

AI Rugged Computing

Design and Manufacturing Services

Designed to Fulfill Mission-Critical Needs and
Endure Harsh Environments

Public Safety / Mission Critical / Smart Agriculture / Mining • Oil • Gas / Chemistry



ADVANTECH

Enabling an Intelligent Planet

Table of Contents

Advantech in Perspective

Why Advantech?	01
Advantech at a Glance	02

About Advantech Design and Manufacturing Services (DMS)

Advantech Design and Manufacturing Services (DMS) with Vertical-Focused Expertise	03
---	----

What sets Advantech DMS Apart?

5 Stage Product Implementation Flow	04
Interconnected Traceability Systems	05

How Do Our Customers Benefit?

Comprehensive Design and Integration Capabilities — from Concept to Implementation	07
--	----

Advantech DMS Strength and Featured Technologies

Challenges and Requirements for Rugged Applications	08
Latest Platform Offerings and Design	09
Modularized Design Quickens Sample Offerings	10
Anti-Explosion Design for Special Fields Usage	11
Military Standard (MIL-STD-810G) Endures Heavy Shock and Vibration	12
Dust and Water Proof Design for Harsh Environment Use	13
Extensive Voltage Adaptation for Different Vertical Requirements	14

Advantech DMS Premium Customizable Services

Premium Selection: RAS-N100	15
RAS-N100 System Specifications	16
Use Case - AI Rugged Box PC	
Public Safety - Security and Protection	17
Smart Farming - Seeding and Harvest Management	18
Smart Farming - Disease/Pest Diagnosis and Management	19
Smart Farming - Intelligence Spraying Management	20
Wind Turbines - Condition Monitoring System	21
Use Case - Rugged AI Anti-Explosion Panel PC	
Painting-Mix Rooms - Explosion Proof Solution	22
<hr/>	
Premium Selection: MIL-N100	23
MIL-N100 System Specifications	24
Use Case - AI Box PC	
Mission Critical - In-Vehicle Applications and Ground Stations	25
Use Case - Modular Design	
AI Applications - Intelligent Edge Devices/ Drones	26

Advantech DMS Worldwide Offices

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

Enabling an Intelligent Planet

Est. **1983**

Headquarters: **Taipei, Taiwan**

INDUSTRIES SERVED
Industry 4.0, Industrial IoT,
Embedded Computing,
Medical, Retail, Logistics



\$8.838B MARKET CAP
(Jan., 2023)



HONORS & AWARDS

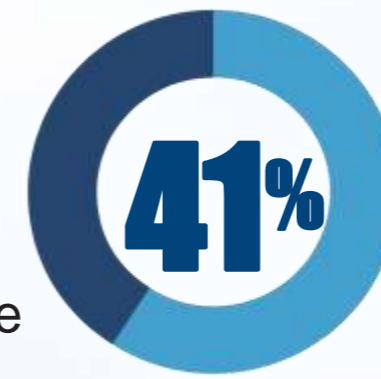
- No.5 in Best Taiwan Global Brands
- No.17 in Top 50 Global Automation Vendors
- No.9 in Top 100 Industrial IoT Companies
- Red Dot Product Design Award
- iF Product Design Award

Interbrand

CONTROL



WORLD'S LARGEST IPC COMPANY

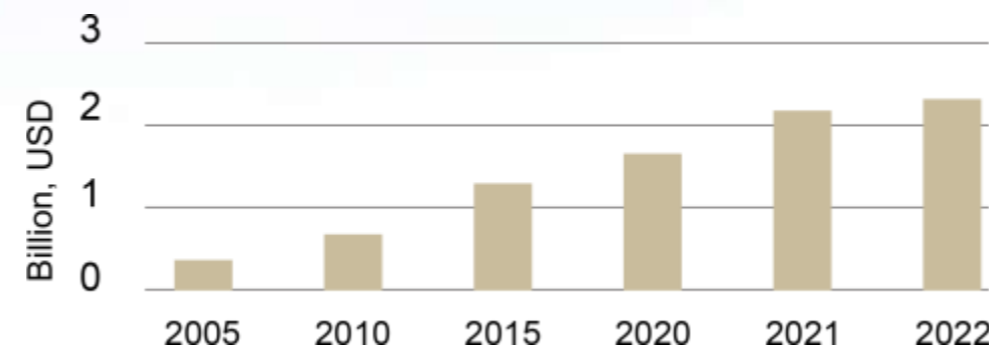


Advantech IPC WW Market Share

- Advantech
- Other IPC Companies

Source : OMDIA - Market Share estimates for Industrial PCs: World, 2022 Edition

\$2.31B 2022 REVENUE



KEY ECO-SYSTEM PARTNERS



QUALITY SYSTEMS IN PLACE

- ISO9001
- ISO14001
- ISO13485
- ISO17025
- ISO27001
- ISO45001
- TL9000
- RoHS
- WEEE
- SONY GP
- REACH

1.8MILLION+ sq. ft.
MANUFACTURING PLANTS

Linkou, Taiwan



- 8 SMT lines
- Engineering sample services
- Complex product lines
- Flexible & quick production

Kunshan, China



- 11 SMT lines
- Chassis design & production
- Mature product lines
- Cost-effective production



Nogata, Japan

- 4 SMT lines
- Japan design center, CTOS service, logistics center, repair center



- Manufacturing 3
- On-site service 4
- Design centers 11
- CTOS centers 16
- Repair centers 17
- Logistics centers 17

More than 90 offices globally!

8700+
EMPLOYEES



Advantech Design and Manufacturing Services (DMS) with Vertical-Focused Expertise

Advantech's Design and Manufacturing Services (DMS) specialize in OEM/ODM of high-quality industrial hardware with integrated software that fulfills the specific needs of the medical, retail, AMR, mission critical, and public safety sectors. We also excel in providing IoT appliances and tablet computing solutions. With our domain know-how in various applications; and our advanced, innovative, and world-leading technologies, we provide diverse levels of customization, flexibility for manufacturing, and worldwide technical/ logistics support.



Vertical Focused Design and Manufacturing Service (DMS) Divisions



Mission Critical



Industrial Equipment
Maker (IEM)



Medical Equipment
Builder (MEB)



Intelligent Display
Computing and Arm



Smart City



Retail



Gaming

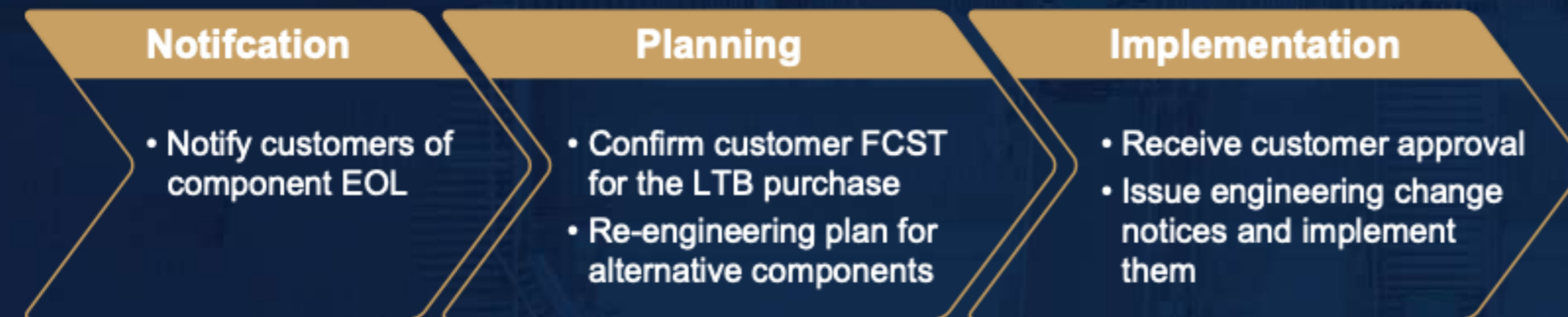
Interconnected Traceability Systems

Research Development

By equipping with ID/EE/ME design capabilities, Advantech provides complete integrated design services — from initial product idea to final implementation — that takes user scenarios, ergonomics, and human interfaces into account.

- Component Information System
- iProject and iDesign
- Green Product Management System
- iLab System

Product Lifecycle Management — Longevity Services



Factory Control and Monitoring System

Advantech implements different systems for suppliers and end customers. Each system interconnects to record/collect data and maintain future tracking.

- SAP
- Material Control System
- Shop Flow Information System
- Supplier Management System



RMA/Quality Management

Advantech has quality control systems for product repairs, issue feedback/tracking, and equipment calibration to ensure customers receive excellent quality solutions.

- Quality Feedback System
- Calibration Control System
- eRMA



Quality Assurance

Comprehensive Design and Integration Capabilities

From Concept to Implementation



Public Safety



Mission Critical



Smart Agriculture



Mining • Oil • Gas



Chemistry

DMS Project Kick-Off

- Customized ID
- Vertical focused designs
- Manufacturing services/new tooling
- Mechanical design

Evaluation Kit Offerings

- Evaluation Kit for vertical SW and HW application validation
- Evaluation Kit for PoC approval and risk mitigation

Key Design Capabilities



Extensive Voltage Adaption



Wide Working Temperature



Military Standards

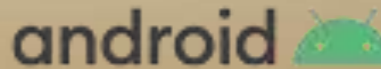
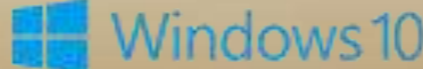
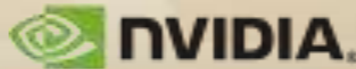


Robust Design



ATEX, IECEx, and Class 1 Division 2 Certifications

Latest Platform Offerings



Challenges and Requirements for Rugged Applications

Public safety, agricultural production, chemical production, mission critical, and mining applications necessitate reliable and enduring solutions that can withstand shock and corrosion while operating in extreme temperature and humidity conditions. Additionally, they require customized modularization services capable of quickly responding to different application needs. This may range between helping customers with testing equipment and capabilities, to verification and design. Advantech offers solutions and services that span the entirety of product development. These services help establish reliable integrated services for scenario-based total solutions.

Advantech DMS Featured Technologies



Latest Platform Offerings and Design

We provide the latest CPU to fulfill the diverse scenario-based needs of applications presented by our customers. These include CPU for AI applications and Linux Android or x86 Windows platforms. Likewise, we are working with leading CPU manufacturers to build a global longevity ecosystem.

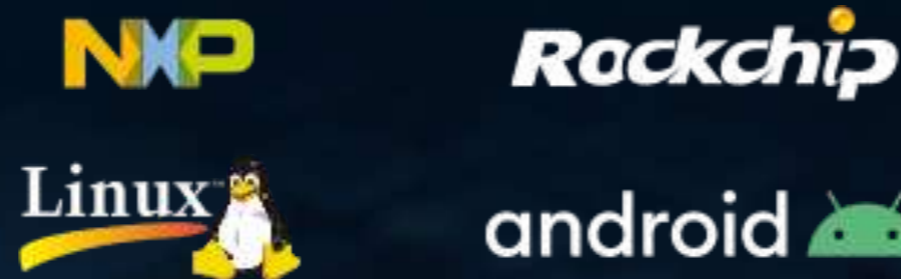
NVIDIA and AI Platforms



- Mission critical and public safety AI segments
- Powerful graphics and AI performance
- Supports NVIDIA AI SDK
- Integrated development ECO-partner system

NVIDIA Jetson Family

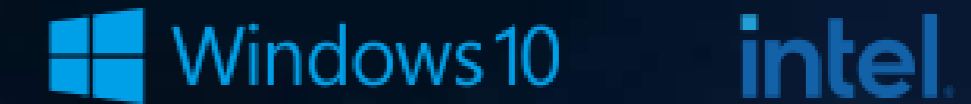
Linux and Android on ARM Platforms



- Supports Android OS
- 15-years longevity

NXP i.MX Series and Rockchip

Intel Platforms



- Optional MXM Graphics
- Support diverse mission critical I/O cards
- Windows 10 IoT LTSC

Tiger Lake/ Elkhart Lake/ Alder Lake

Modularized Design Quickens Sample Offerings

Our design concepts are modularized to...



Speed Up The Provision Of Samples

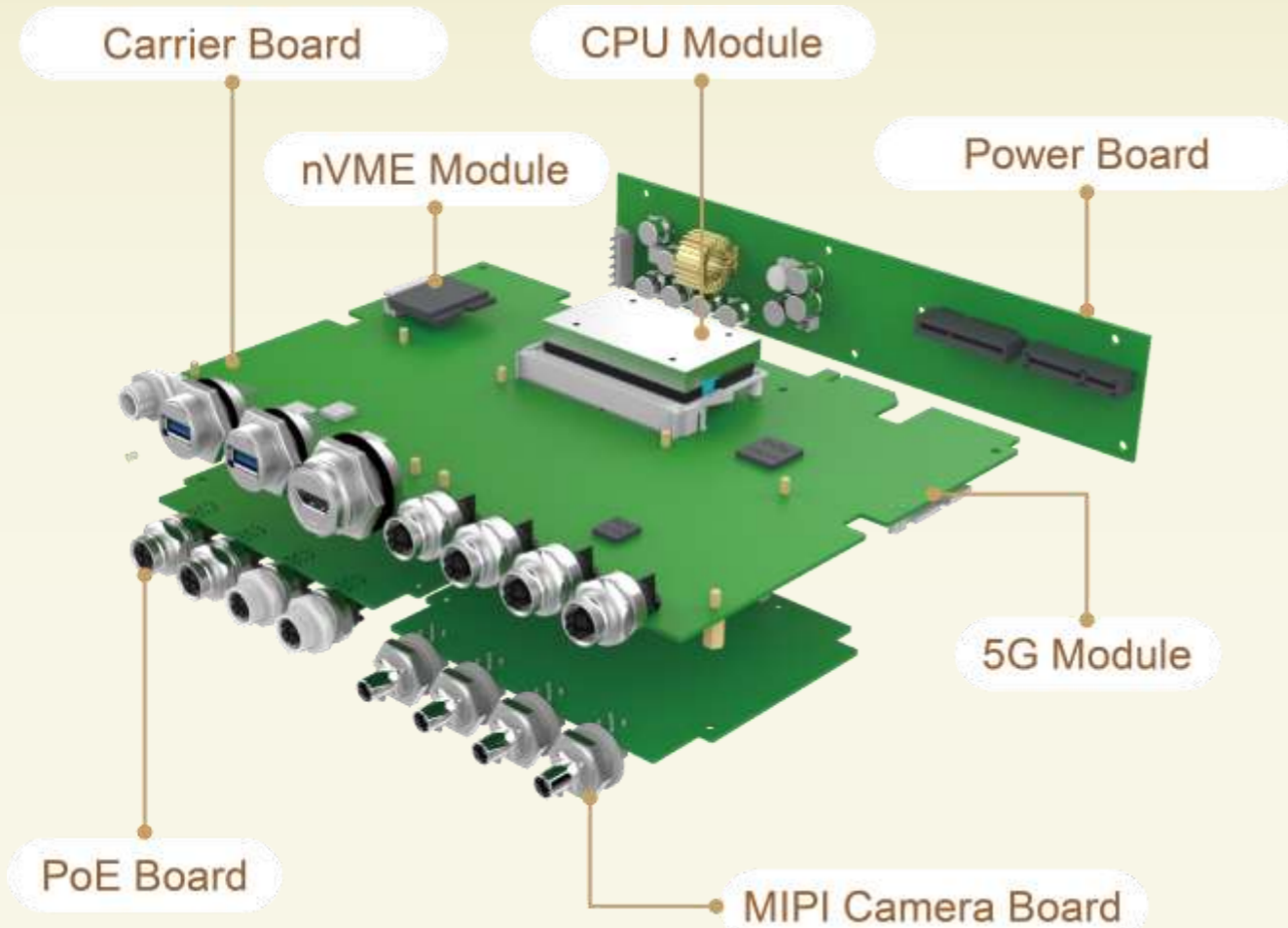


Shorten The Development Schedule

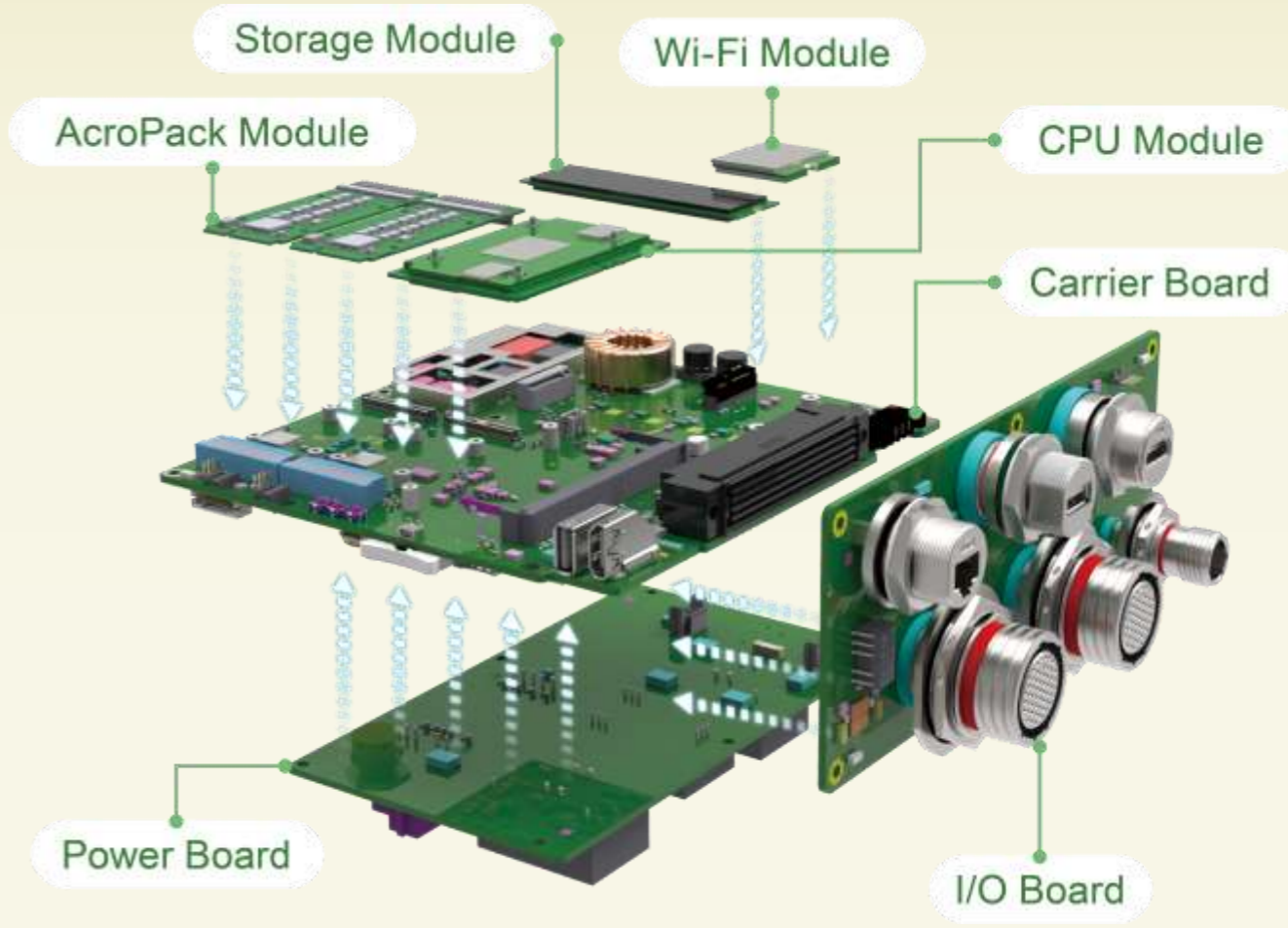


Increase Product Flexibility

Modularization Example 1 on RAS-N100



Modularization Example 2 on MIL-N100



Anti-Explosion Design for Special Field Usage

Some application scenarios - such as those found in gas stations and natural gas plants - require products with explosion-proof certifications. Accordingly, we specialize in the design of explosion-proof products and excel at material selection, EE, and ME design. We also have a team dedicated to helping products obtain relevant explosion-proof certifications.



EE Design

*Special Design Meets
Anti-Explosion Requirements*

Power Supply Selection

Hardware Mechanism Absorbs Extra Energy
to Prevent Heat and Spark Generation



Connector Selection

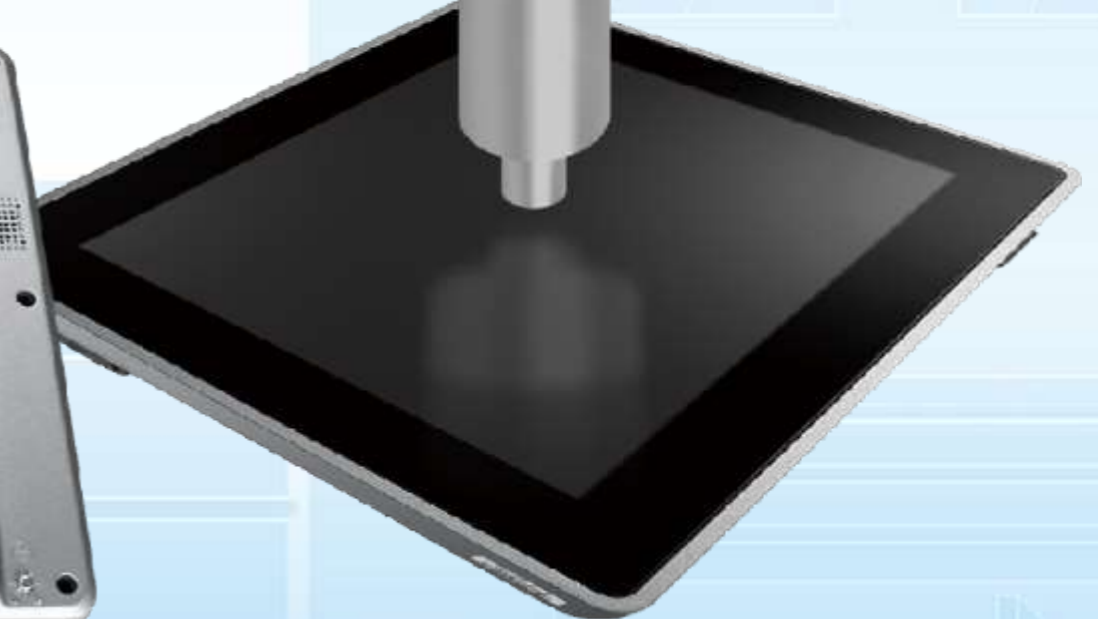
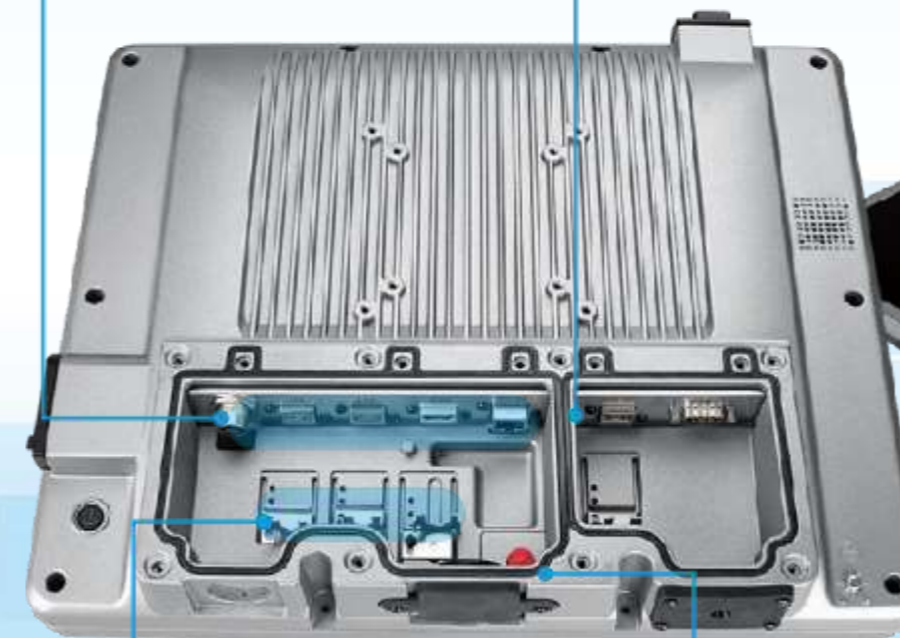
ME Design

*Special Design Meets
Anti-Explosion Requirements*

I/O Port Design

High-Energy I/O Isolation

Ball-Drop Test Requirements



Connector Locking Mechanism

Power-On Design

Cable Design



Military Standard (MIL-STD-810G) Endures Heavy Shock and Vibration

Mechanical design capabilities adhere to MIL-STD-810G standard.

Superior Resistance



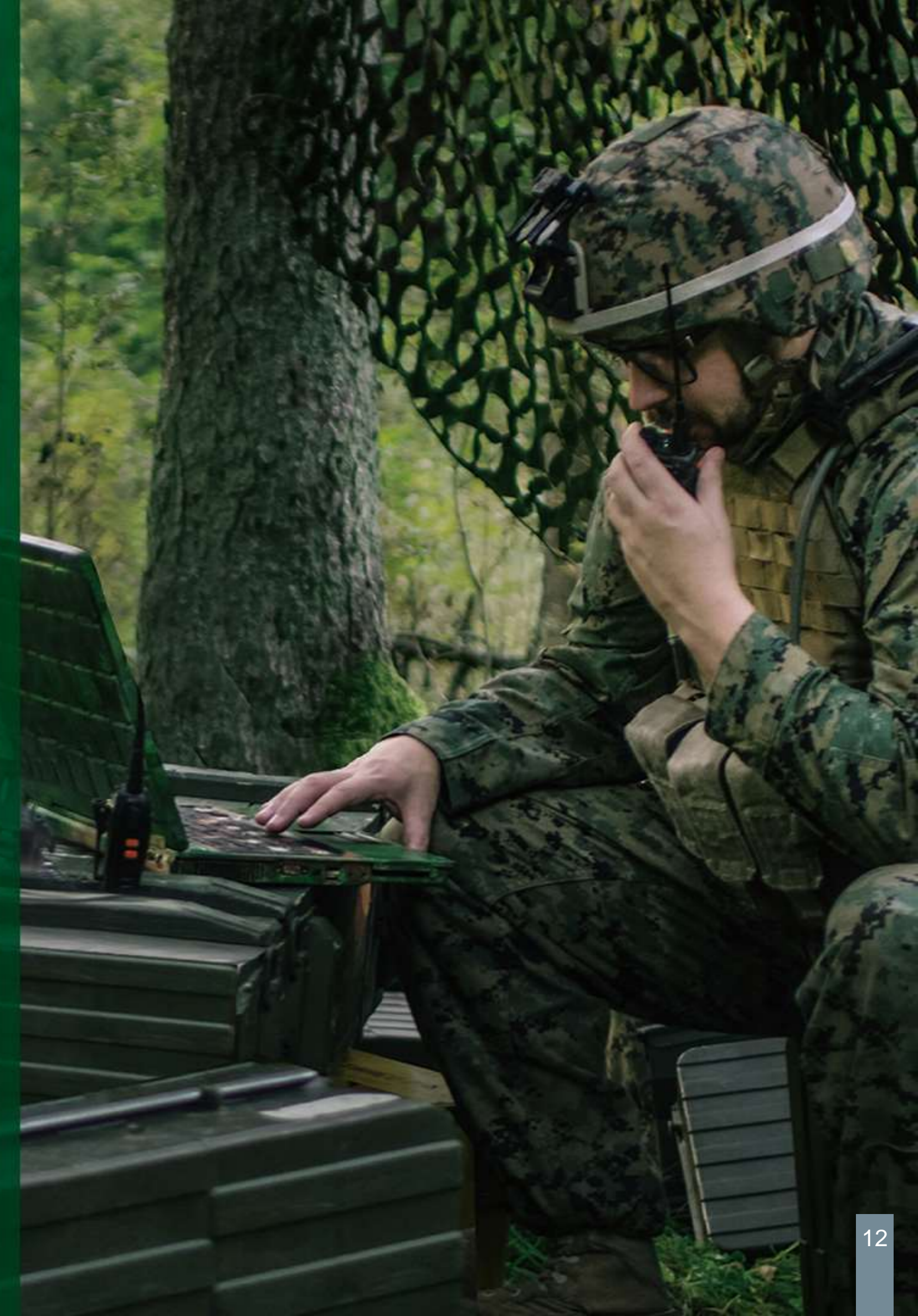
High/Low Humidity



Heavy Shock and Vibration

Advantech's internal lab can execute related test items

MIL-STD-810G Test Items	Test Methods
High-temperature operation test	MIL-STD-810G Method w/Change 1, 501.6 procedure I ~ III
Low-temperature operation test	MIL-STD-810G Method w/Change 1, 502.6 procedure I
High-temperature storage test	MIL-STD-810G Method w/Change 1, 501.6 procedure I ~ III
Low-temperature storage test	MIL-STD-810G Method w/Change 1, 502.6 procedure I
Humidity operation test	MIL-STD-810G Method w/Change 1, 507.6 procedure I
Humidity storage test	MIL-STD-810G Method w/Change 1, 507.6 procedure I
Humidity test (storage and op)	MIL-STD-810G Method w/Change 1, 507.6; Figure 507.6-7
Temperature shock test (non-operation)	MIL-STD-810G Method w/Change 1, 503.6; Figure 503.6-3
Temperature cycle test (op)	MIL-STD-810G Method w/Change 1, 503.6
Random vibration test (op or non-op)	MIL-STD-810G Method w/Change 1, Figure 514.7E-1
Shock test (op)	MIL-STD-810G Method w/Change 1, 516.7 procedure I



Dust and Water Proof Design for Harsh Environment Use



Our Design Capabilities
Adhere to IPx7 Standards

Test Criteria: 100 cm for 30 minutes

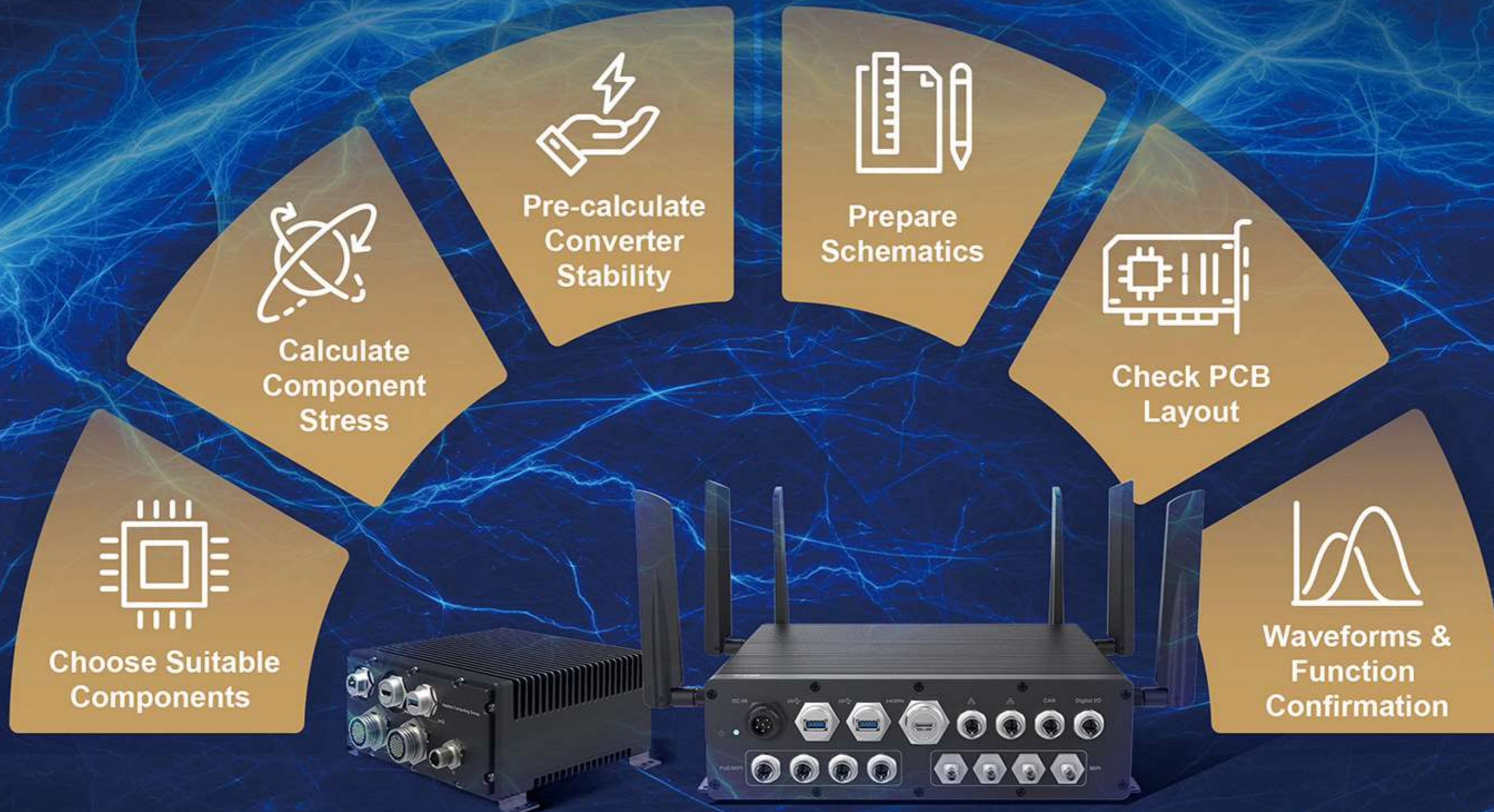


IP Protection Design and
Test Capabilities

- Resistant to high humidity and dust
- Advantech's internal lab can execute IP verification
- Advantech's factory also can verify IP protection

Extensive Voltage Adaptation for Different Vertical Requirements

Rugged applications need to comply with different input voltage ranges. Advantech DMS has a dedicated power R&D team and validation teams for dealing with different voltage requirements and measuring instruments. This ensures that the design meets the needs of customers' scenario-based applications.



Edge AI Rugged Computing Solutions for Public Safety



Extensive Power Design

- Specialized engineering, evaluation, and design for specific power requirements
- Dedicated power validation, engineering, and equipment guarantees power design quality

Cross-Platform Offering ARM to x86

- NVIDIA Jetson series
- Intel® x86 series
- NXP i.MX series
- Rockchip RK series

Modularization

- Customized I/O board, power board, and carrier board
- One-stop shop for diverse modules
- Quickly obtain supplies on demand

Dust and Waterproof

- IP6x protection design
- Specific and integrated equipment for validation

Rugged AI Public-Safety (RAS)

Based on AI and harsh environment requests, provides Quick and Up-to-Date solutions that meet worldwide national demand.

RAS-N100 System Specifications

RAS-N100 Orin NX Rugged Box Full System Specifications

NVIDIA Jetson Module	Processor	NVIDIA Jetson	Orin NX	
	Operating System	-	Linux Ubuntu 20.04	
	Memory	LPDDR4	16GB	
Storage		-	1 x 128GB 2242 NVMe SSD	
I/O	Network	LAN	6 x Modularization (Either one with MIPI camera module): 1 x Gigabit Ethernet (On carrier board); 4 x 802.3af Gigabit Ethernet for PoE cameras (On PoE Module)	
	USB	3.2 Gen 2	2 x	
(2 x Sides of Box PC)	Display Interface	HDMI 2.0	1 x	
	Serial	RS-232	1 x (Internal)	
	Others	CAN bus		2 x (Support CAN-FD)
		MIPI CSI		8 x with deserializer Modularization (Either one): • THine V-by-One • Maxim GMSL
		LED		1 x (power LED)
		Digital I/O		6x (4 x input and 2 x output)
		Speaker		1 x 2W (waterproof)
		I2C		1 x (internal pin headers)
		5G	-	5G SIM slot on module for North American
		Wi-Fi/ BT	-	Wi-Fi 6 and BT5.0
GNSS	-	GPS		
System Power	Power Input	Power Adapter	9 ~ 45V	
		Power Design	Modularization based on different power requirement	
		RTC Battery	1 x	
System Outline	Mechanical	Dimensions (W x L x H)	220 x 275 x 80 mm	
	Operating Temp.	-	-25 ~ 50 °C with air flow	
Environment	IP Rating	-	IP65	
	Shock/ Vibration	-	MIL-STD-810G	



Use Case

AI Rugged Box PC

Public Safety - Security and Protection



High-Performance Connectivity

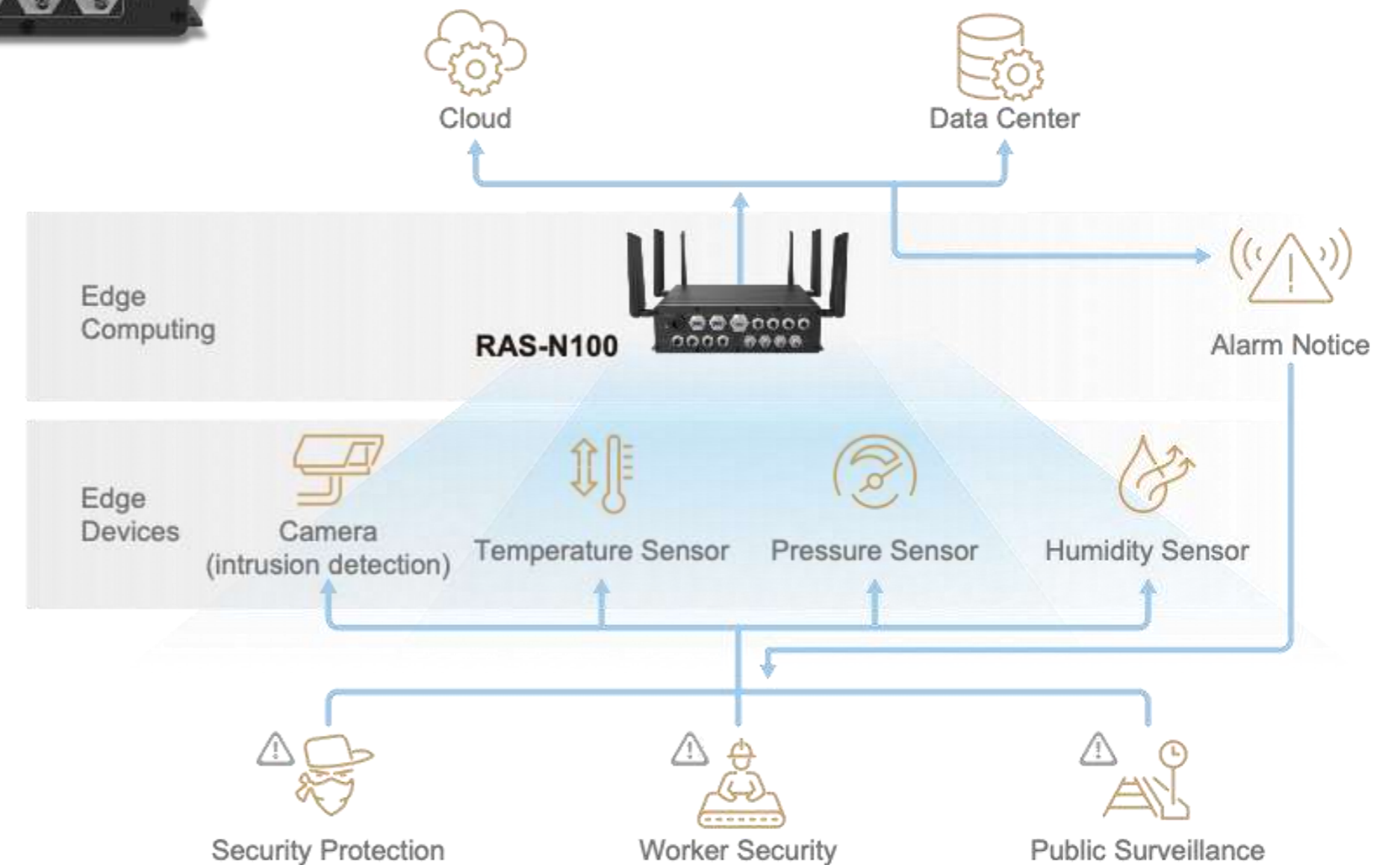


Key Design Features

- IP65
- Fanless design
- MIL-STD-810G
- 8 x MIPI cameras
- 4 x PoE cameras

As A Major Designer, We Provide:

- CPU solution proposal for selection
- Thermal simulation for design assessment
- Full system custom ID and tooling
- Flexible modularized design



Use Case

AI Rugged Box PC

Smart Agriculture - Seeding and Harvest Management



High-Performance Connectivity



Wi-Fi



5G



GNSS

Key Design Features

- IP65
- Fanless design
- MIL-STD-810G
- 8 x MIPI cameras
- 4 x PoE cameras

As A Major Designer, We Provide:

- CPU solution proposals for selection
- Thermal simulations for design assessment
- Rugged IP-rated designs
- Flexible and modularized solutions for different functions and power requirements

Benefit

- Reduces the crop waste left in the field
- AI computer vision can identify harvest readiness and ensure a disease-free crop
- Implement cameras and NVIDIA platform with autonomous robots to sow seeds and harvest huge volumes of crops

Farmers use RF to receive notifications or control machines



Cameras that take crop or environment pictures



RAS-N100

CAN Bus is used to control harvest and seeding machines

Use Case

AI Rugged Box PC

Smart Agriculture - Disease/Pest Diagnosis and Management



High-Performance Connectivity



Wi-Fi



5G



GNSS

Benefit

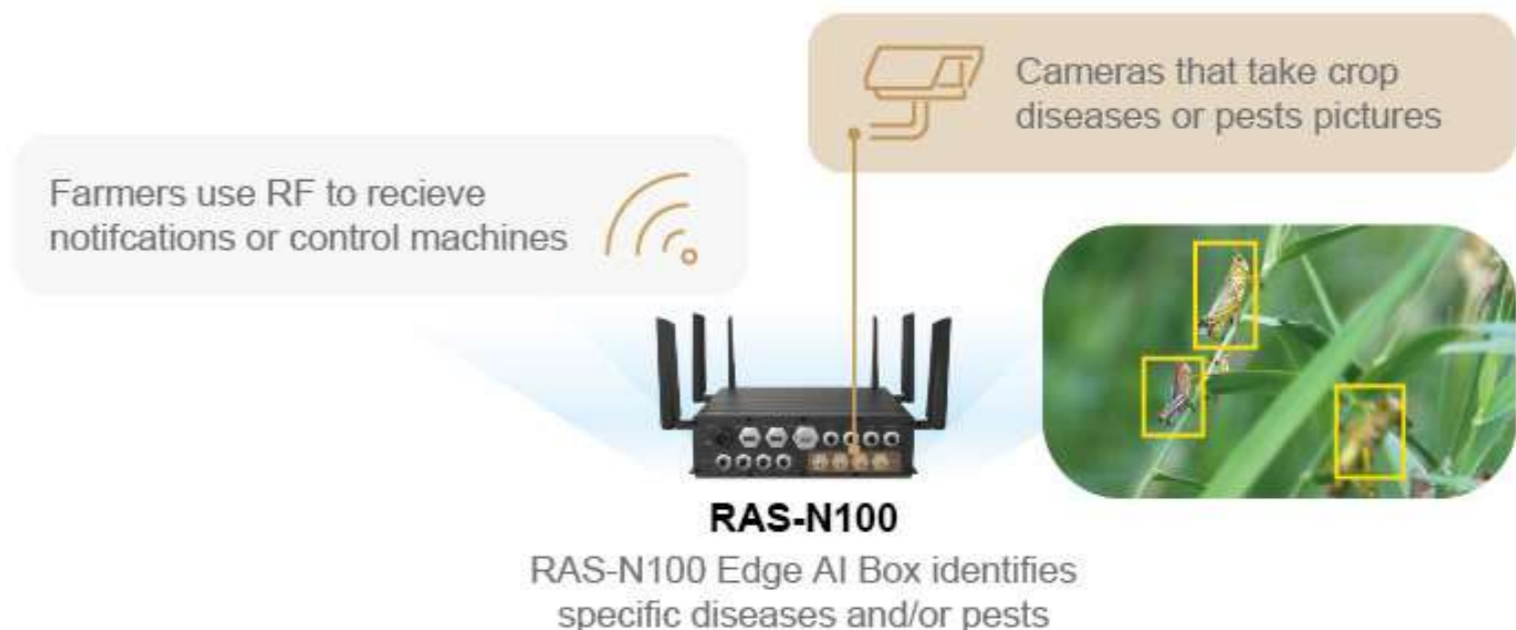
- AI solution helps farmers predict and identify plant diseases/pests and notifies farmers via an alarms
- Notifications can be delivered to farmers when the diseases/pests are located
- Farmers can prevent diseases/pests and reduce the crop loss. They can reduce the chance of spread and improve quality control.

Key Design Features

- IP65
- Fanless design
- MIL-STD-810G
- 8 x MIPI cameras
- 4 x PoE cameras

As A Major Designer, We Provide:

- CPU solution selection proposals
- Thermal simulations for design assessment
- Integrated NVIDIA AI ecosystems
- Flexible and modularized designs for different camera solutions



Use Case

AI Rugged Box PC

Smart Agriculture - Intelligence Spraying Management



High-Performance Connectivity



Wi-Fi



5G



GNSS

Key Design Features

- IP65
- Fanless design
- MIL-STD-810G
- 8 x MIPI cameras
- 4 x PoE cameras

As A Major Designer, We Provide:

- CPU solution selection proposals
- Rugged IP-rated designs
- Integrated NVIDIA AI ecosystems
- Flexible and modularized designs for different power requirements

Benefit

- Using computer vision, AI solutions help farmers spray while controlling the volume and timing of herbicides/insecticide
- Farmers can save more money on herbicides and/or insecticide
- End customers can buy crops with less pesticide residues

Farmers use RF to receive notifications or control machines



Cameras that take plant or environment pictures



RAS-N100
RAS-N100 processes pictures and/or sensor data

CAN Bus is used to control chemical spraying machines

Use Case

AI Rugged Box PC

Smart Agriculture - Intelligence Spraying Management



High-Performance Connectivity



Wi-Fi



5G



GNSS

Key Design Features

- IP65
- Fanless design
- MIL-STD-810G
- 8 x MIPI cameras
- 4 x PoE cameras

As A Major Designer, We Provide:

- CPU solution selection proposals
- Rugged IP-rated design for use in harsh environments
- Integrated NVIDIA AI ecosystems
- Flexible and modularized designs for different camera interfaces

Benefit

Automatic detection reduces the cost of human resources and improves worker safety:

- Flight pest Animals — such as birds — to prevent unexpected damage
- Review wind turbine statuses

RAS-N100 also sends alarms to wind turbine managers



Long Range Surveillance Cameras identify intrusion around wind turbines



RAS-N100

RAS-N100 processes pictures and controls wind turbines



Use Case

Rugged AI Anti-Explosion Panel PC

Painting-Mix Rooms - Explosion Proof Solution



Design for Anti-Explosion Certified

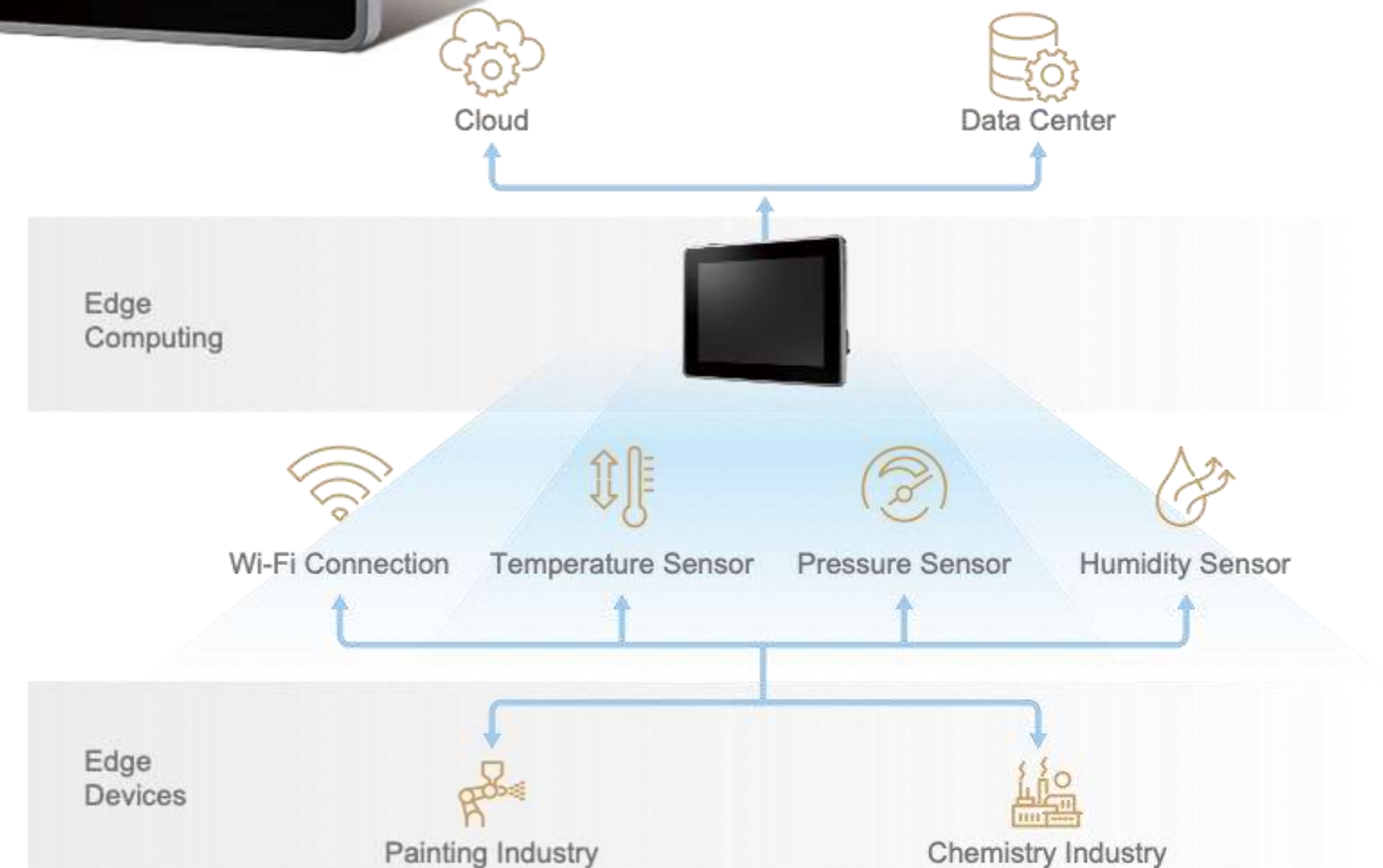


Key Design Features

- IP64
- PCAP touchscreen with four point multi-touch
- Die-cast aluminum housing
- Special mechanism to secure I/O cables to prevent loosening and sparks
- Unique power button design to keeps rear cover properly assembled

As A Major Designer, We Provide:

- CPU and LCD solution proposal for selection
- CAE simulation for mechanical structure assessment
- Thermal simulation for design assessment
- Full system custom ID and tooling



Tailored Mission Critical Computing Solutions



Mission Critical By Request

Providing quick, modern solutions for defense manufacturers that are tough enough to get the job done.



MIL-N100

High Performance

Compact Size & Lightweight Design

Modular Design



Extensive Voltage Adaptation

28V with tolerance from +12VDC to +40VDC continuous (+50VDC transient)



IP67

Ingress protection: protection against temporary immersion and dust



Robust Design

Metal chassis and external I/O cables for hazardous environments



Military Standard

MIL-STD-810G, MIL-STD-1275E*, MIL-STD-461G*, VITA75.20
* By Request



Wide Working Temp.

Fanless operating temp:
-25°C ~ 70°C



Comprehensive Platforms

NVIDIA. intel.

MIL-N100 System Specifications

MIL-N100 Full System Specifications

NVIDIA Jetson Modules	Processor	NVIDIA Jetson	NX (384-core NVIDIA Volta™ GPU, 21 TOPS (Max)) Nano (128 Core Maxwell, 0.5 TFLOPs (FP16))	
	OS	-	Linux Ubuntu 18.04	
	Memory	LPDDR4	8GB (Nano: 4GB LPDDR4)	
	Storage	eMMC	16GB	
External Front Panel Output	Network	LAN	2 x (10/100/1000) (Nano: LAN 10/100/1000 x1)	
	USB	2	2 x	
	USB	3.1 (Gen 2)	1 x (Nano: Gen1)	
	Display	HDMI	1 x	
	GPIO	-	8 x	
	Serial	RS-232		1 x (2 x wires for debug)
		RS-232/422/485		2 x
	Others	I2C		1 x
		Power Button		1 x
		CAN bus		1 x (Nano: w/o CAN bus)
		Audio Line-in/out		1 x
		TPM		2
		AcroPack Output		1 x set Analog Output
	Power	-		1 x set Digital Output
		Power Adapter		+12Vdc to +40Vdc continuous (+50Vdc transient), MIL-STD-1275E/704F, Typical 28V
	Expansion	I/O Slot	RTC Battery	1 x
			mini-PCIe	2 x (For AcroPack module)
M.2			2 x (Key E and Key M)	
System Outline	Mechanical	MicroSD	1 x	
		Dimensions (W x L x H)	203 x 203 x 97 mm (Meet VITA75.20)	
Environment	Operating Temperature	-	-25 ~ 70 °C	
Military Standard	Environment	-	MIL-STD-810G, DO-160*	
	EMC/Safety	-	MIL-STD-461G*	
	Power	-	MIL-STD-1275E*, MIL-STD-704F*	



AI Box PC

Mission Critical - In-Vehicle Applications and Ground Stations



Military Standard Compliance



- MIL-STD-810G
- VITA75.20

- MIL-STD-1275E*
- MIL-STD-461G*

* By Request

Key Design Features

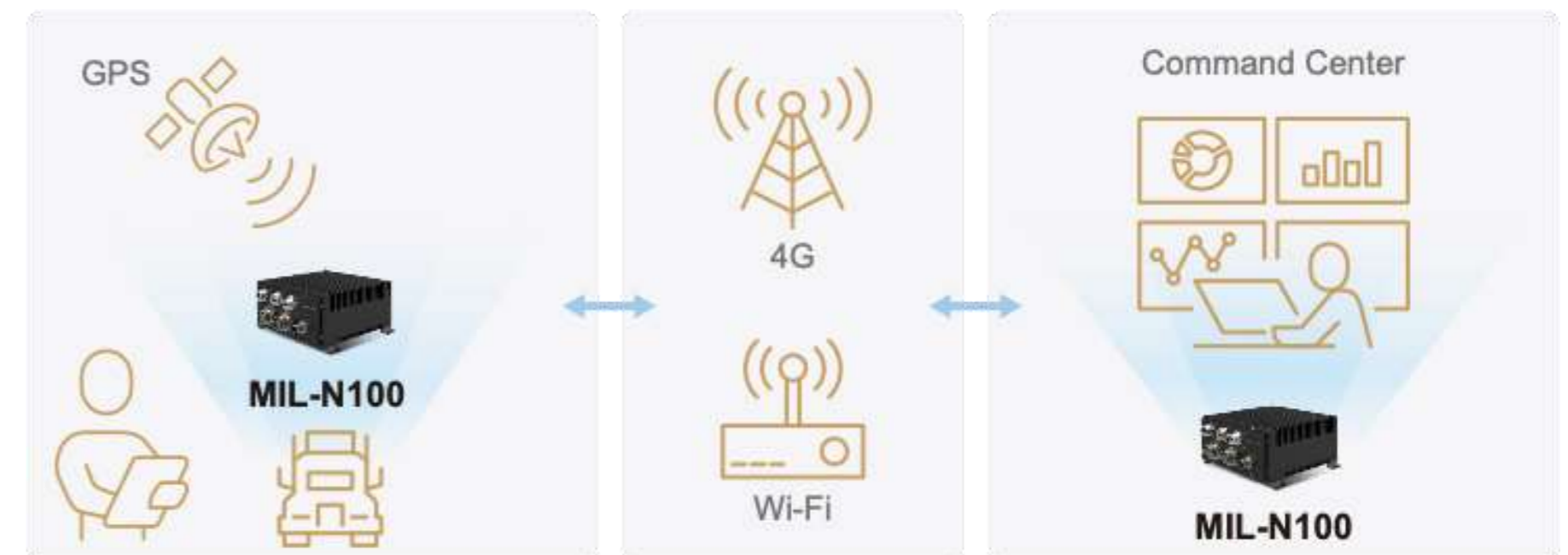
- IP67
- Extensive voltage adaptability
- Supports 2 x different AcroPack modules

As A Major Designer, We Provide:

- Extensive voltage adaptability
- Supports 2 x different AcroPack modules
- IP67

Unmanned Vehicles

- AI computation on NVIDIA Jetson Xavier or Orin modules
- Communication through optional Wi-Fi
- HW monitor through serial ports, GPIO, and CAN-Bus
- Optical reconnaissance through MIPI cameras or PoE cameras



Use Case

Modular Design

AI Applications - Intelligent Edge Devices/ Drones



Military Standard Compliance



- MIL-STD-704* and MIL-STD-1275E* power supply
- MIL-STD-810G

* By Request

Unmanned Vehicles

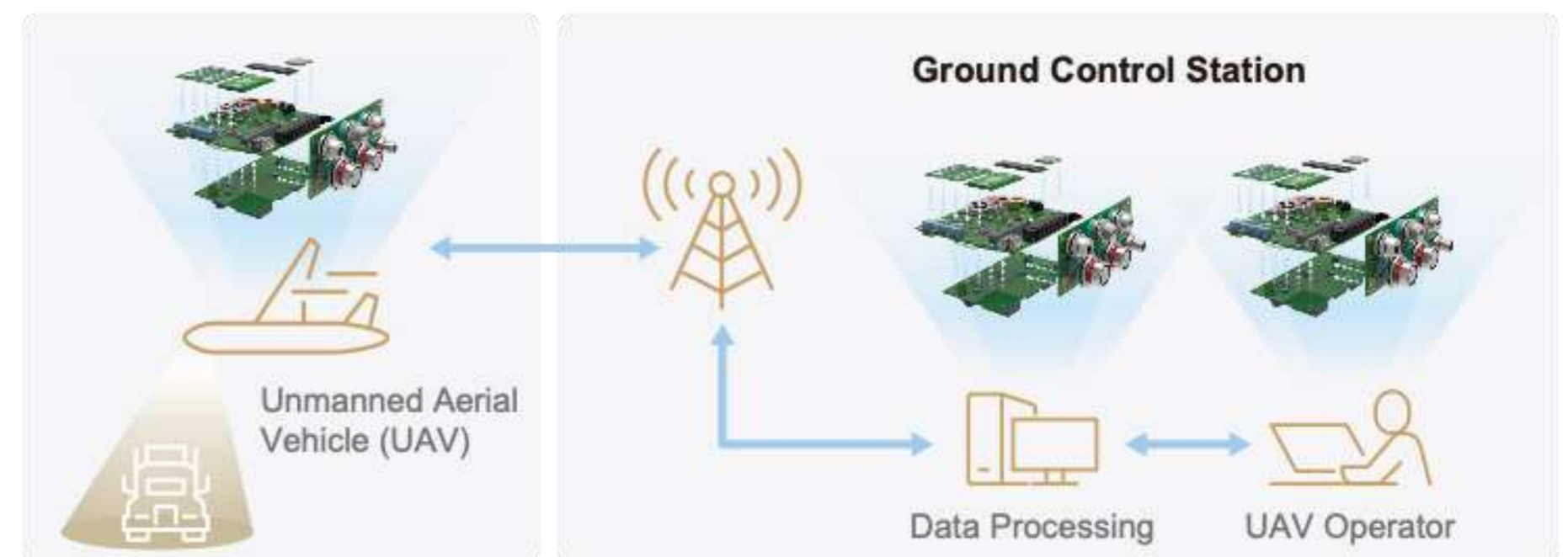
- AI computation on NVIDIA Jetson Xavier or Orin modules
- Communication through optional Wi-Fi
- HW monitor through serial ports, GPIO, and CAN-Bus
- Optical reconnaissance through MIPI cameras or PoE cameras

Key Design Features

- IP67
- Fan-less design
- Extensive voltage adaptability
- 12 x lanes MIPI CSI-2 camera inputs
- Compact size: 193 x 79 x 260 mm

As A Major Designer, We Provide:

- Motherboard customization and flexibility, power, and I/O design
- Thermal simulation for design assessment



Advantech Applied Computing Group

DMS - Panel Computing and Tablet

Global Contact Windows

Headquarters

Taiwan
886-2-2792-7818

Clement Wu
Ryan Chang
Harvey Chang

Clement.Wu@advantech.com.tw
RyanCS.Chang@advantech.com.tw
Harvey.Chang@advantech.com.tw

Ext. 9567
Ext. 2217
Ext. 9233

Regional Offices

USA

Irvine, CA
1-949-420-2500

Japan

Nohgata
81-949-22-2890

Germany

Munich
49-89-12599-0

China

Kunshan
86-512-5777-5666

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com

Please verify specifications before ordering. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, electronic, photocopying, recording or otherwise, without the prior written permission of the publisher. without prior written permission of the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2023



Visit Our Website
8600000613