Up to 200TB storage capacity
• Hybrid storage (NVMe + SAS/SATA)
• 2x on-board M.2

Highly Availability and Serviceability
• Redundant BIOS and BWC F/W image
• Redundant PSU
• Modular Design
• Tool-less Design

Application
Smart City  Healthcare  Retail
Compact 2U Carrier Grade, High Performance Server
Accelerating the Edge Server Revolution

**Beyond High-performance**
- Single AMD EPYC™ 7003/7002 Series Processors
- High-speed networking capacity

**Maximize Flexibility & Expansibility**
- Up to 5 x PCIe Gen 4 x 16 expansion slots
- Mix Storage (NVMe U.2 + M.2 + SATA)
- 2U 20.4" deep rackmount server

**High Reliability**
- High ESD immunity
- EMC class-B barebone design
- Dust filter support

**Advanced Network Solution with Security & Service**
- Supports IPMI for BMC remote control
- TPM support for advanced security
- Supports security boot or fast boot by customized BIOS

**Application**
- High Computing
- NFVI
- Genomics analytics
- AI assisted video analytics
Single EPYC 7003 processor
- 8 to 64 physical cores with up to 3.7GHz frequency
- 32MB of L3 cache in new Zen 3 core minimizes the latency
- Built-in AMD Infinity Guard to secure your physical and virtualized data

High Availability and Serviceability
- Secured out-of-band management to analyze failure faster
- Enhance system reliability sub-components
  - Hot-swappable redundant AC or DC power supply
  - Hot-swappable system FAN

Varity of Expansion Slots
- All in PCIe gen4 bandwidth
- Optional 1G, 10G, 25G, 40G, 100G Ethernet interfaces PoE connectivity
- Optional 3 PCIe x16 for FPGA or Acceleration Card

Network-focused Developer Tools
- DPDK L2/L3 forwarding
- OPENSSL with Advantech PCIe QAT card
- IPSec gateway
- Advantech Server iManager for diagnostics

Network Security  Intrusion Detection  Virtual Private Network  Network Edge Computing
Micro-ATX

AIMB-522
Ryzen™ Embedded 5000 Series

High Expandability
MicroATX Motherboard
Empower the Performance Graphic Computing

AMD Zen3 Ryzen™ Embedded 5000 Series Desktop CPU
Supports the latest AMD Ryzen™ Embedded 5000 Series desktop CPU for embedded market applications requiring enterprise reliability. The Instructions Per Clock of the Zen 3 core is 19% higher than Zen 2. In addition, the 2X L3 cache enables faster responsiveness with lower latency. The 8 Cores/16 Threads AMD Zen 3 CPU delivers best-in-class power efficiency with outstanding performance per watt. These features make the Ryzen™ Embedded 5000 a perfect solution for multitasking applications in smart manufacturing, automated visual inspection, and intelligent surveillance.

Made for Camera-based Applications
Four built in Gigabit Ethernet ports and 8 x USB 3.2 10Gbps interfaces deliver connectivity to high data throughput cameras. Customers can integrate more than 10 x high video quality cameras without additional peripherals cards.

Adaptable to Industrial Applications
Supports 1 x PCI-Express x16 Gen4 technology for graphics demanding applications. Furthermore, dual PCI-Express x4 slots offer the expandability to integrate robotic (arm) controller cards for industrial applications. The onboard M.2 M-Key socket supports high-speed SSD for real-time OS operations.

Application
- Intelligent Surveillance
- Machine Vision
- Smart Manufacturing
3U Edge Computer

EPC-B3522
Ryzen™ Embedded 5000 Series

Machine Vision Edge Computer
For AI Applications in Industrial Automation

Phase In: September 2022
Longevity: January 2026

Desktop Level Computing Platform
• RYZEN™ 9 performance up-to 1.92 x better than Intel Comet lake i9
• RYZEN™ 9 (105W) TDP 17% lower than Alder lake i9 (125W)
• RYZEN™ 9 is 16C/32T for multiple application
• Integrated with NVIDIA Quadro RTX A4500

Industrial Grade System Design
• ESD level 4 (8kV/ 15kV)
• Safety IEC-62368 CB / UL
• Comprehensive EMC protection for both residential and industrial environments

Value-added Software Support
• Windows 10 & Linux Ubuntu Support
• WISE-DeviceOn
• Value-added Software Support

Automation
Automated Optical Inspection
Visual Inspection AI
The Most Powerful COMe Compact Module

- 7nm technology with double performance per watt
- 54W low power with desktop 95W level performance
- +40% graphic performance to save the cost on the external graphic card

BGA SoC with Desktop Performance for Industrial Applications

- Scalable with energy efficiency: lower TDP per core
- Up to 64GB dual channel ECC/non-ECC DDR4-3200 RAM
- Support 4 x 4K displays (DP++, HDMI, VGA, LVDS)

Advantech Design-in Service

- No throttling with QFCS compact thermal design @ 60 °C
- iManager + WISE-DeviceOn for easy maintain, device monitoring, I/O control, and remote management
- Ubuntu OS is ready

Application

- Ultrasound
- Test Equipment
- Video Streaming Equipment
THIN Mini-ITX Motherboard
Upgrading Edge Applications with Breakthrough Performance

Powerful Computing Empowers Graphics-driven Embedded Devices
Advantech’s AIMB-229 increases graphic processing capabilities by 40% using a powerful embedded Radeon™ GPU with up to 7 Cores. It also supports 4 x independent displays with up to 4K60 UHD resolution via 2 x HDMI and 2 x DP++. AIMB-229 provides 6 x USB 3.2 and 1 x PCIe x8 to facilitate high-speed modular add-on cards and diverse peripherals on a compact motherboard designed for medical imaging and machine vision applications.

Slim, Powerful, and Efficient Solution for Mobile Imaging Equipment
AIMB-229 is powered by AMD Ryzen™ Embedded V2000 processors and supports 8-core ZEN 2 CPU cores up to 16 threads. It boasts 64GB DDR4 3200 memory, and M.2 NVMe x4 SSD with 4.2 GHz turbo boost — doubling the computing performance and I/O bandwidth when compared to the previous generation solutions.

Enables Remote Control and Management at the Edge
WISE-DeviceOn provides real-time hardware, software, and peripheral monitoring solutions that deliver real-time alert notifications. It also provides an over-the-air (OTA) BIOS system that facilitates remote BIOS updates and backup recovery mechanisms that prevent unexpected interruptions and boot up failures.
Embedded PCs

**EPC-T3229**

Ryzen™ Embedded V2000

1U Slim Edge PC with Expansions
For kiosks that require multi-tasking capacity

Optimal Platform for Slim and Compact Scenarios
- AMD V2718 with 2 x 260-pin SO-DIMM up to 64GB DDR4 3200 SDRAM
- Supporting up to 4 x displays, 2 x DP ports & 2 x HDMI ports
- 1 x M-Key (support 2242/3042/2280), 1 x E-Key (support 2230)

Slim Mechanical Design with Expansion Capabilities
- 1 x Full-height PCIe expansion slot
- Thin design (44.2 mm)
- Compact form factor (330 x 44 x 270 mm)

Phase In: October 2022
Longevity: January 2032
For Kiosks, EV Charging Stations, & Passenger Information Systems
- 3 x Simultaneously displays up to 4K@60Hz via HDMI 2.0, DP1.4, and LVDS
- Integrated CANBus for Critical Control Loop in EV charging and Transportations
- High-speed UARTs and I2C cover huge sensor interfaces requirements

Easy High-resolution Camera Connection
- Equips 3 x 2.5GbE with up to 2 x PoE at 100 m distance
- Provides 4 x USB 3.2 with 10Gbps & 5Gbps bandwidth for higher resolution

State-of-the-Art Expansion Ability
- 3 x Simultaneous M.2 expansions for WLAN, WWAN, and storage
- 5G/LTE Capable via M.2 B-key 3052/3042
- High-Speed PCI Express Gen.4 NVMe Storages

Indoor, outdoor, and adopts everywhere
- Support extended temperature operation variants from -40 ~ 85 °C
- Wide-Range Power 12~24V +/- 10% reduce additional size and cost
- IPC-A-610 Class 3 Assembly ensure higher reliability
Gaming Platform

DPX®-S451
Ryzen™ Embedded R2000

Multimedia Gaming Engine

Highly integrated gaming motherboard features unrivaled performance and PCIe Graphics Expansion

Features

- High-performance AMD Embedded R2000 SOC APUs
- Quad and dual core APUs up to 3.35 (3.7) GHz
- Radeon™ VEGA GPU with up to 8 x compute units
- Four independent 4k monitors supported
- Comprehensive gaming features
- 12V DC single input or ATX power
- Full featured driver API for I/O and security

Application

- Slot Machines
- VLTs
- GLI compliant

- Displays
  - 4 x DP++ 1.2

- Expansion
  - IPC, PCIe x 16 and Golden Fingers
  - 8 x USB 2.0
  - 3 x USB 3.0

- DPX® Security suite: Secureboot, TPM support, DPX® security features, & BIOS customization

- DPX® Software: Embedded OS, DPX® Diagnostics, & DPX® Connector DPX®-SAS

- Enclosure S2000

- Graphics Cards
  - PCIe x 16 Format

- SSD
- M.2, SATA DOM, HDD, SSD, CFast, & USB

- PuC
  - On-board Micro Controller PuC
Modular Multimedia Gaming Platform

Gaming platform allowing custom features and functions to be added for specific market segments / applications

**Features**

- Supports 4 x DP++ 1.2
- Supports PCIe x8 (PCIe x16 connector, Gen 3.0)
- 2 x 260-pin SO-DIMM up to 32 GB DDR4 3200 MHz ECC/Non-ECC SDRAM
- Removable gaming BIOS module for field verification
- Side expansion port for application specific scenarios expansion modules
- Supports 2 x SATA2/2 x CFast/1 x M.2
- AMD Ryzen Embedded V1000/R1000 Processors
- Secureboot support

**Application**

- Arcade
- Sports Betting
- Gaming

**Expansion**

- Graphics Cards
  - PCIe x 16 Format
- Expansion I/O, PCIe x16 and Sidebus modular expansion

**Enclosure**

- M1000/M2000

**Onboard: 4 x USB 2.0 / 3 x USB 3.1**

**Display: 4x DP++ v1.2 (3 w R series)**

**Onboard IO**

- 2 x DI

**Onboard Security Suite**

- Secureboot, TPM support
- DPX® security features, & BIOS customization

**6 x COM: ccTalk, RS232, ID003, RS485, & TTL**

**Software**

- Embedded OS, DPX® Diagnostics, & DPX® Connector DPX®-SAS

**Summary**

- Raspberry™ Embedded V1000/R1000
- DPX®-E265
- Side expansion port for application specific scenarios expansion modules
- Supports 2 x SATA2/2 x CFast/1 x M.2
- Removable gaming BIOS module for field verification
# Gaming Platform

**DPX®-E140**

*Ryzen™ Embedded V1000/R1000*

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## Features

- AMD Ryzen™ Embedded V1000/R1000 Processors
- High-performance Radeon™ VEGA series graphics
- 4 x 4k monitor support
- Comprehensive gaming features
- Passive cooling system for up to 25W or 54W with fan cooler
- 12V DC single input or ATX power

## Application

- Slot Machine
- VLTs
- GLI Compliant

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## Investment Optimized Gaming Platform

Completely integrated system, designed specifically for regulated gaming markets

**Phase In:** January 2019

**Longevity:** January 2028

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**Digital I/O**

- 32/32

**USB Ports**

- 7 x USB 2.0
- 2 x USB 3.0

**DPX®-Software:**

- Embedded OS, DPX®, Diagnostics, and DPX® Connector DPX®-SAS

- Battery Backed SRAM 8MB

- 9 x COMs: ccTalk, RS232, I/O03, RB485, & TTL

- Expansion PCB

- 4 x DP++, 1.2 (3 with R series)

- On-board Micro Controller PuC

- M.2, SATA DOM, HDD, SSD, CFast, & USB

- Enclosure Metalwork Optional

- Passive cooling system for up to 25W or 54W with fan cooler
Gaming Platform

Eye Catching Multimedia Powerhouse

Highly integrated gaming motherboard features unrivaled performance and PCIe graphics expansion

Features

- AMD Ryzen™ Embedded V1000/R1000 Processors
- Quad and dual core APUs up to 3.35 (3.8) GHz
- Radeon™ VEGA GPU with up to 11 compute units
- Four independent 4k monitors supported
- Comprehensive gaming features
  - 12V DC single input or ATX power
  - Full featured driver API for I/O and security

Application

- Slot Machine
- VLTs
- GLI compliant
- Graphics Cards PCIe x 16 Format
- M.2, SATA DOM, HDD, SSD, & CFast, USB
- On-board Micro Controller PuC

Phase In: January 2021
Longevity: January 2028

Digital I/O 32/32
Expansion PC, PCIe x 16 and Golden Fingers
DPX® Security suite: Secureboot, TPM support DPX® security features, & BIOS customization
Battery backed SRAM 8MB
6 x USB 2.0
3 x USB 3.0
DPX® Software: Embedded OS, DPX® Diagnostics, & DPX®-Connector DPX®-SAS
Displays 4 x DP++ 1.2
(3 with R Series)
10 x COMs: ccTalk, RS232, ID003, RS485, TTL
3 x DP++ 1.2
Enclosure $2000

Digital I/O 32/32
Expansion PC, PCIe x 16 and Golden Fingers
DPX® Security suite: Secureboot, TPM support DPX® security features, & BIOS customization
Battery backed SRAM 8MB
6 x USB 2.0
3 x USB 3.0
DPX® Software: Embedded OS, DPX® Diagnostics, & DPX®-Connector DPX®-SAS
Displays 4 x DP++ 1.2
(3 with R Series)
10 x COMs: ccTalk, RS232, ID003, RS485, TTL
3 x DP++ 1.2
Enclosure $2000

Digital I/O 32/32
Expansion PC, PCIe x 16 and Golden Fingers
DPX® Security suite: Secureboot, TPM support DPX® security features, & BIOS customization
Battery backed SRAM 8MB
6 x USB 2.0
3 x USB 3.0
DPX® Software: Embedded OS, DPX® Diagnostics, & DPX®-Connector DPX®-SAS
Displays 4 x DP++ 1.2
(3 with R Series)
10 x COMs: ccTalk, RS232, ID003, RS485, TTL
3 x DP++ 1.2
Enclosure $2000

Digital I/O 32/32
Expansion PC, PCIe x 16 and Golden Fingers
DPX® Security suite: Secureboot, TPM support DPX® security features, & BIOS customization
Battery backed SRAM 8MB
6 x USB 2.0
3 x USB 3.0
DPX® Software: Embedded OS, DPX® Diagnostics, & DPX®-Connector DPX®-SAS
Displays 4 x DP++ 1.2
(3 with R Series)
10 x COMs: ccTalk, RS232, ID003, RS485, TTL
3 x DP++ 1.2
Enclosure $2000
Gaming Platform

**DPX®-J100**
Ryzen™ Embedded V & R Series

JAMMA Gaming Platform
A full set of I/O, COMs and security features designed specifically for JAMMA applications and street gaming markets

**Features**

- AMD Ryzen™ Embedded V1000/R1000 Processors
- Quad and dual core APUs
- Radeon™ VEGA GPU with up to 8 compute units
- Supports up to 3 x independent monitors
- Comprehensive gaming features
- 72 + 20 Pin JAMMA harness connectors
- Optional Enclosure

**Phase In** February 2022  
**Longevity** January 2029

**Digital I/O**
24/29

**Expansion**
I2C & Mini PCI

**DPX® Security suite**
(as below) +RButton

**Up to 2MB of battery backed FRAM**

**6 x USB 4 x 2.0 - 2 x 3.1/2.0**

**DPX®-Software:**
Embedded OS, DPX® Diagnostics, & DPX® Connector DPX®-SAS

**1 x DP++, 1 x HDMI and 1 x VGA**

**6 x Coms – RS232/ 485 Tx/Rx**

**Optional Enclosure**

**SATA DOM, SSD, HDD, M.2, USB, & CFast**

**PuC**
On board Micro Controller

**Application**

- Street Gaming
- Regulated Gaming

---

Learn More
**4 x Independent 4K Outputs via HDMI 2.0**

Using 4 x independent HDMI 2.0 output enables users to implement 8K TV wall with ease.

**Slim Design (only 19 mm)**

System design with only 19 mm thickness is presently the world's slimmest signage player.

**WISE-PaaS/SignageCMS Bundle**

Bundled with WISE-PaaS/SignageCMS software, enabling customers to develop their signage system cost effectively and easily.
### Industrial-grade Peripherals

#### SQFlash
- AMD EPYC 7003 Milan Server Grade CPU
- 6-channel DDR4 up to 3200MHz for heavy computing workload
- Dual 10G LAN for smooth data stream

#### SQRAM
- Comprehensive DRAM series includes pioneer DDR5 and DDR4
- Extended temperature support (-20~ 85 °C / -40~ 85 °C)
- Intelligent software for real time monitoring

#### Industrial Wireless
- Full coverage wireless technology — 5G/Wi-Fi 6/BLE5.2/ LPWA
- Ruggedized industrial solution -40 ~ 85 °C
- Open, agile, certificate-ready wireless kits

#### Ubuntu Desktop 20.04
- Full-blown graphic UI OS
- Preferred platform for AI, ML, and DL applications
- Consistent OS experience across platforms with long-term support
Embedded Software Services

- Embedded BIOS & LTS OS
- SUSI software API & OS lockdown utility
- iManager: Intelligent self-management on chip

Device Management

- Remote management
- Update management
- Data visualization

- Monitor & control
- Alert & action
- IT/OT total security

Edge AI

- Visual AI turnkey repository
- Embedded BIOS & LTS OS
- Instant AI experience OOB
- Cross-platform support for Windows & Ubuntu

Software & Cloud Integration

- Global distribution
- Monitor & control
- Alert & action

- Azure migration & consulting services
- Windows IoT add-on utility & customization
Boosting Retail Sales with Digital Advertising Signage

**Intro**
Retailers are increasingly using enhanced digital signage in their stores. This customer is a famous health and beauty retailer and pharmacy chain in Europe. They recently added more LCD digital signage systems to their stores in an effort to reduce print & POS requirements, and deliver dynamic content aimed at attracting customers and increasing sales.

**Challenges**
- Supports multiple simultaneous displays
- Fanless industrial grade design delivers stable long lifespan maintenance
- Slim for easy installation

**Solutions and Technologies**
- Supports 4 x displays at 4K UHD resolutions
- An ultra-slim profile of just 19 mm with fanless, cable-free design

**Diagram**

**Benefits**
- Zero-cost Advantech WISE-PaaS/SignageCMS content management software available
- Slim system design is easily installed into limited space enclosures
- Fanless thermal solution prevents issues caused by dust during long operation periods
Digital Transformation in Medical Imaging Analysis

**Intro**
Medical imaging systems — such as CT, MRI, X-ray, and ultrasound machines — are important tools for diagnosis prior to intervention. Consequently, imaging analysis accuracy is a matter of life and death.

**Challenges**
There is a shortage of medical imaging analysis specialists. Indeed, some studies indicate that by 2023, the world will need 31% more specialists than traditional manpower. Medical organizations are expected to fill such jobs. This could result in analysis mistakes, and be exacerbated by shortened working times.

**Solutions and Technologies**
Graphic AI based edge computers have the potential to tackle this problem. AI algorithms operating with powerful graphics processing capacities can deliver analytic results that help medical professionals diagnose patients accurately faster. The Advantech EPC-B5592 leverages the AMD EPYC 7003 Milan CPU and the NVIDIA Quadro A6000 CPU to deliver server-grade computing power to complex AI tasks.

**Benefits**
- Superior computing power designed for graphic AI applications
- Industrial system design endures harsh EMC environments
- 1200W 80+ GOLD power supply to support up to 2 x NVIDIA Quadro GPU cards
Machine Learning Assisted Computing Upgrade for Automated Visual Inspection Equipment

**Intro**
Deploying Advanced Visual Inspection solutions in smart manufacturing necessitates high computing power and machine learning capabilities that maximize productivity.

**Challenges**
Seeking to improve production efficiency, the customer in this case required multiple high-speed digital cameras run with an embedded computer featuring additional machine learning capabilities.

**Solutions and Technologies**
Advantech AIMB-522 and EPC-B3522 leverage high-performance AMD Ryzen Embedded 5000 CPUs with 16 cores. These CPU are capable of managing manufacturing data processing workloads. The high-expandability provided by onboard PCIe x16/x4 slots and the M.2 socket provide the interfaces needed to install add-on cards that engender AI acceleration and/or robot control. In addition, high-speed I/O connectivity with 8 x USB 3.2 Gen 2 (10Gbps) ports and 4 x 1GbE Ethernet ports simplify the adoption of mainstream industrial cameras and help customers build visual inspection machines with ease.

**Benefits**
- Capable of managing multiple high-speed cameras
- Improve manufacturing accuracy and productivity
- Fast deployment and resilience
The Regulated Gaming Industry Requires High Performance Hardware with Specialized Hardware & Software Features

**Intro**
An OEM slot machine manufacturer was looking for a long term, reliable platform with features that meet the requirements of the Regulated Gaming industry. Their latest gaming content required high-performance hardware.

**Challenges**
High-performance, long-lifecycle hardware with necessary industry features.

**Solutions and Technologies**
- DPX-S450 specialized gaming platform
- AMD Ryzen™ Embedded V1000 SOC, Quad core APU at 3.35 GHz (3.8 GHz turbo)
- Integrated Radeon™ “Vega” Graphics Core up to 11 CU (GFX9)
- Supports 4 x independent 4k monitors
- Comprehensive gaming features meet the requirements of GLI-11
- Sophisticated battery backed intrusion logging
- Full featured driver API for I/O and security

**Benefits**
- Reliable, field-proven platform with track record of regulatory approvals reduces risk and time to market
- High-performance capabilities support the running of up-to-date gaming content on high-resolution screens
- 7 years product lifecycle
- DPX-S450 is the 10th generation of DPX-S and boasts a strong roadmap for upcoming products. This protects customer investment in both hardware and software using cross generational mechanical and API compatibilities
SOM-E780, Most Powerful COM HPC Module to Enable Fast & Flexible Deployment on 5G Edge AI Server

**Intro**
Edge AI Servers are used in visualized data collection applications. They are often used to monitor, collect, and analyze big data and thus provide valuable business insights and opportunities.

**Challenges**
Upgrading traditional 13U servers requires too much time and money.

**Solutions and Technologies**
The Advantech SOM-E780 is equipped with an AMD EPYC 7003 socket CPU with up to 64 cores for superior computing power. It features a 512GB ECC RAM and 79 pairs of PCIe Gen 4.0 within a COM HPC Server module. This reduces edge AI server time to market and corresponding development costs. It is also easily upgraded & maintained, and fulfills a variety of demands in different platforms or 5G server applications. When paired with Advantech’s prompt and professional local design in services, it facilitates the rapid exploitation of business opportunities.

**Benefits**
- Featuring a COM-HPC proprietary pinout for EYPC 7003 REAL Server-grade socket CPU, up to 64 Cores to save energy & costs by supporting more VM per server. Producing a solution with high-performance-per-watt
- 79 x PCIe Gen4.0 lanes for various add-on cards, like NIC, GPU, and FPGA
- On-board TPM chipset for Advanced Security
- Active and Passive Thermal Solutions for 60°C environments
Fastest way to integrate a EV Charging System within a Rugged 3.5” Single Board Computer

**Intro**

Electric vehicles (EV) and their charging infrastructures are a rapid growth market. Market size is projected reach USD$ 25.5 billion by 2027. These solutions boast a 26.8% CAGR since 2020.

**Challenges**

EV charging systems require multiple sub-systems with different control buses according to domain preference. These solutions must connect to watt meters, battery controller logic, external management devices, payment systems, HMI, and displays. Integrating systems with this level of complexity takes time and money.

**Solutions and Technologies**

The Advantech MIO-5376 is a 3.5” compact single board computer (SBC). It features an AMD 2000 series CPU and provides extraordinary computing and graphics performance, better user experiences, and content displays. MIO-5376 integrates 3 x 2.5GbE ports — including 2 x optional PoE, CANbus, high speed UARTs, and I2C Bus to simplify the integration of power meters, battery controllers, payment systems, HMI, and displays on one board on EV charging stations.

**Benefits**

- AMD R2000 series provides extraordinary computing & graphics capabilities
- Integrated LAN, PoE, CANbus, UARTs, and I2C
- DC-in 12~24V, 0 ~ 60 °C & -40 ~ 85 °C operating temperature
AOI Computer Vision for Smart SMD Resistor Inspection

Intro
Surface-mount devices (SMD) resistors, are dependent on board requirements—crystal or coil as an example. However, they have become smaller and smaller over the years. Some SMD resistors may be as small as 0.6mm x 0.30mm. The benefits of using SMDs are an incredibly large improvement over past technology, improving not only the cost and reliability of circuit boards but also performance.

Challenges
In a particular case with a Chinese manufacturer, their market demand for SMD resistors continued to grow. To meet the demand, they needed to increase production, which, in turn, required greater measures for quality control.

Solutions and Technologies
Advantech ASMB-830+HPC-7485 provides a faster, more accurate, and more economical method than manual inspection, and can effectively inspect small SMD resistors at an overall maximum processing speed of more than 12,000 pieces/min.

Benefits
- 4U system equipped with ASMB-830 with high scalability, including 8-Bay 2.5"/3.5", two M.2 NVMe, seven PCIe 4.0 expansion slots and dual 10GbE Ethernet ports
- AMD CPU supports from 8 cores to 64 cores, providing powerful computing power to meet various needs
- System cooling design can support CPU up to TDP 225W
- Expandable RAID card and fiber network card, hardware crypto card
AMD EPYC NVR for Video Analysis and Surveillance

- **Intro**
  The video analysis server is an intelligent video analysis and alarm product designed and produced. It adopts video alarm technology and can realize intelligent analysis of 8-32 channels. Large-scale intelligent analysis requirements can be achieved through device stacking to meet the needs of large-scale application scenarios. Including face recognition, crowd counting, people tracking, virtual fence, car tracking and recognition and video anomaly detection, etc.

- **Challenges**
  AI models and deep learning are key technologies for gaining insights from video-enabled applications. With the exponential increase in video streaming and the growing number of deployed cameras, the use of general-purpose CPUs that do all processing entirely in software has become a serious bottleneck.

- **Solutions and Technologies**
  Advantech SKY-7260S is a single AMD EPYC server solution provides the maximum PCIe expansion capability and storage, consider about the utilized efficiency of system, AMD EPYC benefits and balanced the performance between CPU, GPU or FPGA, and storage, also it can scale out for more video analysis from load balancing perspectives. Single AMD can do a dual processor job also means to help on energy saving.

- **Benefits**
  - 2U system equipped AMD EPYC MB in high scalability, including 12-Bay 3.5" or 24-Bay 2.5" storage, two M.2 NVMe, two dual-width PCIe 4.0 x16 card slots and four to six full height or half height PCIe X8 slots.
  - Support single AMD EPYC Rome/Milan 8 cores to 64 cores, CPU TDP up to 225W.
  - Excellent system cooling design with robust and user-friendly mechanism.
  - Expandable RAID card and fiber network card, GPU card, or FPGA card,
64-core Density & Acceleration Ready for Network Innovation

**Intro**
As enterprises become more distributed and move to a less data-center-centric architecture, it is necessary to have a powerful, reliable and secured system to run multiple workloads with high bandwidth to allow simultaneous accesses from every branches with maximum throughput in minimized latency. Finding such kind of optimized solution to handle workloads like virtualization, NFVi and data analytics against threats but also agile to scale up and down is more important.

**Challenges**
Every IT department in the enterprises need to find the balance according to their infrastructure. Off-the-shelf platforms as baremetal are surely the smartest choice to accelerate network transformations with minimized service interruptions to eliminate the supply issue before and after pandemic period.

**Solutions and Technologies**
Advantech's FWA-6080 2U system is specifically designed to accelerate the innovations that can be deployed and seamlessly scaled according to usage needs. It is built with the 3rd generation AMD EPYC 7003 series processor, offers the agility to scale from 8 to 64 physical CPU cores. FWA-6080 can also extend multiple types of Ethernet interfaces from 1GbE RJ45 to 100GbE QSFP28 ports by Advantech defined mezzanine modules to suit different environment in attractive price points. Incoupled with Advantech in-house S/W design IP, FWA-6080 has its own developer tools like DPDK L2/L3 forwarding and Secured Out-Of-Band Management to assist your application enablement in less time.

**Benefits**
- Compatible with key technologies such as DPDK and Intel® QuickAssist (QAT) for easy expansion
- Features 3 x PCIe x16 slots for integrating PCIe cards to maximize CPU resources by shifting some operations to the FPGA-based hardware engine
- Equipped with 8 x network mezzanine card slots that support PCIe Gen4 connectivity to maximize bandwidth
- All the components are field serviceable for cost-effective maintenance and increased availability
Introduction

Open RAN is an ongoing shift in mobile network architectures that enables service providers to use non-proprietary subcomponents from a variety of vendors. An Open RAN, or open radio access network, is made possible by a set of industry-wide standards equipment, which was disaggregated to radio units (RUs), distributed units (DUs), and centralized units (CUs), many of which can be virtualized or containerized. Now DUs and CUs functionality could be performed by CTOS white-box servers.

Challenges

- DUs and CUs servers are normally deployed at the Telco edge environment. They have to accommodate several challenges, such as:
  - Computation wise, to support a variety of telecom accelerators with different form factors and computing power.
  - Environment wise, limited deployment space and unstable cooling condition.
  - Management wise, remote server management and maintenance challenges.

Solutions and Technologies

SKY-8260S is designed to aim for DUs and CUs server market. It’s able to provide plenty of PCIe expansion capability for telecom accelerators and accommodate a wider range of temperature, dust, and humidity to deal with the application system running in any harsh environmental conditions. Redundant and field-replaceable PSU, Fan modules, and Management firmware minimize costly downtime, service interruptions, and onsite interventions.

Benefits

- The SKY-8260S, equipped with AMD EPYC™ 7003/7002 Series Processor, is designed and optimized to meet the high availability and for business-critical use cases.
- By pairing with multiple Network Interface Cards or Acceleration Cards (e.g. FPGA or GPU card), SKY-8260S offers a stable carrier-grade service of network and computing acceleration.
- SKY-8260S provides highly flexible PCIe and IO expansion capability.
<table>
<thead>
<tr>
<th><strong>SOM-E780</strong></th>
<th><strong>AIMB-592</strong></th>
<th><strong>EPC-B5592</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computer on Module</strong></td>
<td><strong>Industrial Motherboard</strong></td>
<td><strong>Embedded PC</strong></td>
</tr>
<tr>
<td><strong>COM-HPC</strong></td>
<td><strong>Micro-ATX</strong></td>
<td><strong>EPYC™ 7003 Series</strong></td>
</tr>
<tr>
<td><strong>AMD Processor</strong></td>
<td><strong>EPYC™ 7003 Series</strong></td>
<td><strong>EPYC™ 7003 Series</strong></td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>4 x Channel 288-pin DDR4 RDIMM up to 3200MHz, both ECC and Non-ECC supported</td>
<td>6 x Channel 288-pin DDR4 RDIMM up to 3200MHz 6 x DIMM slots, Max. 768GB (128GB per DIMM)</td>
</tr>
<tr>
<td></td>
<td>4 x RDIMM slots, Max. 512GB (128GB per RDIMM)</td>
<td>6 x Channel 288-pin DDR4 RDIMM up to 3200MHz 6 x DIMM slots, Max. 768GB (128GB per DIMM)</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>N/A</td>
<td>VGA</td>
</tr>
<tr>
<td><strong>Expansion</strong></td>
<td>79 x PCIe Gen 4 lanes</td>
<td>4 x PCIe x16 slots</td>
</tr>
<tr>
<td><strong>Power Input</strong></td>
<td>Vin: 11.4-12.6V  VSB: 4.75-5.25V</td>
<td>ATX input</td>
</tr>
<tr>
<td><strong>I/O Ports</strong></td>
<td>1 x 2.5 Gigabit LAN  4x USB 3.2 Gen1 &amp; 4x USB2.0  2 x serial (RS-232)  12 x GPIO  1 x IPMB</td>
<td>2 x 2.5GbE  2 x 10GbE  1 x 1GbE for BMC Management  4 x USB 3.2 Gen1  1 x RS-232</td>
</tr>
<tr>
<td><strong>Thermal</strong></td>
<td>1U Heatsink  2U Heatsink</td>
<td>CPU cooler</td>
</tr>
<tr>
<td>(Fan or Fanless)</td>
<td></td>
<td>CPU cooler and system fan</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>0 ~ 60 °C</td>
<td>0 ~ 40 °C (Depends on CPU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 ~ 40 °C (Depends on CPU)</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>200 x 160 mm (7.87&quot; x 6.30&quot;)</td>
<td>244 x 244 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>380 x 454 x 176 mm</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>WISE-DeviceOn Windows Linux</td>
<td>WISE-DeviceOn</td>
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<tr>
<td></td>
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<td>WISE-DeviceOn</td>
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<tr>
<td></td>
<td>ASMB-830</td>
<td>SKY-7260S</td>
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</tr>
<tr>
<td><strong>ASMB-830</strong></td>
<td>Single socket motherboard</td>
<td>2U Rack Mount Server</td>
</tr>
<tr>
<td><strong>SKY-7260S</strong></td>
<td>2U Rack Mount Server</td>
<td></td>
</tr>
<tr>
<td><strong>SKY-8260S</strong></td>
<td>2U Carrier Grade Rack Mount Server</td>
<td></td>
</tr>
<tr>
<td><strong>FWA-6080</strong></td>
<td>2U Rackmount Network Appliance</td>
<td></td>
</tr>
<tr>
<td><strong>AMD Processor</strong></td>
<td>EPYC™ 7002/7003 Series</td>
<td>EPYC™ 7002/7003 Series</td>
</tr>
<tr>
<td><strong>Core</strong></td>
<td>up to 64 cores</td>
<td>up to 64 cores</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>8 x DDR4 RDIMM up to 3200MHz, ECC/RDIMM/LRDIMM supported</td>
<td>16 x DDR4 RDIMM up to 3200MHz, RDIMM/LRDIMM supported</td>
</tr>
<tr>
<td><strong>Networking Controller</strong></td>
<td>2 x Intel® I210AT / Intel® X550-AT2 (dual 10GbE ports)</td>
<td>2 x Intel i210-AT, 1 x Realtek PHY</td>
</tr>
<tr>
<td><strong>Expansion</strong></td>
<td>5 x PCIe x16 slots</td>
<td>1 x PCIe Gen3 x16, 2 x PCIe Gen3 x8</td>
</tr>
<tr>
<td></td>
<td>2 x PCIe x8 slots</td>
<td>1 x PCIe Gen4 x16, 2 x PCIe Gen4 x8</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>2 x M.2 2280/22110 9 x SATA3 (8 via Mini SAS HD + 1 SATA 7P)</td>
<td>12 x 3.5” HDD12 (front) 2 x 2.5” HDD SSD (rear, optional) 2 x M.2 SSD</td>
</tr>
<tr>
<td><strong>I/O Ports</strong></td>
<td>2 x 1GbE, 2 x 10GbE 1 x GbE for BMC Management, 5 x USB 3.2 Gen1, 1 x RS-232</td>
<td>2 x 1GbE, 1 x GbE BMC Management 2 x USB 3.0, 1 x VGA, 1x COM port</td>
</tr>
<tr>
<td><strong>Power Input</strong></td>
<td>ATX Input 800W AC PSU / 1200W AC PSU (optional)</td>
<td>1200W AC/ 800W DC PSU</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>0 ~ 60 °C (32 ~ 140 °F)</td>
<td>0 ~ 40 °C (32 ~ 104 °F)</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>304 x 244mm</td>
<td>438 x 88 x 797 mm</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>Windows</td>
<td>Windows</td>
</tr>
<tr>
<td></td>
<td>Linux</td>
<td>Linux (CentOS, Red Hat, Ubuntu)</td>
</tr>
<tr>
<td>AIMB-522</td>
<td>EPC-B3522</td>
<td>SOM-6872</td>
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<tr>
<td><strong>Industrial Motherboard</strong></td>
<td><strong>Micro-ATX</strong></td>
<td><strong>Computer on Module</strong></td>
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<tr>
<td><strong>Micro-ATX</strong></td>
<td><strong>Embedded PC</strong></td>
<td><strong>Computer on Module</strong></td>
</tr>
</tbody>
</table>

**AMD Processor**
- Ryzen™ Embedded 5000 Series
- Ryzen™ Embedded 5000 Series
- Ryzen™ Embedded V2000
- Ryzen™ Embedded V2000
- Ryzen™ Embedded V2000
- Ryzen™ Embedded R2000

**Memory**
- 4 x Channel 288-pin DDR4 UDIMM up to 3200MHz
- 4 x DIMM slots, Max. 128GB (32GB per DIMM)
- 2-CH 260-pin DDR4, 3200MHz
- Up to 64 GB / 32 GB per SO-DIMM (ECC/non-ECC)
- 2-CH 260-pin DDR4, 3200MHz
- Up to 64 GB / 32 GB per SO-DIMM (ECC/non-ECC)
- 2-CH 260-pin DDR4, 3200MHz
- Up to 64 GB / 32 GB per SO-DIMM (ECC/non-ECC)
- 2-CH 260-pin DDR4 SODIMM up to 3200MHz
- 2 x channel 260-pin DDR4 SODIMM slots, Max. 32GB (16GB per SODIMM)

**Display**
- HDMI, VGA, DP
- HDMI, VGA, DP
- 1 x VGA (optional to DDl)
- 1 x LVDS (optional to eDP)
- 2 x HDMI, 2 x DP (Type-C)
- 2 x HDMI, 2 x DP (Type-C)

**Expansion**
- 1 x PCIe x16, 2 x PCIe x4, 1 x M.2 M key & 1 x M.2 E key
- 1 x PCIe x16, 2 x PCIe x4, 1 x M.2 M key
- 16 PCIe Gen3 lanes
- 1 x PCIe x8, 1 x M.2 M key & 1 x M.2 E key
- 1 x PCIe x8, 1 x M.2 M key & 1 x M.2 E key

**Power Input**
- ATX input
- ATX input
- Vin: 8.5-20V
- 12V DC-in
- 12V DC-in
- DC-in 12-24V +/- 10% AT/ATX Mode

**I/O Ports**
- 4 x GbE
- 8 x External USB 3.2 Gen2
- 4 x USB 3.2 Gen2 & 8x USB2.0
- 2 x serial (RS-232)
- 8 x GPIO
- 2 x GbE
- 4 x USB Gen 2
- 2 x USB Type-C
- 2x USB Type-C
- 3 x 2.5GbE (2 PoE Optional)
- 4 x USB 3.1, 2 x USB 2.0
- 2 x RS-232/422/485, 2 x RS-232 (4-wire)
- 1 x CAN 2.0
- Audio (Line-In/Line-Out), 12C/SMBus
- Smart Fan Control, 1 x SATA Port
- Inverter Power, HDD Power

**Thermal (Fan or Fanless)**
- CPU Cooler
- CPU cooler and system fan
- Heat spreader
- Semi-cooler
- CPU cooler
- CPU Heat sink and system fan
- Fanless for CPU TDP 15W
- Cooler for CPU TDP 25W

**Operating Temperature**
- 0 ~ 40 °C (Depends on CPU)
- 0 ~ 40 °C (Depends on CPU)
- 0 ~ 60 °C
- 0 ~ 60 °C
- 0 ~ 60 °C (Depends on CPU)
- Standard: 0 ~ 60 °C
- Extended: -40 ~ 85 °C

**Dimensions**
- 244 x 244 mm
- 310 x 360 x 134 mm
- 95 x 95 mm
- 170 x 170 mm
- 330 x 270 x 44 mm
- 146 x 102 mm

**Software**
- WISE-DeviceOn
- Windows Ubuntu 20.04
- WISE-DeviceOn
- Windows 10 IoT
- WISE-DeviceOn
- Ubuntu 20.04
<table>
<thead>
<tr>
<th></th>
<th>DPX®-S451</th>
<th>DPX®-E265</th>
<th>DPX®-E140</th>
<th>DPX®-S450</th>
<th>DPX®-J100</th>
<th>DS-082</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD Processor</td>
<td>Ryzen™ Embedded R2000</td>
<td>Ryzen™ Embedded V1000/R1000</td>
<td>Ryzen™ Embedded V1000/R1000</td>
<td>Ryzen™ Embedded V1000/R1000</td>
<td>Ryzen™ Embedded V1000/R1000</td>
<td>Ryzen™ Embedded V1000/R1000</td>
</tr>
<tr>
<td>Memory</td>
<td>2 x channel 260-pin DDR4 SODIMM up to 3200MHz 2 x SODIMM slots, Max. 32GB (16GB per SODIMM)</td>
<td>2 x channel 260-pin DDR4 SODIMM up to 3200MHz 2 x SODIMM slots, Max. 32GB (16GB per SODIMM)</td>
<td>2 x channel 260-pin DDR4 SODIMM up to 3200MHz 2 x SODIMM slots, Max. 32GB (16GB per SODIMM)</td>
<td>2 x Channel DDR4 SODIMM up to 2400MHz 2 x SODIMM slots, Max. 16GB (8GB per SODIMM)</td>
<td>2 x Channel DDR4 SODIMM up to 2400MHz 2 x SODIMM slots, Max. 16GB (8GB per SODIMM)</td>
<td>Dual channel DDR4 2400MHz SODIMM</td>
</tr>
<tr>
<td>Display</td>
<td>4 x Display Port</td>
<td>4 x Display Port (V1000) 3 x Display Port (R1000)</td>
<td>4 x Display Port (V1000) x3 Display Port (R1000)</td>
<td>4 x Display Port (V1000) 3 x Display Port (R1000)</td>
<td>3 x monitor 1 x DP++ 1 x HDMI 1 x VGA (2 x with R1102)</td>
<td>AMD Radeon HD graphics</td>
</tr>
<tr>
<td>Expansion</td>
<td>One PCIe x 16 slot</td>
<td>One PCIe x 16 slot</td>
<td>NA</td>
<td>One PCIe x 16 slot</td>
<td>Half length mini-PCI card</td>
<td>M.2 2230 E Key</td>
</tr>
<tr>
<td>Power Input</td>
<td>12VDC and ATX input</td>
<td>12VDC and ATX input</td>
<td>12VDC and ATX input</td>
<td>12VDC and ATX input</td>
<td>AT12V (V1605) 5V/ 12V Jamma 20pins (R series)</td>
<td>19V DC-in (ATX/AT mode)</td>
</tr>
<tr>
<td>I/O Ports</td>
<td>2 x Gigabit LAN 11 x USB (8 x USB 2.0, 3 x USB 3.0/2.0) 12 x serial (RS232/CCTalk/TTL/RS485) 2 x I2C ports 1 x Line out 5.1</td>
<td>2 x Gigabit LAN 7 x USB (1 x USB 3.0) 5 x Serial (RS-232/CCTalk/ID003/RS485) 1 x Line out</td>
<td>2 x Gigabit LAN 9 x USB (2x USB 3.0) 11 x serial (RS232/CCTalk/TTL/RS485) 2 x I2C port 1 x Line out 5.1</td>
<td>2 x Gigabit LAN 11 x USB (8 x USB 2.0, 3 x USB 3.0/2.0) 12 x serial (RS232/CCTalk/TTL/RS485) 2 x I2C ports 1 x Line out 5.1</td>
<td>1 x Gigabit LAN 6 x RS232 4 x USB 2.0 2 x USB 3.1/2.0 1 x Line out 5.1 1 x SPDIF out (Option)</td>
<td>1 x Gigabit LAN 8 x USB 2.0 2 x USB 3.1/2.0 1 x Line out 5.1 1 x SPDIF out (Option)</td>
</tr>
<tr>
<td>Thermal</td>
<td>Fan</td>
<td>Fan</td>
<td>Fan/Fanless</td>
<td>Fan</td>
<td>Fanless (R1102) Fan (others)</td>
<td>Fanless (R1102) Fan (others)</td>
</tr>
<tr>
<td>Operating</td>
<td>Board 0 ~ 60 °C System 0 ~ 50 °C</td>
<td>Board 0 ~ 60 °C System 0 ~ 50 °C</td>
<td>Board 0 ~ 60 °C System 0 ~ 50 °C</td>
<td>Board 0 ~ 60 °C System 0 ~ 50 °C</td>
<td>Board 0 ~ 60 °C System 0 ~ 50 °C</td>
<td>0 ~ 40 °C</td>
</tr>
<tr>
<td>Dimensions</td>
<td>200 x 170 mm 170 x 185 mm</td>
<td>200 x 270 mm 200 x 170 mm</td>
<td>190 x 190 mm 180 x 190 x 19 mm</td>
<td>200 x 170 mm 170 x 185 mm</td>
<td>190 x 190 mm 180 x 190 x 19 mm</td>
<td>200 x 170 mm 170 x 185 mm</td>
</tr>
<tr>
<td>Software</td>
<td>DirectPCI API, DPX® Connector SDK, DPX®-SAS Engine</td>
<td>WinPuC serial protocol</td>
<td>DirectPCI API, DPX® Connector SDK, DPX®-SAS Engine</td>
<td>DirectPCI API, DPX® Connector SDK, DPX®-SAS Engine</td>
<td>WinIJC serial protocol</td>
<td>WISE-DeviceOn</td>
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