2021

Integrated Factory Solution

Developing and Perfecting Your Own Factory

iEi

intel
partner
Titanium

IEI Integrated Factory Automation Solution

Developing and Perfecting Your Own Factory

IEI's integrated factory solution improves the production efficiency and warehouse management accuracy. To catch the wave of automatic assembly, robot system will be a major role along with the machine vision and motion control solutions. For factory automation control terminals, IEI offers industrial computing solutions with robust IP65 design, wide temperature, and flexible add-on card expansion. To elevate the efficiency of warehouse management, IEI provides UHF RFID and 1D/2D barcode reader solutions with various form factors.

● Intelligent Energy Management

IEI industrial machines can immediately transmit essential operating data — including energy consumption and status. This adds a continuous stream of useful data for plant managers and industrial engineers that can be mined across a facility's machines to detect key trends and worrisome failures. In other words, vital micro machine data gets aggregated into a valuable macro view of a facility.

● Warehouse Management System

One big trend in the future is the introduction of "transport systems" in the warehouse. The autonomous vehicles which can sense their surroundings independently using laser scanners, infrared sensors, and RFID chips, and navigate to their respective destinations autonomously.

The autonomous vehicles (autonomous transport robots) can travel on a track, form the basic elements of the solution. The panel PC, mobile computer and embedded computers form the entire control system.
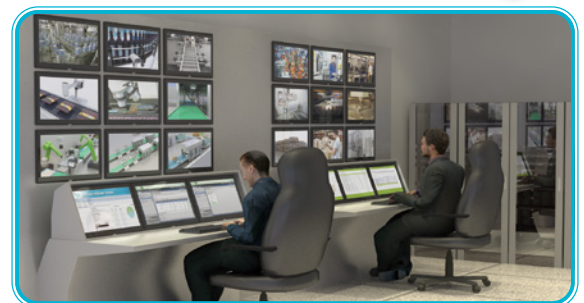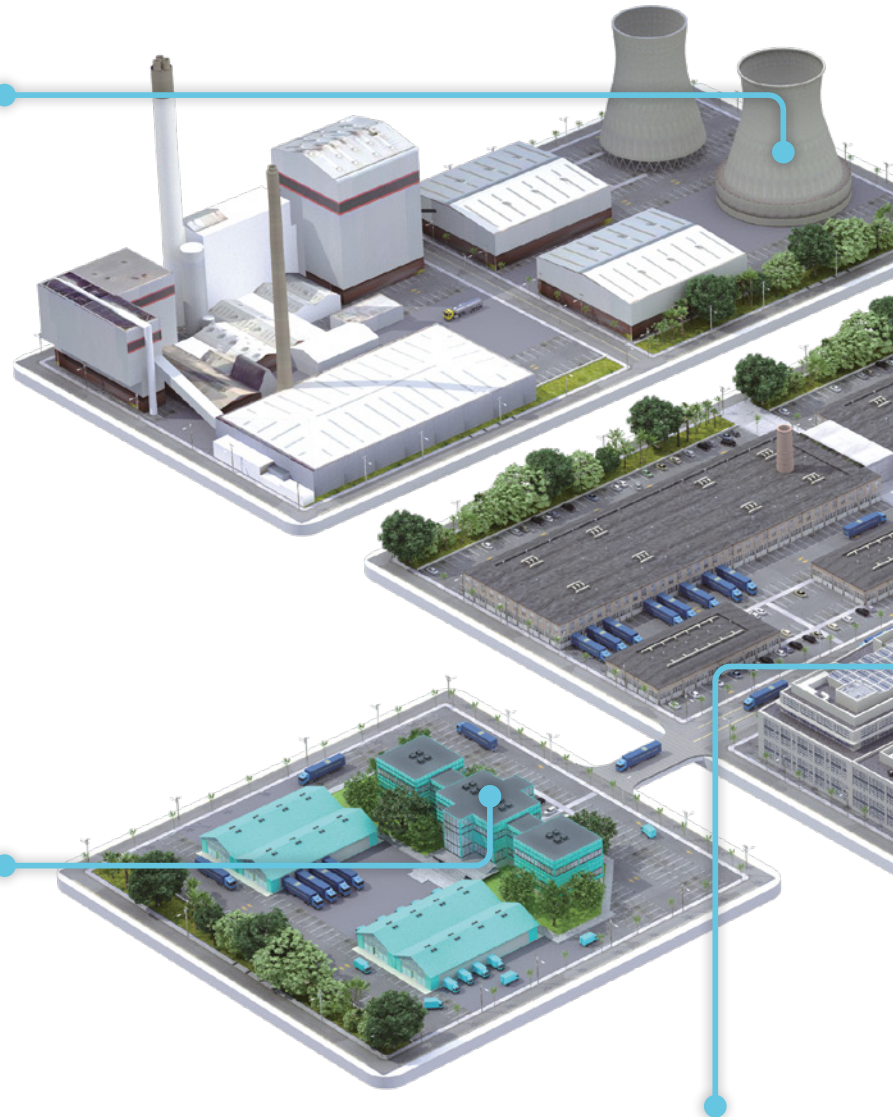
● MES/NAS
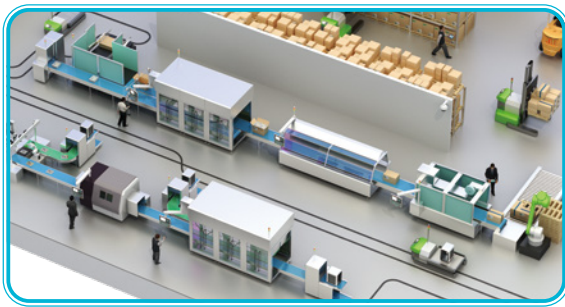
Automatic Manufacturing Solution

Currently, the manufacturing industry is moving towards the goal of Industry 4.0-Smart Factory. From IT to OT, IEI provides a complete IIoT solution to assist customers in digital transformation and enhance market competitiveness.

Machine Vision Solution

Machine vision is the process of applying a range of technologies and methods to provide imaging-based automatic inspection, process control, robot guidance and more.

AI Inference Solution

Artificial intelligence, AI, is changing our lives from the past to the future. The TANK AIoT Dev. Kit and FLEX AIoT Dev. Kit feature rich I/O and multiple PCIe x8 signals to support add-ons like the acceleration cards (Mustang-F100-A10 & Mustang-V100-MX8) or the PoE (IPCIE-4POE) to enhance performance and function for various applications, such as facial recognition, behavior recognition, machine vision and learning quality control, vision inspection, and edge computing
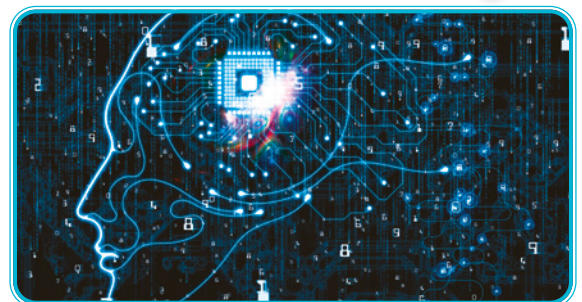
Warehouse Management System (WMS)

Material input/output management and examination are the duty of a warehouse. As quantity inconsistency is the most common problem in handwritten vouchers, personnel will be unable to capture the exact quantity of material input, shipping, and stock and implement first in first out (FIFO) control. Even worse, personnel will need to spend more time on finding raw materials, and can not trace incoming materials effectively. IEI thus introduces Warehouse Management System (WMS) to provide convenient and traceable management through cloud computing. The benefits of the WMS include:

● Ensure traceability for raw material input and product shipping.

● Shorten material selection and shipping time.

● Enhance warehouse management efficiency and accuracy.

● Ensure real-time warehouse information.

● Minimize customer complaints from man-induced mistakes.

● Enable real-time capture of fleet status and enhance vehicle dispatch flexibility.

● Smart Warehouse Management Solutions

Deliveryman can scan the delivery receipt through the barcode reader to upload goods data back to the goods management system for instant update.

MODAT Series

AFL3-12A Panel PC

The warehouse personnel can use the barcode reader to scan barcodes of stock-ins and stock-outs information then upload the stock data to the inventory management system for instant update.

The AFL3/INOX/PPC-F/UPC panel PCs support wide-range operating temperature so that they can be deployed in any high- or low-temperature warehouses.
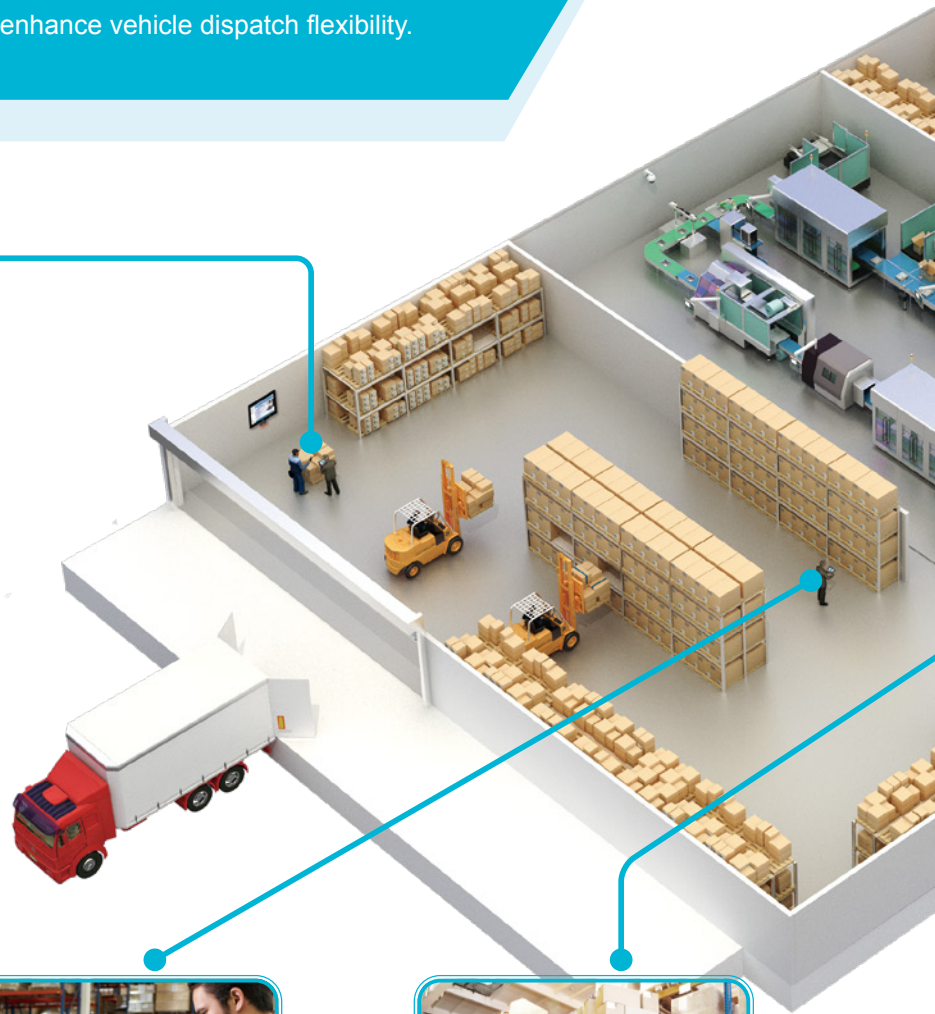
Fleet Logistics Applications

Fleet management and dispatching efficiency can be improved by taking the advantages of the 3G connection of the IKARPC and AFOKAR panel PC to send real-time information to the dispatching center for confirming vehicle locations (GPS) and driving conditions (OBD-II). The IVS series in-vehicle computer is designed with reliable performance for harsh environments. Rich I/O ports are provided to connect with multiple peripheral devices in vehicle for different applications.

IKARPC-W10A   AFOKAR-08A   IVS-110

QNAP NAS
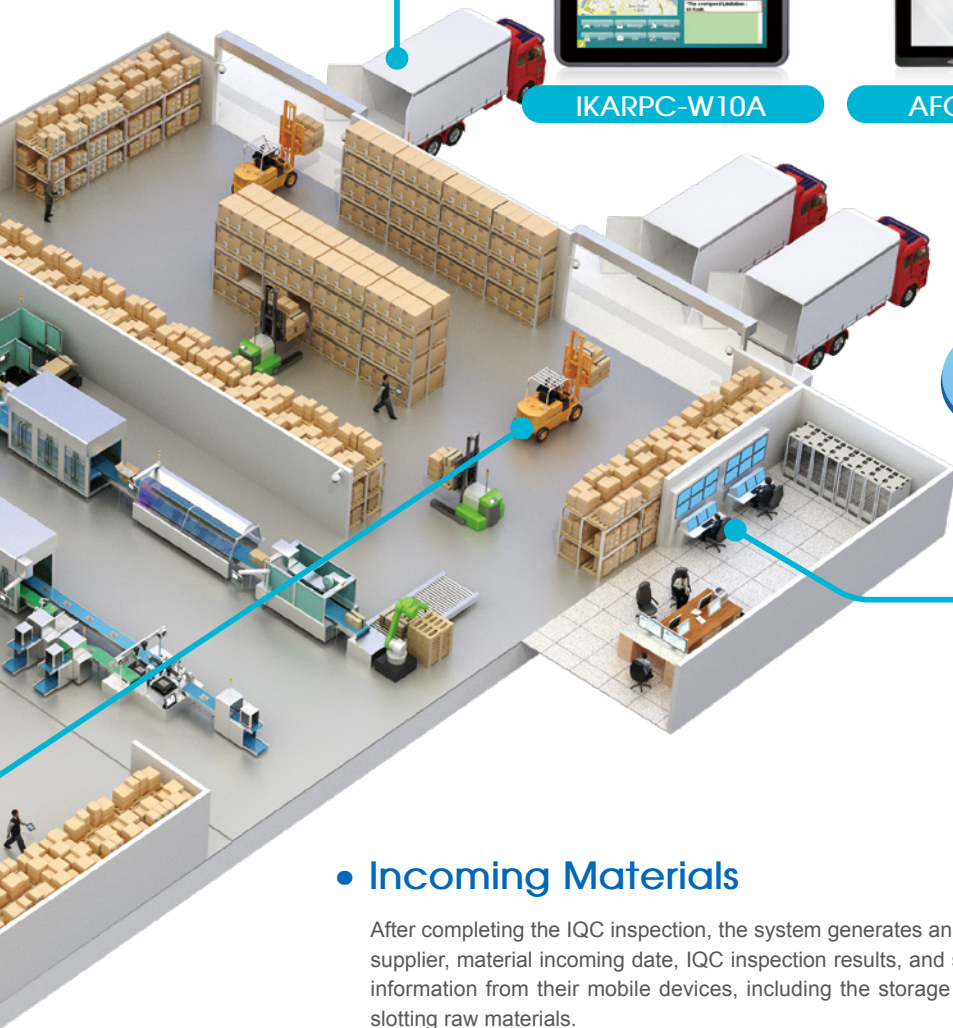
Incoming Materials

After completing the IQC inspection, the system generates an ID for raw materials. This ID enables users to trace the supplier, material incoming date, IQC inspection results, and supplier lot number. Warehouse personnel can retrieve information from their mobile devices, including the storage lot of raw materials and route instruction, to facilitate slotting raw materials.

Shipping Activities

Mobile devices provide picking personnel shipping list to manage picking by picking sequence, by picking route, and by FIFO. When shipping products with pallets, mobile devices will collect the product ID on the shelve using RFID technology to record the shipping order and transportation information.

IRIS™
IPMI 2.0 Compliant

UPC   AFL3 Panel PC   PPC-F Series

Warehouse Management

• Receiving/Dispatching Materials

• Receiving

Handheld device application: After receiving goods and signing on the delivery man's handheld device, the cloud-based inventory management system will be updated in real time.

• Receiving/Dispatching

» AFL3/PPC-F series with barcode reader can be used to scan the barcode of the incoming/outgoing package

» Data can be uploaded to the cloud immediately

MODAT Series

**Receiving/
Dispatching Materials**

**QNAP NAS
Logistics Data Center**

**Order
Picking**

AFL3-12A

PPC-F Series

• Warehouse Management: Inbound/Outbound

● Automation system for scanning incoming/outgoing goods

● Warehouse security monitoring

Outbound Management

**QNAP NAS
Logistics Data Center**

UPC
● Forklift application
● Waterproof and vibration resistant

Industrial Barcode Reader

Industrial Vision Camera

IVS-110

**Route instruction
Material slotting**

**Materials delivered
by suppliers**
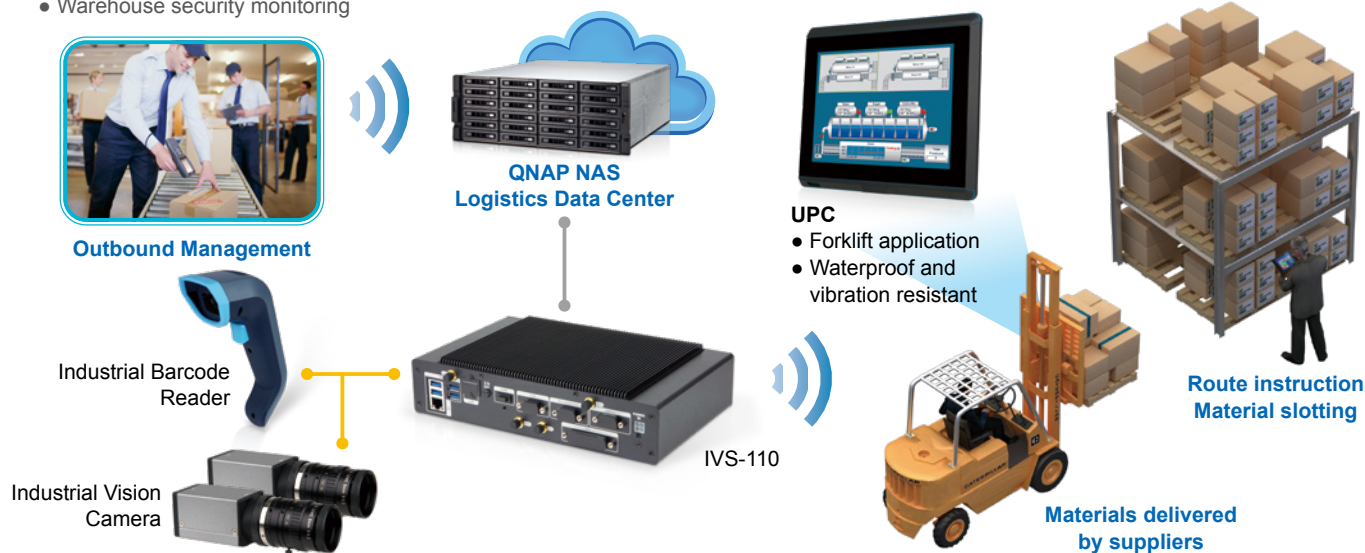
• Fleet Management

● GPS for vehicle tracking
● OBD-II interface for vehicle diagnosis
● 3G/4G capability for data transmission

Remote Management

GPS

3G/4G

**Management
Center**

**Server-Side
Software**

IKARPC-W10A

AFOKAR-08A

IVS-110-AL

MES

• MES Software System Solution

Most manufacturing industries require a lot of labor work in production, production line and equipment management, and production data collection. While modern manufacture-based enterprises need to face land acquisition difficulty, labor cost rise, and labor recruitment difficulty, new employees who are not familiar with production operation will increase defect rate. How to implement effective control has become a real problem to many manufacture-based enterprises.

• Advantages of smart solutions

» Enable process management and optimization. Increase product tractability.

» Provide production scheduling and effective management for production quantity.

» Provide electronic SOPs to enhance product yield rate.

» Ensure equipment management and integration for effective labor hour management and equipment availability.

» Implement automation to reduce labor costs and stabilize production rhythm.

• Smart operation

» ID creation: After IQC inspections, an ID (barcode or RFID) is assigned to the material to accelerate information collection and accuracy in the production process.

» Information analysis: Production data is digitized for production scheduling and management to generate real-time data regarding schedule accomplishment rate, quality report, and production.

» Automatic material replenishment: Materials are fed to each station by means of the AGV system to reduce storage space on the production line.

» Electronic SOP: Provide clear and correct SOPs to each station to ensure the correct version is in place.

» Equipment monitoring: Integrate data of production equipment, monitor equipment status, and provide equipment parameters.

» Robotic arm: Assists in routine handling operation and stabilize production pace.

» Quality management: Measure product quality after production and manage product quality analysis.

• Production record

Products are effectively recorded during production with traceability to their in-process quality analysis, installed parts and components, suppliers and customers, and transportation methods.

System Framework

ERP

Other IT Systems

Data Interface

MES

Work Order Management

Work order management, BOM management

Production Management

Data collection, key part binding, technical process verification, production progress monitoring, production record.

Quality Control

Non-conforming product collection and quality analysis

Report Platform

WIP status report, traceability report production

RFID ID creation

Information analysis

Automatic replenishment

Equipment monitoring

Quality management

Electronic SOP

Robotic arm
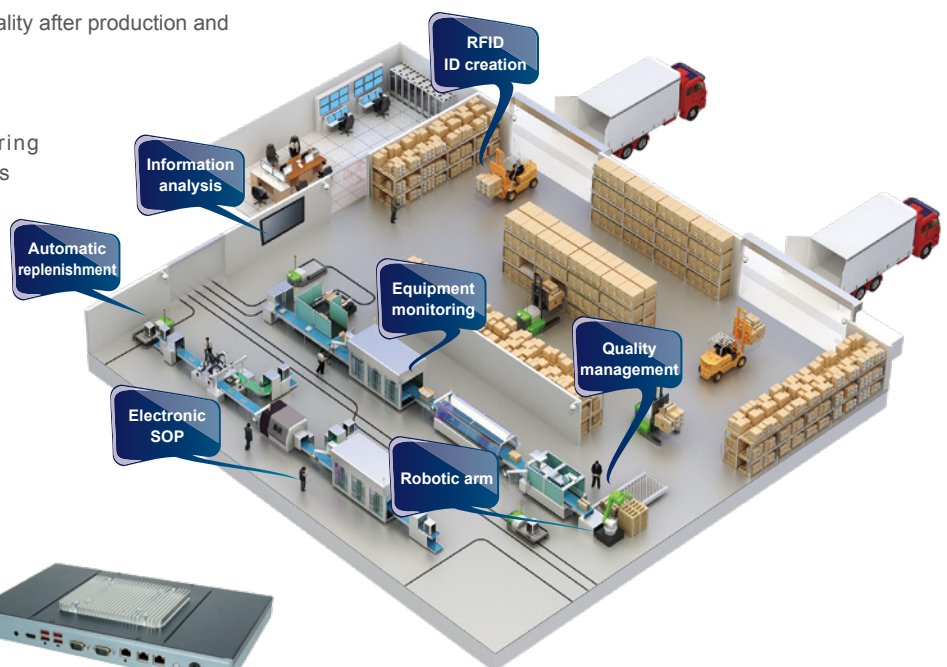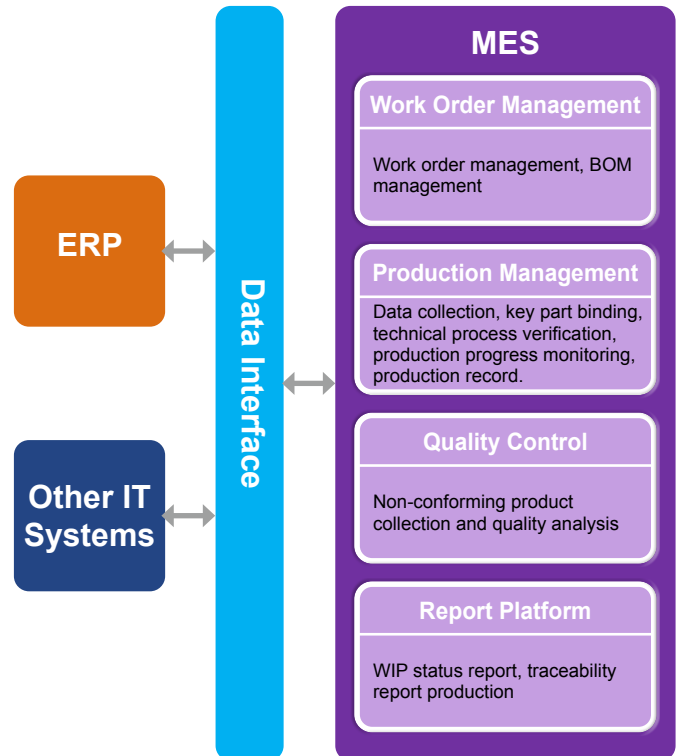
• Product Selection

» TANK-800 & FLEX-BX100 Series

TANK-800 series
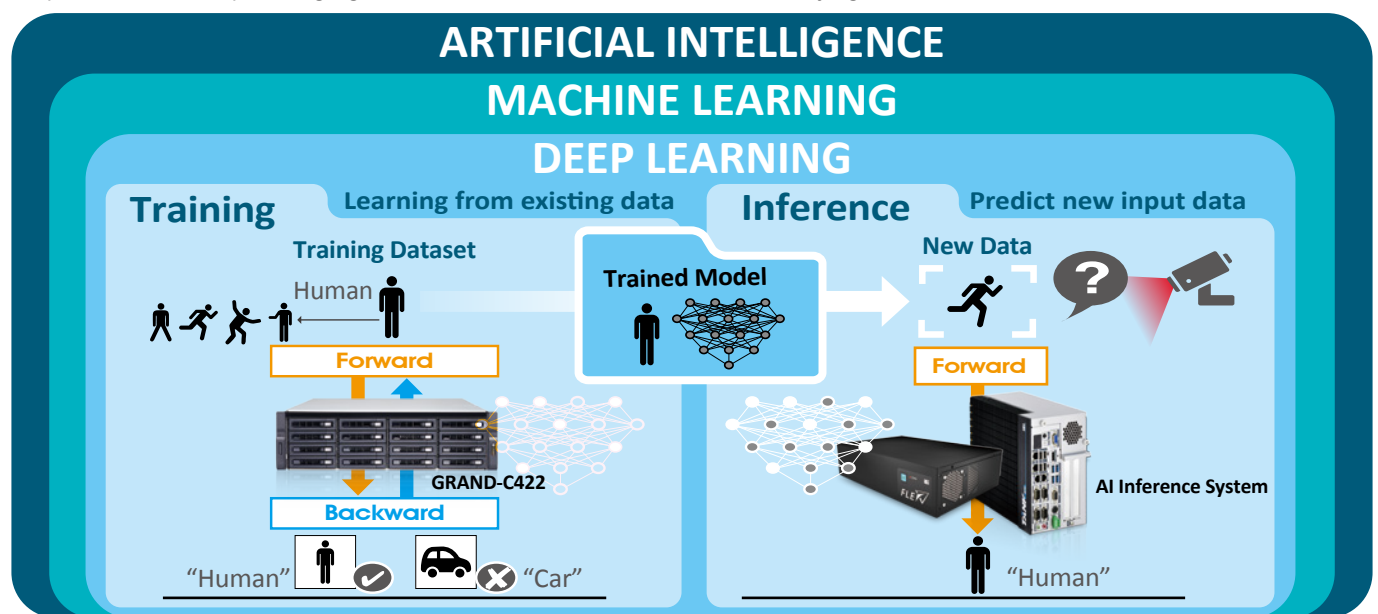
FLEX-BX100 Series

• Applications

» Industry Workstation

AI Inference System in Smart Factory

Artificial Intelligence, AI, is changing our lives from the past to the future. It enables machine learning by using a variety of training models to simulate and infer the status or appearance of objects. Vision Analytics on the factory floor adds intelligence to factories design and process. Today's technologies automate the collection, storage, retrieval, and decision making across multiple factories and factory sub-systems at the edge.
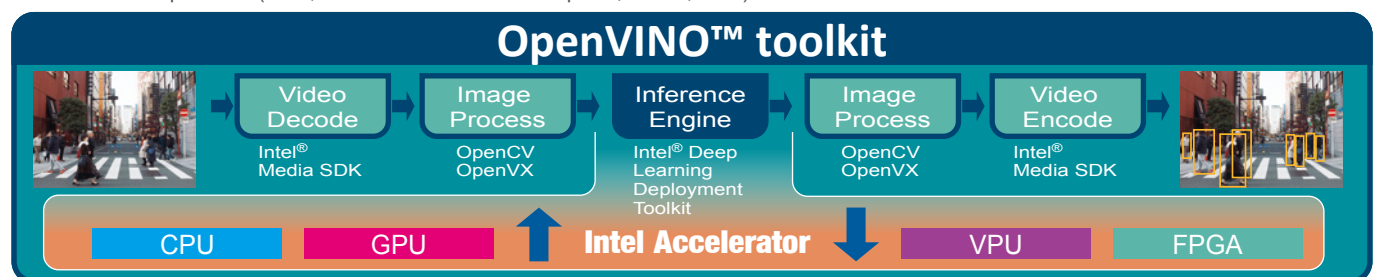
Deep Learning and Inference

Deep learning is part of the machine learning method. It allows computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction. Deep neural network and recurrent neural network architectures have been used in applications such as object recognition, object detection, feature segmentation, text-to-speech, speech-to-text, translation, etc. In some cases the performance of deep learning algorithms can be even more accurate than human judgement.

ARTIFICIAL INTELLIGENCE
MACHINE LEARNING
DEEP LEARNING

Training — Learning from existing data
Training Dataset
Human
Forward
Backward
GRAND-C422
"Human" ✓ "Car" ✗

Inference — Predict new input data
New Data
Trained Model
Forward
AI Inference System
"Human"

• Intel® Distribution of OpenVINO™ toolkit

Intel® Distribution of OpenVINO™ toolkit is based on convolutional neural networks (CNN), the toolkit extends workloads across multiple types of Intel® platforms and maximizes performance.

It can optimize pre-trained deep learning models such as Caffe, MXNET, and Tensorflow. The tool suite includes more than 20 pre-trained models, and supports 100+ public and custom models (includes Caffe*, MXNet, TensorFlow*, ONNX*, Kaldi*) for easier deployments across Intel® silicon products (CPU, GPU/Intel® Processor Graphics, FPGA, VPU).

OpenVINO™ toolkit

Video Decode	Image Process	Inference Engine	Image Process	Video Encode
Intel® Media SDK	OpenCV OpenVX	Intel® Deep Learning Deployment Toolkit	OpenCV OpenVX	Intel® Media SDK

CPU	GPU	Intel Accelerator	VPU	FPGA

TANK -870AI
TANK AIoT Developer Kit

FLEX-BX210
Intel® Comet Lake AI Modular Box PC

Mustang-F100-A10
AI accelerator card with Intel® Arria® 10 FPGA

Mustang-V100-MX8
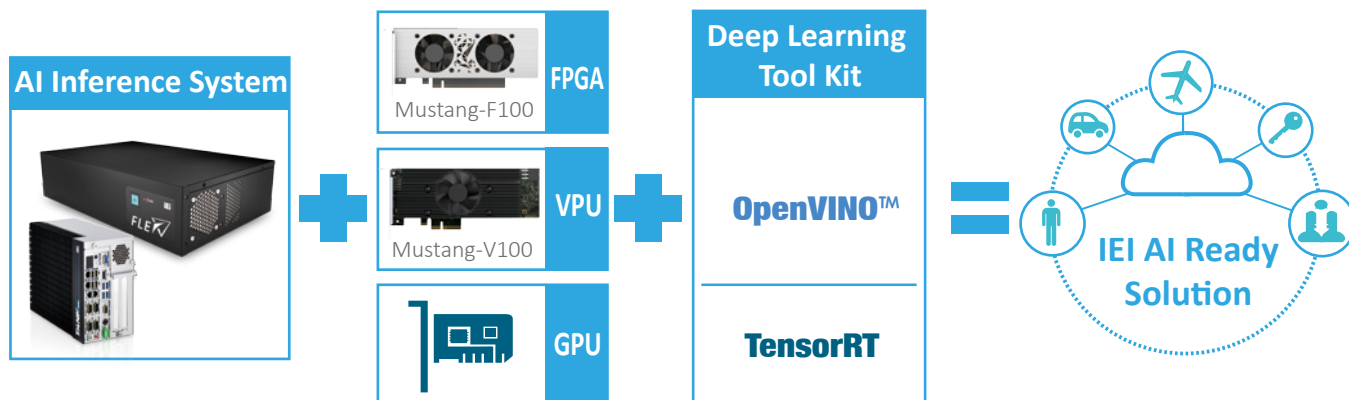AI accelerator card with Intel® Movidius™ VPU

GPOE-4P
IEEE 802.3 af/at PoE with 15.4w / 30w per port

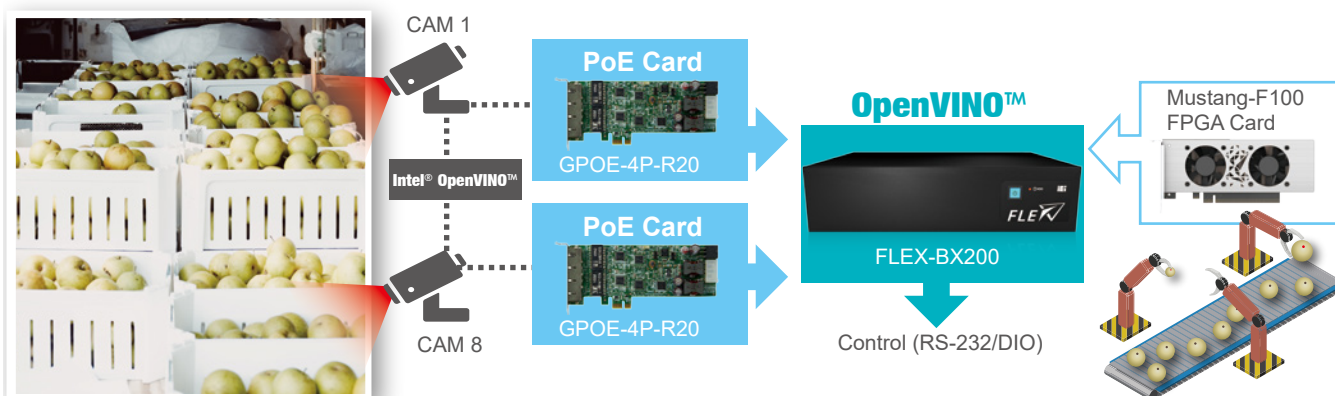# IEI AI Ready Solution Accelerates Your AI Initiative

The FLEX-BX200 and TANK-870AI Dev. Kit are AI hardware ready system ideal for deep learning inference computing to help you get faster, deeper insights into your customers and your business. IEI's FLEX-BX200 and TANK-870AI Dev. Kit support graphics cards, Intel® FPGA acceleration cards, and Intel® VPU acceleration cards, and provide additional computational power plus end-to-end solution to run your tasks more efficiently. With the Intel® OpenVINO toolkit and NVIDIA TensorRT, it can help you deploy your solutions faster than ever.

AI Inference System

FPGA — Mustang-F100

VPU — Mustang-V100

GPU

Deep Learning Tool Kit

OpenVINO™

TensorRT

IEI AI Ready Solution

• Machine Vision for Sorting and Grading of Agricultural Products

Agricultural products are valued by their appearance. The color indicates parameters like ripeness, defects, etc. The quality decisions vary among the graders and often inconsistent. Machine vision technology offers the solution for all these problems.
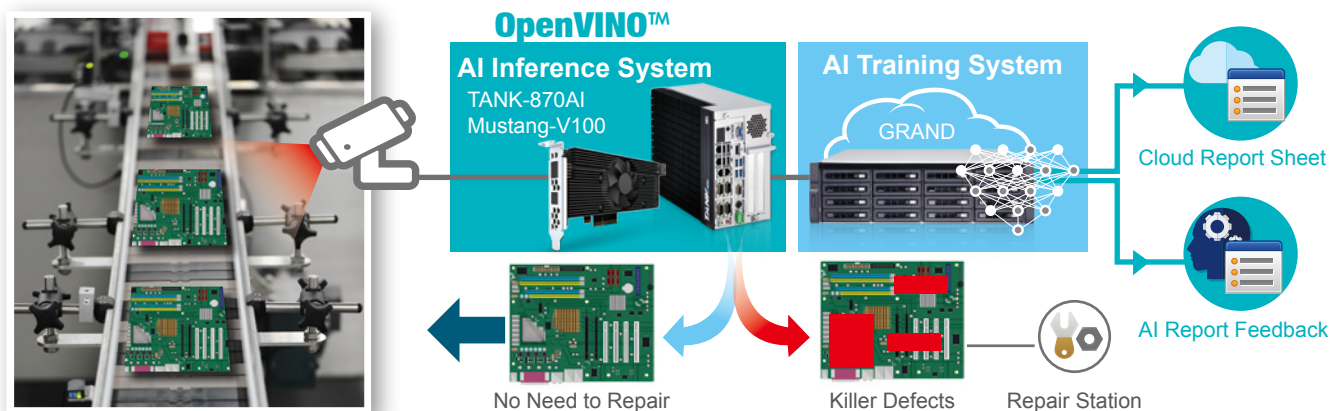
The FLEX series designed for machine vision market has four PCIe 3.0 expansion slots for installing motion controller cards, GP GPU/FPGA/VPU cards and the PoE Ethernet card which is developed by IEI and has four GbE Power over Ethernet (PoE) ports compliant with IEEE 802.3af for direct connection to CCTV cameras without needing separate power.

CAM 1

Intel® OpenVINO™

PoE Card — GPOE-4P-R20

PoE Card — GPOE-4P-R20

CAM 8

OpenVINO™

FLEX-BX200

Control (RS-232/DIO)

Mustang-F100 FPGA Card

• AOI Defect Classification

During the manufacturing process, defects could be introduced and harmful to the quality. It is necessary to classify the defects detected by AOI machine appropriately especially killer defects. The higher accuracy to classify defects, the less cost spent on review and repair station.

The TANK AIoT Dev. Kit features rich I/O and dual PCIe x8 signals to support add-ons like the acceleration cards (Mustang-F100-A10 & Mustang-V100-MX8) or the PoE to enhance defect detection performance.

OpenVINO™

AI Inference System
TANK-870AI
Mustang-V100

AI Training System
GRAND

Cloud Report Sheet

AI Report Feedback

No Need to Repair

Killer Defects

Repair Station

Machine Vision Solution

Machine vision is a replacement for human vision and judgment by using video cameras, software and computers to perform an inspection task, such as gauging, counting as well as barcode and optical character reading (OCR). IEI designs and develops advanced barcode readers and embedded computers, which can be used to perform reliably at higher speed and with greater precision.

• Inspection & Verification

Industrial cameras can stably transfer data to PC while in continuous shooting, enabling it to become a reliable and high compatibility platform.

USB 3.2 Gen 1

Industrial Vision Camera

TANK-800 Series

DM-F Series

Pattern Matching

Packing Inspection

Image Gauging

Defect Detection

Barcode Reading

Analysis
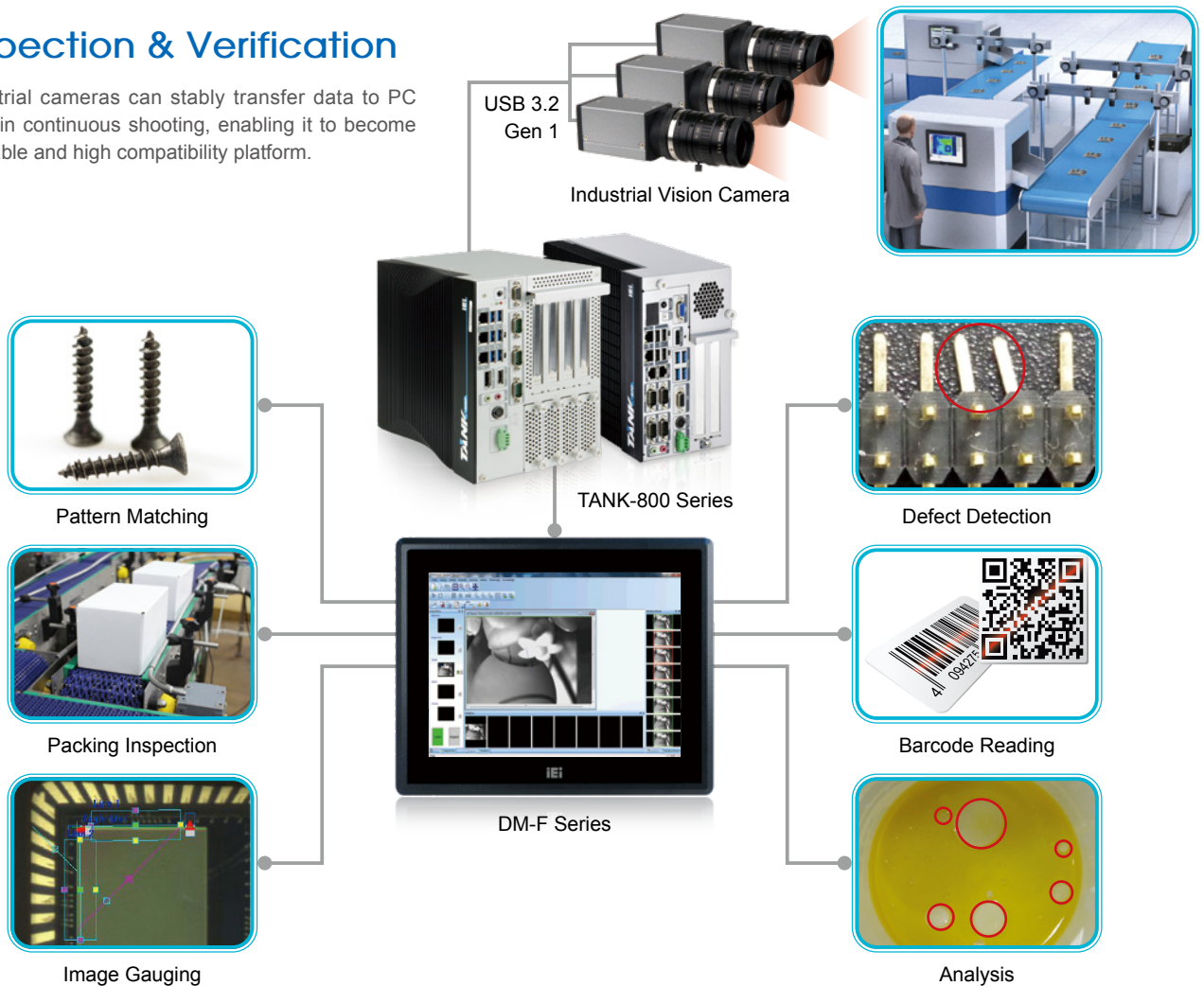
● Product Selection

TANK Series

DM-F Series

IMBA-Q370

IMBA-Q170-i2
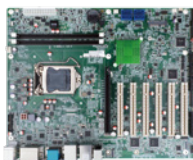
IMBA-H110

● Advanced Controller Applications

- Quality Checking
- Subassembly Verification
- Packing Inspection

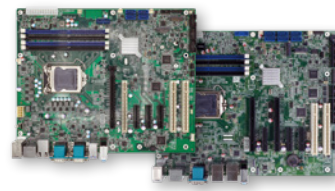# ● IoT High Speed Barcode Reader

Installing ITDB Series barcode reader with QNAP NAS system allows you to manage your production lines in a more efficient way. The NAS can act as a private cloud or a public cloud. An ITDB system that runs over an IP network infrastructure enables the decoded images and results to be distributed to any number of sites, within the constraints of available bandwidth.

IoT 1D/2D Barcode Reader Solution

- Time
- Picture
- Barcode Data

ITDB barcode reader management

Real-time production line status monitoring

Public Cloud (QNAP NAS, Azure, Amazon)

Intelligent Gateway

Wi-Fi

MODAT-550A

QNAP NAS

Ubuntu

Private Cloud
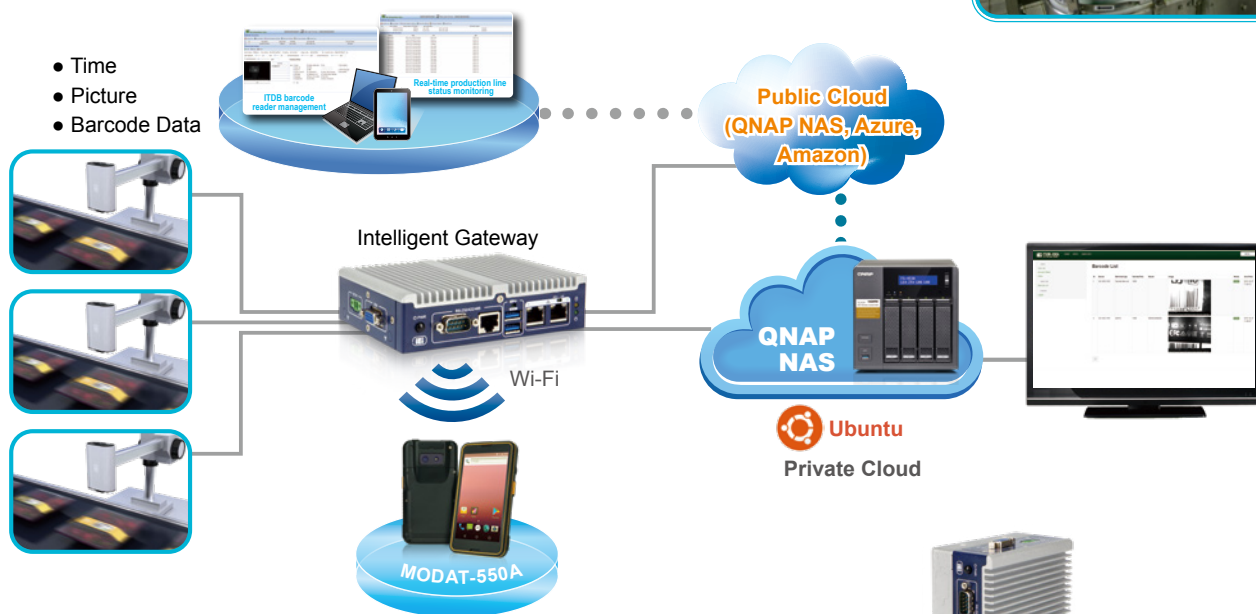
● Applications

- Logistics
- Airport
- High-speed Manufacturing Line

● Product Selection

» MODAT Series
» ITG Series

ITG-100-AL
Compact size din-rail embedded system

Intelligent Energy Management

With a growing interest in renewable energy resources globally, the sun and the wind have become one of the most rapidly growing eco-friendly alternative energy sources in the recent years.

By using solar thermal panels and wind turbines, both sunlight and wind are transformed into electricity ready to be consumed at factory and any other establishments that require electricity. These two will be the most important power production units of any hybrid system up to date.
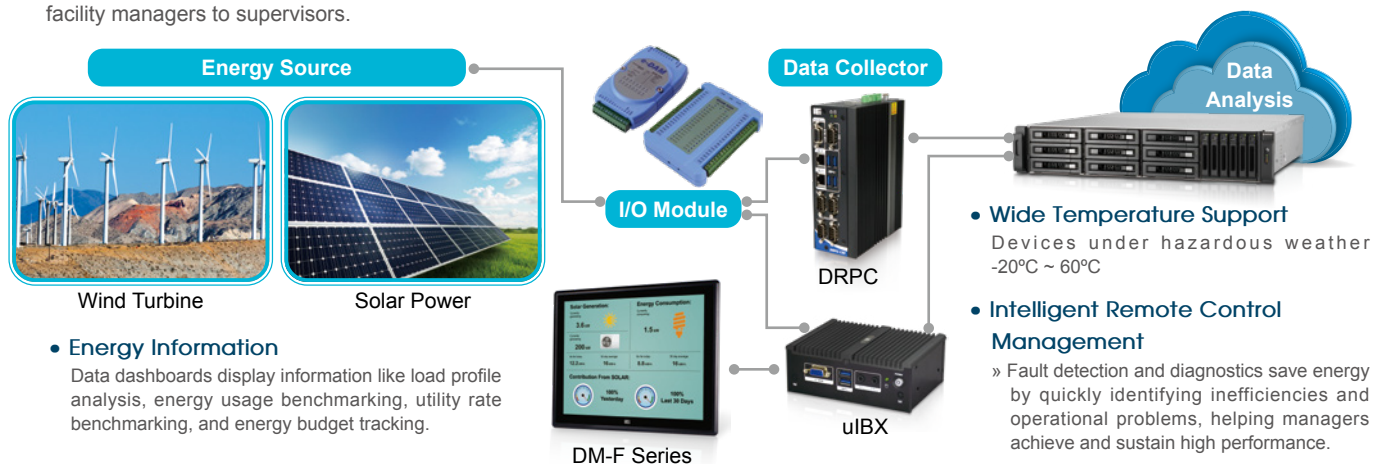
Information about power production and consumption will be collected and used by the control unit to create profiles of power consumption/production for each source/load of the system. Once these profiles are created a better and tighter management can be deployed.

• Energy Data Collection & Analysis

Information technology adds intelligence to factories from design to the end of the process. Today's technologies automate the collection, storage and retrieval of data from across multiple factories and factory sub-systems to make that data available for decision makers, from facility managers to supervisors.

Energy Source

Data Collector

Data Analysis

I/O Module

DRPC

Wind Turbine

Solar Power

• **Wide Temperature Support**
  Devices under hazardous weather -20ºC ~ 60ºC

• **Intelligent Remote Control Management**
  » Fault detection and diagnostics save energy by quickly identifying inefficiencies and operational problems, helping managers achieve and sustain high performance.

• **Energy Information**
  Data dashboards display information like load profile analysis, energy usage benchmarking, utility rate benchmarking, and energy budget tracking.

DM-F Series

uIBX

• Product Selection

» DRPC series & uIBX series

iRIS
IPMI 2.0 Compliant

iRIS Remote Diagnosis & Troubleshooting

Send technicians for on-site support

Equipment failed

System health data

QNAP Industrial NAS

iRIS Remote troubleshooting
More than 85% of issues solved

On-site support
Less than 15% of issues

Real-time & Active alert

Administrator

Right & useful information
Remote diagnosis

DRPC Series

uIBX Series
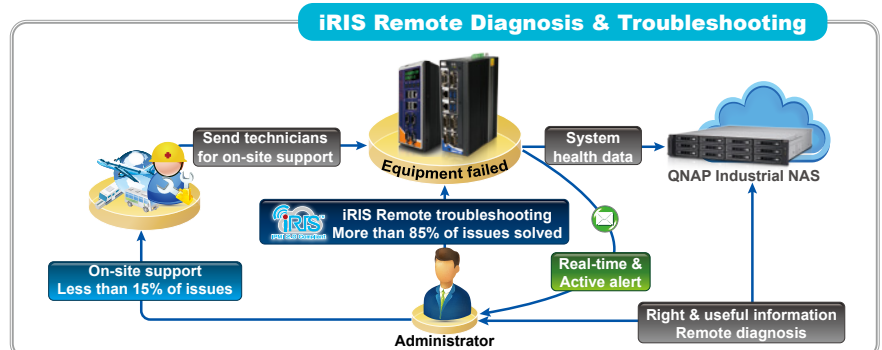
AFL3 PoE Panel PC

Model Name	AFL3-W07A-AL	AFL3-W10A-AL	AFL3-12A-AL	AFL3-W15A-AL	AFL3-W15C-ULT5	AFL3-W19C-ULT5	AFL3-W22C-ULT5
LCD Size	7"	10.1"	12.1"	15.6"		18.5"	21.5"
Resolution	1024 x 600 (16:9)	1280 x 800 (16:10)	1024 x 768 (4:3)	1366 x 768 (16:9)			1920 x 1080 (16:9)
Touch Screen	Projected capacitive with USB interface (anti-UV / anti-glare coating)				Projected capacitive with USB interface (anti-UV / anti-glare coating)		
CPU	Intel® Celeron N3350 (2M Cache, up to 2.4 GHz) TDP 6W	Apollo lake Celeron® Processor J3455 (2M Cache, up to 2.3 GHz) TDP 10W			Intel Whiskey Intel® Core™ i5-8365UE Processor 6M Cache, up to 4.10 GHz (TDP15W)		
I/O Ports & Switch	2 x GbE LAN (LAN1 on-board PoE at) 2 x USB 3.2 Gen 1 2 x USB 3.2 Gen 1 1 x 12 DC jack 1 x power switch 1 x Reset button 1 x Clear CMOS button 1 x AT/ATX switch	1 x RS-232/422/485 by RJ-45 1 x RS-232 by DP9 2 x GbE LAN (LAN1 option PoE bt PD module) 2 x USB 3.2 Gen 1 2 x USB 2.0 1 x HDMI output 1 x 9V ~ 30V DC jack 1 x power switch 1 x Line out 1 x Reset button 1 x Clear CMOS button 1 x AT/ATX switch			2 x PoE GbE LAN (optioal EEE802.3af/at/bt) 1 x GbE LAN 4 x USB 3.1 Gen.2 1 x HDMI output 1 x RS232/422/485 1 x RS232 1 x 12V DC jack 1 x power switch 1 x AT/ATX switch 1 x Clear CMOS button		
Front Panel Construction	PC + ABS Plastic						
PoE Option	on-board IEEE802.3 at	IEEE802.3 bt					
Mounting	Panel, Wall, Stand, Arm, Rack VESA 75 x 75 mm		Panel, Wall, Rack, Stand and Arm VESA 75 x 75 mm / 100 x 100 mm		Panel, Wall, Stand and Arm VESA 75 x 75 mm / 100 x 100 mm		
Operating Temperature (°C)	-20°C ~ 50°C (Ambient with air flow)	-10°C ~ 50°C (Ambient with air flow)	-20°C ~ 50°C (Ambient with air flow)				
Storage Temperature (°C)	-20°C ~ 60°C						
IP Level	IP 65 compliant front panel	IP 64 compliant front panel					
Thermal Solution	Fanless						
Power Requirement	12V only	9V - 30V			12V only		

AFL3 Series Panel PC

Model Name	AFL3-W07A-BT	AFL3-08A-BT	AFL3-W10A-BT	AFL3-12A-BT	AFL3-12C-ULT3
LCD Size	7"	8.4"	10.1"	12.1"	
Resolution	1024 x 600 (16:9)	800 x 600 (4:3)	1280 x 800 (16:10)	1024 x 768 (4:3)	
Touch Screen	Projected capacitive with USB interface (anti-UV / anti-glare coating)	5-wire resistive with RS-232 interface (anti-glare coating) Projected capacitive with USB interface (anti-UV / anti-glare coating)	Projected capacitive with USB interface (anti-UV / anti-glare coating)	5-wire resistive with RS-232 interface (anti-glare coating) Projected capacitive with USB interface (anti-UV / anti-glare coating)	Projected capacitive with USB interface (anti-UV / anti-glare coating)
CPU	Intel® Celeron® N2807 (dual core, 1.58 GHz)	Intel® Celeron® J1900 (quad core, 2.0 GHz)	Intel® Celeron® J1900 (quad core, 2.0 GHz)	Intel® Celeron® J1900 (quad core, 2.0 GHz)	Intel® Core™ i5 and Celeron® ULT Processor
I/O Ports & Switch	2 x RS-232 COM port (DB-9 connector) 2 x USB 3.2 Gen 1 2 x GbE LAN 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x 9-30V Lockable power jack	1 x RS-232 COM port (RJ-45 connector) 1 x RS-232/422/485 COM port (DB-9 connector) (RI/5V/12V) 2 x USB 3.2 Gen 1 2 x RJ-45 for GbE LAN 1 x Power switch 1 x Audio port (line-out) 1 x Reset button 1 x AT/ATX switch 1 x 9-30V DC Lockable power jack	1 x RS-232 COM port (RJ-45 connector) 1 x RS-232/422/485 COM port (DB-9 connector)(RI/5V/12V) 2 x USB 3.2 Gen 1 2 x USB 2.0 2 x RJ-45 for GbE LAN 1 x Power switch 1 x Audio port (line-out) 1 x Reset button 1 x AT/ATX switch 1 x 9-30V DC lockable power jack	1 x RS-232 COM port (RJ-45 connector) 1 x RS-232/422/485 COM port (DB-9 connector)(RI/5V/12V) 2 x USB 3.2 Gen 1 2 x USB 2.0 2 x RJ-45 for GbE LAN 1 x Power switch 1 x Audio port (line-out) 1 x Reset button 1 x AT/ATX switch 1 x 9-30V lockable power jack	1 x RS-232/422/485 (DB-9) 1 x RS232 (RJ-45) 2 x GbE LAN 2 x USB 2.0 2 x USB 3.2 Gen 1 1 x DC jack (12-30V DC) 1 x HDMI 1 x Power switch 1 x Reset button 1 x AT/ATX switch
Front Panel Construction	PC + ABS Plastic				
Mounting	Panel, Wall, Stand, Arm, Rack VESA 75 x 75 mm			Panel, Wall, Rack, Stand and Arm VESA 75 x 75 mm / 100 x 100 mm	
Operating Temperature (°C)	-20°C ~ 50°C (Ambient with air flow)	-15°C ~ 55°C (Ambient with air flow)	-10°C ~ 50°C (Ambient with air flow)	-20°C ~ 50°C (Ambient with air flow)	
Storage Temperature (°C)	-20°C ~ 60°C	-20°C ~ 65°C	-20°C ~ 60°C		
IP Level	IP 65 compliant front panel	IP 64 compliant front panel			
Thermal Solution	Fanless				
Power Requirement	9 V ~ 30 V				

Model Name	AFL3-W15A-BT	AFL3-W15B-H81	AFL3-W15C-ULT3	AFL3-W19C-ULT3	AFL3-W19A-AL	AFL3-W22C-ULT3
LCD Size	15.6"			18.5"		21.5"
Resolution	1366 x 768 (16:9)					1920 x 1080 (16:9)
Touch Screen	5-wire resistive with RS-232 interface (anti-glare coating) Projected capacitive with USB interface (anti-UV / anti-glare coating)			Projected capacitive with USB interface (anti-UV / anti-glare coating)	5-wire resistive with RS-232 interface (anti-glare coating) Projected capacitive with USB interface (anti-UV / anti-glare coating)	
CPU	Intel® Celeron® J1900 (quad core, 2 GHz)	Intel® Core™ i7/i5/i3, Pentium®, Celeron® processor (TDP 35W)	6th Generation Intel® Core™ i5 and Celeron® on-board processor	Intel® Core™ i5 and Celeron® ULT Processor	Intel® Celeron® J3455 (quad core, 1.5GHz up to 2.3GHz)	Intel® Core™ i5 and Celeron® ULT Processor
I/O Ports & Switch	1 x RS-232 COM port (RJ-45 connector) 1 x RS-232/422/485 COM port (DB-9 connector) (RI/5V/12V) 2 x USB 2.0 2 x USB 3.2 Gen 1 2 x GbE LAN 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x Audio port (line-out) 1 x 9-30V lockable power jack	1 x RS-232 COM port (DB-9 connector) 1 x RS-232/422/485 COM port (DB-9 connector) (RI/5V/12V) 2 x GbE LAN 4 x USB 2.0 2 x USB 3.2 Gen 1 1 x HDMI output 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x Audio port (line-out) 1 x 9-30V lockable power jack	1 x RS-232 by DB-9 (RI/5V/12V) 1 x RS-232/422/485 by DB-9 (RI/5V/12V) 2 x GbE LAN 4 x USB 3.2 Gen 1 1 x HDMI output 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x 9-30V lockable power jack	1 x RS-232 by DB-9 (RI/5V/12V) 1 x RS-232/422/485 by DB-9 (RI/5V/12V) 2 x GbE LAN 4 x USB 3.2 Gen 1 1 x HDMI output 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x 9-30V lockable power jack	1 x RS-232/422/485 by RJ-45 1 x RS-232 by RJ-45 2 x GbE LAN 2 x USB 3.2 Gen 1 2 x USB 2.0 1 x HDMI output 1 x 12V ~ 34V DC jack 1 x Power switch 1 x AT/ATX switch 1 x Line out	1 x RS-232 by DB-9 (RI/5V/12V) 1 x RS-232/422/485 by DB-9 (RI/5V/12V) 2 x GbE LAN 4 x USB 3.2 Gen 1 1 x HDMI output 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x 9-30V lockable power jack
Front Panel Construction	PC + ABS Plastic					
Mounting	Panel, Wall, Rack, Stand and Arm VESA 75 x 75 mm / 100 x 100 mm			Panel, Wall, Stand and Arm VESA 75 x 75 mm / 100 x 100 mm	Panel, Wall, Rack, Stand and Arm VESA 75 x 75 mm / 100 x 100 mm	
Operating Temperature (°C) (Ambient with air flow)	-20°C ~ 50°C (Ambient with air flow)				-15°C ~ 50°C (Ambient with air flow)	-20°C ~ 50°C (Ambient with air flow)
Storage Temperature (°C)	-20°C ~ 60°C					
IP Level	IP 64 compliant front panel					
Thermal Solution	Fanless					
Power Requirement	9 V ~ 30 V				12 V - 34 V	9 V - 30 V

● PPC-F Series Heavy Industrial Panel PC

Model Name	PPC-F06B-BT	PPC-F08B-BT	PPC-F10B-BT	PPC-F12B-BT	PPC-F15B-BT	PPC-F17B-BT	PPC-F19B-BT
LCD Size	5.7" (4:3)	8" (4:3)	10.4" (4:3)	12" (4:3)	15'' (4:3)	17" (5:4)	19" (5:4)
Resolution	640 (W) x 480 (H)	800 (W) x 600 (H)		1024 (W) x 768 (H)		1280 (W) x 1024 (H)	
Touch Screen	4-wire resistive type flat touch window, 3H	5-wire resistive type flat touchscreen, 3H		5-wire resistive type with RS-232 interface / projected capacitive type with USB interface			
Touch Controller	PenMount DMC9000			Penmount DMC 9000 EETI EXC3000			
CPU	Intel® Celeron® processor N2807, dual-core, 1.58GHz	Intel® Celeron® J1900 on-board SoC, quad-core, 2GHz					
I/O Ports and Switches	1 x RJ-45 LAN port 1 x RS-232 COM port (DB-9 connector) (RI/5V/12V) 1 x RS-422/485 2 x USB 3.2 Gen 1 2 x USB 2.0 1 x 9 V ~ 36 V DC lockable jack (2-pin) 1 x Audio port (line-out) 1 x Power switch 1 x Reset button 1 x AT/ATX switch	1 x RS-232 COM port (RJ-45 connector) 1 x RS-232/422/485 COM port (DB-9 connector) (RI/5V/12V) 2 x USB 3.2 Gen 1 2 x GbE LAN 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x Audio port (line-out) 1 x 9 V ~ 30 V lockable power jack	1 x RS-232 COM port (RJ-45 connector) 1 x RS-232/422/485 COM port (DB-9 connector) (RI/5V/12V) 2 x USB 2.0 2 x USB 3.2 Gen 1 2 x GbE LAN 1 x Power switch 1 x Reset button 1 x AT/ATX switch 1 x Audio port (line-out) 1 x 9 V ~ 30 V lockable power jack	2 x RJ-45 LAN port 2 x USB 3.2 Gen 1 2 x USB 2.0 1 x HDMI 2 x RS-232 1 x RS-232/422/485 1 x VGA 1 x 9 V ~ 36 V DC jack (4-pin) 1 x 9 V ~ 36 V DC terminal block 1 x Power switch	2 x RJ-45 LAN port 2 x USB 3.2 Gen 1 2 x USB 2.0 1 x HDMI 2 x RS-232 1 x RS-232/422/485 1 x VGA 1 x 9 V ~ 36 V DC jack (4-pin) 1 x 9 V ~ 36 V DC terminal block 1 x Line-out 1 x Power switch	2 x RJ-45 LAN port 2 x USB 3.2 Gen 1 2 x USB 2.0 1 x HDMI 2 x RS-232 1 x RS-232/422/485 1 x VGA 1 x DC jack (4-pin) 1 x Terminal block 1 x Microphone & speaker 1 x Power switch	
System Cooling	Fanless						
Operating Temperature	-10°C ~ 50°C (14°F ~ 122°F)						
Storage Temperature	-20°C ~ 60°C (-4°F ~ 140°F)						

• PPC-F Series Heavy Industrial Panel PC

Model Name	PPC-F15C-Q370	PPC-FW15C-Q370	PPC-F17C-Q370	PPC-FW19C-Q370	PPC-FW22C-Q370	PPC-FW24C-Q370
LCD Size	15" (4:3)	15.6" (16:9)	17" (5:4)	18.5" (16:9)	21.5" (16:9)	23.8" (16:9)
Max. Resolution	1024 x 768	1366 x 768	1280 x 1024	1366 x 768	1920 x 1080	1920 x 1080
Brightness (cd/m²)	450	400	350	400	250	250
Touchscreen Type	Projected capacitive type with 10-point multitouch and anti-glare coating					
Touch Controller	EETI EXC3188					
CPU	8th Genertion Intel® Core™ i7/i5/i3 porcessors in the LGA 1151 package (Please choose the TDP of the the processor under 65W)					
I/O Ports and Switches	1 x HDMI output 1 x Line out 2 x GbE LAN 1 x AC Inlet 6 x USB 3.2 Gen 1 Type-A Power button with power LED (power on=Blue) 2 x RS-232 DB-9 type AT/ATX mode switch 1 x Mic in Reset button					
System Cooling	Active fan					
Operating Temperature	-10°C ~ 50°C (with air flow)					
Storage Temperature	-20°C ~ 60°C					
Humidity	10% ~ 95% (non-condensing)					
Power Supply	AC input ATX power supply Input: 100VAC~240VAC, 50/60Hz					

Model Name	PPC-F15D-ULT5	PPC-FW15D-ULT5	PPC-F17D-ULT5	PPC-FW19D-ULT5	PPC-FW22D-ULT5	PPC-FW24D-ULT5
LCD Size	15" (4:3)	15.6" (16:9)	17" (5:4)	18.5" (16:9)	21.5" (16:9)	23.8" 16:9)
Max. Resolution	1024 x768	1366x768	1280x1024	1366x768	1920x1080	1920x1080
Brightness (cd/m²)	450	400	350	400	250	250
Touchscreen Type	Projected capacitive type with 10-point multitouch and anti-glare coating					
Touch Controller	EETI EXC3000 Series					
CPU	8th Genertion Intel® Core™ i5-8365U 4.10GHz 8th Genertion Intel® Celeron® 4205U 2.00GHz					
I/O Ports and Switches	4 x USB 3.2 Gen 1 1 x HDMI output 1 x RS-232/422/485 1 x RS-232 2 x PoE GbE LAN (IEEE802.3af/at/bt)			1 x GbE LAN 1 x 12V DC jack 1 x Power switch 1 x AT/ATX switch		
Thermal Solution	Fanless					
Front Frame	Aluminum					
Mounting	Panel, Wall, Rack, Stand and Arm VESA 100 x 100 mm			Panel, Wall, Stand and Arm VESA 100 x 100 mm		
Operating Temperature	-10°C ~ 50°C (with air flow)					
Storage Temperature	-20°C ~ 60°C					
IP Level	IP 65 compliant front panel					
Power Supply	12V DC input					

• Heavy Industrial Monitor

Model Name	DM-F65A	DM-F08A	DM-F12A	DM-F15A
LCD Display	6.5" (4:3)	8" (4:3)	12" (4:3)	15" (4:3)
Max. Resolution	640 (W) x 480 (H)	800 (W) x 600 (H)	1024 (W) x 768 (H)	1024 (W) x 768 (H)
Touchscreen & Controller	5-wire resistive single touch window / Penmount 6000		5-wire resistive single touch window / Penmount 6000 10-point projected capacitive touch window / EETI EXC3000	
I/O Ports	1 x VGA (DB-15) 1 x DVI 1 x USB 2.0 (touch) 1 x RS-232 (reserved for resistive touch ATO) 1 x Lockable 12V DC jack		1 x VGA (DB-15) 1 x HDMI 1 x DisplayPort 1.1 1 x USB 2.0 (touch)	1 x RS-232 (reserved for resistive touch ATO) 1 x Lockable 9V-36V DC jack 1 x 9V-36V terminal block
Construction Material	Aluminum front frame and sheet metal rear cover			
Mounting	Panel Mount/ Rack Mount/ 75 x 75 VESA Mount		Panel Mount/ Rack Mount/ 100 x 100 VESA Mount	
Operating Temperature	-20°C ~ 60°C (with air flow)		-20°C ~ 60°C	
Storage Temperature	-20°C ~ 70°C			
IP Level	IP 65 compliant front panel			
Power Input	12V DC		9V ~ 36V DC	

Model Name	DM-F17A	DM-F19A	DM-F22A	DM-F24A
LCD Display	17" (5:4)	19" (5:4)	21.5" (16:9)	24" (16:9)
Max. Resolution	1280 (W) x 1024 (H)	1280 (W) x 1024 (H)	1920 (W) x 1080 (H)	1920 (W) x 1080 (H)
Touchscreen & Controller	5-wire resistive single touch window / Penmount 6000 10-point projected capacitive touch window / EETI EXC3000		10-point projected capacitive touch window / EETI EXC3000	10-point projected capacitive touch window / EETI EXC3000
I/O Ports	1 x VGA (DB-15) 1 x DVI (F19A only) 1 x HDMI (F17A only) 1 x DisplayPort 1.1 1 x USB 2.0 (touch) 1 x RS-232 (reserved for resistive touch ATO) 1 x Lockable 9V-36V DC jack 1 x 9V-36V terminal block		1 x VGA (DB-15) 1 x HDMI 1 x DisplayPort 1.1 1 x USB 2.0 (touch) 1 x RS-232 (reserved for resistive touch ATO) 1 x Lockable 9V-36V DC jack 1 x 9V-36V terminal block	
Construction Material	Aluminum front frame and sheet metal rear cover			
Mounting	Panel Mount/ Rack Mount/ 100 x 100 VESA Mount	Panel Mount/ Rack Mount 100 x 100 VESA Mount	Panel Mount/ 100 x 100 VESA Mount	Panel Mount/ 100 x 100 VESA Mount
Operating Temperature	-20°C ~ 60°C (with air flow)		-10°C ~ 50°C (with air flow)	-10°C ~ 50°C (with air flow)
Storage Temperature	-20°C ~ 70°C		-20°C ~ 60°C	-20°C ~ 60°C
IP Level	IP 65 compliant front panel			
Power Input	9V ~ 36V DC			

• Vertical Market Panel PC   • AI Accelerator Card

Model Name	UPC-F12C-ULT3
LCD Size	12.1"
Resolution	1024 (W) x 768 (H)
Touchscreen	P-CAP / Resistive Touch
CPU	6th Generation Intel® Core™ i5 and Celeron® ULT processor
I/O Ports and Switches	M12 Type: 1 x 5-pin M12 connector for DC jack (12 ~ 36V DC) 1 x 8-pin M12 connector for GbE LAN 1 x 8-pin M12 connector for RS-232 1 x 8-pin M12 connector for RS-232/422/485 2 x 8-pin M12 connector for two USB 2.0 Standard Type: 1 x DC in terminal block (12V-36V DC) 1 x DC jack (12V-36V DC) 1 x HDMI 1 x RS-232 (COM1 RJ-45) 1 x RS-232/422/485 (COM2 RJ-45) 1 x VGA 2 x LAN 2 x USB 2.0 2 x USB 3.2 Gen 1
System Cooling	Fanless
Operating Temperature	-20°C ~ 60°C (without heater solution) -40°C ~ 60°C (with heater solution)
Storage Temperature	-40°C ~ 70°C
IP Rating	Full IP65 or Full IP 66 (with M12 connectors)

Model Name	Mustang-F100-A10	Mustang-V100-MX8
Main Chip	Intel® Arria® 10 GX1150 FPGA	Eight Intel® Movidius™ Myriad™ X MA2485 VPU
Deep Learning Tool	Intel® Distribution of OpenVINO™ toolkit	
Memory	8G On-board DDR4	4G On-board DDR4
Dataplane Interface	PCI Express 3.0 x8	PCI Express 2.0 x4
Power Consumption	<60W	<30W
Operating Temperature	5°C~60°C (ambient temperature)	5°C~55°C (ambient temperature)
Cooling	Active fan	Active fan
Dimensions	Standard Half-Height, Half-Length, Double-slot	Half-Height, Half-Length, Single-slot PCIe
Power Connector	Preserved PCIe 6-pin 12V external power	Preserved PCIe 6-pin 12V external power
Dip Switch/LED Indicator	Identify card number	Identify card number

● Industrial PDA

● TANK AIoT Developer Kit

Model Name		MODAT-550A
Display	LCD size	5.5"
	Max Resolution	1080 x 1920 (Full HD)
	Touchscreen	5-point capacitive
System	CPU	Octa-core 64-bit Cortex-A53 1.5 GHz processor
	Operating System	Android 7.0
I/O Interface	USB	1x High-speed Micro USB 2.0 OTG
	Micro HDMI	N/A
	Audio	1 x 0.5W speaker 1 x Headset/Mic-in
	Expansion	N/A
Power	Power Adapter	5V/3A
	Battery	4000 mAh
Environment	Operating Temperature	-10°C ~ 50°C
	Storage Temperature	-20°C ~ 60°C
	Environmental Protection	IP 65

Model Name		TANK-870AI	
CPU		Intel® Xeon® E3-1268LV5 2.4GHz (up to 3.4GHz, quad core, TDP 35W) Intel® Core™ i7-7700T 2.9GHz (up to 3.8GHz, quad core, TDP 35W) Intel® Core™ i5-7500T 2.7GHz (up to 3.3GHz, quad core, TDP 35W) Intel® Core™ i7-6700TE 2.4 GHz (up to 3.4GHz, quad core, TDP 35W) Intel® Core™ i5-6500TE 2.3 GHz (up to 3.3GHz, quad core, TDP 35W)	
iRIS Solution		1 x iRIS-2400 (optional)	
I/O Interfaces		1 x HDMI/DP 1 x iDP (optional) 1 x Line-out 1 x Mic-in 1 x VGA 2 x RJ-45 (LAN1: Intel® I219LM PCIe controller/ LAN2 (iRIS): Intel® I210 PCIe controller)	2 x RS-232/422/485 (DB-9) 4 x RS-232 (2 x RJ-45, 2 x DB-9 w/ isolation) 4 x USB 2.0 4 x USB 3.2 Gen 1 1 x TPM 2.0 module
Expansions		1 x Half-size PCIe Mini slot 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA) 2 x PCIe x8 slot	
System Fan		Fanless	
Chassis Construction		Extruded aluminum alloy	
Power Input		DC jack: 9 V ~ 36 V DC Terminal Block: 9 V ~ 36 V DC	
Power Consumption		19 V@3.68 A (Intel® Core™ i7-6700TE with 8 GB memory)	
Mounting		Wall mount	
Operating Temperature		Xeon® E3: -20°C ~ 60°C with air flow (SSD) i7-7700T: -20°C ~ 35°C with air flow (SSD) i5-7500T: -20°C ~ 45°C with air flow (SSD)	i7-6700TE: -20°C ~ 45°C with air flow (SSD) i5-6500TE: -20°C ~ 60°C with air flow (SSD)
Weight (Net/Gross)		4.2 kg/6.3 kg	

● Embedded System

Model Name	TANK-880-Q370	TANK-870-Q170	TANK-870e-H110	TANK-802-ULT5
CPU	8th Gen Intel® Core™ CPU & Intel® Core™ i7-9700TE 1.8GHz (up to 3.8GHz, 8-core, TDP 35W) Intel® Core™ i5-9500TE 2.2GHz (up to 3.6GHz, 6-core, TDP 35W)	7th Gen Intel® Core™ CPU & Intel® Core™ i7-6700TE (2.4 GHz, quad-core, TDP 35W) Intel® Core™ i5-6500TE (2.3 GHz, quad-core, TDP 35W)		Intel® Core™ i5-8365UE 1.6 GHz (up to 4.1 GHz, quad-core, TDP 15W) Intel® Celeron® 4205U 1.8 GHz (dual-core, TDP 15W)
iRIS Solution	N/A	1 x iRIS-2400 (optional)	N/A	N/A
I/O Interfaces	1 x HDMI 1 x DP 1 x Line-out 1 x Mic-in 3 x RJ-45 (1 x PCIe GbE by Intel® I219 controller 2 x PCIe GbE by Intel® I210 controller) 3 x RS-232/422/485 (DB-9 w/ isolation) 6 x USB 3.2 Gen 1 8-bit DIO (4-in/4-out) 4 x 2.5" HDD/SSD SATA 6Gb/s bay (with RAID 0/1/5/10 support) 1 x TPM pin header (2x10 pin)	1 x HDMI/DP 1 x iDP (optional) 1 x Line-out 1 x Mic-in 1 x VGA 2 x RJ-45 (LAN1: Intel® I219LM PCIe controller LAN2 (iRIS): Intel® I210 PCIe controller) 2 x RS-232/422/485 (DB-9) 4 x RS-232 (2 x RJ-45, 2 x DB-9 w/ isolation) 4 x USB 2.0 4 x USB 3.2 Gen 1	1 x HDMI 1.4 1 x Line-out 1 x Mic-in 1 x VGA 2 x RJ-45 PCIe GbE by RTL8111G controller 2 x RS-232/422/485 (DB-9, w/ isolation) 4 x USB 3.2 Gen 1	1 x HDMI 1 x VGA 1 x Line-out 1 x Mic-in 3 x RJ-45 (1 x PCIe GbE by Intel® I219 controller 2 x PCIe GbE by Intel® I211 controller) 2 x RS-232/422/485 (DB-9 w/ isolation) 6 x RS-232 (4 x DB-9/2 x RJ-45) 4 x USB 3.2 Gen 2 2 x USB 2.0 8-bit DIO (4-in/4-out)
Expansions	1 x Full-size PCIe Mini slot (PCIe x1 / USB 2.0 / SATA) 1 x 2230 A key (PCIe x2 / USB 2.0) 2 x 2280 M key (PCIe x2) 1 x PCIe x 16 / 1 x PCIe x1/ 2 x PCIe x4	1 x Half-size PCIe Mini slot 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA) 2-slot model: 1 x PCIe x16, 1 x PCI 2-slot model: 2 x PCIe x8 4-slot model: 2 x PCIe x8, 2 x PCI, 1 x Full-size PCIe Mini 4-slot model: 1 x PCIe x16, 3 x PCI, 1 x Full-size PCIe Mini	1 x Full-size PCIe Mini slot 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA) 3A: 1 x PCIe x16, 2 x PCI 3B: 1 x PCIe x16, 1 x PCIe x4, 1 x PCI 3C: 3 x PCI	1 x 2230 M.2 A key (PCIe x2/USB 2.0) 1 x 2242/80 B key (USB 2.0/SATA)
System Fan	Fanless			
Chassis Construction	Extruded aluminum alloys			
Power Input	DC jack: 9 V ~ 36 V DC Terminal block: 9 V ~ 36 V DC		DC jack: 9 V ~ 36 V DC Terminal block: 9 V ~ 36 V DC	Terminal Block: 9 ~ 36V DC
Power Consumption	19V @ 3.6A (Intel® Core™ i7-8700T with 8GB memory)	19 V@3.68 A (Intel® Core™ i7-6700TE with 8 GB memory)	19 V@3.44 A (Intel® Core™ i7-6700TE with 8 GB memory)	TBD
Mounting	Wall mount		Wall mount & DIN Rail	Wall mount
Operating Temperature	-20°C ~ 60°C with air flow (SSD), 10% ~ 95%, non-condensing	i7-6700TE: -20°C ~ 45°C with air flow (SSD) i5-6500TE: -20°C ~ 60°C with air flow (SSD)	i7-6700TE: -20°C ~ 50°C with air flow (SSD) i5-6500TE: -20°C ~ 60°C with air flow (SSD)	-20ºC ~ 60°C with air flow(SSD), 10% ~ 95% noncondensing
Weight (Net/Gross)	5.4 kg/8.45 kg	2-slot: 4.2 kg/6.3 kg / 4-slot: 4.5 kg/6.5 kg	2.8 kg/4.3 kg	TBD

Model Name	FLEX-BX210-Q470	FLEX-BX200-Q370	FLEX-BX100-ULT5	IVS-110-AL
CPU	Intel® 10th Generation Core™ processor (Max. 65W)	8th/9th Genertion Intel® Core™ i7/i5/i3 porcessors in the LGA 1151(Max. 65W) Intel® 300 Series Chipsets Q370	8th Genertion Intel® Core™ i5-8365U 4.10GHz 8th Genertion Intel® Celeron® 4205U 2.00GHz	Intel® Atom™ x7-E3950 processor (quad-core 1.6GHz, 12W TDP)
I/O Interfaces	1 x AC power in inlet 1 x HDMI output 1 x DP output 1 x Line out 1 x Mic in 2 x GbE LAN 2 x RS-232 DB-9 type 6 x USB 3.2 Gen 1 Type-A	1 x AC power in inlet 1 x HDMI output 1 x Line out 1 x Mic in 2 x GbE LAN 2 x RS-232 DB-9 type 6 x USB 3.2 Gen 1 Type-A	4 x USB 3.2 Gen.1 1 x HDMI output 1 x RS-232/422/485 1 x RS-232 1 x GbE LAN 2 x PoE GbE LAN (IEEE802.3af/at/bt) 1 x 12V DC jack 1 x Power switch 1 x AT/ATX switch	1 x 16-bit digital I/O (8-bit in/8-bit out) 1 x DB-9 OBD-II/J1939 1 x HDMI 1 x Line-out 1 x RJ-45 PCIe GbE by Intel® I211 1 x RS-232/422/485 1 x VGA 2 x On-board SIM card slot 4 x USB 3.2 Gen 1
Expansions	1 x 2230 M.2 A key (PCIe x1/USB 2.0) 1 x 3042 M.2 B key (PCIe x1/USB 3.2 Gen 1) 1 x 2280 M.2 M key (PCIe x4) 2 x PCIe 3.0x4 2 x PCIe 3.0x8	1 x 2230 M.2 A key (PCIex1/USB 2.0) 1 x 3042 M.2 B key (PCIex1/USB 3.2 Gen 1) 1 x 2280 M.2 M key (PCIex4) 2 x PCIe 3.0x4 2 x PCIe 3.0x8	M.2 2230 A key (PCIex1/USB2.0) M.2 2280 M Key (PCIex4)	1 x Full/Half-size with SIM card slot (PCIe/USB 2.0) 1 x Full/Half-size with SIM card slot (PCIe/USB 2.0) 1 x Half-size (PCIe/USB 2.0)
System Fan	Active fan	Active fan	Fanless	Fanless
Chassis Construction	Metal housing	Metal housing	Sheet metal	Extruded aluminum alloy
Power Input	115 VAC~230VAC, 50/60Hz	115 VAC~230VAC, 50/60Hz	DC jack: 12 V DC	Cigarette lighter power cable: 9 V~36 V DC
Power Consumption	115 VAC@1A, 230VAC@0.5A	115 VAC@1A, 230VAC@0.5A	12 V@2.2 A (Intel® Core™ i5-8365U with 4 GB DDR4 memory)	12 V @ 5A (Intel® Atom™ x7-E3950 CPU with 8GB DDR3L memory)
Mounting	Wall mount / RACK moynt	Wall mount / RACK mount	Wall mount	Mounting kit & VESA mount
Operating Temperature	-20°C ~ 50°C (with SSD and TDP 65W processor) -20°C ~ 40°C (with HDD or add-on cards without fan)	-20°C ~ 50°C (with SSD and TDP 65W processor) -20°C ~ 40°C (with HDD or add-on cards without fan)	-10°C ~ 50°C with air flow	-30°C ~ 70°C with air flow
Weight (Net/Gross)	4 kg/6 kg	4 kg/6 kg	3 kg/4.5 kg	2.4 kg/3.8 kg

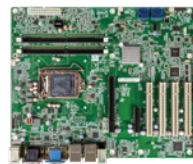| Model Name	DRPC-230-ULT5	DRPC-130-AL	DRPC-120-BT	ITG-100-AL	uIBX-250-BW
CPU	Intel® Core™ i5-8265U 1.6GHz (up to 3.9 GHz)	Intel® Atom™ E3930 1.8GHz	Intel® Atom™ E3845 1.91GHz	Intel® Atom™ x5-E3930 1.3 GHz (up to 1.8GHz, dual-core, TDP=6.5W)	Intel® Celeron® N3160 (up to 2.24GHz, quad-core, 2 MB cache, TDP=6W)
iRIS Solution	N/A	N/A	1 x iRIS-2400 (optional)	N/A	N/A
I/O Interfaces	1 x HDMI 1 x DP 3 x RJ-45 (1 x PCIe GbE by Intel® I219 controller, 2 x PCIe GbE by Intel® I211 controller) 4 x RS-232/422/485 (DB-9) 2 x RS-232 (RJ-45) 4 x USB 3.2 Gen 2 (10Gb/s) 8-bit DIO (4-in/4-out) 1 x TPM pin header (2x10 pin)	1 x DB-9 w/ 2.5kV isolation protection supporting 2-port CAN-bus 1 x Internal on-board SIM slot (optional) 1 x TPM 2.0 (2x10 pin, optional) 2 x HDMI 1.4b 2 x RJ-45 (PCIe GbE by Intel® I211 controller) 4 x RS-232/422/485 (DB-9) 4 x USB 3.2 Gen 1	1 x HDMI 1 x VGA 2 x RJ-45 1 x PCIe GbE by Intel® I210 controller 1 x PCIe GbE by Intel® I211 controller 2 x RS-232 (DB-9 w/3KV isolation protection*) 2 x RS-422/485 (DB-9 w/3KV isolation protection*) 2 x USB 2.0 2 x USB 3.2 Gen 1	1 x AT/ATX switch 1 x VGA 1 x Power button 1 x Reset button 1 x VGA 2 x RJ-45 PCIe GbE by Intel® I211 controller 2 x RS-232/422/485 2 x USB 3.2 Gen 1	1 x AT/ATX switch 1 x HDMI 1 x Line-out 1 x Mic-in 1 x Power button 1 x Reset button 1 x VGA 2 x RJ-45 PCIe GbE by Intel® I211 controller 2 x RS-232/422/485 (RJ-45) 4 x USB 3.2 Gen 1
Expansions	1 x Full-size PCIe Mini slot (PCIe x1 / USB 2.0 / SATA) 1 x 2230 M.2 key (PCIe x1 / USB 2.0) 1 x PCIe x4	1 x Full-size PCIe Mini slot 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA)	1 x Half-size PCIe Mini slot (w/o USB signal) 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA)	M.2: 1 x M.2 2230 (A key, PCIe by 1, USB 2.0) PCIe Mini: 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA)	1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA)
System Fan	Fanless	Fanless	Fanless	Fanless	Fanless
Chassis Construction	Extruded aluminum alloy	Extruded aluminum alloy	Extruded aluminum alloy	Extruded aluminum alloy	Extruded aluminum alloy
Power Input	12~24V DC-in	3-pin terminal block: 12 V ~ 24 V DC	3-pin terminal block: 9 V ~ 30 V DC	2-pin terminal block: 12 V DC	DC jack: 12 V DC
Power Consumption	12V @ 4.98A	12V @ 2.88 A (Intel® Atom™ x5-E3930 CPU with 4GB 1600 MHz DDR3L memory)	12 V@ 2.1 A (Intel® Atom™ E3845 with 2 GB memory)	12V @ 1A (Intel® Atom™ E3930 with 2GB memory)	12 V@2 A (Intel® Celeron® N3160 with 2 GB memory)
Mounting	DIN-rail	DIN-rail / Wall mount	DIN-rail	DIN-rail / Wall mount	Wall mount, VESA 75
Operating Temperature	-20°C ~ 60°C with air flow (SSD), 10% ~ 95%, non-condensing	-20°C ~ 60°C with air flow (SSD)	-20ºC ~ 60ºC with air flow (mSATA)	-20°C ~ 60°C with air flow (SSD)	-20°C ~ 60°C with air flow (SSD)
Weight (Net/Gross)	2.9 kg	1.4Kg/2.5Kg	1.4 kg/2.5 kg	ITG-100-AL-E1/S: 0.67 kg/1.03 kg ITG-100-AL-E1: 0.86 kg/1.22 kg	470 g/1.4 kg

* COM port isolation: 3 kV for 1 sec, 2.5 kV for 1 minute

• Transportation System

Model Name	IKARPC-07A-BT	AFOKAR-08A	IKARPC-W10A-BT
LCD Size	7"	8"	10.1"
Resolution	1024 × 3 (RGB) × 600	800 (RGB) × 1280	1280 x 800
Touchscreen	Projected capacitive touch with USB interface	Projected capacitive touch with AG coating	Projected capacitive touch with USB interface
CPU	Intel® Atom™ processor E3826 (dual-core, 1.46 GHz, 7W)	Rockchip RK3399 (dual-core Cortex-A72 up to 1.8GHz + quad-core Cortex-A53 up to 1.5GHz)	Intel® Atom™ processor E3826 (dual-core, 1.46 GHz, 7W)
Expansions PCIe Mini	1 x Full-size PCIe Mini (reserved for mSATA module), 1 x Full-size PCIe Mini (reserved for WWAN module), 1 x Half-size PCIe Mini (reserved for WLAN module)	1 x Full-size PCIe Mini (reserved for WWAN)	1 x Full-size PCIe Mini (reserved for WWAN module), 1 x Full-size PCIe Mini (reserved for WLAN module)
System Fan	Fanless	Fanless	Fanless
Chassis Construction	PC + ABS plastic	PC + ABS plastic front, Metal rear	PC + ABS plastic
Power Input	Cigarette lighter power cable, DC 9 V ~ 30 V	Cigarette lighter power cable, DC 9 V ~ 30 V	Cigarette lighter power cable, DC 9 V ~ 30 V
Power Consumption	12V @ 1.25 A	12V @ 1.2A	12 V @ 1.73 A
Mounting	VESA 75	VESA 75	VESA 100
Operating Temperature	-20°C ~ 60°C with air flow	-10°C ~ 50°C with air flow	-20°C ~ 60°C with air flow

• Industrial Motherboard

Model Name	IMBA-Q470	IMBA-Q370	IMBA-H310	IMBA-Q170-i2
CPU Socket	LGA1200	LGA1151	LGA1151	LGA1151
CPU Type	10th generation Intel® Core™ i9/i7/i5/ i3, Pentium® or Celeron® processor	8th/9th generation Intel® Core™ i9/i7/ i5/i3, Pentium® or Celeron® processor	8th/9th generation Intel® Core™ i9/i7/ i5/i3, Pentium® or Celeron® processor	6th/7th generation Intel® Core™ i7/i5/i3 Pentium® and Celeron® processor
Display Interface	Triple independent displays 1 x VGA 1 x DisplayPort 1 x HDMI 1 x Internal Type-C DP	Triple independent display support 1 x DP++ 1 x VGA 1 x HDMI 1 x Internal DisplayPort	Triple independent display 1 x DVI-D 1 x VGA 1 x Internal DisplayPort	Triple independent display support 1 x HDMI 2.0 1 x VGA 1 x DVI-D 1 x iDP interface
iRIS	N/A	N/A	1 x iRIS-2400 slot	1 x iRIS-2400 slot
I/O Interface	2 x PS/2 KB/MS 8 x USB 2.0 1 x RS-232/422/485 (RS-485 support AFC) 1 x 422/485 (RS-485 support AFC) 4 x USB 3.2 Gen1 4 x RS-232 2 x USB 3.2 Gen2 4 x SATA 6G/s (RAID 0/1/5/10 supported)	1 x PS/2 KB/MS 2 x RS-232/422/485 2 x USB 3.2 Gen 2 4 x RS-232 4 x USB 3.2 Gen 1 6 x USB 2.0 6 x SATA 6G/s (RAID 0/1/5/10 supported)	4 x USB 3.2 Gen 1 5 x RS-232 1 x RS-232/422/485 (RS-485 support AFC) 4 x USB 2.0 2 x KB/MS 1 x LPT 4 x SATA 6G/s	1 x KB/MS 1 x LPT 2 x RS-232/422/485 5 x USB 3.2 Gen 1 4 x RS-232 7 x USB 2.0
Dimensions	244 mm x 305 mm	244 mm x 305 mm	244 mm x 305 mm	244 mm x 305 mm
Weight	GW: 1200g / NW: 700g	GW: 1200g / NW: 700g	GW: 1200g / NW: 700g	GW: 1200g / NW: 700g

*Specifications are subject to change without prior notice.

2021.03