Intelligent Mobile Solutions

Logistics, Commercial Fleets, and Heavy Duty Machines

/ Ports
/ Logistics Center
/ Heavy Duty Machines
/ Utility Fleets
/ iBus
/ Mobile Worker

iService **iBus**

DeviceOn

AMC

ADVANTECH **iAutomation**

Premier Partner
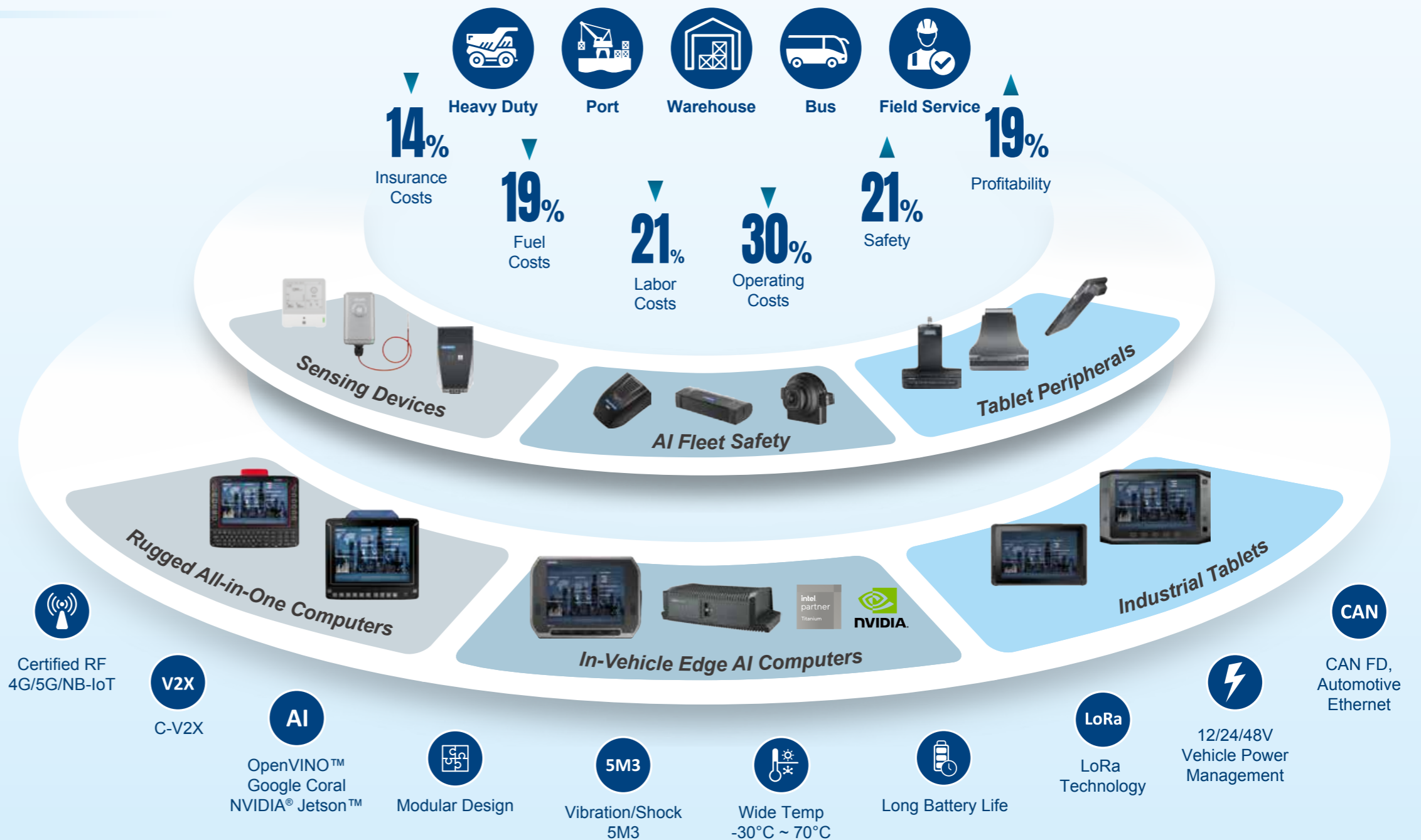
www.amc-systeme.de

Intelligent Mobile Solutions

As a leading provider of intelligent mobile solutions, Advantech offers comprehensive system integration, hardware, software, customer-centric design services, and global logistics support. Our sector maintains two mature product lines to effectively satisfy diverse industrial requirements.

In-Vehicle & Rugged Computers

This product line focuses on rugged design, certified car power designs, Android, x86, and RISC-based architectures, making them ideal for ports, warehouses, heavy duty, utility fleets, and clean energy buses. Advantech also offers various products that feature a full suite of RF protocols, shock and vibration resistance, and comprehensive software development kits to facilitate the development of applications.

Industrial Tablets

AIM industrial tablets, available in 8" and 10" sizes, are designed for a variety of industrial applications. They provide real-time data access, enabling field workers to make informed decisions on the spot. This streamlines workflows and improves efficiency to optimize quality and increase productivity. The AIM series tablets are also equipped with extension ports for integrating additional modules that expand system functionalities to support a wide range of applications.

Heavy Duty | Port | Warehouse | Bus | Field Service

14% Insurance Costs

19% Fuel Costs

21% Labor Costs

30% Operating Costs

21% Safety

19% Profitability

Sensing Devices

AI Fleet Safety

Tablet Peripherals

Rugged All-in-One Computers

In-Vehicle Edge AI Computers

Industrial Tablets

intel partner Titanium
NVIDIA.

Certified RF 4G/5G/NB-IoT

V2X C-V2X

AI OpenVINO™ Google Coral NVIDIA® Jetson™

Modular Design

5M3 Vibration/Shock 5M3

Wide Temp -30°C ~ 70°C

Long Battery Life

LoRa LoRa Technology

12/24/48V Vehicle Power Management

CAN CAN FD, Automotive Ethernet

Rugged All-in-One Computers

High Performance for Optimized Productivity and Reliable Operation

In-Vehicle Edge AI Computers

Tough, Smart, Reliable, and Versatile in Harsh Scenarios

DeviceOn | navis ready | SOTI MOBICONTROL

DLT

TREK

High Performance	Ultra-Rugged System	Multi-OS Support	Excellent Wireless Connectivity

Advanced Functionality for Efficient Operation

- Sunlight-readable display with optical bonding technology
- Glove-compatible touchscreen
- AddOn Module for extended I/O ports

Rugged System for Challenging Operating Environments

- Full IP66 rating
- Shock & vibration resistance
- Wide operating temperature range (-30 ~ 50°C)
- IK08-rated touchscreen

Easy System Integration & Device Management

- Supports Windows, Linux, and Android OS
- Built-in Advantech MSuite software tools
- SOTI, Navis, and StayLinked certified

Uninterrupted Data Transmission

- Supports Wi-Fi 6, 4G/LTE, GPS, and BT 5.3
- Fast WLAN roaming
- Integrated NFC module
- Optional connector for external antenna

Application Scenarios

Intralogistics	Ports	Mining	Agriculture	Factories with Harsh Environments

Scalability

The modular design allows the system I/O to be extended to facilitate the integration of optional modules, making it easy for customization and configuration.

Ruggedness

The accumulation of in-depth in-vehicle industry knowledge has led to the creation of a rugged system that fits challenging user scenarios and reduces maintenance costs.

Simplicity

TREK-60N operates just like a multi-box system to offer car power protection, Intel-powered computing, NVIDIA-powered computing, a PoE switch, and more.

In-Vehicle Specialization

- Enables IPxPT
- 12V/24V certified car power
- Zero data loss CANs & CAN Open
- Intelligent vehicle power management mechanism

Connectivity

- Expansion module for 4G/5G, WLAN & V2X
- Embedded uBlox GPS

Ruggedized

- 5M3, MIL-STD-810
- Fanless wide temperature design (-30C ~ 70°C)*
- IP65 with I/O cover

Best-Fit I/O

- One cable to pair with the driver console (TREK-30x)
- Dual display output & dual audio output
- 10 x LAN (TREK-60)/ 6 LAN (TREK-60N)
- Rich I/Os (COM, isolated DIO, USB)

* Features differ by model.

Industrial Tablet Solutions

Equipped with application-oriented peripherals

Environmental Sensing Solutions

Ensuring food and pharmaceutical safety

Google Mobile Services

AIM 8"
AIM 10"

AIM

| All Day Battery Life | Seamless Connectivity | Rugged Design Water / Dust / Drop Protection | Sunlight Readable |

Peripherals

| Extension Modules | Docking Solution | Battery Charging Station | Accessories |

Application Scenarios

| Retail & Hospitality | Manufacturing | Logistics & Warehousing | Field Service |

Environmental Sensing

Cold Chain | **Web** | **Cloud Platform WISE-iService** | Public Cloud | Private Cloud | **Mobile**

Gateways

| USM-S67 Series Compact Gateway | USM-S67 Series Flagship Gateway | USM-S62 Gateway | USM-S66 LoRa Dongle | LEO-L50 Asset Tracking Device |

LoRaWAN | LoRa

Sensors

TAF | NIST

| LEO-S550 DAQ Control | LEO-S595 Smart Button | LEO-S595 Magnetic Switch | LEO-S592 7-in-1 AQI Sensor | LEO-S592 Insertion Temperature Sensor | LEO-S573 CO2 Sensor | LEO-S57 Temperature Probe Sensor | LEO-S55 Temperature /Humidity Sensor | TREK-120 Temperature /Humidity Probe Sensor | TREK-120 Temperature /Humidity Sensor |

| High-Penetration Data Transmission | Low Data Loss | Low Maintenance & Low Cost | Long Battery Life | Water and Dust Resistance |

Application Scenarios

| Healthcare | Cold Storage | Food Factories | Retail Stores | Refrigerated Trucks |

Intralogistics

Digitalization and the pandemic have changed the global logistics industry significantly. Many logistics companies have had to adapt and improve their operations. Advantech provides hardware solutions for intralogistics and warehouses. This includes rugged vehicle-mounted terminals (VMTs), industrial-grade tablets, all-in-one (AiO) touch computers, and various accessories. These can be integrated with warehouse management systems to boost efficiency and profitability.

Cold Storage Operation & Environment Monitoring **1**

- Reliable cold storage operation using rugged forklift-mounted computers and LoRa sensors for transport and real-time temperature monitoring

DLT-V7210 KD
10.1" Rugged VMT with full keyboard and screen defroster

TREK-120
LoRa-based cold chain temperature and humidity sensor

Goods Allocation **2**

- Automated goods allocation and transport using AGVs and AMR
- Goods-to-person solution with sensor fusion technologies

TREK-60
Modular AI platform for AGVs

DLT-V73
10"/12" Rugged VMT for smart forklift

Shipping and Receiving of Goods **3**

- Efficient and accurate inbound goods processing using forklift-mounted computers and mobile tablets

PWS-872FL
10" Rugged tablet with Windows OS

AIM-65
8" Industrial-grade tablet

Order Picking & Packing **4**

- Efficient and accurate order picking using forklift-mounted computers to access picking instructions and optimize route planning
- Paperless and accurate order packing using all-in-one touch computers to access packing lists and instructions

DLT-V7212 P+
12.1" Rugged VMT with P-CAP touch-screen

UTC-520
21.5" Rugged AiO touch computers

Wireless Communication **5**

- Industrial wireless AP & gateways
- Reliable wireless connectivity

EKI-6333AC-2G
Dual-Band Wi-Fi AP/Client

EKI-1361
1-port WLAN serial device server

Inventory Management **6**

- Real-time inventory checking using industrial-grade tablets
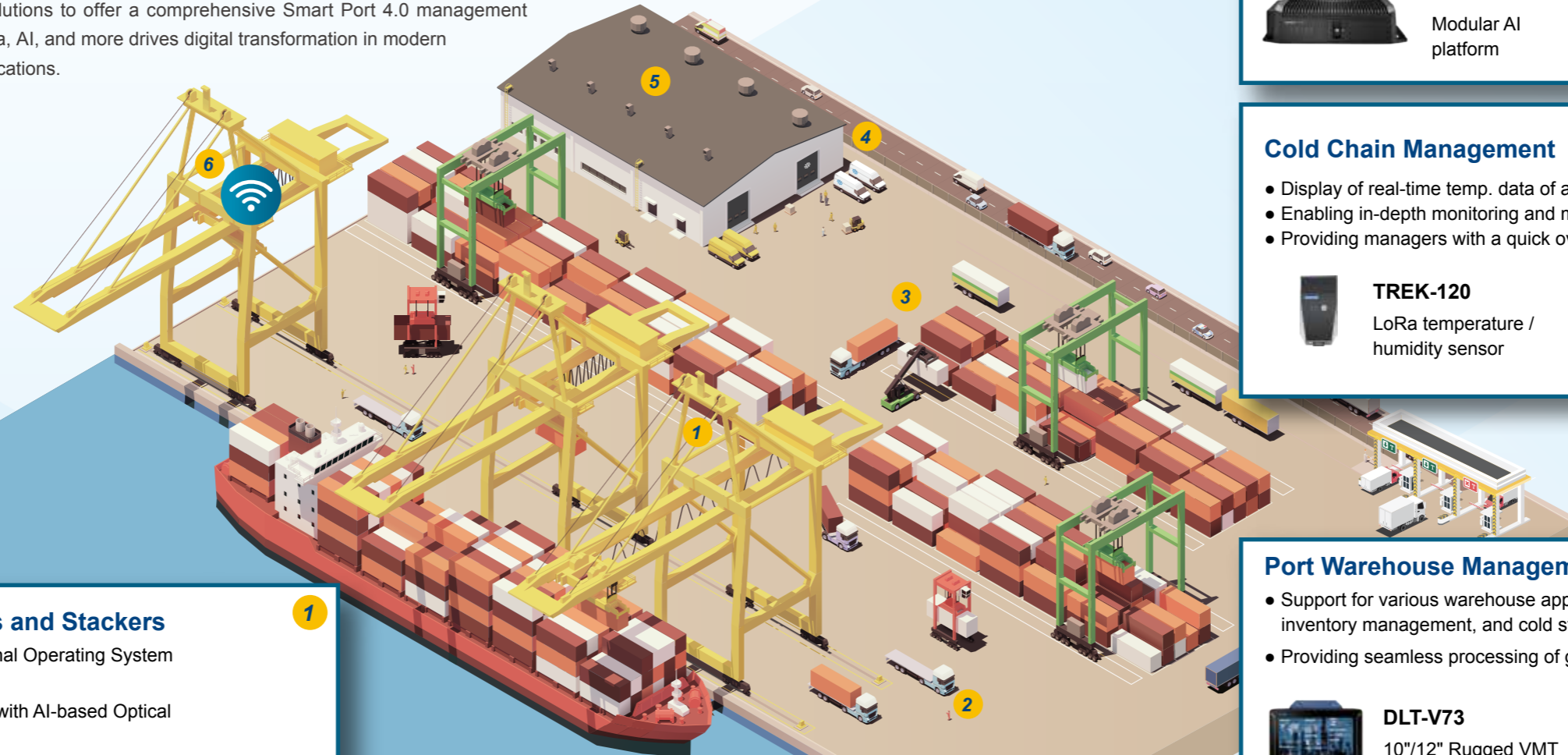- First-in-first-out valuation

AIM-77
10.1" Industrial-grade Tablet with Android OS

AIM-68S
10.1" Industrial-grade tablet with Windows OS

Container Port

As cargo ships grow in size and volume, global container ports are challenged with daily operations, goods handling, and equipment management. To address these issues, ports are increasingly adopting innovative and automated solutions for enhanced efficiency, safety, and security. Advantech, a leading IoT solutions provider, leverages its expertise in industrial automation and smart city solutions to offer a comprehensive Smart Port 4.0 management solution. Our integration of IoT, 5G, big data, AI, and more drives digital transformation in modern ports, fostering innovation for smarter applications.

Truck Management — 3

- Camera system that can automatically identify vehicle plate, chassis number, and container number.
- In-vehicle computers on trucks transfer all the necessary data in real time to the gate computer, including plate number, driver's license, and container number.

TREK-60
Modular AI platform

TREK-773
7" AIO ultra-rugged mobile data terminal

Cold Chain Management — 4

- Display of real-time temp. data of all sensors installed in the location.
- Enabling in-depth monitoring and management of the end-to-end cold chain.
- Providing managers with a quick overview of the KPI of different locations.

TREK-120
LoRa temperature / humidity sensor

LEO-S57
LoRaWAN temperature probe sensor

Port Warehouse Management — 5

- Support for various warehouse applications, such as order picking, inventory management, and cold storage.
- Providing seamless processing of goods and storage for port customers.

DLT-V73
10"/12" Rugged VMT with multi-OS support

AIM-68S
10.1" Industrial-grade tablet with Windows OS

Wireless Communication — 6

- LoRaWAN technology allows sensors and IoT devices to be deployed in inaccessible or remote parts of the port, enhancing asset tracking and monitoring with its long-range capabilities and low power consumption.
- High-speed and real-time dual-band Wi-Fi and LTE enable real-time asset tracking and optimization of port operations.

EKI-6333AC-2G
Dual-Band Wi-Fi AP/client

WISE-6610
LoRaWAN gateway

Intelligent Connected Cranes and Stackers — 1

- Streamlined port operations with Terminal Operating System (TOS)
- Automated container information entry with AI-based Optical Character Recognition (OCR) system

DLT-V72 Facelift
10"/12" Rugged VMT with Navis certification

TREK-60N
Dual-system rugged AI platform

Yard Field Service — 2

- Enabling efficient cargo inspections and issuing of reports.
- Streamlining of port workflows and workforce management.
- Support for real-time asset tracking and operation recording.

AIM-75S
8" Industrial-grade tablet with GMS and Android OS

PWS-872FL
10.1" Rugged tablet with Windows OS

Mining Operation Solutions

Advantech's mining operation solutions offer high computing capability and durability to withstand harsh environments faced by vehicles like dump trucks and excavators. These solutions, designed to endure shock and vibrations, empower tasks such as communication, geographic information analysis, and fleet management, aiming to enhance on-site safety, boost productivity, and improve management efficiency.

Site Monitoring **5**

● Real-time air quality, temperature, and wind speed monitoring and analysis to enhance hazard prediction

MIC-733
AI Inference System Based on NVIDIA Jetson AGX Orin

TREK-60N
Dual-System Rugged AI Platform for Harsh Environments

Payload Management **6**

● Promotes efficiency and longevity of shovels by optimizing power usage through the dig cycle

PWS-872FL
10.1" Rugged tablet with Windows OS

DLT-V73
10"/12" Rugged VMT with Multi-OS Support

Collision Avoidance **1**

● DSRC/V2V position enhancement for high-accuracy fleet deployment

TREK-154
Blind spot detection camera

TREK-60
Modular AI Platform for Scalable Surveillance

Underground Mine Mapping **2**

● AI simulation and data analysis provide accurate mapping to enhance site safety

ITA-460
Water-resistant Fanless In-vehicle Computer

TREK-60N FL
Dual-System Rugged AI Platform for Harsh Environments (Core™ i)

Semi-Autonomous / Remote Control **3**

● NVIDIA AI-empowered semi-autonomous vehicle/machine control

MIC-715
Ruggedize AI Inference System

TREK-50N
Rugged AI Platform based on NVIDIA Jetson Orin

Wireless Communication **4**

● 5G/4G/long-range Wi-Fi enables millisecond response time & big data communication

EKI-9508E-L
EN50155 Unmanaged Ethernet Switch

UNO-430
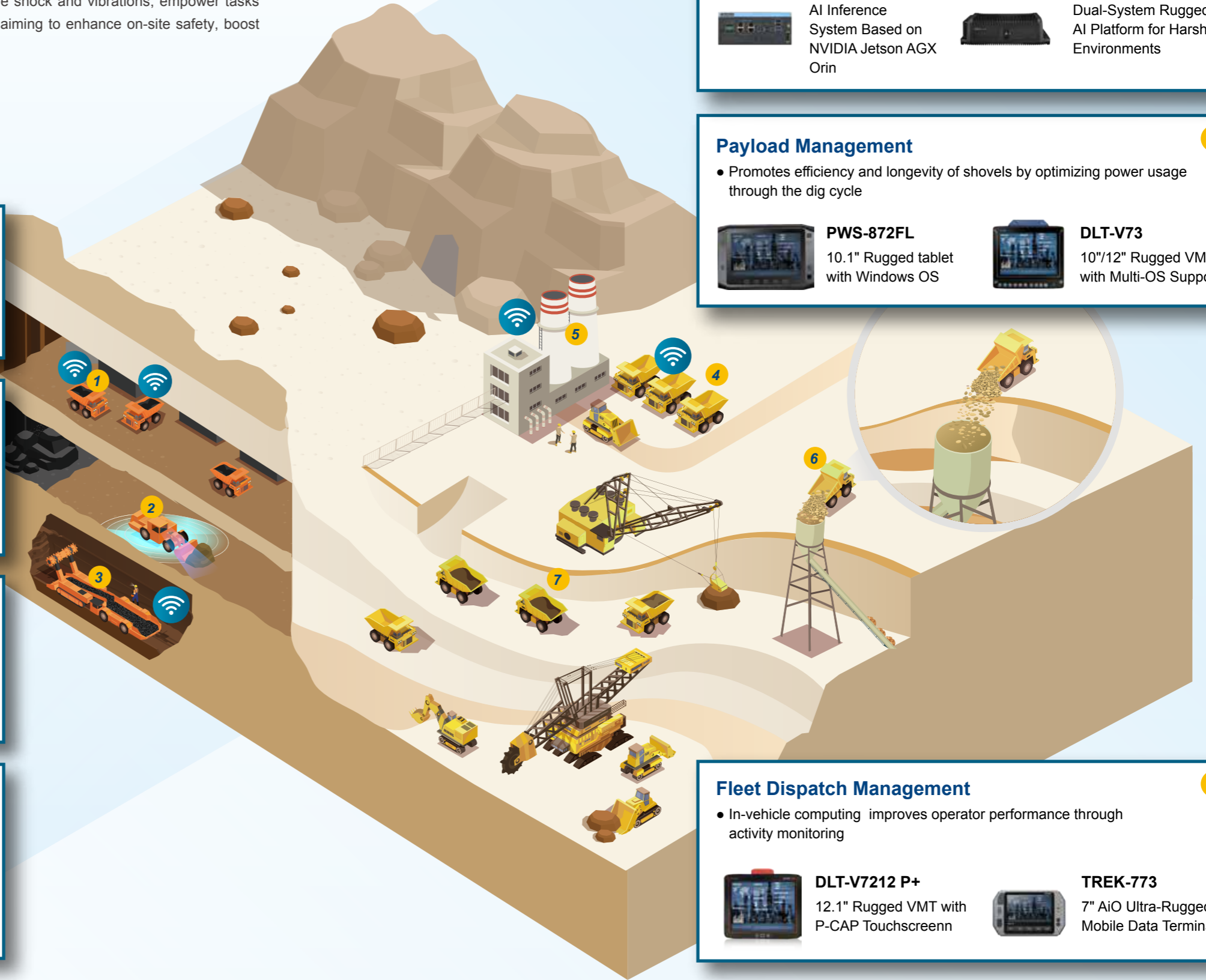Waterproof Edge Intelligence Gateway

Fleet Dispatch Management **7**

● In-vehicle computing improves operator performance through activity monitoring

DLT-V7212 P+
12.1" Rugged VMT with P-CAP Touchscreenn

TREK-773
7" AiO Ultra-Rugged Mobile Data Terminal

Transportation & iBus

Public transportation consistently strives to enhance safety and security for smart cities. With advanced technology such as edge AI, 5G, ADAS, V2X etc., and reliable system design that fits transportation requirements, Advantech draws from extensive industrial expertise to deliver reliable solutions. These address a spectrum of challenges in public transportation scenarios, including control centers, parking facilities, buses, bus stations, and roadside infrastructure.

Bus- Driving Safety and In-Vehicle Computing Solutions **1**

- Real-time video surveillance on buses to enhance passenger safety
- Informative signage system for bus arrivals and passenger crowding information to improve the onboard experience.

TREK-150, 152, 154
ADAS Driving Safety Solutions

TREK-60
Modular AI Platform for Scalable Surveillance

Buses—Interactive Services **2**

- Generating extra profit from selling digital advertising spaces
- Optimizing passenger experiences with internet connectivity, entertainment, and bus information

USM-110
4K Ultra-Compact RISC-Based Hospitality Box Computer

DSD-5038
38" High Resolution Stretched Display

Bus Stops **3**

- Reduced waiting times with bus arrival information
- Improved passenger flow and crowd management

UTK-7521
Modular Kiosk System Built with a UTC-520 Series Touch Computer

UTC-520IT
21.5" Ubiquitous Touch Computer (IP66 & 69K)

Roadside Infrastructure **4**

- V2X (Vehicle-to-Everything) solution enabling direct communication between vehicles and infrastructure
- Traffic analysis empowered by AI computing, with real-time connectivity to optimize city transportation

TREK-60N
Dual-System Rugged AI Platform for Harsh Environments

ITA-3650
6th & 7th Gen Intel® Desktop Processors, Fanless Systemm

EV Charging **5**

- Optimized charging process with energy metering and manageability
- Clear and functionable HMI solution with enhanced interactive control

MIO-5375
11th Gen. Intel® Core™ Processor

UNO-1372G-J
Small-Size DIN-Rail IPC

Bus/Fleet Control Center and Depot Solution **6**

- Enabling efficient fleet dispatch for better passenger experiences
- Prompt instructions for bus drivers via reliable connectivity

DSD-7055
Intel® Smart Display Module (SDM) Signage Display

DS-082
AMD Ryzen Ultra-Slim Digital Signage Player

Heavy Duty Machine Solutions

Dedicated to Mining, Agricultural, and Construction Vehicles

AI			70°C -30°C	3 Grms		V2X
NVIDIA Intel® OpenVino™ Google Coral	**12/24/48V Vehicle Power Management**	**-30~70°C Wide Operating Temperature Range**	**Endures up to 3Grms of Shock & Vibration**	**Vehicle Communication CAN, J1708, J1939, Automotive Ethernet**		**GNSS, DR, RTK Wi-Fi 6E, 5G**

Surface Mining	Underground Mining	Agriculture	Construction

- Equipment I/O expansion for sensor fusion
- Improves payload measurement accuracy

- V2X
- Rugged design endures environments with explosion hazards (ATEX/C1D2)

- Route management operational accuracy
- ISO 25119 - Functional Safety (FuSa)

- Blind spot detection enhances operational safety

Intelligent Bus Solutions

Enhancing All-Round Driving Safety and Management Eficiency

Enhance Passenger Satisfaction	Increase Driving Safety	Optimize Operational Effciency	Augment Advertising Revenue

iBus Management Cloud Solution

Fleet Overview	Advertising and Media Management	Ticketing Management	Event Analysis

TREK-154
Driver Identification (NFC)
TREK-152
RS-485
RS-232
TREK
TREK-306
Lidar
TREK-154
RS-485
LAN
RS-232
TPMS Receiver
Ethernet Switch
TPMS Emitter
TREK-154
RS-485
TPMS Emitter

Bus Information Display
Camera 1
Camera 4
AV in
Camera 6
Camera 2
In-Vehicle Surveillance System
Camera 5
Camera 3
AV in
Camera 8
Signage
TREK-306
Camera 7
VGA
Ethernet
VGA
Invoice Printer
RS-485
Passenger Counter
Repeater
TREK
RS-232
Ethernet
e-Ticket Validator
Passenger Infotainment Display
TPMS Signal Emitter
TPMS Signal Receiver

Door Sensor

TPMS Signal Emitter

Camera
- 1,4 Front door, back door
- 2,5 Front to back, back to front
- 6,7 Side view
- 3,8 Front view, rear view (external)

Intelligent Mobile Solutions Design to Order Services (DTOS)

iMS DTOS department offers three key features, with relevant technical specifications:

Rugged Design for Harsh Environments

The iMS DTOS team excels at creating devices with a wide operating temperature range (-30 ~ 70°C) and IP69K dust and water protection. They also ensure shock and vibration tolerance, meeting MIL-STD-810G and EN60721-3-5 class 5M3 standards. In-house testing facilities validate and optimize designs.

System Integration Capabilities

The team integrates mobile devices with existing systems and instruments, meeting specific standards like UL201, ISO-25119 for Agriculture Function Safety, and ISO 7637-2 (E-Mark) for fleet management. This results in reliable mobile computing products.

Market-Proven Consulting Services

Our team benefits from close partnerships with hardware and software vendors, offering advanced technology and software. They provide custom proposals and feasibility analysis. A disciplined approach ensures milestones are met and customers' unique visions are realized.

Customer Requirements Discussion

Feasibility Study
- Concept Design
- Thermal Simulation
- PCB Simulation
- System Design

Development
- Electronic Design
- Mechanical Design
- Power Analysis
- Software Design
- System Integration

Qualification
- Signal Analysis
- System Validation
- Lab Test

Bug Management

Test Case Management

Design Review

Vendors
- Component Management
- Green Product Management
- Product Lifecycle Management

IT Infrastructure

With expertise in design, system integration, and project management, the Intelligent Mobile DMS service is more than a passive vendor; we are a strategic resource provider and business partner delivering precise design and manufacturing services.

CAN 2.0 and Automotive Ethernet

CAN BUS and CAN FD

In the modern automotive industry, CAN BUS (Controller Area Network) and CAN FD (CAN Flexible Data Rate) stand out as two of the most critical technologies. Here are three key highlights of these technologies in automotive applications:
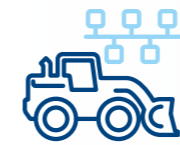
Real-Time Data Communication:
CAN BUS and CAN FD facilitate efficient, instant data sharing among vehicle systems, enhancing overall performance and safety.

High-Capacity Data Transfer:
CAN FD offers higher data transfer rates, accommodating data-intensive applications like HD video and advanced sensors, expanding the possibilities for vehicle technology.

Improved Reliability and Efficiency:
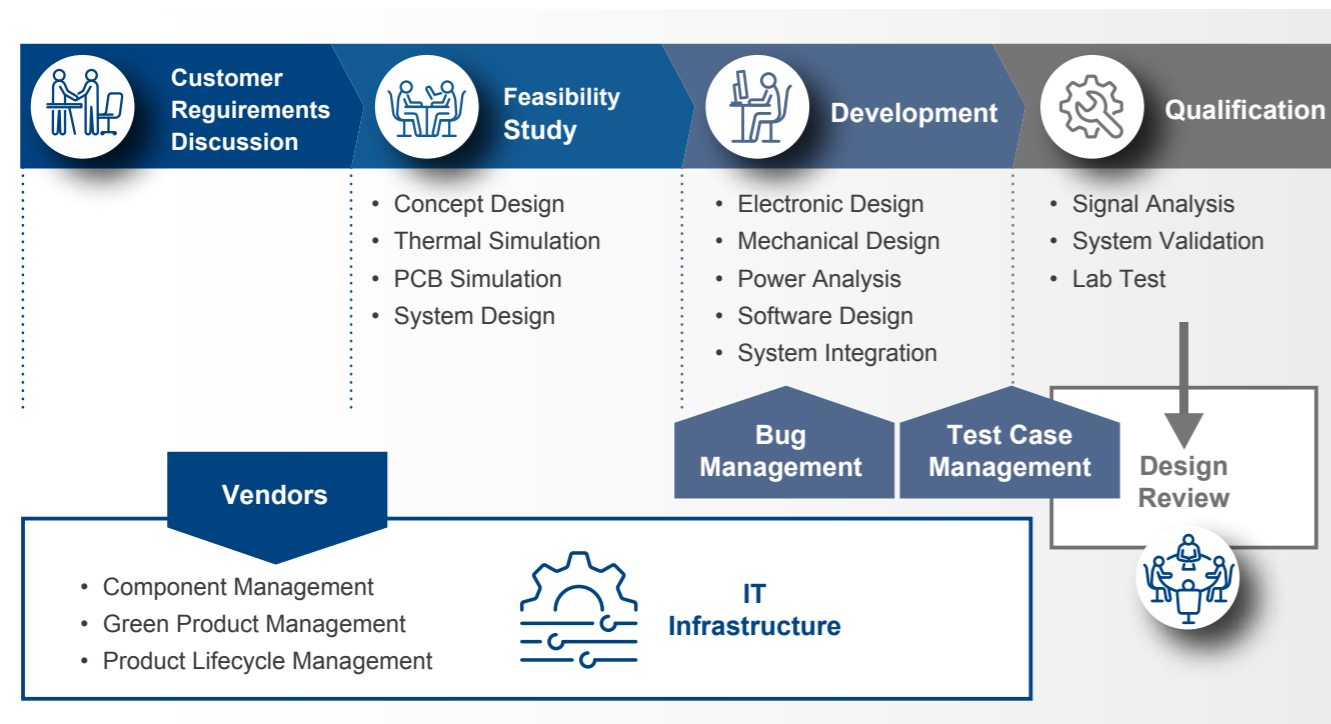These technologies reduce failure risks, have low power consumption, and simplify electronic system design, resulting in more reliable, cost-effective vehicles with prolonged lifespans.

Automotive Ethernet

With its cutting-edge 1000BASE-T1 (802.3bp) technology, automotive ethernet addresses critical issues, delivers significant value, and boasts three key technical features:

High-Speed Data Transmission
With speeds up to 1 Gbps, it ensures seamless high-definition video and real-time sensor data transmission for advanced driver assistance systems.

Low Latency Communication
Boasting ultra-low latency, often within microseconds, it supports real-time system interactions, vital for features like emergency braking.

Scalability
Automotive Ethernet adapts to evolving data demands, supporting technologies such as autonomous driving and vehicle connectivity, laying a robust foundation for future automotive innovation.

Tolerant of Vibration, Shock, and Vehicle Power Fluctuations

Vehicle Power Management

Efficient power management requires embedded software control. Software design must be integrated with hardware design from the beginning of power development to avoid complications during system implementation. The vehicle power management mechanism is designed to handle various use scenarios for different applications, e.g., startup delays to avoid voltage drop during engine startup, and shutdown delays to avoid operation system hang-up during the shutdown process. Remote wakeup by the cellular module can enable shorter system-ready time for emergency tasks and 24/7 asset tracking.

Vehicle Power Protection

The automotive environment is fraught with electrical hazards, including electromagnetic interference, electrostatic discharge, and other electrical disturbances. They are generated by various vehicular subsystems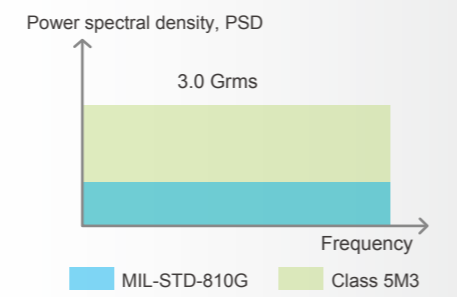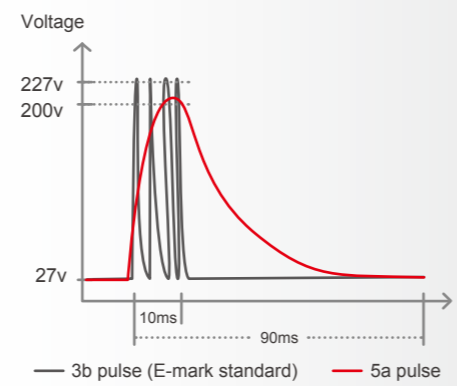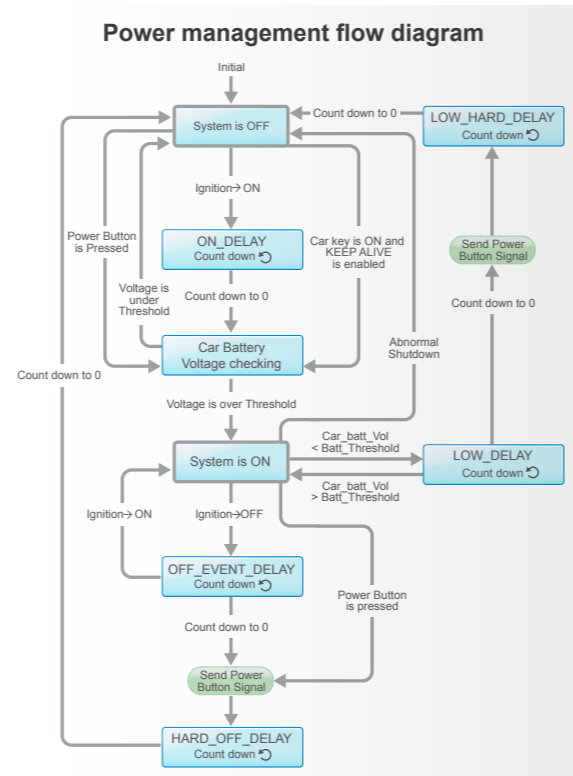 such as ignition, relay contacts, alternators, injectors, and accessories. The system is designed to provide thorough protection to prevent system damage caused by vehicle power fluctuations.
- ISO-7637-2 4.6.5 pulse 5a test
- E-Mark

In-Vehicle Solutions Built to Withstand Shock and Vibration

Fleet management systems can be negatively impacted by shocks and vibrations under varying road conditions and driving situations. In response to this concern, Advantech performs a series of lifecycle profile tests designed to test environmental conditions and physical acceleration on its mobile data products.
- EN60721 class 5M3: 3 times stronger than military standards
- SAE J1455, MIL-STD810G, ISO 7637-2, and E-mark

Power management flow diagram

Voltage

227v
200v

27v

10ms 90ms

—— 3b pulse (E-mark standard)   —— 5a pulse

Power spectral density, PSD

3.0 Grms

Frequency

■ MIL-STD-810G   ■ Class 5M3

World-Class RF Solution

Wi-Fi Technology
- Facilitates automatic device switches and greater roaming capabilities through diversified Wi-Fi technology, widely applied in diverse sectors such as warehouse management, transportation, mining, and construction industries.
- Greater capacity and wider channels for high-definition content with Wi-Fi 6E support.

LoRa (Long-Range Low-Power Wireless Communication) Technology
- Long-Range Connectivity: LoRa technology is known for its ability to transmit data over long distances, making it suitable for applications that require communication over several kilometers, in both urban and rural environments.
- Low Power Consumption: LoRa devices are energy-efficient, consuming very little power during both transmission and standby modes. This low power consumption extends the battery life of devices, making them ideal for remote and low-maintenance IoT deployments.

V2X (Vehicle-to-Everything) Technology
V2X is communication between a vehicle and any entity that may affect or may be affected by the vehicle. It is a vehicular communication system that incorporates other more specific types of communication including V2I (vehicle-to-infrastructure), V2N (vehicle-to-network), V2V (vehicle-to-vehicle), V2P (vehicle-to-pedestrian), and V2D (vehicle-to-device).
- V2V can be used to directly communicate from vehicle-to-vehicle and warn vehicles if they are too close.
- V2I can help special vehicles, such as fire trucks or ambulances, gain priority at traffic lights.

GNSS Technology
- Catering to the requirements of mining, we enhance accuracy by supporting SBAS. At the same time, navigation output settings such as static hold are offered to meet specific customer needs.
- In response to requests for centimeter-level accuracy, we offer support for the RTK (Real-Time Kinematic) module. This module utilizes phase measurements of the signal's carrier wave, in addition to signal information. It relies on either a single reference station or an interpolated virtual station to provide real-time corrections.

WWAN 5G Technology
- Ultra-reliable low-latency communication (uRLLC) helps the vehicle quickly obtain signals such as speed limit signs, traffic lights, or other street devices and make best judgments.
- Enhanced Mobile Broadband (eMBB) has faster connections, higher throughput, and larger capacity to help the system upload large-capacity information to the cloud.

# Robust In-Vehicle Computers Ensure Stable Operation in Extreme Environments

Advantech's in-vehicle computers are built for extreme temperature resilience, with operating ranges from -30°C to 70°C. Component selection is fine-tuned and simulation software is employed to maintain stability. Comprehensive testing covers CPUs, memory, storage, wireless modules (Wi-Fi, LTE), and I/O interfaces (CAN Bus, DI/O, LAN) under full-load conditions to ensure smooth operation in harsh temperatures. This meticulous design and testing result in a secure, stable hardware platform, allowing worry-free software and system development.

Benefits

Environmental Adaptability: A wider operating temperature range makes systems suitable for a broader range of application scenarios, including extremely high or low temperature environments.

Reliability: A fanless design enhances system reliability by lowering the risk of mechanical failures and reducing maintenance requirements.

Durability: Industrial-grade components and materials make systems more durable and capable of withstanding extreme environmental conditions.
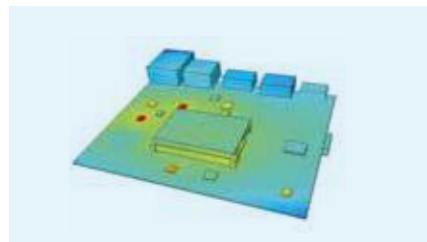
Qualified Thermal Material

Selection/integration of the most suitable thermal interface material solutions for extreme environments.

Heat Pipe Design

The heat pipe is designed to efficiently dissipate heat via the top fins.
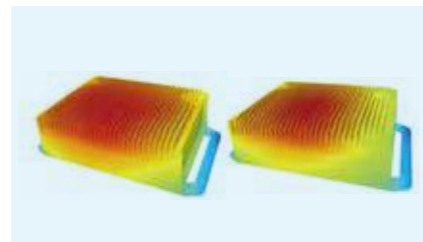
Fanless Design

Fanless designs conduct heat and provide airflow without a fan for improved durability and design flexibility.
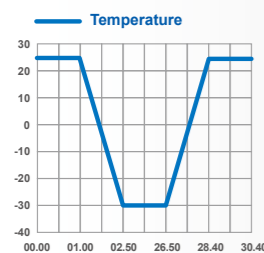
Figure 1.01.1.02 Low temperature storage test curve
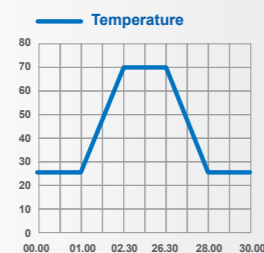
Figure 1.01..1.03 High temperature storage test curve

Advantech's new generation of in-vehicle computer products adheres to internal testing standards such as IEC 60068-2 and ISO 16750-4.

- High- and low-temperature burn-in tests.
- High-low temperature thermal shock tests.
- Rigorous testing extends to 20,000 cycles of high-temperature power cycling.

Highly Accelerated Life Testing (HALT):

- Identifies system weaknesses and vulnerabilities.
- Leads to improvements in system design.

FUSA—Navigating the Future with Confidence: Functional Safety Meets Tech Trends

Functional Safety is the discipline focused on preventing or mitigating hazards resulting from system or equipment failures. It involves identifying potential risks, assessing their impact, and implementing safety measures to ensure that systems operate without endangering people or the environment.

Functional Safety is an ongoing journey, and Advantech is committed to gradually raising safety levels to achieve new milestones. This involves enhancing design capabilities, ensuring safety standards, and ultimately making a lasting investment in long-term business sustainability.

Benefits

Enhanced Safety: Functional Safety measures reduce the risk of accidents and hazards, ensuring the safety of people and assets.

Compliance: Compliance with industry-specific safety standards and regulations, avoiding penalties and legal issues.

Reliability: Improved reliability and performance of systems and equipment, reducing downtime and operational disruptions.

Market Access: Access to new markets and customers that demand Functional Safety compliance.

Risk Mitigation: Better risk management and protection against potential liabilities.

IEC 61800-5-2 Electronic Devices
ISO 26262 Automotive
IEC 61513 Nuclear power
IEC 61508 Functional Safety
ISO 13849 Machinery
EN 50128 Railway
ISO 25119 Agriculture
IEC 61511 Process Industry
IEC 60601 Medical

Definition, Analysis, Feasibility Study
Design
Integration and Test

Participating Customer
Concept Phase
Field Testing (User Testing)
Mass Production Product Launch
Engineering Requirement
Validation
Process / Product Approval
Architecture Design
Verification
System Testing & Certification
Design Phase
Integration Testing
Engineering / Prototype Build

Industrial Tablet DTOS

At Advantech DTOS, customized services are not merely a business strategy but also a commitment. We deeply understand that each customer is unique, with distinct needs, objectives, and desires. Therefore, our goal is to respond to the needs of each customer in a dedicated service-oriented manner, providing genuinely valuable solutions.

Our customization capability is not only evident in our products and services but also ingrained in our culture and values. Our team is dedicated to details, places a high value on listening to customers' voices, and creatively meets their expectations. We firmly believe that true cooperation and professional expertise are essential for achieving mutual success and assisting customers in reaching their goals.

Rugged Design

Our industrial tablets are engineered with a focus on ruggedness, ensuring their durability in harsh and demanding conditions. They are built to withstand extreme temperatures, moisture, dust, and shock, making them suitable for use in environments where standard consumer devices would falter. Robust materials and innovative engineering techniques are employed to create devices that are not only tough but also reliable, minimizing downtime and maintenance costs.

Adapted for Harsh Outdoor Fields

Rich experience in water and dust proof designs, Implementing the optimal solutions

Elevated Durability in Temperature Limits

Considering thermal solutions right from component selection

Fearless in Challenging Usage Conditions

Follow MIL-STD 810H Test Method and more tightened criteria based on field needs

Highly Cautious Environmental Requirements

Building upon intrinsically safe design to meet explosion-proof certification requirements.

Battery Optimization and Management

Efficient and dependable battery performance is paramount for mobile workers who rely on continuous operation. This enables the industrial tablets to extend usage times while maintaining optimal performance levels. Our commitment to conserving battery power ensures that our devices seamlessly adapt to the demanding energy requirements of challenging industrial tasks.

- Smart charger and variable battery design
- Power quality optimization and analysis
- Designed for high temperature environments
- Power consumption efficiency optimization
- Hardware & software monitor solutions
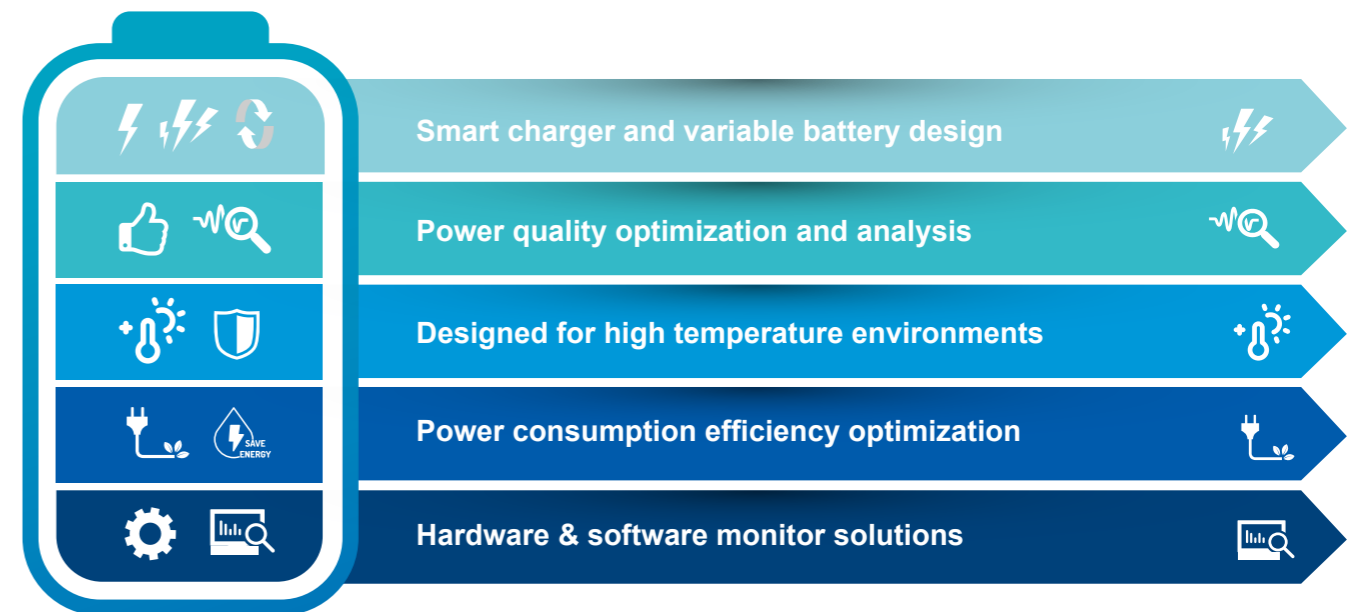
Application-Oriented Peripheral Integration

In various industrial domains, specialized peripherals and accessories are often required to enhance productivity. Our custom services are dedicated to seamless integration design to accommodate a wide range of application-specific peripherals. Whether you need a dedicated automotive signal communication module, multi-point network quality inspection instruments, or any other specific tools, our integration design capabilities are here to meet these demands. This flexibility ensures that your industrial tablet can evolve according to your requirements, adapting to the diverse needs of your industry.

RFID Reader / Legacy I / OS / Barcode scanner / Customized modules

Sensing Technology

Wireless Communications

Advantech's robust sensing solution excels in achieving wireless sensor networks, harnessing various wireless technologies. We offer multiple communication options, allowing us to seamlessly adapt to diverse communication environments. For instance, we use LoRa communication for cold chain applications in metal environments, and we implement LPWAN in standalone devices to extend battery life. From on-site networks to cloud communication and even satellite communication, our solution can adapt to a wide range of scenarios.

Short-Range	Edge-to-Cloud	Satellite Communication
LoRaWAN®	lte LTE-M	
WiFi Bluetooth	NB-IoT	

Power Management

Power management is the key to ensuring optimal performance and longevity for battery-based edge devices. Advantech's LEO team has a great deal of expertise and is dedicated in this field, making the CCM sensors and LEO solution the ideal choice for addressing this critical aspect.

Optimized Data

Reduce the amount of data transmitted by batching data whenever possible. Minimize the frequency of network communication. Opt for protocols that support efficient data compression and transmission.

Hardware Management

Disable peripherals that consume power when not in use, employ intelligent sleep modes, and utilize energy-efficient algorithms.

Energy Harvesting

Integrate energy harvesting techniques to recharge or supplement the battery.
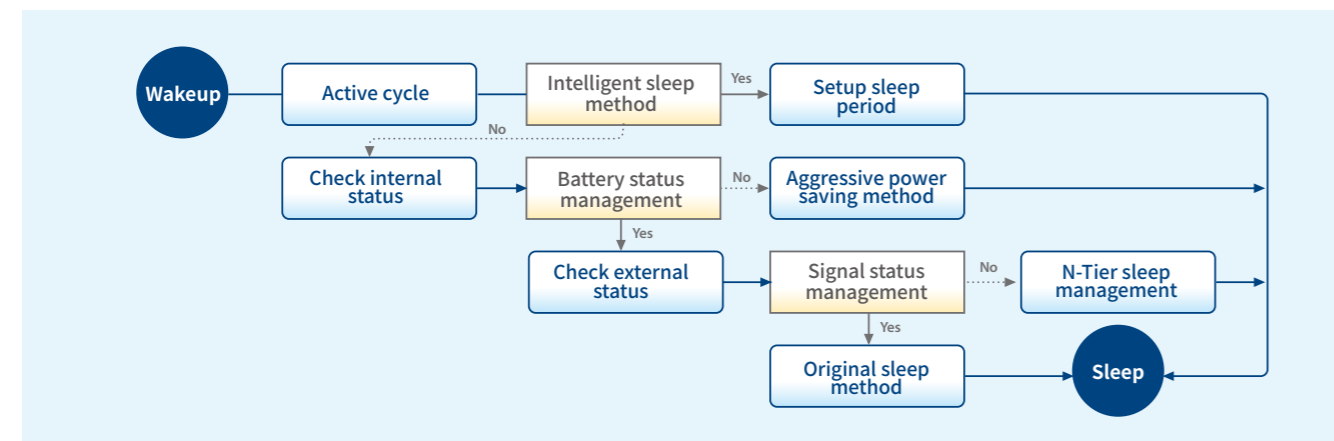
DeviceOn-iService Suite

Unlock full control of your IT devices with DeviceOn-iService Suite. Manage devices, update software, and monitor operations with ease, all from one central platform.

Key Features:

Device Builder

Streamline device setup with swift enrollment and activation. Effortlessly configure devices for optimal efficiency.

Device Updates

Keep your devices up-to-date with over-the-air software management. Customize updates to fit your enterprise's needs.

Device Manager

Gain complete oversight with digital monitoring and notifications. Be the first to know about issues and resolve them efficiently.

Remote Control & Recovery

Take control with integrated services for quick issue resolution, minimizing downtime.

System Dashboard & Analysis

Get valuable insights into your devices with our comprehensive overview dashboard. Make informed decisions and optimize operations.
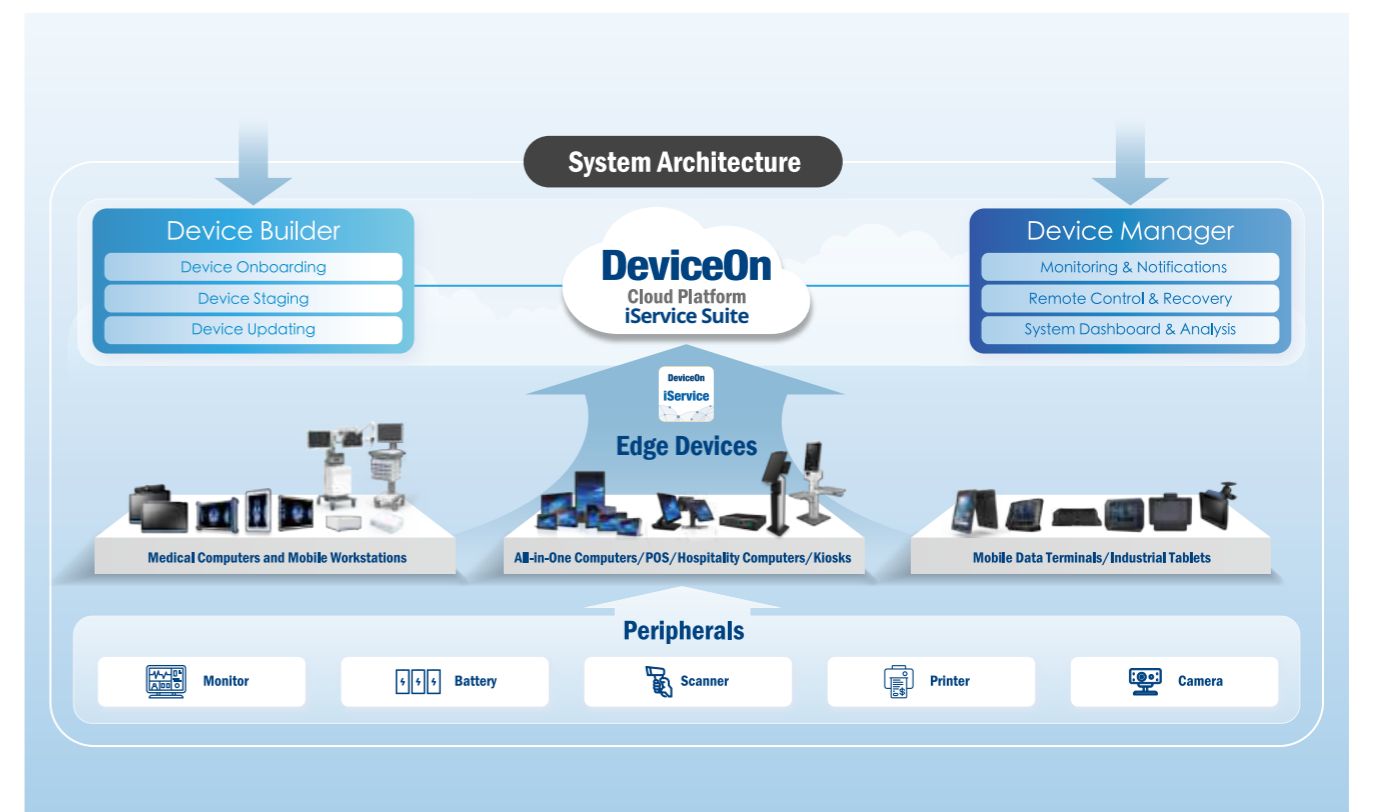
Industrial Android (GMS, AER)

Industrial Android refers to the use of the Android operating system in industrial settings. Industrial Android devices are designed to withstand harsh environments, have robust hardware, and often come with specialized software for industrial purposes. They can be vehicle-mounted and are used in various industries including manufacturing, logistics, and healthcare.

Benefits

Long-term support for Android enterprise devices

Easy software application development using standard Google APIs

Ensure your device system is well secured with regular security patch updates

GMS (Google Mobile Services)

While the Android Open Source Project (AOSP) provides common, device-level functionalities, Google Mobile Services (GMS) is a collection of proprietary Google apps and APIs that support enhanced functionality across devices. Apps such as Google Search, Google Play, YouTube, Gmail, and more work together seamlessly to ensure Android provides a great user experience.

EDLA (Enterprise Devices License Agreement)

EDLA stands for Enterprise Device License Agreement and is a new agreement offered by Google to extend GMS approvals. This license applies if the device lacks a battery, screen size is greater than 18 inches, or if it is a headless unit with a separate display unit. It covers Rugged, POS and Kiosk devices. Additionally, EDLA devices are required to provide security patch support for at least 24 months (2 years) from product launch to make sure those devices are protected and Android users are kept safe.

AER (Android Enterprise Recommended)

A list is compiled of devices and service providers that meet Google's strict enterprise requirements. This allows you to feel good about setting your business up on mobile, and it makes it easy to scale and support your device fleet. Standardized features let you manage devices seamlessly and consistently every time. You also get timely security patches (every 90 days) and major updates are guaranteed (+1 OS update).

iMobile DevStack

iMobile DevStack software SDKs/Utilities streamline your workflows in integration, deployment, management and data collection. Advantech mobile software SDKs help you to get more productivity in every stage of your device lifecycle, so that you can focus more on driving the creative and growth of your business.

Integration Tools:

Comprehensive SDKs accelerate the integratation of your applications with mobile resources, including fieldbus CAN protocol, GNSS sensors, ADAS sensors, and power management.

Staging Tools:

Our pre-built MDevice, device configuration, and MStage tools assist Windows and Android mobile device deployment through features such as mobile device settings, kiosk mode, OS-related settings, and HMI displays.

Management Tools:

The built-in AIM Dashboard helps check and diagnose tablet devices with just a few clicks. It reduces unnecessary repairs and downtime by monitoring components such as the battery, scanner, RF, cameras, and more. In addition, Advantech DeviceOn iService Suite enables remote management of Advantech devices.

Data Collection:

A suite of SDKs are provided for collecting RFID and IoT sensing data into your business applications or cloud storage quickly and easily.

Maximize Your Mobile Device Productivity

Integrate	Secure & Deploy	Manage	Data Collection
Developers	**IT Admins**	**Managers**	**Field Staff**
Rapid integration of business apps with iMS hardware	Automate rapid device staging and security of devices	Maximize device uptime, avoiding the risks of device failures and costly troubleshooting	Utilize tools for improving productivity in the field and making data collection uncomplicated
Mobile Resource SDK	Configuration Tool	Device Diagnostic Tool	Scanner Worker Tools
Power Management SDK	Staging Tool		CAN Communication SDK
Scanner Access SDK	Device Security Tool		Wireless Sensing SDK

Enhancing Waste Management Efficiency with the TREK-674 Fleet Management System

North America's leading waste management systems provider

Solution

Enhancing the efficiency of waste management is a crucial aspect of creating a smarter and more efficient city. The Advantech fleet management system cooperates with system integration partners to elevate the operation and management efficiency for waste truck fleet managers.

With real-time monitoring of driver behaviors and vehicle operating status, managers can optimize decisions regarding vehicle maintenance. This includes predicting wear and tear on vehicles, thereby preventing unexpected malfunctions.

Why Advantech?

- Improved fleet operational performance
- Seamless integration with top billing and maintenance software
- Monitoring of driver behavior and optimized routing
- Reduced maintenance and fuel costs
- Improved driving safety and diagnostics

Advantech has Partnered with Komatsu to Provide Computing Systems Specific for Mining Scenarios

Komatsu is a leading manufacturer of construction, mining, and industrial heavy equipment

Solution

Advantech provided a rugged TREK in-vehicle platform for Komatsu's semi-automated construction equipment to realize features such as 3D modeling manipulation and graphical user interfaces. Advantech also provided ultra-rugged DLT computers to Modular Mining, a Komatsu subsidiary providing operation optimization systems for the mining industry, and to Komatsu's Autonomous Haulage System, the world's first autonomous driving system for large mining dump trucks. Advantech's application-oriented middleware and software also enhances Komatsu's productivity. With the assistance of semi-automated equipment, management has been able to lower the criteria for operators.

Why Advantech?

- Robust design capabilities to meet demanding environmental standards: extensive operating temperature range (-30°C ~ 70°C), resistance to shocks and vibrations (compliant with MIL-STD-810G and 5M3).
- Comprehensive expertise in in-vehicle design, incorporating CAN Bus support and efficient vehicle power management for streamlined vehicle operations.
- Exceptional and specialized support through iMobile SDK, ensuring enhanced stability in operation and robust in-vehicle system support.

Collaboration Between Handsfree and Advantech Stretches the Boundaries of Emergency Services

Handsfree group is a leading supplier for emergency services in UK

Solution

Security and safety issues rank as top priorities in every country. Ensuring a prompt and reliable emergency response during life-threatening or critical events brings a sense of reassurance to governing bodies and the public. Recognizing this, Handsfree Group selected Advantech as a strategic key supplier to develop a Fixed Vehicle Device (FVD) for the United Kingdom Emergency Services Network (ESN).

The initial feedback on the R5 has been highly positive among users. This positive reception is not only attributed to the system surpassing expectations but also because Handsfree Group provides a one-stop service. This service encompasses supplying the FVD and related accessories, handling installation, and providing necessary software.

Why Advantech?

- Ability to Integrate multiple voice communication methods, including wireless solutions (such as LTE, Wi-Fi, Airwave DMO (device to device), Bluetooth headsets, handsfree speakers, and microphones)
- Data-intensive connectivity and reliable Airwave/TETRA networks
- Rigid and thorough product development support
- Spec support on the Android operating system, GMS/EDLA, and real-time communication
- High-quality, stable, and rugged hardware

Advantech Supports VinBus Intelligent Bus Solutions to Reduce Carbon Emissions

First VinBus electric buses launched in Vietnam

Solution

VinFast, a subsidiary of Vietnam's largest conglomerate VinGroup, that builds vehicles, wanted a partner capable of supplying the smart solutions needed to manufacture electric buses. Advantech's superior hardware and software integrated solutions for electric buses and extensive experience implementing similar projects in Taiwan made them a logical partner. VinBus opted to collaborate with Advantech and use their TREK Intelligent Electric Bus Management System. Combined with intelligent features, these electric buses attract previously reluctant people. The project will also reduce the amount of time people spend on motorcycles, further reducing air pollution.

Why Advantech?

- A total ADAS solution for enhanced driving safety
- Superior hardware & software solutions for electric buses
- Extensive experience implementing similar projects
- Reliable hardware performance
- Reliable system performance that encourages individuals to choose public transportation, thereby contributing to a further reduction in air pollution

Improving Operational Efficiency at the Port of Salalah with Advantech's DLT Series of Rugged Vehicle-Mounted Terminals

APM Terminals - Port of Salalah, Oman

Solution

To enhance operational efficiency and productivity, APMT Port of Salalah has invested in the upgraded version of the Navis N4 terminal operating system (TOS). The port was also in search of new RDT devices with superior system resources to achieve superior computing performance. Advantech's DLT series of rugged vehicle-mounted terminals (VMTs) proved to be a suitable solution offering a comprehensive range of products with the desired specifications. These industrial-grade systems are not only cost-effective but also contribute to efficient and reliable port operations.
Moreover, with Helicon Technologies serving as a local partner in the UAE, Advantech was able to provide enhanced customer support in terms of service, consultation, installation, and quality commissioning throughout the duration of the project.

Why Advantech?

- DLT series terminals are durable, high-performance VMTs to withstand harsh port environments while ensuring efficient and reliable operations.
- DLT series VMTs are both Navis N4 and SOTI MobiControl certified to provide seamless integration.
- Advantech has been working closely with regional partners to ensure successful project implementation and provide comprehensive local support and customer service.

Intelligent Connected Tugger Trains with DLT Series VMTs Improve Assembly Logistics at Multinational Car Plants

German multinational manufacturer of luxury vehicles and motorcycles

Solution

Efficiency and precision in production logistics are crucial for car manufacturing. A German multinational car manufacturer has adopted a mixed transport system, incorporating autonomous and connected tugger trains, to streamline the intricate process of supplying more than 20,000 numbered parts to its assembly lines. Utilizing Advantech's DLT series of Vehicle-Mounted Terminals (VMTs) along with dynamic route guidance, these intelligent connected tugger trains navigate between warehouses based on delivery priority. They efficiently deliver parts directly to the portioning zones in the assembly hall. Integrated into the manufacturing control and reporting systems, the DLT provides an intuitive interface for tugger train operators, facilitating smart collaboration with autonomous transport systems.

Why Advantech?

- The DLT series offers industrial-grade, high-performance VMTs to ensure reliable and efficient operations.
- Advantech offers strong local technical and sales support for customers to build the best solutions.
- Advantech is a leading provider of IoT solutions with a strong global network and infrastructure in more than 28 countries.

DLT Series Rugged VMTs with Defroster Improve Cold Storage Operations

Japan's largest 3rd-party logistics and cold storage service provider

Solution

Cold storage solutions are essential for delivering a stable supply of refrigerated food to businesses and residences all around the world. In Japan, the country's largest third-party logistics and cold storage service provider collaborated with Brain Corporation and Advantech to upgrade its two warehouses located in Osaka and Tokyo. These warehouses feature 0°C (32°F), -25°C (-13°F), and -35°C (-31°F) degree storage areas that are integral to the storage and provision of refrigerated and frozen goods. When forklifts operate between zero and sub-zero temperature areas, forklift VMTs face various frost and condensation issues. Advantech's DLT series VMTs not only support wide operating temperatures, but are also equipped with a screen defroster, ensuring stable and efficient cold storage operations.

Why Advantech?

- DLT series VMTs support customized settings for system initialization and the screen defroster to reduce waiting time and improve productivity.
- DLT series VMTs support the latest WLAN standard and offer superior Wi-Fi roaming performance for stable uninterrupted data transmission.
- By leveraging Advantech's high-performance DLT-V8312 VMTs and Brain Corporation's strong technical support, the customer was able to improve productivity and operational efficiency by 20%

Manufacturing Transformation: The Power of Industrial Tablets Unleashed

A semiconductor manufacturing company in China

Solution

At semiconductor workstations, a strategically positioned tablet is precisely configured to eliminate errors. Its efficiency is further enhanced with the integration of a barcode scanner, marking the transition to a paperless system. This shift not only reduces costs but also aids in real-time operations. Within the Manufacturing Industry's Semiconductor Package Product Line, a 10-inch tablet is essential, fostering brand loyalty thanks to its reliability. Local service is also tailored to meet diverse client needs with precision.

Why Advantech?

- Tablets are implemented at each semiconductor workstation to eliminate personnel errors.
- Enhanced production/ warehouse efficiency with the integration of barcode scanners.
- Paperless record system to reduce management costs and enable real-time mission dispatching.

Enhancing Equipment Patrol Inspection with the AIM-75S Industrial Tablet

A railway company in China

Solution

Ensuring the safety and functionality of the railway system and equipment requires an essential mobile, durable, and flexible solution. This solution must offer real-time updates on the status and connections of every railway and equipment component. High mobility ensures on-site access, durability withstands wear and tear, and flexibility makes it easy to adapt to changes, fostering efficient operations. This dynamic solution plays a pivotal role in maintaining railway safety and functionality.

Why Advantech?

• 8″ display with camera allows you to see more detail in images while maintaining good mobility.
• With a rugged design, stable wireless connection, and operating temperature range of -10 to 50°C, it can operate smoothly even when used outdoors in winter or summer.
• The replaceable battery design reduces downtime for battery changes and charging, supporting longer operation.

AIoT Cold Chain Solutions Ensure Food Safety

An international catering group in Taiwan

Solution

In recent years, the company has primarily focused on two pivotal information technologies, AI and IoT, to elevate food quality and safety management standards. For instance, the utilization of LEO-S temperature monitoring sensors ensures that storage devices and heating equipment maintain appropriate temperature levels, complying with standards to inhibit microbial growth. This significantly alleviates the administrative burden on employees tasked with recording refrigerator temperatures and ensures the safe operation of heating equipment during food preparation. Furthermore, in the event of equipment malfunctions, LEO-S sensors can promptly detect and report abnormalities, enabling relevant personnel to take immediate corrective actions.

Why Advantech?

• LEO-S55 wireless LoRaWAN sensors are easy to install, minimizing various installation issues.
• Advantech engages directly with customers, understanding their needs, and offering valuable suggestions.
• LoRa enables high-penetration data transmissions, allowing one gateway to cover an entire floor of a store.

Mobile Computing Solution for Various Applications—Agriculture, Military, Harbors, and Large Town Squares

Agriculture, military, harbors, and large town squares in the USA, Taiwan, and Japan

Solution

Drones play a crucial role in extensive search and investigation operations, spanning agriculture, military, harbor security, and public spaces. They provide valuable insights and surveillance capabilities. To effectively control these drones, PWS-872 tablets are commonly used as mobile command centers, offering a effective controll area for operators.

Why Advantech?

• An 10″ display not only allows for viewing more detailed images, but also ensures ease of use for the operator.
• Impressive performance, and expandable with accessories, enabling easy and stable connection to other devices (e.g., joystick).
• The replaceable battery design reduces downtime for battery changes and charging, supporting longer operation times outdoors.

Temperature Management Solution for Both Sea and Land

Taiwan's largest third-party logistics company

Solution

Advantech cold chain solutions has been implemented in marine transportation from RD&D Cold Logistics Co., Ltd. sailing to Taiwan's Penghu Islands. A comprehensive solution involving LoRa, 4G, and Wi-Fi technologies has been developed. The TREK-120 LoRa wireless sensor is placed in the cold chain containers. In the absence of a 4G signal at sea, Wi-Fi is utilized to transmit the temperature back to the cockpit. Immediate alerts are triggered if an abnormal temperature is detected, notifying the crews. Additionally, a 4G plus Wi-Fi route is set up in the cockpit to relay the container temperature information. This effectively addresses temperature monitoring during maritime navigation, achieving comprehensive maritime cold chain management.

Why Advantech?

• The TREK-120 wireless sensor utilizes high-penetration data transmissions through LoRa, enabling seamless transfer of cold chain data between trucks and cargo ships.
• Long battery life and easy calibration.
• Quick installation, taking only 90 seconds to set up.

In-Vehicle Box

Model Name		TREK-570	TREK-60	TREK-60 FL	TREK-60N
System	Processor	Intel® Atom™ E3826	Intel® Atom™ E3940/ Intel® Core™ i5, i7	Intel® Core™ i7-1365URE/ Intel® Core™ i5-1345URE	Intel® Atom™ E3940
	Processor (via NVIDIA)	N/A	N/A	N/A	NVIDIA® Jetson Orin™ NX 8GB
	Memory	DDR3L 4GB, SO-DIMM	1 x SO-DIMM up to 8GB DDR3L	2 x SO-DIMM up to 64GB DDR5	1 x SO-DIMM up to 8GB DDR3L
	Storage	1 x mSATA	1 x mSATA, 1 x externally accessible 2.5" SSD tray	1 x mSATA, 1 x externally accessible 2.5" SSD tray	1 x mSATA, 1 x externally accessible 2.5" SSD tray
RF	GNSS	Built-in uBlox MAX-M8Q	Built-in u-blox Neo-M8N, Optional Neo-M8U/M8L (dead reckoning)	Built-in u-blox Neo-M9N, Optional Neo-M9V (dead reckoning)	Built-in u-blox Neo-M8N, Optional Neo-M8U/M8L (dead reckoning)
	WLAN/BT	IEEE 802.11a/b/g/n/ac/ax + BT V5.X	IEEE 802.11a/b/g/n/ac/ax + BT V5.X	IEEE 802.11a/b/g/n/ac/ax + BT V5.X	IEEE 802.11a/b/g/n/ac/ax + BT V5.X
	WWAN	LTE, HSPA+/GSM/GPRS/EDGE	4G LTE, 5G available upon request	4G LTE, 5G available upon request	4G LTE, 5G available upon request
Video Output	Digital	1 x Smart Display Port 1.0	1 x Smart Display Port 2.0	1 x Smart Display Port 2.0	1 x Smart Display Port 2.0
	VGA, HDMI	1 x VGA, 1 x HDMI	1 x HDMI	1 x HDMI	N/A
Video Surveillance	Video Input	N/A	8 x RJ-45 for 10/100 Base T(X) PoE	8 x RJ-45 for 10/100 Base T(X) PoE	4 x RJ-45 for 10/100 Base T(X) PoE
I/O	Vehicle I/O Ports	1 x J1708 (with J1587 support), 2 x CAN Bus, Ignition & Car Battery power input, 1 x RS-485	1 x J1708 (with J1587 support), 2 x CAN bus, Ignition & Car Battery power input	1 x J1708 (with J1587 support), 2 x CAN FD (Compliant with CANbus), 2 x CAN bus, Ignition & Car Battery power input	1 x J1708 (with J1587 support), 2 x CAN bus, Ignition & Car Battery power input
	Generic I/O Ports	1 x CVBS in	2 x 4-wire RS-232/ RS-485	2 x 4-wire RS-232/ RS-485	2 x 4-wire RS-232/ RS-485
		1 x Mic-in	2 x Mic-in	2 x Mic-in	2 x Mic-in
		1 x Line-Out	2 x Line-Out	2 x Line-Out	2 x Line-Out
		4 x Isolated DI (Dry) / 4 x Isolated DO	6 x Isolated DI (Dry/Wet) / 4 x Isolated DO	6 x Isolated DI (Dry/Wet) / 4 x Isolated DO	6 x Isolated DI (Dry/Wet) / 4 x Isolated DO
	Standard I/O Ports	1 x RS-232	N/A	N/A	N/A
		1 x USB 3.0 Host 1 x USB 2.0 Host	1 x USB 3.0 Type A (front) 2 x USB 2.0 Type A	1 x USB 2.0 Type A (front) 2 x USB 3.0 Type A	1 x USB 3.0 Type A (front) 2 x USB 2.0 Type A
		1 x Giga LAN	2 x Giga LAN	2 x Giga LAN	2 x Giga LAN
	Sensors	3-axis G-Sensor	1 x g-sensor and gyroscope	1 x g-sensor and gyroscope	1 x g-sensor and gyroscope
Car Power Design	Voltage input	Supports 12/24 V vehicle power	Supports 12/24 V vehicle power	Supports 12/24 V vehicle power	Supports 12/24 V vehicle power
	Power Regulation	E-mark (E13)	E-Mark (E13), SAE J1455, ISO 7637-2, SAE J1113	E-Mark (E13), SAE J1455, ISO 7637-2, SAE J1113	E-Mark (E13), SAE J1455, ISO 7637-2, SAE J1113
Environment	IP Rating	IP30; (Optional: IP54 with I/O cover)	IP65 (excludes rear I/O) (optional IP65-rated I/O cover)	IP65 (excludes rear I/O) (optional IP65-rated I/O cover)	IP65 (excludes rear I/O) (optional IP65-rated I/O cover)
	Operating Temperature	-30°C ~ 70°C, without airfolw	-30 ~ 70°C (Atom™ SKU)/ -20 ~ 60°C (Core™ i7/i5, project-based), without airflow	-20 ~ 60°C (Core™ i7/i5, by project-based), without airflow	-20 ~ 60°C (Atom™ X5-E3940), without airflow
	Shock / Vibration	MIL-STD-810G, EN60721-3-5 (5M3)	MIL-STD-810G, EN60721-3(5M3)	MIL-STD-810G, EN60721-3(5M3)	MIL-STD-810G, EN60721-3(5M3)
Physical	Dimensions (W x H x D)	230 x 72 x 118 mm	314 x 75.1 x165.5 mm	314 x 75.1 x165.5 mm	314 x 95.3 x 172.2 mm
	Weight	1.45 kg	4.2 kg (excludes SSD)	4.2 kg (excludes SSD)	5.8 kg (excludes SSD)

Model Name		TREK-60N FL	TREK-50N	TREK-50	TREK-20
System	Processor	Intel® Core™ i7 1365URE	N/A	Intel® Atom™	Qualcomm® Snapdragon™
	Processor (via NVIDIA)	NVIDIA® Jetson Orin™ NX 8GB	NVIDIA® Jetson Orin™ NX 8GB	N/A	N/A
	Memory	2 x SO-DIMM up to 64GB DDR5	N/A	1 x SO-DIMM up to 16GB DDR5	eMCP 4GB
	Storage	1 x NVMe storage, 1 x externally accessible 2.5" SSD tray	1 x NVMe storage	1 x NVMe storage	Flash eMCP 64GB, MicroSD (up to 128GB/Optional)
RF	GNSS	Built-in u-blox Neo-M9N, Optional Neo-M9V (dead reckoning)	Built-in u-blox Neo-M9N, Optional Neo-M9V (dead reckoning)	Built-in u-blox Neo-M9N, Optional Neo-M9V (dead reckoning)	GPS, GLONASS w/ max 75 channels
	WLAN/BT	IEEE 802.11a/b/g/n/ac/ax + BT V5.X	IEEE 802.11a/b/g/n/ac/ax + BT V5.X	IEEE 802.11a/b/g/n/ac/ax + BT V5.X	IEEE 802.11 a/b/g/n/ac Dual Band 2.4/5GHz and MIMO
	WWAN	4G LTE, 5G available upon request	4G LTE, 5G available upon request	4G LTE, 5G available upon request	LTE FDD, LTE TDD
Video Output	Digital	1 x Smart Display Port 2.0	1 x Smart Display Port 2.0	1 x Smart Display Port 2.0	1 x Smart Display
	VGA, HDMI	N/A	N/A	1x HDMI	N/A
Video Surveillance	Video Input	8 x RJ-45 for 10/100 Base T(X) PoE	4 x RJ-45 for 10/100 Base T(X) PoE	N/A	N/A
I/O	Vehicle I/O Ports	1 x J1708 (with J1587 support), 2 x CAN FD (Compliant with CANbus), Ignition & Car Battery power input	1 x J1708 (with J1587 support), 2 x CAN FD (Compliant with CANbus), Ignition & Car Battery power input	1 x J1708 (with J1587 support), 2 x CAN FD (Compliant with CANbus), Ignition & Car Battery power input	1 x CANbus (supports raw CAN, J1939, OBD-II/ISO15765, firmware configurable
	Generic I/O Ports	2 x 2-wire RS-232	1 x 2-wire RS-232, 1x RS-485	2 x 4-wire RS-232/ RS-485, 2 x 2-wire RS-232	Mic-In (x 1) SPK +/- 4Ohm & 10W (x 1) Line-Out (x 1)
		2 x Mic-In	1 x Mic-In	1 x Mic-In	1 x RS-232 TX, RX,RTS,CTS
		2 x Line-Out	1 x Line-Out	1 x Line-Out	5 x DI (2DI(Wet contact)+3DI(Dry contact))
		6 x Isolated DI (Dry/Wet) / 4 x Isolated DO	6 x Isolated DI (Dry/Wet) / 4 x Isolated DO	6 x Isolated DI (Dry/Wet) / 4 x Isolated DO	4 x DO
	Standard I/O Ports	N/A	1 x Automotive Ethernet	1 x Automotive Ethernet	1 x USB 3.0 OTG for trouble shooting
		1 x USB 2.0 Type A (front) 2 x USB 3.0 Type A	1 x USB 3.0 Type A 1 x USB 2.0 Micro (OTG)	2 x USB 3.2 Type A	1 x USB 3.0 Host 2 x USB 2.0 Host
		2 x Giga LAN	1 x Giga LAN 2 x Giga LAN 2 x Giga LAN	1 x Giga LAN 2 x Giga LAN 2 x Giga LAN	2 x Giga LAN
	Sensors	1 x g-sensor and gyroscope	1 x g-sensor and gyroscope	1 x g-sensor and gyroscope	N/A
Car Power Design	Voltage input	Supports 12/24 V vehicle power	Supports 12/24 V vehicle power	Supports 12/24 V vehicle power	Supports 12/24 V vehicle power
	Power Regulation	E-Mark (E13), SAE J1455, ISO 7637-2, SAE J1113	E-Mark (E13), SAE J1455, ISO 7637-2, SAE J1113	E-Mark (E13), SAE J1455, ISO 7637-2, SAE J1113	E-Mark (E13), ISO 7637-2
Environment	IP Rating	IP65 (excludes rear I/O) (optional IP65-rated I/O cover)	IP67 (by version)	IP67 (by version)	IP54 With IP cover
	Operating Temperature	-20 ~ 50°C (Core™ i7), without airflow	-20 ~ 70°C, without airflow	-20 ~ 70°C, without airflow	-20 ~ 60°C, without airflow
	Shock / Vibration	MIL-STD-810G, EN60721-3(5M3)	MIL-STD-810G, EN60721-3(5M3)	MIL-STD-810G, EN60721-3(5M3)	MIL-STD-810G, EN60721-3-5 (5M3)
Physical	Dimensions (W x H x D)	314 x 95.3 x 172.2 mm	314 x 79.5 x 165.5 mm	314 x 79.5 x 165.5 mm	180 x 50 x 115 mm
	Weight	5.8 kg (excludes SSD)	3.5 kg	3.5 kg	under 2.5 kg

In-Vehicle Display

Model Name		TREK-303RH	TREK-303R FL	TREK-306DH	TREK-306D FL	TREK-306PH	TREK-306P FL
Design Compatible Models		Paired with TREK-570	Paired with TREK-60/TREK-60N	Paired with TREK-570	Paired with TREK-60/TREK-60N	Paired with TREK-570	Paired with TREK-60/TREK-60N
Display	Size/Type	7" (16:9) TFT LCD	7" (4:3) TFT LCD	10.4" (4:3) TFT LCD	10.4" (4:3) XGA TFT LCD	10.4" (4:3) TFT LCD	10.4" (4:3) XGA TFT LCD
	Max. Resolution	800 x 480	800 × 480	1024 x 768	1024 x 768	1024 x 768	1024 x 768
	Brightness (cd/m2)	500 nits	500 nits	400 nits	500 nits	500 nits	500 nits
	Viewing Angle (H/V)	140° / 120°	120° / 100°	178° / 178°	176° / 176°	176° / 176°	176° / 176°
	Backlight Life	50,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs
Touchscreen		4-wire resistive type	4-wire resistive type	5-wire resistive type	5-wire resistive type	10 Fingers projected capacitive touchscreen	10 Fingers projected capacitive touchscreen
Brightness Control		Light sensor for auto dimming (optional) 2 x hotkeys for brightness control (default)	Light sensor for auto dimming	Light sensor for auto dimming	Light sensor for auto dimming	Light sensor for auto dimming	Light sensor for auto dimming
Function Key		5 x programmable with green light	5 x programmable function keys	5 x programmable with green light	5 x programmable with green light	5 x programmable with green light	5 x programmable with green light
I/O Ports	Power Button	Yes	Yes	Yes	Yes	Yes	Yes
	Reset Button	Yes	Yes	Yes	Yes	Yes	Yes
	USB Port	1 x USB 2.0 Type A (Front side)	1 x USB 2.0 (Front side)	1 x USB 2.0 Type A (Rear side)	1 x USB 2.0 Type A (Rear side)	1 x USB 2.0 Type A (Rear side)	1 x USB 2.0 Type A (Rear side)
	Smart Display Port	36-pin locking type connector paired with TREK box (Connect TREK-570/674 with SDP 1.0)	1 x with 10-meter/5-meter SDP 2.0 cable for pairing with TREK computing box Support 12V (2A) power output	36-pin locking type connector paired with TREK box	SDP 2.0 By High Speed Data (HSD) (4+2) Connector Support 12V (2A) power output for Next Gen. TREK-3xx	36-pin locking type connector paired with TREK box	SDP 2.0 By High Speed Data (HSD) (4+2) Connector Support 12V (2A) power output for Next Gen. TREK-3xx
Audio		1 x 2-watt speaker	1 x 2-watt speaker	2 x 2-watt speakers	2 x 2-watt speakers	2 x 2-watt speakers	2 x 2-watt speakers
Power		12 V ± 5% (Powered by TREK-5xx)	Powered by TREK-60	12 V ± 5% (Powered by TREK-5xx)	12V /1.5 A (via SDP 2.0 Port)	12 V ± 5% (Powered by TREK-5xx)	12V /1.5 A (via SDP 2.0 Port)
Environment	IP Rating	IP54 (with I/O cover, by project) IP31 (entire system)	IP54 (with I/O cover, by project) IP31 (entire system)	IP55 (with I/O cover)	IP55 (with I/O cover)	IP55 (with I/O cover)	IP55 (with I/O cover)
	Operating Temperature	-30°C ~ 70°C	-30°C ~ 70°C	-30°C ~ 70°C	-30°C ~ 70°C	-30°C ~ 70°C	-30°C ~ 70°C
	Shock / Vibration	MIL-STD-810G, EN60721-3(5M3)	MIL-STD-810G, SAE J1455 4.9.4.2, EN60721-3-5 (5M3)	MIL-STD-810G, SAE J1455 4.9.4.2	MIL-STD-810G, SAE J1455 4.9.4.2, EN60721-3-5(5M3)	MIL-STD-810G, SAE J1455 4.9.4.2	MIL-STD-810G, SAE J1455 4.9.4.2, EN60721-3-5(5M3)
Certifications		CE, FCC, CCC, E-MARK (E13)	CE, FCC, UL/cUL, CCC, IC, CB	CE, FCC	CE/FCC/IC/CCC/UL/ cUL/CB	CE, FCC	CE/FCC/IC/CCC/UL/ cUL/CB
Physical	Dimensions (W x H x D)	244 x 160 x 41 mm	212.75 x 141.85 x 35 mm	303 x 226 x 35 mm	303 x 226 x 35 mm	303 x 226 x 35 mm	303 x 226 x 35 mm
	Weight	0.95 kg	0.67 kg	1.7 kg	1.7 kg	1.7 kg	1.7 kg
	Mounting	RAM mount	VESA mount, RAM mount	VESA mount, RAM mount	VESA mount, RAM mount	VESA mount, RAM mount	VESA mount, RAM mount

ADAS Module

Model Name		TREK-150	TREK-152	TREK-154
Application		Forward Collision Warning (FCW), Lane Departure Warning (LDW), Headway Monitoring, and Pedestrian Detection	Driver Behavior Monitoring (Drowsiness, Yawning, Lack of attention, Cellphone use, Eating/smoking, Driver absence)	Blind Spot Monitoring
Intelligent Video Analysis	Lens Installation Height	120 ~ 220 cm / 47.2 ~ 86.6 in according to vehicle size/type (i.e., bottom of windshield for a bus and top of windshield for a sedan)	N/A	1M ~ 3.5M
	Mask Wearing Detection	N/A	Whether the driver is wearing a face mask	N/A
	Driver Fatigue Detection		Alerts for Drowsiness (eyes closed longer than threshold time) Yawning Mask wearing does not impact detection performance.	
	Distraction Detection		Alerts for Lack of attention (gaze moves/head turns more than 30° left or right) Cellphone use Eating/smoking Driver absence	
	Detection Conditions		Distance between driver's face and camera lens: 60 ~ 120 cm / 23.6 ~ 47.2 inch Anti-glare IR LED Suitable for low-light environments, reflected ambient light, and drivers wearing coated glasses	
Electrical Interface	Camera Sensor	CMOS type, 720p resolution, 115 dB dynamic range, 52° horizontal FoV	CMOS type, monochrome, global shutter, active pixel array 1280H x 800V, 1.0 MP, 45° horizontal FoV	CMOS type, 1280 x 960 (1280 x 720 viewing resolution), 100 dB dynamic range, 180°/170° sensing / viewing FOV (Horizontal)
	I/O	1 x 2-wire RS-232, 1 x video out (RCA, male), 1 x VCC/ACC/GND, 2 x LED indicators (R/L)	1 x 2-wire RS-232, 1 x video out (RCA, male), 1 x VCC/ACC/GND	1 x Video out (RCA, male), cascading RS-485 connectors for connecting multiple modules, and 1 x ACC/GND (open wire)
	Power Input	12/24 V vehicle power (9 ~ 36 VDC and ISO-7637-II compliant)	12/24 V vehicle power (10 ~ 36 VDC and ISO-7637-II compliant)	10 ~ 36 VDC
	Power Consumption	7.2 W (typical) including both camera module and ECU box	8.4 W (typical), including with camera module and ECU box	< 4W
Environmental	Operating Temperature	-25 ~ 85°C / -13 ~ 185°F	-30 ~ 85°C / -22 ~ 185°F	-40 ~ 85°C / -40 ~ 185°F
	Storage Temperature	-30 ~ 85°C / -22 ~ 185°F	-40 ~ 85°C / -40 ~ 185°F	-40 ~ 105°C / -40 ~ 221°F
	Shock/ Vibration	N/A	N/A	N/A
Certification	EMC	N/A	N/A	CE, FCC, E-Mark
Mechanical	Dimensions (W x H x D)	ECU box: 200.5 x 31 x 86.5 mm / 7.89 x 1.22 x 3.4 in Camera module: 89.5 x 67 x 39 mm / 3.52 x 2.64 x 1.54 in	ECU box: 200.5 x 31 x 86.5 mm / 7.89 x 1.22 x 3.4 in Camera module (w/o mount): 102 x 22 x 38 mm / 4 x 0.86 x 1.49 in Camera bracket: 110 mm / 4.33 in (H), 80 x 60 mount holes	50 x 44.7 mm / 1.96 x 1.76 in (w/o bracket)
	Weight	ECU box: 440 g / 0.97 lb Camera module: 80 g / 0.18 lb	ECU box: 440 g / 0.97 lb Camera module (with mount): 294 g / 0.64 lb	Camera module: 132 g / 0.29 lb Camera bracket: 88 g / 0.19 lb

Rugged All-in-One Computers

Model Name		DLT-V73	DLT-V73A	DLT-V83
Screen Size		10.4"/12.1"		10.4"/12.1"/15.1"
System	CPU	Intel® Core™ i5-1145GRE quad-core, 1.5 GHz, Intel® Celeron® 6305E dual-core, 1.8 GHz	Qualcomm® Snapdragon™ 660 octa-core 2.2 GHz	Intel® Core™ i5-4300U dual-core, 1.9 GHz Intel® Celeron® 2980U dual-core, 1.6 GHz
	RAM	8/16 GB RAM LPDDR4X	4 GB RAM LPDDR4X	4/8 GB RAM
	Storage	128 GB or 256 GB CFast	64 GB eMMC internal, expandable 128 GB or 256 GB SD card	16 GB - 256 GB CFast 128 GB - 512 GB 2.5" SSD (optional)
OS		Windows 11 IoT Enterprise, Windows 10 IoT Enterprise LTSC, Debian-based Linux	Android 12 AOSP, Android 12 with GMS	Windows 10 IoT Enterprise LTSC, WES 7, Win7 Pro, WE 8.1 Industry Pro*, Debian-based Linux*
Display		DLT-V7310 — 10.4" XGA color TFT with 1024 x 768 resolution, 500 cd/m²	DLT-V7310AP — 10.4" XGA color TFT with 1024 x 768 resolution, 500 cd/m²	DLT-V8310 — 10.4" XGA color TFT with 1024 x 768 resolution, 400 cd/m²
		DLT-V7312 DLT-V7312P+ — 12.1" XGA color TFT with 1024 x 768 resolution, 600 cd/m²	DLT-V7312AP DLT-V7312AP+ — 12.1" XGA color TFT with 1024 x 768 resolution, 600 cd/m²	DLT-V8312 — 12.1" XGA color TFT with 1024 x 768 resolution, 500 cd/m²
				DLT-V8315 — 15.1" XGA color TFT with 1024 x 768 resolution, 400 cd/m²
Touchscreen & Function Keys		DLT-V7310 DLT-V7312 — • Resistive touchscreen with 12 function keys • PCT touchscreen with 12 function keys	DLT-V7310AP DLT-V7312AP — • PCT touchscreen with 12 function keys	DLT-V8310 — • Resistive touchscreen with 5* or 26 function keys • Sunlight-readable resistive touchscreen with 26 function keys (Celeron only)
		DLT-V7312P+ — • PCT touchscreen with 3 function keys	DLT-V7312AP+ — • PCT touchscreen with 3 function keys	DLT-V8312 DLT-V8315 — • Resistive touchscreen with 26 function keys • Sunlight-readable resistive touchscreen with 26 function keys (Celeron only)
Screen Defroster		Yes (only with resistive touchscreen)*	N/A	N/A
Communications	WLAN	IEEE 802.11 a/b/g/n/ac/ax (Wi-Fi 6)	IEEE 802.11 a/b/g/n/ac (Wi-Fi 5)	IEEE 802.11 a/b/g/n/ac (Wi-Fi 5)
	WWAN, GPS	(LTE, UMTS, HSPA+, GPS)*		(LTE, UMTS, HSPA+, GSM, GPRS, EDGE)*
	LAN	1 x LAN (10/100/1000/2500 Mbit/s), 1 x LAN (10/100/1000 Mbit/s)	2 x LAN (10/100/1000 Mbit/s)	1 x LAN (10/100/1000 Mbit/s) with optional 2nd LAN
	WPAN	Bluetooth 5.3	Bluetooth 5.0	Bluetooth 5.0
	NFC	NFCIP-1, NFCIP-2, ISO/IEC 14443, ISO/IEC 15693, MIFARE		N/A
Interface	Serial	1 x COM RS-232: 5V$_{DC}$/12V$_{DC}$/RI (switchable)		2 x RS-232, or 1 x RS-232 and 1 x RS-422/485
	USB	2 x USB-A 3.2 Gen1, 1 x USB-C 3.2 Gen2, 1 x Service USB-C 3.2 Gen2	2 x USB-A 3.2 Gen1, 1 x USB-C 3.2 Gen1, 1 x Service USB-C 3.2 Gen1	3 x USB 2.0, 1 x Service USB 2.0
	External Antenna	1 x RSMA for WLAN, 1 x SMA for WWAN*, 1 x SMA for GPS*		2 x RSMA for WLAN, 2 x SMA for WWAN*
	CAN	1 x CAN bus (CAN2.0/J1939/CAN FD)* (optional with AddOn Module)		1 x CAN*
Sensors		1 x Ambient light sensor 1 x Accelerometer 1 x Gyroscope		N/A
Environmental	IP Rating	IP66 rating for the entire system		IP66 rating for the entire system
	Operating Temperature	-30 ~ 50°C (-22 ~ 122°F)		-30 ~ 50°C (-22 ~ 122°F)
	Relative Humidity	10 to 90% at 40°C (104°F), non-condensing		10 to 90% at 40°C (104°F), non-condensing
	Shock / Vibration	5M3, MIL-STD 810F		10"/12" (5M3, MIL-STD 810F), 15"(5M2, MIL-STD 810F)
	Touchscreen Durability	IK08		IK08
Power Supply	Input Voltage	12/24/48V certified vehicle power; Automatic power on/off via ignition		12/24/48V certified vehicle power; Automatic power on/off via ignition
	Uninterruptible Power Supply (UPS)	via battery pack (supports up to 20 minutes)*		N/A

* Optional features

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Model Name		DLT-V7210/V7212 /V7212 P+/V7215 P+	DLT-V7210K / KD	DLT-V6210 Facelift	TREK-773
Screen Size		10.4"/12.1"/15"	10.1"	10.4"	7"
System	CPU	Intel® Atom™ E3845 quad-core, 1.91 GHz	Intel® Atom™ E3845 quad-core, 1.91 GHz	Intel® Atom™ E3825 dual-core, 1.33 GHz	Intel® Atom™ E3827 dual-core, 1.75 GHz
	RAM	4 GB RAM	4 GB RAM	4 GB RAM	4 GB RAM (up to 8 GB)
	Storage	16 GB - 256 GB CFast	16 GB - 256 GB CFast	64 GB CFast	32 GB CFast (default with full configuration)
OS		Windows 10 IoT Enterprise , WES 7, Debian-based Linux, IGEL Linux, Android 9	Windows 10 IoT Enterprise , WES 7, Win7 Pro, Debian-based Linux, IGEL Linux, Android 9	Windows 10 IoT Enterprise	Win10 (64-bit) Linux Ubuntu 18.04 (64-bit)
Display		DLT-V7210 — 10.4" XGA color TFT with 1024 x 768 resolution, 400 cd/m²	10.1" widescreen WXGA color TFT with 1280 x 800 resolution, 500 cd/m²	10.4" XGA color TFT with 1024 x 768 resolution, 600/1300 cd/m²	7" (16:9) TFT with 800 x 480 resolution, 1000/750 cd/m²
		DLT-V7212 DLT-V7212 P+ — 12.1" XGA color TFT with 1024 x 768 resolution, 500/600 cd/m²			
		DLT-V7215 P+ — 15" XGA color TFT with 1024 x 768 resolution, 600 cd/m²			
Touchscreen & Function Keys		DLT-V7210 DLT-V7212 — • Resistive touchscreen with 12 function keys • PCT touchscreen with 12 function keys	Sunlight-readable PCT touchscreen with 12 function keys and a full-size keyboard	Sunlight-readable PCT touchscreen with 3 function keys	Resistive touchscreen with 5 function keys
		DLT-V7212 P+ DLT-V7215 P+ — Sunlight-readable PCT touchscreen with 3 function keys			
Screen Defroster		Yes (only with resistive touchscreen)	Yes (only with DLT-V7210 KD)	N/A	N/A
Communications	WLAN	IEEE 802.11 a/b/g/n/ac (Wi-Fi 5)*	IEEE 802.11 a/b/g/n/ac (Wi-Fi 5)*	IEEE 802.11 a/b/g/n/ac (Wi-Fi 5)*	IEEE 802.11 a/b/g/n/ac (Wi-Fi 5)
	WWAN, GPS	(LTE, UMTS, HSPA+, GSM, GPRS, EDGE)*	(LTE, UMTS, HSPA+, GSM, GPRS, EDGE)*	(LTE, UMTS, HSPA+, GSM, GPRS, EDGE)*	(LTE, HSPA+, GSM/GPRS/ EDGE, EV-DO Rev a1, 1xRTT, GPS)
	LAN	1 x LAN (10/100/1000 Mbit/s)	1 x LAN (10/100/1000 Mbit/s)	2 x LAN (10/100/1000 Mbit/s)	1 x Giga LAN with RJ45 connector
	WPAN	Bluetooth 5.0*	Bluetooth 5.0*	Bluetooth 5.0*	Bluetooth V5.0 combo module
	NFC	N/A	N/A	N/A	ISO/IEC 14443A, 14443B, 15693; MIFARE 1K/4K, Ultralight; NFC-IP2 protocol
Interface	Serial	2 x RS-232, COM 1 with switchable 5 V$_{DC}$/RI	2 x RS-232, COM 1 with switchable 5 V$_{DC}$/RI	1 x RS-232, 5 V$_{DC}$	1 x High-speed full RS-232, 1 x RS-485 with auto flow control
	USB	4 x USB 2.0, 1 x Service USB 3.0	4 x USB 2.0, 1 x Service USB 3.0	2 x USB 2.0, 1 x Service USB 2.0	1 x USB 2.0, 1 x USB 3.0
	External Antenna	1 x RSMA for WLAN, 1 x SMA for WWAN*	1 x RSMA for WLAN, 1 x SMA for WWAN*	1 x RSMA for WLAN, 2 x SMA for WWAN*	5 x SMA (2 for WWAN, 1 for GPS, 2 for WLAN)
	CAN	N/A	N/A	N/A	1 x CAN 2.0 (Support Raw CAN, J1939, OBD-II/ISO 15765)
Sensors		1 x Accelerometer 1 x Gyroscope*	1 x Accelerometer 1 x Gyroscope*	N/A	1 x Light sensor 1 x G-sensor
Environmental	IP Rating	IP66 rating for the entire system	IP65 rating for the entire system	IP65 rating for the entire system	IP54 with I/O cover
	Operating Temperature	-30 ~ 50°C (-22 ~ 122°F)		-30 ~ 50°C (-22 ~ 122°F)	-30 ~ 60°C (-22 ~ 140°F)
	Relative Humidity	10 to 90% at 25°C (77°F), non-condensing		10 to 90% at 25°C (77°F), non-condensing	95% at 25°C ~ 55°C, non-condensing
	Shock / Vibration	5M3, MIL-STD 810F		5M3, MIL-STD 810F	5M3, MIL-STD 810G
	Touchscreen Durability	IK08		IK08	IK06
Power Supply	Input Voltage	12/24/48V certified vehicle power; Automatic power on/off via ignition		12/24/48V certified vehicle power; Automatic power on/off via ignition"	12/24 V certified vehicle power with Intelligent Vehicle Power Management (iVPM 2.0)
	Uninterruptible Power Supply (UPS)	via battery pack (supports up to 20 minutes)*	via battery pack (supports up to 20 minutes)*	N/A	N/A

* Optional features

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AIM-S & R Tablet

Model		AIM-77	AIM-65	AIM-68	AIM-68S	AIM-75S	AIM-78S	PWS-872FL
System	Processor	Rockchip RK3568 (Quad-core ARM Cortex-A55 up to 2.0GHz)	Intel® Atom™ x5-Z8350 Quad-core, 1.6GHz (1.44GHz)	Intel® Atom™ x7-Z8750 Quad-core, 1.6GHz (2M cache, up to 2.56GHz)	Intel® N200, up to 3.70GHz	Qualcomm® Snapdragon™ 660 Octa-core 2.2GHz	Qualcomm® Snapdragon™ 660 Octa-core 2.2GHz	Intel® Celeron® 3965U, 2.2GHz Intel® Core™ 7th i3-7100U/i5-7300U/i7-7600U, upto 2.8GHz (*)
	Memory	4GB/8GB LPDDR4	2/4GB DDR3	4GB DDR3	8GB LPDDR 5	4GB DDR4	4GB DDR4	8GB DDR4
	OS	Android 12	Windows 10 IoT Enterprise, Android 6.0	Windows 10 IoT Enterprise, Android 6.0	Windows 10 IoT, Windows 11	Android 12 with AER and GMS certification	Android 10	Windows 10 IoT, 64-bit
Storage		64GB/128GB eMMC 5.1 & Micro SD	eMMC/micro SD	eMMC/micro SD	128GB or 256GB M.2 NVMe SSD	eMMC/micro SD	eMMC/micro SD	mSATA SSD/SD
Display	Type	10.1" IPS LCD	8" IPS LCD	10.1" FHD LCD	10.1" FHD LCD	8" IPS LCD	10.1" FHD LCD	10.1" WXGA LCD
	Resolution	WXGA 1280 x 800	WUXGA 1920 x 1200	WUXGA 1920 x 1200	WUXGA 1920× 1200	WUXGA 1920 x 1200	WUXGA 1920 x 1200	10.1" WXGA LCD 10.1" WUXGA LCD
	Touch Type	10-point, multi-touch PCAP	10-point, multi-touch PCAP	10-point, multi-touch PCAP	"10-point, multi-touch PCAP"	10-point, multi-touch PCAP	10-point, multi-touch PCAP	10-point, multi-touch PCAP
Wireless Communication		WLAN, BT, NFC (optional), WWAN (optional)	WLAN, BT, NFC, WWAN (optional)	WLAN, BT, NFC, WWAN (optional)	WLAN 6E, BT 5.0+, NFC	WLAN, BT, NFC, WWAN (optional)	WLAN, BT, NFC, WWAN (optional)	WLAN, BT, NFC (optional), WWAN (optional)
Camera		Front: 5MP FF camera Rear: 8MP AF camera	Front: 2MP FF camera Rear: 5MP AF camera	Front: 2MP FF camera Rear: 5MP AF camera	Front: 5MP FF camera Rear: 13MP AF camera	Front: 5MP FF camera Rear: 8MP AF camera	Front: 8MP FF camera Rear: 13MP AF camera	Front: 2MP FF camera Rear: 8MP AF camera
Battery		7.7V, 34.19Wh, 4440mAh	3.8V, 18.6Whr, 4900mAh	10.8V, 26Whr, 2400mAh	11.55V, 46.3Whr, 4010mAh	3.8V, 18.6Whr, 4900mAh	10.8V, 26Whr, 2400mAh	Primary battery: 4S1P 14.4V 3250mAh
I/O*		Standard I/O, dock I/O	Standard I/O, extended I/O, dock I/O	Standard I/O, extended I/O, dock I/O"	Standard I/O, extended I/O, dock I/O	Standard I/O, extended I/O, dock I/O	Standard I/O, extended I/O, dock I/O	Standard I/O, extended I/O, dock I/O
Environmental	Operating Temperature	0 ~ 40°C / 32 ~ 104°F	-10 ~ 50°C / 14 ~ 122°F					-20 ~ 50°C / -4 ~ 122°F
	Storage Temperature	-10 ~ 60°C / 14 ~ 140°F	-20 ~ 60°C / -4 ~ 140°F					-40 ~ 60°C / -40 ~ 140°F
	IP Rating	IP54 (excpet MSR SKU)	IP65					
	Drop Tolerance	75 cm (2.5 ft)	Up to 120 cm (4 ft)					

AIM Peripherals

VESA / Vehicle Dock / Office Cradle

Applicable Model	AIM-65/75S VESA Dock	AIM-68/68S/78S VESA Dock	AIM-65/75S Vehicle Dock	AIM-68/68S/78S Vehicle Dock	PWS-872 Series Vehicle Dock	AIM-77 Magnet Office Cradle
Features	• VESA (75 x 75) standard mounting holes • Full I/O: USB 3.0, RS232, LAN, power jack • Charger & USB: USB 2.0, power jack	• VESA (75 x 75) standard mounting holes • Full I/O: USB 3.0, RS232, LAN, power jack • Charger & USB: USB 2.0, power jack	• Full I/O: CAN bus, DI, DO, odometer, USB 2.0, RS-232 + RS-485 (USB 2.0, power input), power jack • Charger only: Power input	• Full I/O: CAN bus, DI, DO, odometer, USB 2.0, RS-232 + RS-485 (USB 2.0, power input), power jack • Charger only: Power input	LAN A8 (M12), GPS SMA, USB 3.0, HDC (RS-232, CAN 2.0, DI, DO, Line-In, Line-Out), power input (M12)	• Embedded 3" BT Thermal Printer • I/O: 2 x USB 3.0, 1x USB 2.0 1 x RJ-45, 1 x RJ-11 (Cash Drawer), 1 x RJ-48 (COM), DC-in Jack

Desk Dock / Thermal Printer

Applicable Model	AIM-77 Magnet Charging Cradle	AIM-77 Magnet Office Cradle	AIM-65/75S	AIM-65/75S	AIM-68/68S/78S	PWS-872 Series
Features	I/O: 1 x USB 3.0, DC-in Jack	I/O: 2 x USB 3.0, 1 x RJ-45, 1 x RJ-48 (COM), DC-in Jack	I/O: USB 2.0, micro USB	• Full I/O: USB 2.0, RS-232, HDMI, power jack, battery charging station • Charger & USB: USB 2.0, power jack	• Full I/O: USB 2.0, RS-232, HDMI, power jack, battery charging station • Charger & USB: USB 2.0, power jack	I/O: USB 3.0, RS-232, VGA, LAN, power jack

Extension Modules

Applicable Model	AIM-65/68/68S/75S/78S Barcode scanner 20°	AIM-65/68/68S/75S/78S Barcode scanner 70°	AIM-65/68/68S/75S/78S MSR + barcode scanner	AIM-65/68/68S/75S/78S LAN + COM module	PWS-872 Series Additional I/O module	PWS-872 Series MSR & smart card reader
Features	• Sensor: 640 x 480 CMOS sensor • Field of view: horizontal: 37.8°; vertical: 28.8°	• Sensor: 640 x 480 CMOS sensor • Field of view: horizontal: 37.8°; vertical: 28.8°	**MSR** • Swipe Speed: 3 ~ 75 in/sec • Supported Format: ISO 7811/ JIS II bi-directional swipe **Barcode Scanner** • Sensor: 640 x 480 CMOS sensor • Field of view: horizontal: 37.8°; vertical: 28.8°	• 1 x 10/100 Ethernet port • 1 x COM port	I/O: USB 3.0, LAN, RS-232	MSR and smart card reader

Charging Station Accessories

Applicable Model	AIM-65/68/75S/78S Multi-Battery Charging Station	AIM-65/75S Multi-Tablet Charging Station	PWS-872 Series Multi-Bay Battery Charger	AIM-65/68S/75S/78S Hand Strap	PWS-872 Series Universal cover package	AIM-77/65/68/68S/75S/78S PCAP Stylus
Features	Supports up to 4 batteries	Supports up to 4 batteries	Supports up to 4 external battery packs	Stylus holder	Universal cover package	PCAP Stylus

LEO-S Sensors

Model Name		TREK-120 LoRa Temperature & Humidity Sensor	TREK-120 LoRa Temperature & Humidity Probe Sensor
Temperature	Measurement Range	-40 ~ 70°C	
	Accuracy Range	± 0.2°C from 0~70°C	
		± 0.3°C from -40~0°C	
	Resolution	0.01°C	
Relative Humidity	Measurement Range	0~100% RH	
	Accuracy Range	± 2% from 0~100% at 25°C	
	Resolution	0.01%	
NFC	Frequency	13.56 MHz	
	Function	Bulk download configuration and sensor data	
LoRa	Wireless Technology	Advantech LoRa technology	
	Frequency	920 ~ 925 MHz for Taiwan, 902 ~ 928 MHz for US, 863 ~ 870 MHz for Europe, 470 ~ 510 MHz for China, 921~922 MHz for Japan	
	Wireless Range	>500 meters (Line of Sight)**	
	Topology	Star	
	Data Storage Capacity	5000 data log readings	
	LED Indicators	1 x Power status, 1 x Alarm	
	Buttons	1 x Start button	
	Battery	3V/2400mAh wide-temperature primary (non-rechargeable) battery	
	Battery Life	18 months (10 min intervals)*	
	Data Transmissions	NFC + LoRa	
Mechanical	Mount Options	Fixed by adhesive tape, magnet, fastener, screws	
	Dimensions (W x D x H)	123.47 x 65 x 24.5 mm (4.88 x 2.56 x 0.91 in)	
	Weight	108 g (0.23 lb)	248 g (0.55 lb)
	Probe Type	N/A	Nickel plated copper
	Probe Cable Length	N/A	2 m
Environmental	Operating Temperature	-40 ~ 70°C	
	Storage Temperature	-40 ~ 85°C	
	Working Humidity	0 ~ 100% (non-condensing)	
	IP Rating	IP65	
	Drop Tolerance	4 ft. drop onto concrete	
	Certifications	CE, FCC, NCC	

**Dependent on usage scenario

Model Name		LEO-S57 LoRaWAN Temperature & Humidity Sensor	LEO-S57 LoRaWAN Temperature Probe Sensor	LEO-S592 Insertion Temperature Sensor
Temperature	Measurement Range	-30°C ~ 70°C	-200 ~ 50°C	-30°C ~ 70°C
	Accuracy Range	0°C ~ 70°C (± 0.3°C)	± 0.5°C	± 0.5°C
		-30°C ~ 0°C (± 0.6°C)		
	Resolution	0.01°C	0.01°C	0.01°C
Relative Humidity	Measurement Range	0~100% RH	N/A	N/A
	Accuracy Range	10% to 90% RH(± 3%), below 10% and above 90% RH(± 5%)	N/A	N/A
	Resolution	0.50%	N/A	N/A
NFC	Frequency	13.56 MHz		
	Function	Y(Configuration)		
LoRaWAN	Wireless Technology	Advantech LoRaWAN technology		
	Frequency	US915/AU915/KR920/AS923/CN470		
	Wireless Range	100 meters+ (Line of Sight)*		
	Topology	Star		
	Data Storage Capacity	2800	1000	1200
	LED Indicators	N/A	N/A	N/A
	Buttons	1 x Power Button (Internal)	1 x Power Button (Internal)	1 x Power Button (Internal)
	Battery	2 x 4000 mAh battery (ER18505)	1 x 19000 mAh battery (ER34615)	1 x 4000 mAh battery (ER18505)
	Battery Life	5 years (10 min interval, @25°C)*	5 years (10 min interval, @25°C)*	2 years (10 min interval, @25°C)*
	Data Transmissions	NFC + LoRaWAN		
Mechanical	Mount Options	magnet, fastener, screws	fastener, screws	
	Dimensions (W x D x H)	88.5 x 85.3 x 27 mm (3.48 x 3.36 x 1.06 in)	105.4 x 71 x 69.5 mm (4.1 x 2.8 x 2.7 in)	Probe: Φ 10 × 400 mm Node: Φ 90 × 26 mm
	Weight	130 g	1 kg	330 g
	Probe Type	N/A	Stainless steel 304	Stainless steel 304
	Probe Cable Length	N/A	1.5 m	N/A
Environmental	Operating Temperature	-30°C ~ 70°C		
	Storage Temperature	-30°C ~ 70°C		
	Working Humidity	0 ~ 100% (non-condensing) at 25°C (77°F)	0 ~ 100% (non-condensing) at 25°C (77°F)	0 ~ 95% (non-condensing) at 25°C (77°F)
	IP Rating	IP67		
	Drop Tolerance	N/A		
	Certifications	FCC, TELEC, CE**	FCC, TELEC, CE**	FCC, CE**

* Tested under laboratory conditions and for guideline purposes only
**CE by project

LEO-S Sensors

Model Name	LEO-S592 7-In-1 AQI Sensor	LEO-S573 CO2 Sensor
Display	4.2" B/W epaper	N/A
Frequency	US915/AU915/KR920/AS923/CN470	
NFC	Y (Configuration)	
LED	R/O/G	N/A
Button	1 x Power Button 1 x Reset Button	1 x Power Button (Internal)
Power	5V/1A by Type-C Port	1 x 19000 mAh battery (ER34615)
Working Temperature	-20°C ~ 60°C ePaper (0°C ~ 40°C)	-30°C ~ 70°C
Working Humidity	10% ~ 90% (non-condensing) at 25°C (77°F)	0 ~ 95% (non-condensing) at 25°C (77°F)
Wireless Range	50 meters+ (Line of Sight)**	100 meters+ (Line of Sight)*
Dimensions	100.8 x 114 x 22 mm (3.97 x 4.49 x 0.87 in)	147.9 × 71 × 69.5 mm
Weight	680 g	550 g
IP Rating	IP30	IP30
Certification	FCC, CE***	FCC, CE***
Temperature	Range	-40°C ~ 85°C	-30°C ~ 70°C
	Accuracy	±1°C	0°C ~ 70°C (± 0.3°C) '-30°C ~ 0°C (± 0.6°C)
	Resolution	0.1°C	0.1°C
Humidity	Range	0~100% RH	0~100% RH
	Accuracy	±3%	10~90%RH: ±3% Other: ±5%
	Resolution	0.50%	0.50%
CO2	Range	400~2000PPM	400~2000PPM
	Accuracy	50PPM± 5%	±(30 ppm + Reading 3 %)
	Resolution	1PPM	1PPM
Brightness	Range	60000 lux	
PM2.5/PM10	Range	0 ~ 1000 µg/m3	
	Accuracy	0~100 (±10 µg/m3) 100~1000 (±10 %)	
	Resolution	1 µg/m3	
HCHO*	Range	0 ~ 6 mg/m3	
	Accuracy	±10 %	
	Resolution	0.01 mg/m3	

* Tested under laboratory conditions and for guideline purposes only
**CE by project

Model Name		LEO-S550 DAQ Control
Frequency		US915/AU915/KR920/AS923
NFC		Y (Configuration)
		1 × System, 1 × ACT
Button		N/A
Power		5-24 VDC
Working Temperature		-20°C ~ 60°C
Working Humidity		0 ~ 90% (non-condensing) at 25°C (77°F)
Wireless Range		100 meters+ (Line of Sight)*
Dimensions		93 × 70 × 22 mm (3.66 × 2.76 × 0.87 in)
Weight		470 g
IP Rating		IP30
Certification		FCC, CE***
Interface Type		3.5mm Terminal Block
I/O	Ports	4 × DI + 2 × DO
	Digital Input	Opto-isolated Digital Inputs, 3-24VDC (pulse counter support)
	Digital Output	SPDT Relay Contact Rating: 3A@DC Max: 30 V or AC Max: 250 V
Serial Ports	Ports	1 × RS232 + 1 × RS485
	Baud Rate	1200~115200 bps
	Protocol	Transparent (RS232), Modbus RTU (RS485)
Analog Input	Ports	2 × 4~20 mA + 2 × 0~10 V
	Resolution	12-bit
Analog Input (RTD)	Ports	2 × PT100 RTD Input
	Input Connections	2-, 3-wire
	Resolution	12-bit
	Range	-200°C ~ 800°C

* Tested under laboratory conditions and for guideline purposes only
**CE by project

Model Name	LEO-S595 Smart Button
Frequency	US915/AU915/KR920/AS923/CN470
NFC	Y (Configuration)
LED	R/G
Button	1 x External Button 1 x Reset Button
Battery	1 x 1650 mAh battery (ER14335)
Battery Life	5 years (1080 min interval + 10 presses per day)*
Working Temperature	-30°C ~ 60°C
Working Humidity	0 ~ 90% (non-condensing) at 25°C (77°F)
Wireless Range	50 meters+ (Line of Sight)*
Dimension Sensor	50 x 50 x 18 mm (1.97 x 1.97 x 0.71 in) Button: Ø20 mm (Ø0.79 in)
Weight	11 g
IP Rating	IP30
Certification	FCC,CE**

* Tested under laboratory conditions and for guideline purposes only
**CE by project

Model Name	LEO-S595 Magnetic Switch
Frequency	US915/AU915/KR920/AS923/CN470
NFC	Y (Configuration)
LED	R/G
Button	1 x Reset Button(Internal) 1 x Tampering Button
Battery	1 x 1200 mAh battery (ER14250)
Battery Life	5 years (1080 min interval + 30 triggers per day)*
Working Temperature	-20°C ~ 60°C
Working Humidity	0 ~ 90% (non-condensing) at 25°C (77°F)
Wireless Range	50 meters+ (Line of Sight)*
Dimension Sensor	50.5 x 31 x 18.5 mm (1.99 x 1.22 x 0.73 in)
Magnet	30 x 13.5 x 10 mm (1.18 x 0.53 x 0.39 in)
Weight	11 g
IP Rating	IP20
Certification	FCC,CE**
Detection Distance	15~20 mm
Alarms	Open/Close Status, Tamper
Installation	Sensor and magnet installation plane distance <15mm, height difference <7.5mm

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