EI-52 + EdgeX: 
Accelerate AIoT Applications

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Advantech USA
Growing Demand On AIoT Market

“IoT devices to generate 79.4 ZB of data in 2025” -- IDC

Growth on AI Market

AI Inference & Training Market

Growth on AI Market By Industry

Source: Omdia

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The Value of Edge Computing

- Data pre-processing and analysis
- Event driven rule engine
- Data collection and protocol convert
- Edge data filter for bandwidth control

- Keep privacy data AT Edge
- Data transmission and storage security
- Standalone work ability
- Self-management

Edge computing is entering the mainstream as organizations look to extend cloud to on-premises and to take advantage of IoT and transformational digital business applications.

2021 Strategic Roadmap for Edge Computing by Gartner
EIS Series: Edge-to-Cloud Connect Acceleration
Realizing Data Integration & Visualization from Edge-to-Cloud

Equipment Connectivity
- Support industrial protocol OPC-UA/Modbus/ODBC
- Domain focus solution for semiconductor and smart factory

Edge Intelligence
- Edge Data pre-processing and analysis
- Event driven rule-engine

Easy Deployment
- Centralize configuration and deployment
- Edge protocol setting and duplicate

Data Visualization
- One-key generate dashboard
- Based on vertical application and customer using scenario

Built-in
- EI-52
- EIS-D620
- EIS-D210
- EIS-D150

Smart Energy Storage Monitoring
- Semiconductor
- PCB Manufacturing
- CNC Monitoring and Management

Edge Intelligent Server

Smart Energy Storage Monitoring

EIS-S230
Edge Cloud

Edge-X
EI-52 Edge Intelligent System
All-in-one Compact High Performance for AIoT Application

Plug & Play System Design
• Easy start-up and configuration for IoT deployment
• 11th Gen Intel® delivers powerful computing with built-in SSD/memory

Edge-to-Cloud Interconnection
• Integrated software architecture and low-code integration
• Sensing data integration and built-in remote management software

AI x 5G Platform Ready
• Compatible AI acceleration model with Intel® Movidius™ Myriad X VPU
• Compatible 5G modules achieve 10 x faster throughput and 100 x traffic capacity

Increase in Operational Efficiency 30%
Reduction in Maintenance Cost 50%
Reduction in Deployment Time 60%
EI-52 Feature Highlights

• Intel® Core i5-1145G7E/i3-1115G4E/Celeron-6305E, i5 Turbo boost up to 4.1 GHz
• 4K HDMI + DP 1.4a Dual display
• 2x Intel GbE, 2x RS-232/422/485, 4x USB 3.0, 2x USB 2.0
• Built-in 16G/8G DDR4 Memory & 64G SATA Slim SSD
• OS supports Win 10 IoT & Ubuntu 20.04
• Pre-installed Edge X Expendable data acquisition API and WISE-DeviceOn
• Intel VNNI/OpenVINO & Advantech Edge AI Suite support for AI/deep learning

Target Applications:

Smart City/ Factory Automation/ Retail/ Self-service kiosk
Optional AMK-A0039: Thermal kit for AIW-355 5G Module

AIW-355
5G Module

AMO-I026A
M.2 to mPCIe Adapter

AMK-A0039
EI-52 Thermal kit for AIW-355

10x Faster Throughput
Compared to 4G peak speed 1 Gbps, 5G can provide up to 10 Gbps.

10x Latency Decrease
With 5G, lag time will drop to <1 ms compared to 4G lag time 10~20 ms.

100x Traffic Capacity
5G can connect up to 1M devices per square km, increased 100x over 4G capacity.
EI-52 Expansions: WIFI

Optional WIFI kit: Support EWM-W189H02E WIFI+Bluetooth Module

- Add-on wireless capability: EWM-W189H02E WIFI module
- Support WIFI 802.11 a/b/n/ac & Bluetooth upto 3 Mbps
- Support -40~70C operating temperature

CE RED/FCC Ready in Q3
EI-52 Expansions: AI

Optional AMK-A0038: VEGA-330 with Intel Movidius Myriad X VPU

- Add-on AI capability: up to 8 TOPS with 7.6 watt only
- Edge AI Suite with 100+ pre-trained AI models, graphic UI and built-in OpenVINO to accelerate development
- DevCloud tp evaluate
- FaceView industrial app with high precision AI engine and SDK for face recognition applications

Power Efficient Edge AI Inference:
up to 8 TOPS @7.6 Watt

AMK-A0038
Including VEGA-330 and Thermal solution

Certificate PASS!
Compared to previous 8th Gen., Intel 11th Core i processor supports Vector Neural Network Instruction (VNNI), which improves AI inference performance about 4x higher.
Open Platform Edge-to-Cloud Integration EdgeX-API

DeviceOn/iService
Intelligence Services Mgmt.

EdgeX Productivity Tools
POCLink for Battery Mgmt.
Device Diagnostics

Ubiquitous Data Stream
Device Connection
Data Processing

Fast Application Integration
Edge Analytics
Cloud Integration

Device Gateways
Fleet Gateways
Medical Computers
Intelligent Service
Self-service Kiosks
LoRa Gateway
Why Edge X?
Open Platform to Speed up Data Acquisition and Application Development

Traditional Architecture

- User APP
- Device API
- Device API
- Device API

Edge X Architecture

- Unified Device API
- Modbus
- Ethernet/IP
- OPC UA
- Amazon Web Services
- Microsoft Azure

Device API
**Edge X Supported Data Protocol & Device List**

<table>
<thead>
<tr>
<th>Supported Protocol</th>
<th>Tested Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACnet</td>
<td></td>
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<tr>
<td>BLE</td>
<td></td>
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<tr>
<td>Grove</td>
<td></td>
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<tr>
<td>Modbus</td>
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<tr>
<td>MQTT</td>
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<td>NEMA</td>
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<tr>
<td>OPC-UA</td>
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<tr>
<td>ONVIF</td>
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<tr>
<td>REST</td>
<td></td>
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<tr>
<td>SNMP</td>
<td></td>
</tr>
<tr>
<td>UART Command</td>
<td></td>
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<tr>
<td>USB</td>
<td></td>
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<tr>
<td>VIRTUAL</td>
<td></td>
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<tr>
<td>ZIGBEE</td>
<td></td>
</tr>
<tr>
<td>Others (Proprietary)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>POC-IPSM90</td>
</tr>
<tr>
<td>Cold chain sensor</td>
<td>Trek-120</td>
</tr>
<tr>
<td>GPS sensor</td>
<td>NEO-M8U-06B</td>
</tr>
<tr>
<td>I/O Module</td>
<td>WISE-4012</td>
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<tr>
<td>IP cam</td>
<td>GeoVision GV-TDR2700/TBL2703</td>
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<tr>
<td>Printers</td>
<td>URPPT800</td>
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<tr>
<td></td>
<td>TMT82I</td>
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<td></td>
<td>TMT88V</td>
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<td>PPTC31</td>
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<td></td>
<td>SLKTL212</td>
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<tr>
<td></td>
<td>WPK851</td>
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<tr>
<td>USB devices: Cam/MSR/RFID/2D Scanner</td>
<td>UTC-P01 camera</td>
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<tr>
<td></td>
<td>UTC-P02 Magnetic card reader</td>
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<tr>
<td></td>
<td>UTC-P03 RFID</td>
</tr>
<tr>
<td></td>
<td>UTC-P06 smart camera</td>
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<tr>
<td></td>
<td>UTC-P07 2D scanner</td>
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<tr>
<td>Monitor devices</td>
<td>External VGA/HDMI monitor</td>
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<tr>
<td></td>
<td>Integrated monitor LVDS</td>
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<tr>
<td>Scanner MQTT devices</td>
<td>Honeywell N3640/N4680/5860</td>
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<tr>
<td></td>
<td>New Land EM2096</td>
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<tr>
<td></td>
<td>JayRay IG 380/820</td>
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<tr>
<td></td>
<td>Jogtek ADT007A</td>
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</tbody>
</table>
WISE-DeviceOn
Empower Edge Intelligence & Enhance Data Security

Highlights

- Dashboard overview
- Real-time status
- Device list & health status

- Easy-to-Use UI
- Remote power management
- Windows lockdown

- Backup w/o interrupting current tasks
- Dynamic scheduling for backup timing
- Unauthorized applications blocking
EI-52 Target Markets

Intel 11th Gen. Powerful Performance / Compact Dimension /AI & 5G Compatible

3 Key Values

- Large-Scale Deployment
- Connectivity Service
- Software Integration

- Simplify Deployment
- Management Software
- IoT Development Tools

- Device Connection
- Vertical Focus Software
- 24/7 Security
Retail Robot Wireless AI Notification System

The compact EI-52 equipped with Edge X WISE-DeviceOn is deployed in autonomous retail robot. When the robot moves along the aisle, the scanner would scan the goods on the shelves and detect issues need to be fixed, for example, out of stock, price issue or wrong product. The detected data is transmitted to the backend server, and then the central system can notify the staff to correct the issues. On the other hand, IT operator can remote control and monitor EI-52 in real-time through the built-in WISE-DeviceOn software.

**Key Benefits:**
- Built-in Edge X for robot and backend data connectivity
- Built-in DeviceOn for real-time device monitor and control
- WIFI module support for wireless transmission
- Save man cost and enhance operating efficiency
Automatic Water Pump Control

EI-52 equipped with Edge X data acquisition API is deployed in the factory and connect with IoT I/O module and PLC. Through the connection, the water pump can be automated set according to the liquid level and temperature sensor data to save man cost and enhance operating efficiency.

**Key Benefits:**
- Built-in Edge X data acquisition API
- Collect sensor data and trigger equipment action automatically
- Save man cost and enhance operating efficiency
Automatic Water Pump Control: Software Architecture

**Gateway**
- WISE-PaaS DataHub

**InsightAPM**
- Water pump Mgnmt model

**SaaS Composer**
- Visualization model

**AIFS/PHM**
- Water pump PHM model

**EdgeX Message Bus (Core Service Layer)**
- WISE-PaaS App Service
- Rule Engine
- Alert & Notification
- Edge AI Data Connector
- Modbus TCP Device Service
- MQTT RTU Device Service

**Cloud**
- DataHub

**Edge**
- Ei-52 Gateway
- WISE-4012 I/O Module
- PLC

**OpenVINO AI Inference Engine**

**Video AI Service**
Automatic Water Pump Control: Application Dashboard

Water Pump Dashboard

Water Pump PHM Model
(Device Health Status)
Co-Creating the Future of the IoT World