



EVSE NEXT GENERATION

Focus Solution for Integration Support

ADVANTECH

Enabling an Intelligent Planet

Available from

GPC
TECHNOLOGY GROUP

#1

Integrated EVSE Controller & SECC Design



Currently, most EV chargers (EVSE) are designed as building blocks, integrating function like control, HMI, retail services, EV communication, payment, and power board interface. This design approach offers flexibility but also introduces complexity to system design, integration, production, and maintenance.

Advantech's EV-focused platform aims to offer a highly integrated solution, streamlining compatibility so that equipment builders can be unencumbered with their designs, thus creating more possibilities for ID design and enhancing the user experience.

An EV charger is a composite system in which the computing unit not only serves as an HMI but also acts as a central controller to communicate with various devices from different domains, thereby increasing complexity. It consists of a controller, HMI system, payment & billing, power meter, AC/AC or AC/DC power delivery, and additional parking lockers or camera systems.

Achieving such a system design may require additional LAN switches, I/O expanders, and protocol converters, resulting in a complex and cumbersome system that is challenging to manufacture and maintain. The Advantech EV charger platform combines essential components onto one board, making system design easier. You can now connect to all parts of the system using 3 Ethernet ports, 2 CAN bus connections, 4 RS-232/422/485 ports, 6 USB ports, an internal USB 3 port, and even optional PoE for camera connections.

Additionally, there are 3 M.2 sockets for various wireless connections and storage options. Moreover, it's adaptable for expansion to J1772 and PLC (power-line-communication) compatibility, which follows HPGP/HPAV standards for plug-and-charge functionality and future service enhancements.

- ✔ **x86 & Arm-based platform**
- ✔ **Multiple I/O options**
- ✔ **HPGP/HPAV communication interfaces**
- ✔ **Compliant with ISO15118 and main protocols**



#2

Enhanced Manageability via Out-of-Band Capacity



In the context of the rapid deployment of EV charging infrastructure, challenges emerge in maintaining network systems. The in-band remote control primarily be triggered above the OS and application layer resulting in cybersecurity concerns.

Advantech presents a new solution called EdgeBMC. This solution introduces out-of-band (OOB) manageability, enabling monitoring and control on a hardware-level system.

EdgeBMC

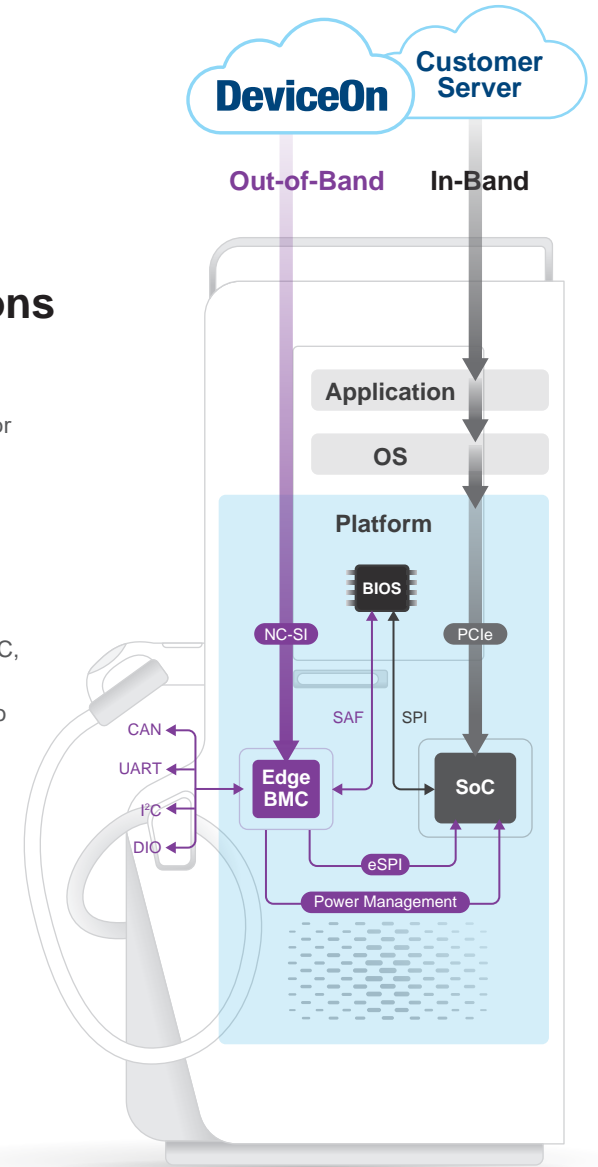
EdgeBMC – Manage Anytime, Anywhere, Under Any Conditions

Out-of-band management (OOB) involves a direct network connection at the hardware and firmware layers. Unlike traditional in-band management through applications and OS layer, OOB often uses separate components like an MPU, Arm-based/RISC-V-based MCU, or embedded controller. These components work independently from the main processor and deliver essential and reliable functionalities.

While an In-Band connection is unresponsive or out of service, EdgeBMC will utilize predefined rules to initiate a connection from hardware to the BIOS, allowing it to recover from interruptions during firmware OTA updates and prevent unauthorized firmware modifications.

Furthermore, EdgeBMC serves as an industrial-grade embedded controller, integrating various I/O buses like CANbus, I2C, I3C, and high-speed UART to design features like physical buttons, gesture or light sensors, and remote control methods. These functionalities can activate the system, services, and maintain the system in a low-power state during idle modes to enhance power usage efficiency.

Through OOB management, EdgeBMC enhances manageability by creating a fail-safe and redundant system, leading to an improved MTBF (Mean Time Between Failures) and faster MTTR (Mean Time To Repair) services. Additionally, Advantech provides user-friendly APIs to simplify integration. Users can easily integrate with their own cloud servers or choose to utilize the Advantech DeviceOn service for a more seamless and ready-to-use platform service.



Remote Out-of-Band Connection

Maximize System Control



Versatile Industrial I/O Interface

Under System Drivers or Standalone Use Cases



Control & Monitor with Security

Power Management & BIOS SAF, Root-of-Trust



Fast Integration of Cloud Services

WISE-DeviceOn Ready with API for Developers

#3

Scalable in Computing and AI Capacity for Future-Proofing



The growth of EV infrastructure is reshaping traditional business models, requiring innovative approaches to maintain profitability while providing enhanced services to EV users. Traditional gas stations primarily rely on customer traffic for revenue. As the electric vehicle (EV) market keep growing, EV owners tend to charge their vehicles at home to reduce charging costs. This shift also impacts the future revenue streams of traditional and EV charging stations. Additionally, a variety of power sources (including charging grid, renewable energy with energy storage) lead to discussions about workload balancing and electricity management to achieve the most effective return on investment.

Considerations for Next-Level Expansion Technologies of EV Chargers:

- Workload Balance
- Generation of Revenue Streams
- Intelligent Route Planning and Charging Optimization

Expanding charging station features with Kiosk & Retail options is the future trend of charging station development to generate revenue streams. By using smart digital displays or signage with AI inference and camera detection, the station can show tailored ads, services, and sales offers based on user profiles and memberships. This keeps users willing to stay longer, benefiting station owners by increasing revenue, addressing high installation and maintenance costs, thus potentially improving energy efficiency through workload balancing. For example, users could view ads for e-commerce or order food from nearby restaurants while charging, thus extending their stay to boost potential revenue and indirectly contribute to enhanced workload balancing in power usage for the charging station.

Furthermore, intelligent route planning enhances EV charging efficiency and workload balance by offering optimized charging plan. Users can plan their travel routes in advance, and the charging site will allocate parking with reserved spots. Upon arrival, the cameras will identify members and license plates, automatically releasing the designated space. This creates a more flexible power facility infrastructure and enhances profitable site management.

Advantech's next generation EVSE solution provides multiple, high-quality displays in company with PoE & internal USB3 interfaces to ease camera integration. With the build-in scalable computing, multi-stream hardware media transcoding, graphics rendering, and AI framework, it brings the huge possibility to implement innovative services hence benefit whole value chain.



Ease Camera I/O

PoE Extension, Internal USB3



AI Computing

Silicon Supported AI Framework



Content Display & Rendering

- Multiple 4K/8K Displays
- HEVC/H.264 Multi-Streams HW Acc.
- 3D Rendering Acc. on DirectX & OGL



#4

Embedded Software & Security Solutions








As the demand for computation and communication grows, EV charging systems (EVSE) become increasingly susceptible to a single point of attack, which could lead to widespread failures in the electrical grid.

Regulators around the world have been demanding comprehensive security protection for critical EV infrastructure. The ISA/IEC 62443 standard serves as the guiding framework for this security. Leveraging 40 years of embedded computing expertise, Advantech provides practical tools and services to strengthen security measures and guide your EVSE toward compliance with these standards.

Advantech Solutions

- Boot Management with TPM
- 10-Year Long-Term Support: Ubuntu and Windows IoT
- Secure, Zero-Touch Onboarding and Provisioning
- Data Transportation during Daily Operation
- System Recovery and Failover

Security Stack for IEC 62443 Requirements

Life cycle management	 <ul style="list-style-type: none"> • Secure State and Life Cycle Management • Anomaly Detection and Reaction • Secure Communication (Protocols) • Compliance and Auditing 	IEC 62443-3-3 SR1.1/ SR1.2/ SR1.3/ SR1.8/ SR1.11/ SR2.8/ SR2.9/ SR2.11/ SR3.3/ SR4.1/ SR4.3/ SR7.3
Security Application	<div style="display: flex; justify-content: space-between;"> <div data-bbox="455 463 1029 593">  <p>Embedded Security Solution</p> <ul style="list-style-type: none"> • Configuration Toolkit • Whitelist Protection • No Need Virus Code </div> <div data-bbox="1044 463 1555 593"> <p>Windows UWF and Ubuntu OverlayFS</p> <ul style="list-style-type: none"> • Software Isolation • Reliable Control Transfer </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div data-bbox="455 607 1029 747">  <p>Backup & Recovery Solution</p> <ul style="list-style-type: none"> • Whole System Backup • Runtime Incremental Backup • One Key Recovery </div> <div data-bbox="1044 607 1555 747"> <p>Windows' Bitlocker and Ubuntu's LUKS</p> <ul style="list-style-type: none"> • Full Disk Encryption • Secure Key Management • Centralized Management and Recovery • Data Integrity and Authentication </div> </div>	IEC 62443-4-1 SR-2: Threat Model SD-2 Defense in Depth Design SI-1: Secure Implementation Review SI-2: Secure Coding Standards SVV-3 Vulnerability Testing SUM-4: Security Update Delivery
Operation System	<div style="text-align: center; margin-bottom: 5px;"> Advantech SUSI API </div>  <ul style="list-style-type: none"> • Secure Update Mechanisms • Secure Policy Compliance • 10 years long-term support 	IEC 62443-4-1 Component Requirement (CR) CR 1.2.x/ CR 1.5.x/ CR 1.8.x/ CR 1.9.x/ CR 1.14.x/ CR 2.4.x/ CR 2.12.x/ CR 3.1.x/ CR 3.4.x/ CR 3.8.x/ CR 3.9.x/ CR 3.10.x / CR 3.11.x/ CR 3.12.x/ CR 3.13.x/ CR 3.14.x/ CR 4.1.x/ CR 4.2.x/ CR 4.3.x/ CR 7.3.x
BIOS Bootloader	 <ul style="list-style-type: none"> • Secure Boot • Boot Guard • Trust Zone hardware architecture and Arm Secure Boot • Failover-dual boot 	
HW (Longevity)	<div style="display: flex; justify-content: space-between;"> <div data-bbox="455 1103 634 1215" style="background-color: #e0f0ff; padding: 5px;"> <p>TPM 2.0 SQFlash EdgeBMC</p> </div> <div data-bbox="655 1117 1357 1191"> <ul style="list-style-type: none"> • Cryptographic Operations • Cryptographic Key and Certificate Store • Cryptographic Key Generation and Injection • Residual Information Purging • Secure (Encrypted) Storage </div> </div>	Embedded Device Requirement (EDR) Host Device Requirements (HDR) DR 2.4.x/ DR 3.10.x/ DR 3.11.x/ DR 3.12.x/ DR 3.13.x/ DR 3.14.x

Advantech Versatile Resolution Package

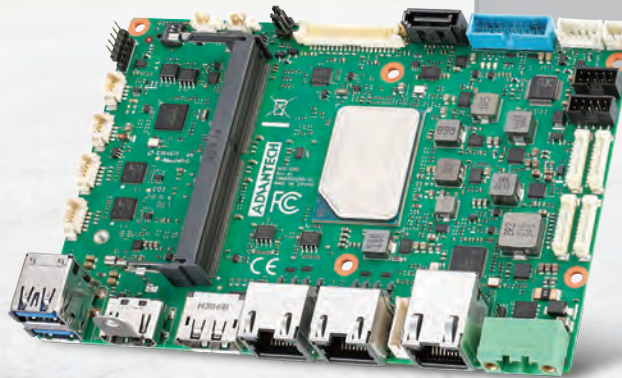
Advantech provides a total solution offering comprehensive and convenient package components, including the brain-like EVSE Controllers to handle advanced computing for sophisticated functionalities, ruggedized HMI/Signage Displays, versatile Unmanaged Ethernet Switches, WLAN Communication Modules with OCPP, efficient data-processing Edge Gateways, robust RTD Ethernet I/O Modules, and high-speed 5G/LTE Routers.

These holistic solutions offer reliable integrated services and maintenance to clients, effectively assisting them in obtaining optimal solutions as they navigate the dynamically evolving market.

A EVSE + SECC

AFE-E350 3.5" SBC

- Integrated PLC, CAN, LAN, UART
- EdgeBMC OOB Manageability
- DC 12~24V, -40C~85°C Op.
- Conformal coating service



D**B** Unmanaged Ethernet Switch**EKI-2525I**

- 5/8 Fast Ethernet auto MDI
- V_{dc} 12~48V & P-Fail relay
- Wide temp. -40~85°C

C High Bright Display**IDK-2115**

- 15" 1024x768 resolution
- 1200nits delivers superior sunlight readability
- Thermal solution improve reliability

D Signage Display**DSD-3055**

- 55" UHD resolution 3840 x 2160
- 178/178 view angle, SPKR 10W x2, VGA/HDMI/DP
- Backlight lifetime 50,000 hr
- 5~45°C, 500nits, 4000:1

E Communication Module**BB-WLNN**

- ARM9 600MHz/128MB DDR
- OpenWrt support
- Serial / UART / Ethernet to Dual Band Wi-Fi
- OCPP v1.6J/2.0.1 compatible
- Wide operating temperature -30 ~ 85°C

F Edge Gateway**EPC-R3220**

- TI Sitara AM3352 Cortex-A8
- 6x DIO, 2x RS232/485
- USB OTG, 2x LAN, MicroSD
- V_{dc} 12~24V, -20~70°C

G RTD Ethernet Remote I/O**ADAM-6015**

- 7-channel RTD
- Protocols: Modbus TCP, RESTful API, ASCII
- GCL to perform basic logic control rules
- Peer-to-Peer function for I/O status mapping

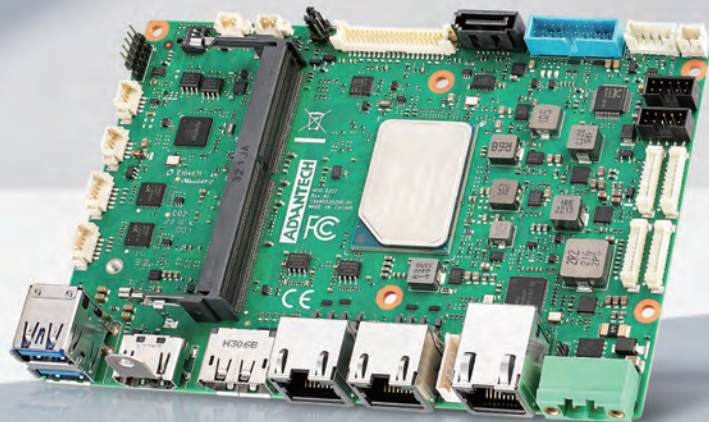
H 5G/LTE Router**ICR-4461**

- 5G NR, Sub-6GHz, global band
- Dual SIM, eSIM ready
- Open platform allows custom scripts
- Free Router APPs with containers for security, protocol conversion and remote monitoring

INSPIRE The Next Level of EVSE

AFE-E350

3.5" SINGLE BOARD COMPUTING



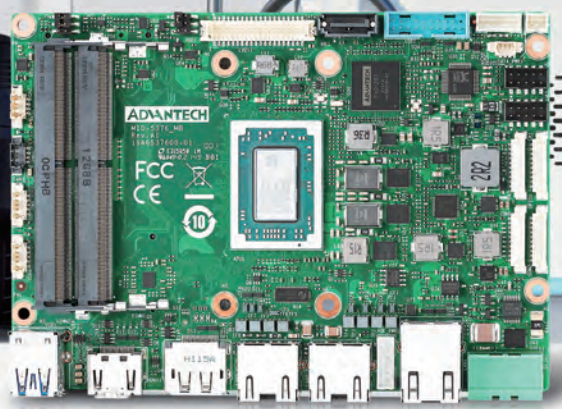
11th Gen. Intel® Core i7/i5/i3/Celeron® 3.5" SBC

- LVDS, HDMI2.0, DP1.4, 3-independent displays
- 2x CAN/-FD, 4x RS-232/422/485, 3x Ethernet, 2x Extend PLC
- 3x M.2 E-Key, B-Key, M-Key for WiFi, cellular, and storage
- Wide 12-24V, Extended -40~85C Operating Temperature
- EdgeBMC out-of-band manageability and software API
- Intel Atom x6000E processor series



MIO-5376

3.5" SINGLE BOARD COMPUTING

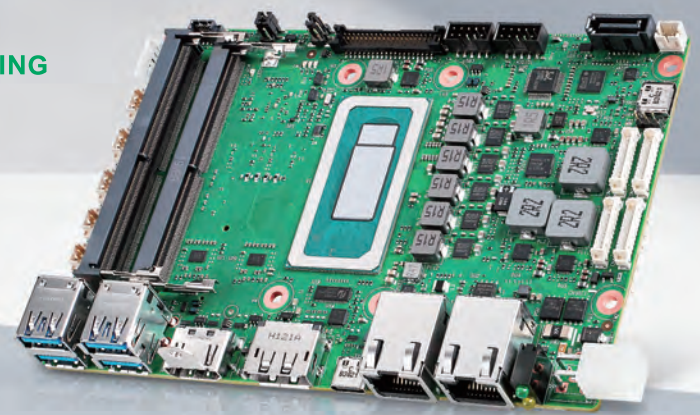


AMD Ryzen™ Embedded R2000 Series 3.5" SBC

- AMD Ryzen Embedded R2000 Processor with Quad Cores, TDP 15W/ 28W
- Dual Channel DDR4-2667 up to 32GB
- 3 simultaneous displays: LVDS/HDMI/DP
- 3 GbE, support optional PoE PSE Dual port 15.4W (Module: MIOe-PSE)
- Expansion: M.2 E-Key/ B-Key/ M-Key (supports NVMe)
- Supports iManager & Software APIs, WISE-DeviceOn

MIO-5377

3.5" SINGLE BOARD COMPUTING



12th Gen. Intel® Core i7/ i5/ i3 P-series 3.5" SBC

- 12th Gen. Intel® Core™ Processor up to 12 Cores, TDP 28/15W
- Dual Channel DDR5-4800 up to 64GB
- 4 simultaneous displays: LVDS/ HDMI/ DP/ USB-C Alt. DP
- 2 GbE, 6 USB, USB4/ TBT4, 4 UART, 2 CANBus, 3 I2C
- 3 Expansions: M.2 E-Key, B-Key, M-Key (support NVMe)
- Supports iManager & Software APIs, WISE-DeviceOn

Enabling an Intelligent Planet

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.

ADVANTECH



APC Technology Group is a leading UK distributor for Advantech. Our specialist team offer expert advice, full product support and design-in assistance to support your projects.

In addition to Advantech's embedded computing solutions, APC offers a range of electrical components and systems to support all aspects of electrified mobility projects. Working alongside leading manufacturers, we can offer technical insight and support on a wide range of technologies suitable for electric vehicles and their related infrastructures.

Power management | Power conversion | EMI filtering | Embedded computing | Displays
Networking and synchronisation | Cables and connectors | Cable protection
Electronic test equipment | Battery testing solutions

Find out more about how we can support your projects by starting a technical conversation with a member of our team.

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