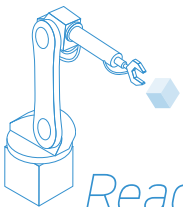
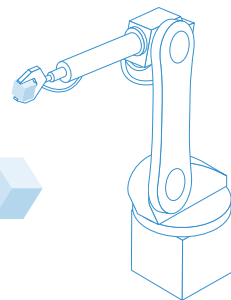


Industrial Platform Solution

We Customize Your Business



*Ready platforms for time-to-market
integration in industrial applications*



2025



ipc.msi.com

Table of Contents

◆ Overview

Table of Contents	2
Overviews	3
Design & Manufacturing Services	4
Software Services Provided	5
Automation	6-7
Transportation	8-9
Smart Retail	10-11

◆ Product Selection Guide

Panel PC	12
Tablet PC	13
Industrial Computer	14-20
Industrial Motherboard	21-37

◆ Panel PC

MS-1A91	39
MS-1A22	40
MS-1A32	41
MS-1A71	42
MS-1A81	43

◆ Tablet PC

MS-N0T1	44
---------	----

◆ Industrial Computer

Industrial Lite BOX

MS-C918	45
MS-C918S	46

Embedded BOX

MS-C909	47
MS-C906	48
MS-C903	49

MS-9A89	50
---------	----

MS-9A79	51
---------	----

MS-C907	52
---------	----

Slim BOX

MS-1P17 (MS-C924)	53
-------------------	----

MS-C902	54
---------	----

MS-9B05	55
---------	----

MS-9A85	56
---------	----

Edge AI BOX

MS-C913	57
---------	----

MS-C910	58-59
---------	-------

MS-9A76	60
---------	----

◆ Industrial Motherboard

COM Express Board

MS-98H7	61
---------	----

MS-98F7	62
---------	----

MS-9988	63
---------	----

Pico-ITX Board

MS-CF16	64
---------	----

MS-98I6	65
---------	----

3.5" Board

MS-CF17	66
---------	----

MS-98M3	67
---------	----

MS-98L3	68
---------	----

MS-98H3	69
---------	----

MS-CF03	70
---------	----

MS-98J8	71
---------	----

MS-98E6	72
---------	----

MS-98I8	73
---------	----

MS-98G6	74
---------	----

MS-98F6	75
---------	----

EPIC Board

MS-98H5	76
---------	----



Mini-ITX Board

MS-CF13	77
MS-98N1	78
MS-9892	79
MS-98B1	80
MS-98J0	81
MS-98F1	82
MS-98I0	83
MS-98E3	84
MS-98F5	85
MS-CF10	86
MS-CF02	87
MS-98L1	88
MS-98K1	89
MS-98E1	90

Micro-ATX Board

MS-CF09	91
MS-98L2	92
MS-98E2	93

ATX Board

MS-CF20	94
MS-CF05 V2.0	95
MS-CF05	96
MS-CF22	97
MS-CF06	98
MS-98N9	99
MS-98K9 V2.1	100
MS-98K9	101
MS-98L9 V2.0	102
MS-98L9	103
MS-98H9 V2.0	104
MS-98H9	105
MS-98M9	106

MSI AIoT and IPC Team

With over 30 years in motherboard design and manufacturing, MSI ranks among the world's top 3, renowned for quality and stability. Since 2006, MSI expanded into Embedded and Industrial markets, offering reliable, expandable products with longevity support.

Our high-quality embedded boards and systems cater to diverse applications including digital signage, medical electronics, ATM, POS, Kiosk, industrial automation, gaming, utility, and transportation. Backed by robust R&D and manufacturing capabilities, we deliver efficient DMS (Design & Manufacturing Services) solutions, poised to be the preferred partner in the Embedded and Industrial market worldwide.

We are a seasoned, cutting-edge department specializing in industrial/embedded motherboards and BOX IPC barebone/systems for discerning OEMs. With a wealth of experience, we offer both standard products and tailored design solutions.

Design & Manufacturing Services

Our Strengths

Our structured custom design process ensures seamless customer interaction with reasonable NRE costs and flexible project size parameters. Beyond meeting specifications, we streamline timelines, minimize costs, and mitigate risks in every ODM engagement.

The advantages of using MSI's DMS include



Customization

Tailoring embedded boards, systems and touch panel PCs to meet specific requirements ensures compatibility and optimized performance for each project.



Faster Development

Simplifying the design process accelerates project timelines, allowing clients to bring their products to market more quickly.



Reduced Design Risk

Leveraging off-the-shelf products as a foundation for development helps mitigate risks associated with designing components from



Prototype Delivery

Quick turnaround times for prototypes enable rapid iteration and testing, facilitating the refinement of products before full-scale production.



Scalability

MSI's solutions can be scaled to accommodate various project sizes and requirements, providing flexibility as needs evolve.



Revision Control & Management

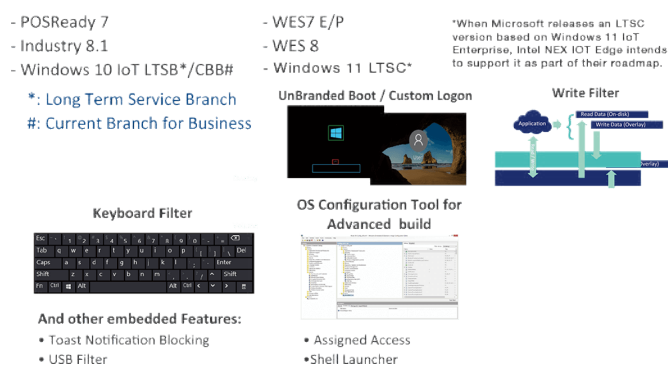
MSI ensures long-term product availability with reliable components, typically lasting 5-7 years. They notify customers of revisions 6 months in advance, offering options and guidance for informed decisions.

Software

The customization service offers tailored embedded OS solutions for MSI IPC products to meet specific operational needs. It includes integrating Microsoft Embedded OS with device drivers and customer applications by request. Additionally, APIs and drivers for the HIDAC Utility can be provided to enhance system availability and simplify maintenance.

EMBEDDED OS CUSTOMIZATION

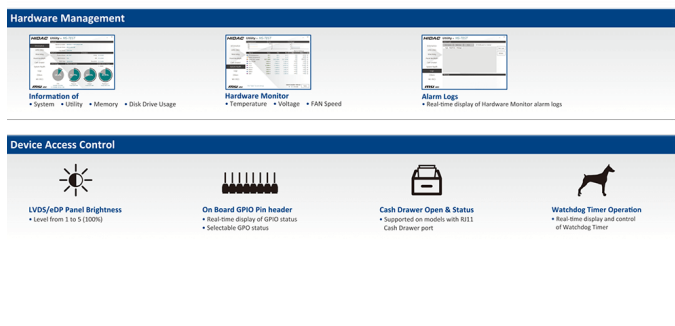
Windows Embedded OS (POS Ready 7, Industry 8.1, Windows 10 IoT LTSC/CBB) allow deep customization. Features include unbranded boot, custom logon screens, write filters for system integrity, keyboard filters for input control, toast notification blocking, USB filtering, and tools for assigned access and shell launcher customization to boost security and functionality.



MSI HIDAC UTILITY & API/ DRIVERS

We provide extensive hardware management with device access control. Features include monitoring system info (utility, memory, disk), real-time data on temperature, voltage, fan speed, and alarm logs for issues. Device access control includes adjusting panel brightness, GPIO pin control, managing cash drawer via RJ11 port, and watchdog timer for stability.

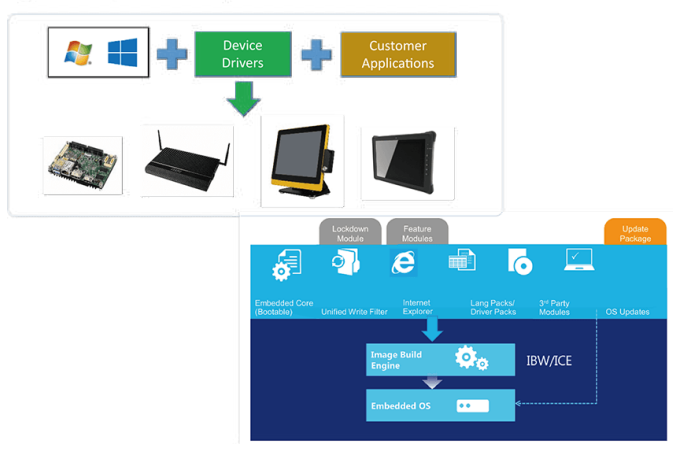
Hardware Information & Device Access Control



EMBEDDED OS INTEGRATION

We integrate Microsoft's Embedded OS with tailored device drivers and customer applications, customized for various Windows Embedded systems using MSI HIDAC Utility & API/Drivers. Features include real-time system monitoring, adjustable hardware settings, and enhanced security, optimizing embedded system performance to meet specific customer needs.

- Integrated Microsoft Embedded OS with device driver and customer's application by customer request



Smart Factory



Automatic Material Replneishment

MS-C907
MS-C929



Vision Control System

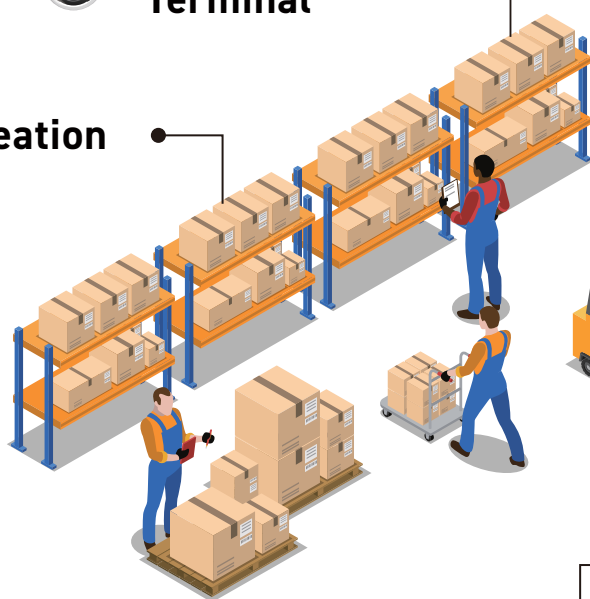
MS-C906
MS-C902



IP Camera Terminal

RFID ID Creation

MS-C910
MS-C910E



Information Analysis

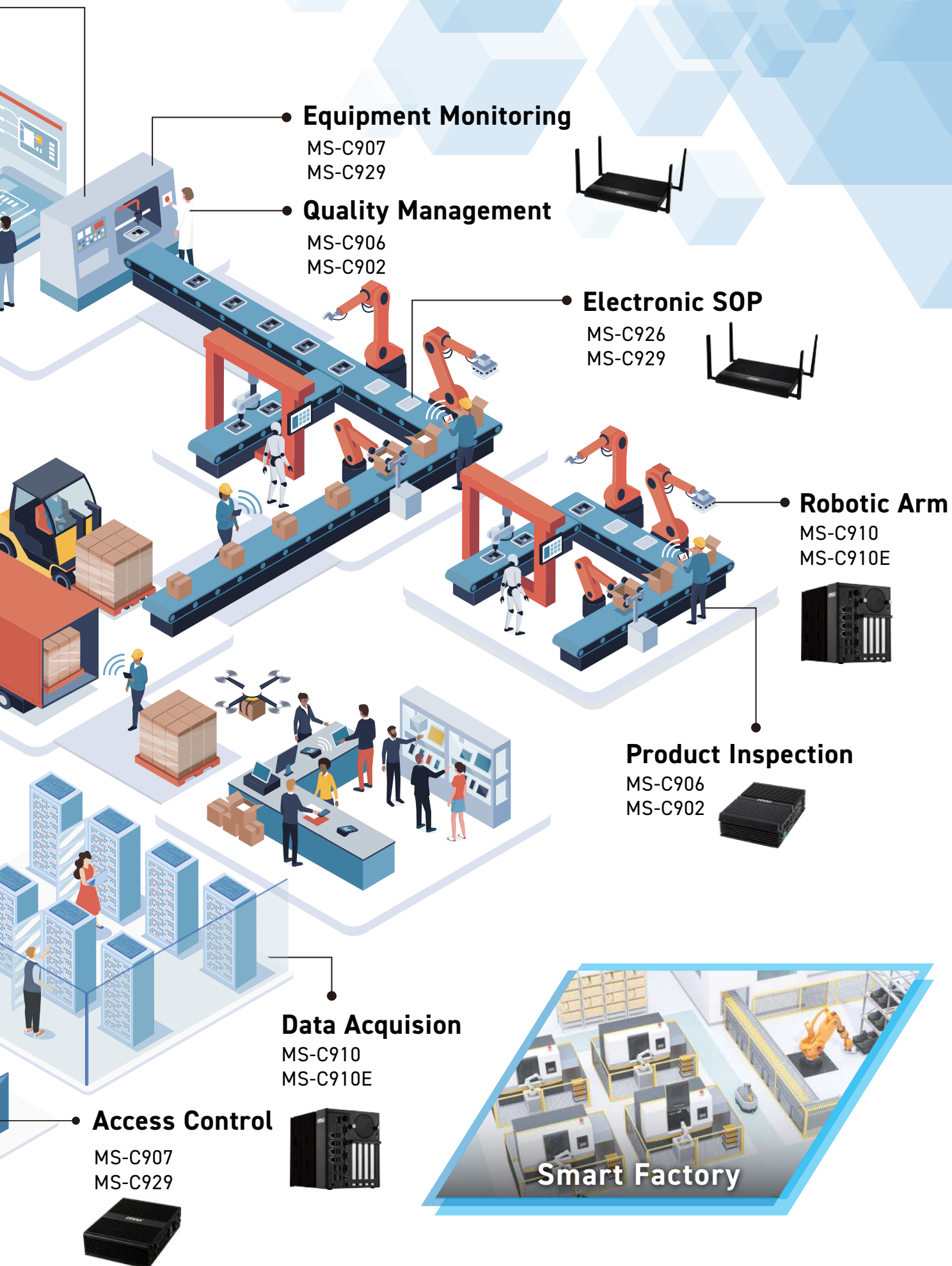
MS-C906
MS-C902



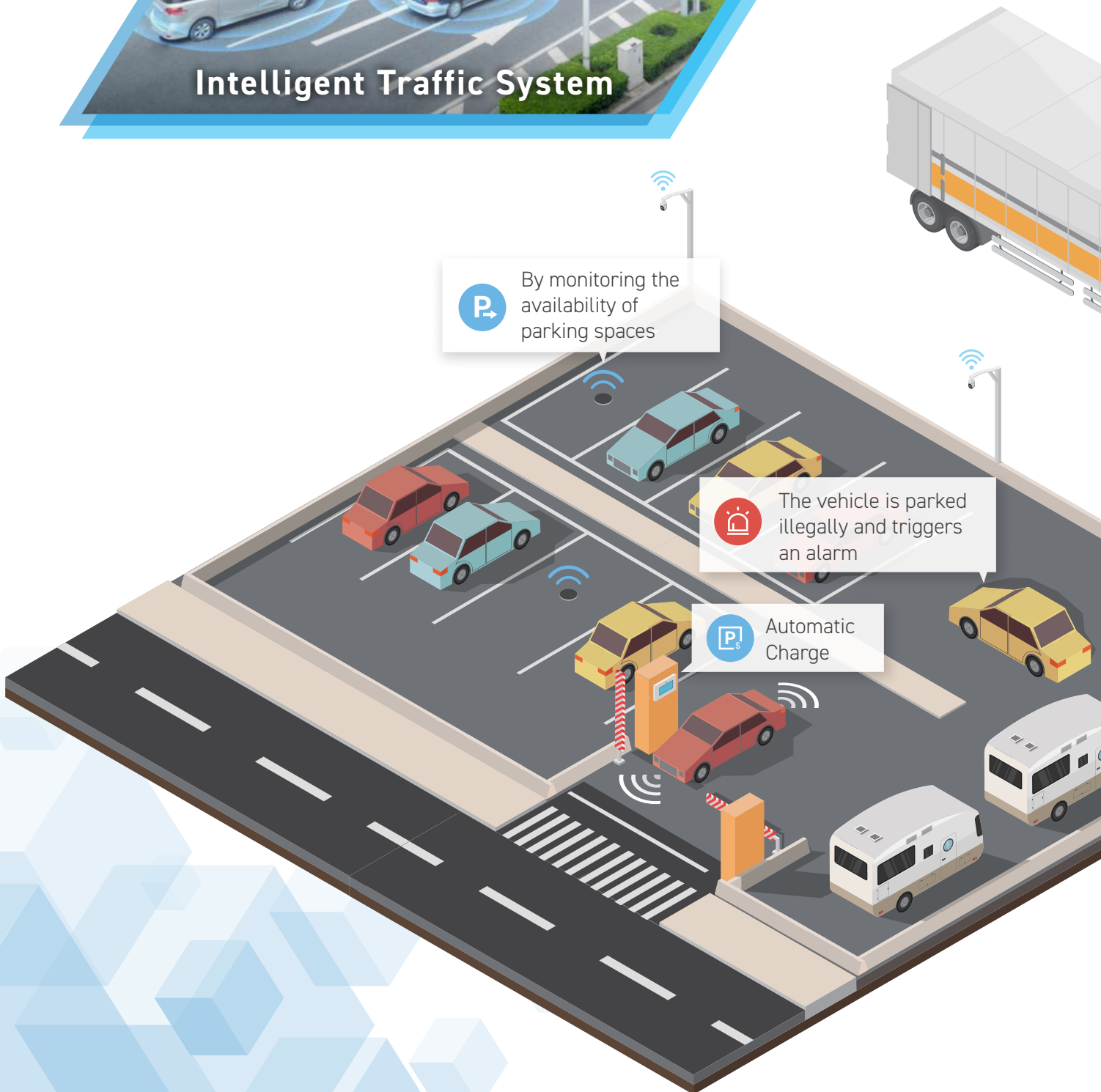
PPC for HMI (Operator Panel)

Panel PC





Smart Parking



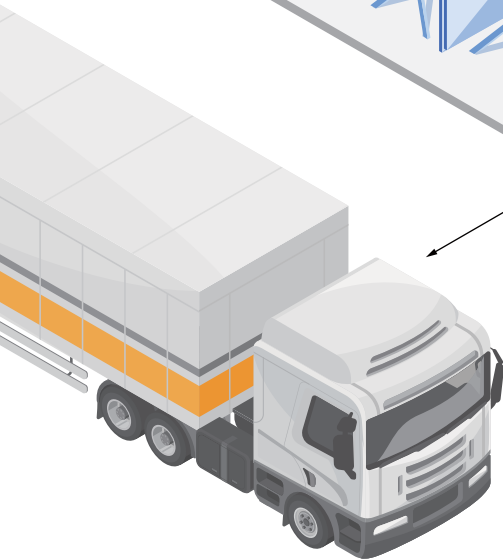


GPS



Management Center

MS-C910
MS-C910E
MS-C930(4U)



Remote Management 4G/5G MS-C906



Smart Parking

Smart Retail (KIOSK)

Vending Machines

Smart Self-ordering Kiosk

MS-C907
MS-C929
MS-1P17

Smart Self-Checkout system

Panel PC



+



Cutting-edge recognition technology
for in-store business analytics

MS-C910
MS-C910E
MS-C930(4U)

Digital Menu Boards

Digital signage solutions as menu boards
displaying real-time promotions

MS-1P17
MS-C926



Panel PC

POS Terminal

Panel PC

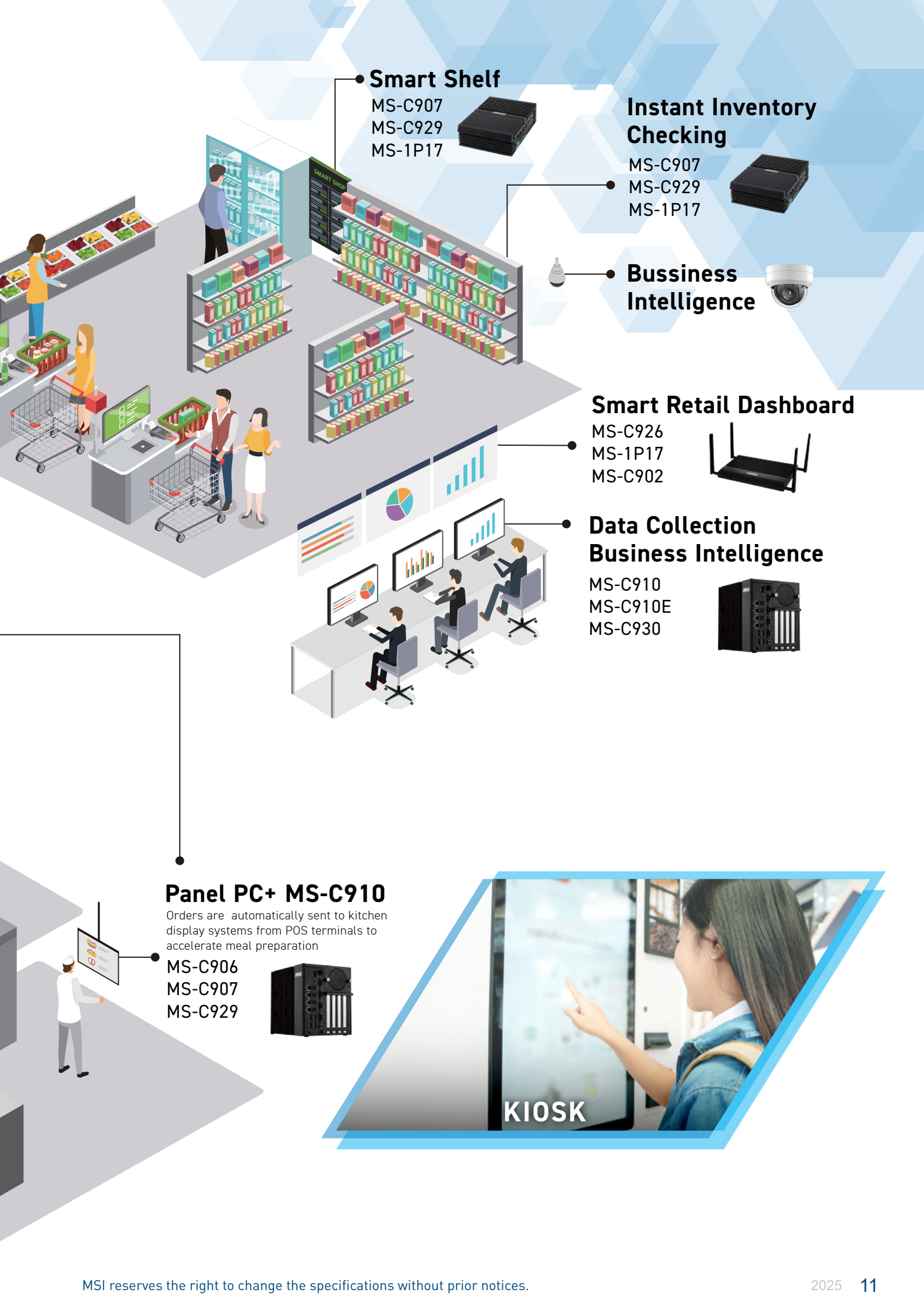
Intelligent Shelf

Interactive Digital Signage with Facial Recognition

Self-ordering kiosks to cut
customer queuing time

MS-C926
MS-C902





Smart Shelf

MS-C907
MS-C929
MS-1P17



Instant Inventory Checking

MS-C907
MS-C929
MS-1P17



Business Intelligence



Smart Retail Dashboard

MS-C926
MS-1P17
MS-C902



Data Collection Business Intelligence

MS-C910
MS-C910E
MS-C930



Panel PC+ MS-C910

Orders are automatically sent to kitchen display systems from POS terminals to accelerate meal preparation

MS-C906
MS-C907
MS-C929



KIOSK



	MS-1A91	MS-1A22	MS-1A32	MS-1A71	MS-1A81
	Panel PC				
LCD Size	10.1"	12.1"	15"	15.6"	21.5"
Resolution	1024 x 600	1024 x 768	1024 x 768	1920 x 1080	1920 x 1080
Brightness (cd/m2)	500	500	350	500	500
Contrast Ratio	500	700	800	1000	1000
Support Colors	16.7M	16.7M	16.2M	16.2M	16.7M
Pixel Pitch (H/Vmm)	0.217 x 0.208	0.24 x 0.24	0.297 x 0.297	0.17925 x 0.17925	247.95 x 247.95 (um)
Viewing Angle	70/70/60/60	80/80/70/70	80/80/70/80	89/89/89/89	89/89/89/89
Touch Panel	5-Wire Resistive	Projective Capacitive 5-Wire Resistive	Projective Capacitive 5-Wire Resistive	Projective Capacitive	Projective Capacitive
CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz ,QC ,12W Intel® Atom X7425E 1.5GHz , QC, 12W	Intel® Alder Lake N Series Intel® processor N97 2.0GHz ,QC ,12W Intel® Atom X7425E 1.5GHz , QC, 12W Intel® Core i3-N305 1.8GHz , 8C, 15W			
Frequency	3.2 up to 3.80 GHz	3.2 up to 3.80 GHz	3.2 up to 3.80 GHz	3.2 up to 3.80 GHz	3.2 up to 3.80 GHz
L2 Cache	6MB	6MB	6MB	6MB	6MB
Chipset	SoC	SoC	SoC	SoC	SoC
Technology	Single-channel DDR5 MHz	Single-channel DDR5 MHz	Single-channel DDR5 MHz	Single-channel DDR5 MHz	Single-channel DDR5 MHz
Max. Capacity	Up to 16GB	Up to 16GB	Up to 16GB	Up to 16GB	Up to 16GB
Socket	1 x 262-pin SO-DIMM	1 x 262-pin SO-DIMM	1 x 262-pin SO-DIMM	1 x 262-pin SO-DIMM	1 x 262-pin SO-DIMM
Display Interface	HDMI up to 3840 x 2160 DP up to 4096 x 2160	HDMI up to 3840 x 2160 DP up to 4096 x 2160	HDMI up to 3840 x 2160 DP up to 4096 x 2160	HDMI up to 3840 x 2160 DP up to 4096 x 2160	HDMI up to 3840 x 2160 DP up to 4096 x 2160
Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Mini-PCIe	N/A	N/A	N/A	N/A	N/A
M.2	1 M.2 E key (reserved for WiFi)	1 M.2 E key (reserved for WiFi)	1 M.2 E key (reserved for WiFi)	1 M.2 E key (reserved for WiFi)	1 M.2 E key (reserved for WiFi)
SATA	N/A	1 x 2.5" HDD (Option)	1 x 2.5" HDD (Option)	1 x 2.5" HDD (Option)	1 x 2.5" HDD (Option)
M.2	1 x M.2 B key (reserved for storage)	1 x M.2 B key (reserved for storage)	1 x M.2 B key (reserved for storage)	1 x M.2 B key (reserved for storage)	1 x M.2 B key (reserved for storage)
mSATA	N/A	N/A	N/A	N/A	N/A
CFast	N/A	N/A	N/A	N/A	N/A
CompactFlash	N/A	N/A	N/A	N/A	N/A
RJ-45	2	2	2	2	2
Audio	1 x Line-out 1 x MIC-in	1 x Line-out 1 x MIC-in	1 x Line-out 1 x MIC-in	1 x Line-out 1 x MIC-in	1 x Line-out 1 x MIC-in
USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
Serial	1 x COM (1 x edge I/O) COM1: RS-232/422/485, 0V/5V/12V	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Optionwith cable)
Parallel	N/A	N/A	N/A	N/A	N/A
PS/2	N/A	N/A	N/A	N/A	N/A
HDMI	1	1	1	1	1
DVI	N/A	N/A	N/A	N/A	N/A
DisplayPort	1	1	1	1	1
VGA	N/A	N/A	N/A	N/A	N/A
Antenna	Inside	Inside	Inside	Inside	Inside
DC Input	DC-in 12~24V	DC-in 12~24V	DC-in 12~24V	DC-in 12~24V	DC-in 12~24V
IP Rating	Front IP65 / Rear 41	Front IP65 / Rear 41	Front IP65 / Rear 41	Front IP65 / Rear 41	N/A
Operating Temperature	0°C ~ 40°C	0°C ~ 40°C	0°C ~ 40°C	0°C ~ 40°C	0°C ~ 40°C
Operating Humidity	20%~90% RH	20%~90% RH	20%~90% RH	20%~90% RH	20%~90% RH
Storage Temperature	-20°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C
Storage Humidity	10% ~ 90% non-condensing	10% ~ 90% non-condensing	10% ~ 90% non-condensing	10% ~ 90% non-condensing	10% ~ 90% non-condensing
Housing	Plastic / Metal	Plastic / Metal	Plastic / Metal	Plastic / Metal	Plastic / Metal
Dimensions (L x W x D)	272 x 178 x 42 mm	200.75 x 267.32 x 40.8 mm	291.5 x 359.50 x 38.1 mm	255.6 x 399.7 x 38.1 mm	333.01 x 538.55 x 41.95 mm
Weight	1.6kg (3.53lbs)	2kg (4.4lbs)	3kg (6.61lbs)	2.71kg (5.97lbs)	5.6kg (12.34lbs)
Mounting	VESA 75 x 75, 100 x 100 mm (Optional)	VESA 75 x 75, 100 x 100 mm (Optional)	VESA 75 x 75, 100 x 100 mm (Optional)	VESA 75 x 75, 100 x 100 mm (Optional)	VESA 75 x 75, 100 x 100 mm (Optional)
EMC	FCC, CE, BSMI, VCCI	FCC, CE, BSMI, VCCI	FCC, CE, BSMI, VCCI	FCC, CE, BSMI, VCCI	FCC, CE, BSMI, VCCI
Safety	PSE	PSE	PSE	PSE	PSE
OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise 2022				



	MS-N0T1
	Tablet PC
LCD Size	10.1"
Resolution	1024 x 600
Brightness (cd/m2)	500
Contrast Ratio	500
Support Colors	16.7M
Pixel Pitch (H/Vmm)	0.217 x 0.208
Viewing Angle	88/88/88/88
Touch Panel	5-Wire Resistive
CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz ,QC ,12W Intel® Atom X7425E 1.5GHz , QC, 12W
Frequency	3.2 up to 3.80 GHz
L2 Cache	6MB
CPU Type	N/A
Chipset	SoC
CPU Type	N/A
Technology	Single-channel DDR5 MHz
Max. Capacity	Up to 16GB
Socket	1 x 262-pin SO-DIMM
Display Interface	HDMI up to 3840 x 2160 DP up to 4096 x 2160
Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Mini-PCle	N/A
M.2	1 M.2 E key (reserved for WiFi)
SATA	N/A
M.2	1 x M.2 B key (reserved for storage)
mSATA	N/A
CFast	N/A
CompactFlash	N/A
RJ-45	2
Audio	1 x Line-out 1 x MIC-in
USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
Serial	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V
Parallel	N/A
PS/2	N/A
HDMI	1
DVI	N/A
DisplayPort	1
VGA	N/A
Antenna	Inside
DC Input	DC-in 12~24V
IP Rating	Front IP65 / Rear 41
Operating Temperature	0°C ~ 40°C
Operating Humidity	20%~90% RH
Storage Temperature	-20°C ~ 60°C
Storage Humidity	10% ~ 90% non-condensing
Housing	Plastic / Metal
Dimensions (L x W x D)	200.75 x 267.32 x 40.8 mm
Weight	2kg (4.4lbs)
Mounting	VESA 75 x 75, 100 x 100 mm (Optional)
EMC	FCC, CE, BSMI, VCCI
Safety	PSE
OS Support	Windows 10 IoT Enterprise LTSC 2022 Windows 11 IoT Enterprise

NEW



NEW



NEW



Model		MS-C918	MS-C918S	MS-C909
		Industrial Computer		
System Processor	CPU	Intel® Mobile Alder Lake-N N100 Processor, 6W	Intel® Mobile Alder Lake-N N100 Processor, 6W	Intel® Celeron® Processor J6412, QC, 10W
	Frequency	0.8 GHz~3.4 GHz	0.8 GHz~3.4 GHz	2.0 GHz, up to 2.6 GHz
	L2 Cache	6MB	6MB	1.5MB
	CPU Type	BGA	BGA	BGA
	Chipset	Integrated in SoC Process	Integrated in SoC Process	Integrated in SoC Process
Memory	BIOS	AMI	AMI	AMI
	Technology	Single-channel LPDDR5 4800 MHz	Single-channel LPDDR5 4800 MHz	Single-Channel DDR4 3200 MHz
	Max. Capacity	Up to 4 GB	Up to 4 GB	Up to 16 GB
Graphic	Socket	N/A	N/A	1 x 260-pin DDR4 SO-DIMM
	Controller	Intel® UHD Graphics	Intel® UHD Graphics	Intel® UHD Graphics
	Graphic Memory	Depends on CPU	Depends on CPU	Depends on CPU
	Multiple Display	2 independent displays	2 independent displays	2 independent displays
Ethernet	Display Interface	HDMI 2.0b up to 4096 x 2160 @60Hz DP 1.4a up to 4096 x 2304 @60Hz (option)	HDMI 2.0b up to 4096 x 2160 @60Hz DP 1.4a up to 4096 x 2304 @60Hz (option)	HDMI up to 3840 x 2160 @30Hz
	Controller	1 x Realtek® RTL8111H-CG	1 x Realtek® RTL8111H-CG	1 x Intel® I226-V 2.5 GbE LAN
Audio	Controller	N/A	N/A	N/A
	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
H/W Monitor	Smart Fan	N/A	N/A	N/A
TPM	Controller	N/A	N/A	Infineon SLB9672VU2.0
	PCIe x16	N/A	N/A	N/A
	PCIe x8	N/A	N/A	N/A
	PCIe x4	N/A	N/A	N/A
	PCIe x1	N/A	N/A	N/A
	PCI	N/A	N/A	N/A
	M.2	N/A	N/A	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230
Storage	Mini-PCIe	N/A	N/A	N/A
	SATA	N/A	N/A	1 x M.2 B key (SATA), 2242/2280
	mSATA	N/A	N/A	N/A
	CFast	N/A	N/A	N/A
	CompactFlash	N/A	N/A	N/A
I/O Interface	RJ-45	1	1	1 x 2.5 GbE LAN 1 x InnoAgent (Optional)
	PoE	N/A	N/A	N/A
	Audio	N/A	N/A	N/A
	USB	1 x USB 2.0 2 x USB 10Gbps	1 x USB 2.0 2 x USB 10Gbps	4 x USB 3.2 Gen 1
	Serial	N/A	N/A	1 x COM port COM1: RS-232/422/485, 0V/5V/12V
	Parallel	N/A	N/A	N/A
	PS/2	N/A	N/A	N/A
	GPIO	N/A	N/A	8-bit (4 x GPI; 4 x GPO), 5V 6-bit (Optional by InnoAgent)
	CANbus	N/A	N/A	N/A
	HDMI	2 or 1 (option)	2 or 1 (option)	2
	LVDS	N/A	N/A	N/A
	DVI	N/A	N/A	N/A
	DisplayPort	1 (option)	1 (option)	N/A
	VGA	N/A	N/A	N/A
	Antenna	2 internal reserved for antennas	2 internal reserved for antennas	2 openings reserved for antennas
Power Supply	DC Input	DC-in 12V	DC-in 12V	DC-in 12~24V with Lockable DC Jack
	AC Input	N/A	N/A	N/A
	IP Rating	N/A	N/A	N/A
Environment	Operating Temperature	0 ~ 40°C	0 ~ 55°C Note: Thermal w/ Airflow:0.7m/s	-10~60°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	0 ~ 60°C	0 ~ 60°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Vibration	Operating: 0.25 Grms, 5-300Hz, 3axes	Operating: 0.25 Grms, 5-300Hz, 3axes	IEC61373 Category 1, Class B
	Shock	Operating: 3 G, half sine 11 ms duration	Operating: 3 G, half sine 11 ms duration	IEC61373 Category 1, Class B
Physical haracteristics	Dimensions(W x D x H)	80 x 80 x 39.5 mm	80 x 78 x 48 mm	130 x 155 x 40 mm
	Weight	0.22 kg	0.35 kg	0.91 kg
	Mounting	VESA mount	VESA mount	Wall mount (STD)/DIN-rail mount(STD)
Certification	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC	CE, FCC, RCM, VCCI, BSMI, UKCA, IC
	Safety	BSMI	BSMI	BSMI
Software Platform	OS Support	Windows 11 IoT Enterprise LTSC (Pre-test)	Windows 11 IoT Enterprise LTSC (Pre-test)	Windows 10 IoT Enterprise LTSC (64-bit, 21H2) Linux (Support by request)



NEW



NEW

Model		MS-C906		MS-C903			
		Industrial Computer					
System Processor	CPU	Embedded SKUs	Industrial SKUs	Embedded SKUs	Industrial SKUs		
		Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i5-1345UE / i3-1315UE	Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i5-1345URE / i3-1315URE	Intel® Mobile 11th Gen Tiger Lake-UP3 Series Processors, Core™ i3-1115G4E / i5-1145G7E / i7-1185G7E	Intel® Mobile 11th Gen Tiger Lake-UP3 Series Processors, Core™ i3-1115GRE / i5-1145GRE		
		Frequency		3.30 GHz~4.6 GHz (Depends on CPU)		2.20 GHz~4.4 GHz (Depends on CPU)	
		L2 Cache		6M~12M (Depends on CPU)		6M~12M (Depends on CPU)	
		CPU Type		BGA		BGA	
		Chipset		Integrated in SoC Process		Integrated in SoC Process	
		BIOS		AMI		AMI	
Memory	Technology	Single-channel DDR5 5200 MHz		Dual-channel DDR4 3200 MHz			
	Max. Capacity	Up to 32 GB		Up to 64 GB			
	Socket	1 x 262-pin SO-DIMMs		2 x 260-pin SO-DIMMs			
Graphic	Controller	Intel® UHD Graphics		Intel® Iris® Xe Graphics (For i5/i7 SKU) Intel® UHD Graphics (For i3 SKU)			
	Graphic Memory	Depends on CPU		Depends on CPU			
	Multiple Display	4 independent displays		2 independent displays			
	Display Interface	HDMI 2.0 up to 4096 x 2340 @60Hz		HDMI 1.4 up to 4096 x 2160 @30Hz DP up to 7680 x 4320 @60Hz			
Ethernet	Controller	4 x Intel® I226-LM GbE LAN	4 x Intel® I226-IT 2.5 GbE LAN	2 x Intel® I225-LM GbE LAN	2 x Intel® I225-IT 2.5 GbE LAN (LAN Speed running at 1000/100/10Mbps when OP TEMP. over 70°C)		
Audio	Controller	Realtek® ALC897 HD Audio Codec (Co-lay ALC888S)		Realtek® ALC888S-VD2-GR HD Audio Codec			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer			
TPM	Smart Fan	N/A		N/A			
	Controller	Infineon SLB9672VU2.0	Infineon SLB9672XU2.0	Infineon SLB9670VQ2.0/FW7.85	Infineon SLB9670XQ2.0/FW7.85		
Expansion Slot	PCIe x16	N/A		N/A			
	PCIe x8	N/A		N/A			
	PCIe x4	N/A		N/A			
	PCIe x1	N/A		N/A			
	PCI	N/A		N/A			
	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0, w/CNV), 2230		1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (SATA 3.0, PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0), 2230			
	Mini-PCIe	N/A		N/A			
Storage	SATA	1 x 2.5" SSD Bay		1 x 2.5" SSD Bay			
	mSATA	N/A		N/A			
	CFast	N/A		N/A			
	CompactFlash	N/A		N/A			
I/O Interface	RJ-45	4		2			
	PoE	N/A		N/A			
	Audio	1 x Mic-in 1 x Line-out		1 x Mic-in 1 x Line-out			
	USB	4 x USB 2.0 4 x USB 3.2 Gen 2		4 x USB 2.0 4 x USB 3.2 Gen 2			
	Serial	4 x COM ports COM1~4 RS-232/422/485, 0V/5V/12V		6 x COM ports COM1~4 RS-232/422/485, 0V/5V/12V COM5~6: Option by M.2 Module			
	Parallel	N/A		N/A			
	PS/2	N/A		N/A			
	GPIO	16-bit (Default 8 x GPI, 8 x GPO), 5V		16-bit (Default 8 x GPI, 8 x GPO), 5V/0.5A			
	CANbus	N/A		1 (Option by M.2 Module)			
	HDMI	4		1			
	LVDS	N/A		N/A			
	DVI	N/A		N/A			
	DisplayPort	N/A		1			
	VGA	N/A		N/A			
	Power Supply	Antenna	6 openings reserved for antennas		6 openings reserved for antennas		
DC Input		DC-in 12V~24V Wide-Range (OCP & OVP) Phoenix pluggable connectors with latch (V+, V-)		DC-in 12V~24V Wide-Range (OCP & OVP) Phoenix pluggable connectors with latch (V+, V-)			
AC Input		N/A		N/A			
Environment	IP Rating	N/A		N/A			
	Operating Temperature	0 ~ 50°C (w/ 2.5" SATA SSD (Ta: 85°C)) 0 ~ 45°C (w/ M.2 NVMe SSD (Ta: 85°C)) Note: Thermal w/ Airflow: 0.7m/s	-20 ~ 70°C (w/ WT M.2 NVMe SSD (Ta: 85°C), w/ WT MEM (Ta: 95°C)) Note: Thermal w/ Airflow: 0.7m/s	-10~50°C (w/ WT devices) Note: Thermal w/ Airflow: 0.7m/s	-20~70°C (w/ WT devices) Note: Thermal w/ Airflow: 0.7m/s		
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing			
	Vibration	IEC61373 Category 1, Class B		IEC61373 Category 1, Class B			
Physical haracteristics	Shock	IEC61373 Category 1, Class B		IEC61373 Category 1, Class B			
	Dimensions(W x D x H)	215 x 155 x 65 mm		215 x 155 x 65 mm			
	Weight	2.25 kg		2.24 kg			
	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)		Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)			
Certification	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC		CE, FCC Class A, VCCI, RCM, UKCA, BSMI			
	Safety	BSMI		BSMI			
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, Pre-scan) Linux (Support by request)		Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)			



Model		MS-9A89							MS-9A79		
		Industrial Computer									
System Processor		MS-9A89-A1	MS-9A89-A2	MS-9A89-A3	MS-9A89-U1	MS-9A89-U2	MS-9A89-U3	MS-9A89-U4	MS-9A79-A1	MS-9A79-A2	MS-9A79-A3
	CPU	Intel® Atom™ x7 Processor E3950, QC, 12W	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor J3455, QC, 10W	Intel® Kaby Lake-U Core™ i3-7100U Processor, DC, 15W	Intel® Skylake-U Core™ i5-6300U Processor, DC, 15W	Intel® Skylake-U Core™ i3-6100U Processor, DC, 15W	Intel® Skylake-U Core™ i7-6600U Processor, DC, 15W	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor N3350, DC, 6W	Intel® Celeron® Processor J3455, QC, 10W
	Frequency	1.6 GHz up to 2.0 GHz	1.6 GHz up to 1.8 GHz	1.5 GHz, up to 2.3 GHz	2.4 GHz			2.6 GHz	1.6 GHz up to 1.8 GHz	1.1 GHz up to 2.4 GHz	1.5 GHz, up to 2.3 GHz
	L2 Cache	2MB			3MB				2MB		
	CPU Type	BGA							BGA		
	Chipset	Integrated in SoC Process				Integrated in Process			Integrated in SoC Process		
Memory	BIOS	AMI							AMI		
	Technology	Single-channel DDR3L 1866/1600 MHz				Single-channel DDR4 2133 MHz			Single-channel LPDDR4 2133 MHz		
	Max. Capacity	Up to 8GB				Up to 16GB			Up to 4GB		
Graphic	Socket	1 x 204-pin SO-DIMMs				1 x 260-pin SO-DIMMs			Onboard		
	Controller	Intel® HD Graphics							Intel® HD Graphics		
	Graphic Memory	Depends on CPU							Depends on CPU		
	Multiple Display	3 independent displays							2 or 3 independent displays		
	Display Interface	HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz LVDS up to 1920 x 1200 @60Hz (optional by cable) DVI-I up to 1920 x 1200 @60Hz (optional by MS-99C0)				HDMI1.4 up to 4096 x 2160 @24Hz DP up to 3840 x 2160 @60Hz (Support DP++) LVDS up to 1920 x 1200 @60Hz (optional by cable) DVI-I up to 1920 x 1200 @60Hz (optional by MS-99C0)			HDMI up to 3840 x 2160 @30 Hz Mini-DP up to 4096 x 2160 @60 Hz LVDS up to 1920 x 1200 @60 Hz (optional by cable) DVI-I up to 1920 x 1200 @60 Hz (optional by MS-99C0)		
Ethernet	Controller	2 x Intel® I210-IT GbE LAN	2 x Intel® I210-AT GbE LAN LAN		1 x Intel® I210-AT GbE LAN 1 x Intel® I219-LM GbE LAN PHY			2 x Intel® I210-IT GbE LAN 2 x Intel® I211-AT GbE LAN LAN			
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec							Realtek® ALC887-VD2-CG HD Audio Codec		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer							256-level Watchdog Timer		
TPM	Smart Fan	N/A							N/A		
	Controller	N/A							Pin Header		
Expansion Slot	PCIe x16	N/A							N/A		
	PCIe x8	N/A							N/A		
	PCI	N/A							N/A		
	M.2	N/A							N/A		
	Mini-PCIe	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)							1 x Full-size (w/ NANO SIM-Holder) 1 x Half-size (Shared w/ mSATA)		
Storage	SATA	1 x 2.5" HDD/SSD Bay							1 x 2.5" HDD/SSD Bay		
	mSATA	1 x Full-size							1 x Half-size (Shared w/ Mini-PCIe)		
	CFast	N/A							N/A		
I/O Interface	RJ-45	4 (LAN1/2 Standard, LAN3/4 by Option)							2		
	PoE	2 x 802.11af (Option by Request)							N/A		
	Audio	1 x Line-out, 1 x Mic-in							1 x Line-out, 1 x Mic-in		
	USB	4 x USB 2.0 2 x USB 3.2 Gen 1			4 x USB 2.0 4 x USB 3.2 Gen 1			2 x USB 2.0 2 x USB 3.2 Gen 1			
	Serial	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V							2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V		
	PS/2	N/A							N/A		
	GPIO	16-bit (8*GPI; 8*GPO), 5V							16-bit (8*GPI; 8*GPO), 5V		
	CANbus	2 x CAN 2.0B (Option)							CAN 2.0B (by BOM option)		
	HDMI	1							1		
	LVDS	1 (optional)							1 (by BOM option)		
	DVI	1 (DVI-I by option)							1 (DVI-I by BOM option)		
	DisplayPort	1							1 (Mini-DP)		
	Antenna	4 openings reserved for antennas							4 openings reserved for antennas		
Power Supply	DC Input	DC-in 12V~24V							DC-in 12V Jack (5.5mm/2.5mm) / Phoenix pluggable with latch (Support OCP/ OVP Protection)		
Environment	IP Rating	N/A							N/A		
	Operating Temperature	-10~45°C (HDD) -20~70°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	-10~45°C (HDD) -10~60°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s		-10~45°C (HDD) -10~60°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s			-10~45°C (HDD) -20~70°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	-10 ~ 45°C (HDD) -10 ~ 55°C (SSD/mSATA) Note: Thermal w/ Airflow:0.7m/s		
	Operating Humidity	10 ~ 90%, non-condensing							10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C							-40 ~ 80°C -20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing							10 ~ 90%, non-condensing		
	Vibration	IEC61373 Category 1, Class B							IEC61373 Category 1, Class A		
	Shock	IEC61373 Category 1, Class B							IEC61373 Category 1, Class A		
Physical haracteristics	Dimensions(W x D x H)	215 x 155 x 55 mm							155 x 110 x 55 mm		
	Weight	1.55 kg							1.1 kg		
Certification	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)							Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)		
	EMC	CE, FCC, VCCI, RCM, BSMI, EN50155							FCC, CE, RCM, VCCI, BSMI		
Software Platform	Safety	BSMI							BSMI		
	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)							Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)		



NEW



NEW

Model		MS-C907		MS-1P17 (MS-C924)		
		Industrial Computer				
System Processor	CPU	Intel® IOTG Alder Lake-N Processor N97, QC, 12W	Intel® IOTG Alder Lake-N Core i3-N305, OC, 12W up to 15W	Intel® IOTG Alder Lake-N Processor N97, QC, 12W	Intel® IOTG Alder Lake-N Atom® X7425E, QC, 12W	Intel® IOTG Alder Lake-N Core i3-N305, OC, to 15W
	Frequency	2 GHz, up to 3.6 GHz	1.8 GHz, up to 3.8 GHz	2 GHz, up to 3.6 GHz	3.4 GHz	1.8 GHz, up to 3.8 GHz
	L2 Cache	6MB		6MB		
	CPU Type	BGA		BGA		
	Chipset	Integrated in SoC Process		Integrated in SoC Process		
Memory	BIOS	AMI		AMI		
	Technology	Single Channel DDR5 4800 MHz		Single-Channel DDR5 4800 MHz		
	Max. Capacity	Up to 16GB		Up to 16 GB		
Graphic	Socket	1 x 262-pin SO-DIMM		1 x 262-pin SO-DIMM		
	Controller	Intel® UHD Graphics		Intel® UHD Graphics		
	Graphic Memory	Depends on CPU		Depends on CPU		
	Multiple Display	2 independent displays		2 independent displays		
Ethernet	Display Interface	HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz		HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz		
	Controller	2 x Intel® I225-V 2.5 GbE LAN		2 x Intel® I225-V 2.5 GbE LAN		
Audio	Controller	Realtek® ALC897 HD Audio Codec		Realtek® ALC256 HD Audio Codec		
	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer		
H/W Monitor	Smart Fan	N/A		N/A		
	TPM	Controller		Infineon SLB9672VU2.0		
Expansion Slot	PCIe x16	N/A		N/A		
	PCI	N/A		N/A		
	M.2	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230		1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230		
	Mini-PCIe	N/A		N/A		
Storage	SATA	1 x 2.5" HDD/SSD Bay		N/A		
	mSATA	N/A		N/A		
	CFast	N/A		N/A		
	RJ-45	2		2 x 2.5GbE LAN		
I/O Interface	PoE	N/A		N/A		
	Audio	1 x Line-out 1 x Mic-in		1 x Line-out 1 x Mic-in		
	USB	6 x USB 2.0 2 x USB 3.2 Gen 2 2 x USB 3.2 Gen 1		4 x USB 3.1 2 x USB 2.0		
	Serial	4 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232 COM3~4: Option by M.2 Module		1 x COM port COM1: RS-232/422/485, 0V/5V/12V		
	PS/2	N/A		N/A		
	GPIO	8-bit (4*GPI; 4*GPO), 5V		N/A		
	CANbus	2 (Option by M.2 Module)		N/A		
	HDMI	1		1		
	LVDS	N/A		N/A		
	DVI	N/A		N/A		
	DisplayPort	1		1		
	VGA	N/A		N/A		
	Antenna	4 openings reserved for antennas		2 openings reserved for antennas		
	Power Supply	DC Input	DC-in 9~36V with Lockable DC Jack Phoenix pluggable connectors with latch (V+, V-)		DC-in 12~24V with Lockable DC Jack	
AC Input		N/A		N/A		
Environment	IP Rating	N/A		N/A		
	Operating Temperature	-10 ~ 40°C -10 ~ 55°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s		0~40 °C		
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		
	Vibration	IEC61373 Category 1, Class B		N/A		
Physical haracteristics	Shock	IEC61373 Category 1, Class B		N/A		
	Dimensions (WxDxH)	200 x 150 x 55 mm		197 x 162.8 x 25 mm		
	Weight	1.38 kg		0.91 kg		
Certification	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount (by option)		Stand/VESA mount (by BOM option)		
	EMC	CE, FCC, RCM, VCCI, BSMI, UKCA, IC		CE, FCC, RCM, VCCI, BSMI, UKCA		
Software Platform	Safety	BSMI		BSMI		
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)		Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)		



Model		MS-C902	MS-9B05	MS-9A85
		Industrial Computer		
System Processor	CPU	12th Gen Intel® Mobile Alder Lake-P U-series Core™ i5/i3/ Celeron® Processor, DC, 15W	8th Gen Intel® Mobile Whiskey Lake-U Core™ i5 Processor, QC, 15W	Intel® Celeron® Processor J3455, QC, 10W
	Frequency	1.0 GHz~4.4 GHz (Depends on CPU)	Depends on CPU	1.5 GHz, up to 2.3 GHz
	L2 Cache	8MB~12MB (Depends on CPU)	Depends on CPU	2MB
	CPU Type	BGA	BGA	BGA
	Chipset	Integrated	Integrated	Integrated
	BIOS	AMI	AMI	AMI
Memory	Technology	Dual-channel DDR4 3200 MHz	Dual-channel DDR4 2400 MHz	Single-Channel DDR3L 1600/1866 MHz
	Max. Capacity	Up to 64GB	Up to 32GB	Up to 8 GB
	Socket	2 x 260-pin SO-DIMMs	2 x 260-pin SO-DIMMs	1 x 204-pin SO-DIMMs
Graphic	Controller	Intel® Iris® Xe Graphics (For i5 SKUs) Intel® UHD Graphics (For i3/Celeron SKUs)	Intel® UHD Graphics 620	Intel® HD Graphics
	Graphic Memory	Depends on CPU	Depends on CPU	Depends on CPU
	Multiple Display	4 independent displays	3 independent displays	3 independent displays
	Display Interface	HDMI 2.0 up to 4096 x 2304 @60Hz DP up to 7680 x 4320 @60Hz	HDMI 2.0 up to 4096 x 2160 @60Hz HDMI 1.4 up to 4096 x 2160 @24Hz	HDMI 2.0 up to 3840 x 2160 @60Hz* DP 1.2 up to 4096 x 2160 @60Hz (Resolution combination depends on various application) (*HDMI resolution for 30Hz or 60Hz depends on monitor)
Ethernet	Controller	2 x Intel® I226-LM 2.5 GbE LAN	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	2 x Intel® I211-AT GbE LAN
Audio	Controller	Realtek® ALC888-VD2-GR HD Audio Codec (Co-lay ALC897)	Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC887/888S HD Audio Codec
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A	N/A	N/A
TPM	Controller	Infineon SLB9670VQ 2.0	Infineon SLB9665TT2.0 (by BOM option)	Infineon SLB9665TT2.0 (by BOM option)
Expansion Slot	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe, SATA 3.0), 2242/2280 1 x M.2 B key (PCIe x1, USB 3.2, USB 2.0 w/ NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0), 2230	1 x E key (2x PCIe x1, USB 2.0), 2230 1 x M key (PCIe x4), 2242	1 x E key (PCIe x2, USB 2.0), 2230 1 x M key (SATA only), 2280
	Mini-PCIe	N/A	1 x Half/Full-size (w/ mSATA) 1 x Half/Full-size (w/ Nano-SIM holder)	1 x Full-size (with SIM holder)
Storage	SATA	1 x 2.5" SSD (7mm)	1 x 2.5" HDD/SSD	1 x 2.5" HDD/SSD
	mSATA	N/A	1 x Full-size (shared with mini-PCIe)	N/A
	CFast	N/A	N/A	N/A
I/O Interface	RJ-45	2	2	2
	PoE	N/A	N/A	N/A
	Audio	1 x Line-out (Mic-in by AP driver)	1 x SPDIF-out/Line-out 1 x Mic-in/Line-in	1 x Line-out (Mic-in by AP driver)
	USB	2 x USB 3.2 Gen2, Type-A 1 x USB 3.2 Gen2, Type-C 2 x USB 2.0, Type-A	4 x USB 2.0 2 x USB 3.2 Gen 2	1 x USB 2.0 3 x USB 3.2 Gen 1
	Serial	2 x COM ports COM1/2: RS-232/422/485, 0V/5V/12V	2 x COM ports COM1/2: RS-232/422/485, 0V/5V/12V	1 x COM port COM1: RS-232/422/485, 0V/5V/12V
	GPIO	N/A	N/A	N/A
	CANbus	N/A	N/A	N/A
	HDMI	N/A	3	1
	DVI	N/A	N/A	N/A
	DisplayPort	2	N/A	2
	VGA	N/A	N/A	N/A
	Antenna	N/A	4 openings reserved for antennas	2 openings reserved for antennas
Power Supply	DC Input	DC-in 19V with Lockable DC Jack	DC-in 9~36V with Lockable DC Jack	DC-in 19V with Lockable DC Jack
	AC Input	N/A	N/A	N/A
Environment	IP Rating	Full IP40	Full IP40	N/A
	Operating Temperature	-10 ~ 50°C (SSD) Note: Thermal w/ Airflow:0.7m/s	-10 ~ 40°C (HDD) -10 ~ 50°C (SSD) Note: Thermal w/ Airflow:0.7m/s	0 ~ 40°C (HDD/WT M.2 M key) -10 ~ 50°C (SSD) Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Vibration	Operating: IEC 60068-2-64: 2 Grms, 5 ~ 500 Hz, 1hr/axis (w/ SSD)	IEC61373 Category 1, Class A Operating: IEC 60068-2-64: 2 Grms, 5 ~ 500 Hz, 1hr/axis (w/ SSD)	Operating, 0.25 Grms, 5-300Hz, 3axes (w/ HDD)
	Shock	Operating: IEC 60068-2-27: 50G, half sine, 11ms (w/ SSD)	IEC61373 Category 1, Class A Operating: IEC 60068-2-27: 50G, half sine, 11ms (w/ SSD)	Operating, 3 G, half sine 11 ms duration (w/ HDD)
Physical haracteristics	Dimensions (W x D x H)	196 x 285 x 29 mm	260 x 185 x 27 mm	180 x 255 x 19 mm
	Weight	2.24 kg	1.77 kg	1.17 kg
	Mounting	VESA/Wall mount	VESA/DIN Rail(STD), Wall mount (by BOM option)	VESA mount
Certification	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC	FCC, CE, RCM, VCCI, BSMI Class A	FCC, CE, RCM, VCCI, BSMI
	Safety	BSMI	BSMI	BSMI, Energy Star
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)



NEW



NEW

Model		MS-C913		MS-C910					
		Industrial Computer							
System Processor		Jetson Orin Nano 4GB/8GB	Jetson Orin NX 8GB/16GB	SKU1	SKU2	SKU3	SKU4	SKU5	
	CPU	6-core Arm® Cortex® -A78AE, 7W	Jetson Orin NX 8GB:6-core Arm® Cortex® -A78AE,10W Jetson Orin NX 16GB:8-core Arm® Cortex® -A78AE,10W	Intel® 12th Gen IOTG Alder Lake-S Processor Core i9/i7/i5/i3, Pentium®, Celeron® Processor, Max. 35W Intel® 13th Gen IOTG Raptor Lake-S Processor Core i9/i7/i5/i3, Max. 35W Intel® 14th Gen IOTG Raptor Lake-S Refresh Processor Core i9/i7/i5/i3, Max. 35W					
	Frequency	1.5 GHz (Max)	2 GHz (Max)	P-Core 1.1 GHz~5.5 GHz (Depends on CPU) E-Core 0.8 GHz~4.0 GHz (Depends on CPU)					
	L2 Cache	1.5MB	2MB	4M~36M (Depends on CPU)					
	CPU Type	Jetson Orin Nano/NX Module		Socket (LGA1700)					
	Chipset	Integrated in SoC Process		Intel® R680E chipset					
	BIOS	N/A		AMI					
Memory	Technology	Integrated in SoC Process, LPDDR5 DRAM 2133 MHz	Integrated in SoC Process, LPDDR5 DRAM 3200 MHz	Dual-channel DDR5(ECC/non-ECC) 5600MHz (ECC support & Frequency will depend on CPU)					
	Max. Capacity	4GB/8GB	8GB/16GB	Up to 64GB					
	Socket	N/A		2 x 262-pin SO-DIMMs					
Graphic	Controller	NVIDIA® Ampere GPU	NVIDIA® Ampere GPU	Intel® UHD Graphics					
	Graphic Memory	Depends on GPU		Depends on CPU					
	Multiple Display	N/A		4 independent displays					
	Display Interface	HDMI up to 3840 x 2160 @30Hz	HDMI up to 7680 x 4320 @30Hz	HDMI up to 4096 x 2304 @60Hz DP up to 4096 x 2304 @60Hz					
Ethernet	Controller	1 x Broadcom BCM5720 1GbE LAN		1 x Intel® i226LM 2.5GbE LAN (Support Intel® AMT) 3 x Intel® i226V 2.5GbE LAN					
Audio	Controller	N/A		Realtek® ALC897 HD Audio Codec					
H/W Monitor	Watchdog Timer	N/A		256-level Watchdog Timer					
	Smart Fan	N/A		Yes					
TPM	Controller	Infineon SLB9670VQ 2.0		Infineon SLB9672VU2.0					
Expansion Slot	PCIe x16	N/A		1				N/A	
	PCIe x8	N/A		N/A				2	
	PCI	N/A		3	1	N/A			
	M.2	1 x M.2 E-key (PCIe/UART), 2230 1 x M.2 B-key (USB 3.0), 3242 1 x M.2 M-key (PCIe), 2280		1 x M.2 M key (PCIe Gen4 x4 NVMe & SATA 3.0), 2280 1 x M.2 E key (PCIe Gen4 x1, USB2.0), 2230		1 x M.2 M key (PCIe Gen4 x4 NVMe & SATA 3.0), 2280			
	Mini-PCIe	N/A		N/A		1 x Full-size	N/A		
Storage	SATA	N/A		2 x 2.5" HDD/SSD				N/A	2 x 2.5" HDD/SSD
	mSATA	N/A		N/A					
	CFast	N/A		N/A					
	RJ-45	2		4					
	PoE	N/A		N/A					
I/O Interface	Audio	N/A		1 x Mic-in 1 x Line-out					
	USB	4 x USB 3.2 Gen 2 1 x Micro USB 2.0 Gen 2		8 x USB 3.2 Gen 2 2 x USB 3.2 Gen 1 3 x USB 2.0 (internal, Type-A)					
	Serial	1 x DB-9 for COM port COM1: RS-232/422/485		4 x COM ports COM1~2: RS232/422/485, 0V/5V/12V COM3~4: RS-232, 0V					
	GPIO	1 x DB-9 for GPIO		8-bits (4 x GPI; 4 x GPO), 5~35V, isolation 1.3KV					
	CANbus	N/A		N/A					
	HDMI	1		2					
	DVI	N/A		N/A					
	DisplayPort	N/A		2					
	VGA	N/A		N/A					
	Antenna	4 x SMA connectors (Optional)		2 openings reserved for antennas	N/A				
	Power Supply	DC Input	DC-in 19V		DC-in 8-48V Wide-Range Pluggable connectors with latch (V+, V-)				
AC Input		N/A		N/A					
IP Rating		N/A		N/A					
Environment	Operating Temperature	0 ~ 50 °C with 0.7 m/s air flow		-10 ~ 50°C w/ industrial DC power Up to 35W CPU Note: Thermal w/ Airflow:0.7m/s					
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90% , non-condensing					
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C					
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing					
	Vibration	2.09Grms @ 5 ~ 500 Hz, random, 30 min/axis		Operating, IEC 60068-2-64: 2 Grms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD/SSD)					
Physical haracteristics	Shock	50 G, half sine, 4 ms duration		Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD/SSD)					
	Dimensions (W x D x H)	160 x 140 x 60 mm		178 x 242 x 217 mm	142 x 240 x 217 mm	123 x 240 x 217 mm	127 x 240 x 217 mm		
	Weight	1.38 kg		5.0 kg	4.4 kg	4.3 kg	4.4 kg		
	Mounting	N/A		Wall mount					
Certification	EMC	N/A		FCC Class A, CE, RCM, BSMI, VCCI, UKCA, IC					
	Safety	N/A		IEC 62368: CE(LVD) / BSMI					
Software Platform	OS Support	NVIDIA® Jetson Linux 35.5		Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)					

**MS-9A76**

Model		MS-9A76		
System Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Core™ i7/i5/i3/Celeron®/Pentium® Processor, Max. 65W		
	Frequency	2.3 GHz~3.9 GHz (Depends on CPU)		
	L2 Cache	2M~8M (Depends on CPU)		
	CPU Type	Socket (LGA1151)		
	Chipset	Intel® Q170 Express / Intel® C236 Express		
	BIOS	AMI		
Memory	Technology	Q170: Dual-channel DDR4(non-ECC) 2133/2400MHz C236: Dual-channel DDR4(ECC) 2133/2400MHz		
	Max. Capacity	Up to 32GB		
	Socket	2 x 260-pin SO-DIMMs		
Graphic	Controller	Intel® HD Graphics		
	Graphic Memory	Depends on CPU		
	Multiple Display	3 independent displays		
	Display Interface	DP up to 3840 x 2160 @60Hz DVI-I up to 1920 x 1200 @60Hz		
Ethernet	Controller	1 x Intel® I219GbE-PHY LAN (Support Intel® AMT) 1 x Intel® I210-AT GbE LAN		
Audio	Controller	Realtek® ALC887 HD Audio Codec		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	N/A		
TPM	Controller	Infineon SLB9665TT2.0		
Expansion Slot	PCIe x16	1	N/A	1
	PCIe x8	N/A	2	N/A
	PCI	3	2	1
	M.2	N/A		
	Mini-PCIe	N/A		1 x Full-size (w/ mSATA)
Storage	SATA	2 x 2.5" HDD/SSD		
	mSATA	N/A		1
	CFast	1		
I/O Interface	RJ-45	2		
	PoE	N/A		
	Audio	1 x Mic-in 1 x Line-out 1 x Line-in		
	USB	5 x USB 2.0 (one port w/ security key) 6 x USB 3.2 Gen 1		
	Serial	5 x COM ports COM1~2: RS232/422/485, 0V/5V/12V COM3~5: RS-232, 0V		
	PS/2	1		
	GPIO	8-bits (4 x GPI; 4 x GPO), 5~35V, Isolation 1.5KV		
	CANbus	N/A		
	HDMI	N/A		
	LVDS	N/A		
	DVI	1 (DVI-I)		
	DisplayPort	2		
Antenna	N/A			
Power Supply	DC Input	DC-in 9-36V Wide-Range Pluggable connectors with latch (GND, V-, V+)		
Environment	IP Rating	Full IP20		
	Operating Temperature	-10 ~ 40°C w/ fan module up to 65W CPU -10 ~ 50°C w/ industrial DC power up to 35W CPU Note: Thermal w/ Airflow:0.7m/s		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		
	Vibration	Operating, IEC 60068-2-64: 1.5 Grms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD/SSD)		
Physical haracteristics	Shock	Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD/SSD)		
	Dimensions (W x D x H)	217 x 226 x 176 mm	217 x 226 x 143 mm	
	Weight	4.8 Kg	4.4 Kg	
	Mounting	Wall mount		
Certification	EMC	FCC Class A, CE, RCM, VCCI, BSMI		
	Safety	UL		
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 (64-bit)		



Model		MS-98H7		MS-98F7	MS-9988
		COM Express Board			
Processor	CPU	8th Gen Intel® Embedded Coffee Lake-H Xeon™ E-2176M Mobile Processor, HC, 45W		7th/6th Gen Intel® Embedded Mobile Kaby Lake-ULT/Skylake-ULT Core™ i7/i5/i3/Celeron® Processor, DC, 15W	N/A
	Frequency	2.5GHz~4.4GHz (Depends on CPU)		2.0GHz~3.4GHz (Depends on CPU)	N/A
	L2 Cache	8MB~12MB (Depends on CPU)		2MB~4MB (Depends on CPU)	N/A
	CPU Type	BGA		BGA	N/A
	Chipset	Intel® CM246 Express	Intel® QM370 Express	N/A	N/A
	BIOS	AMI		AMI	AMI
Memory	Technology	Dual-channel DDR4 (ECC) 2666MHz	Dual-channel DDR4 (Non-ECC) 2666MHz	Dual-channel DDR4 2133MHz	N/A
	Max. Capacity	Up to 32GB		Up to 32GB	N/A
	Socket	2 x 260-pin SO-DIMMs		2 x 260-pin SO-DIMMs	N/A
	Controller	Intel® HD Graphics		Intel® HD Graphics	N/A
	Graphic Memory	Depends on CPU		Depends on CPU	N/A
	LVDS	Dual channel 18/24-bit		Dual channel 24-bit	Dual-channel 24-bit (depends on module board)
	eDP	N/A		N/A	N/A
	VGA	1		1 (Share with DDI1 Signal, by BOM option)	1
	DVI	N/A		N/A	N/A
	HDMI	N/A (3 DDI ports support DVI/HDMI/DP (DDI3 AUX shared with VGA))		N/A (2 DDI ports support HDMI/DP (DDI1 by BOM option, default is for VGA))	N/A
	DisplayPort	N/A		N/A	3
	Multiple Display	3 independent displays		3 independent displays	3 independent displays
	Display Interface	LVDS Resolution up to 1920 x 1200 @60Hz VGA Resolution up to 1920 x 1080 @60Hz 3 x DDI: DVI up to 1920 x 1200 @60Hz HDMI1.4 up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz		LVDS Resolution up to 1920x1200 @60Hz VGA Resolution up to 1920 x 1080 @60Hz 2 x DDI: HDMI1.4 up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz	Depends on module board
Ethernet	Controller	1 x Intel® I219LM GbE-PHY LAN (AMT 12.x supported)		1 x Intel® I219LM GbE-PHY LAN (AMT 11.x supported)	1 x RJ45 for COM Express module board
Audio	Controller	Support HD audio interface to carrier board		Support HD audio interface to carrier board	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	N/A		N/A	Fintek F81866
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes		Yes	Yes
TPM	Controller	Infineon SLB9665TT 2.0		Yes (TPM2.0, by BOM option)	Pin header
I/O Interface	USB	8 x USB 2.0 (to carrier board) 4 x USB 3.2 Gen 1 (to carrier board)		8 x USB 2.0 (to carrier board) 4 x USB 3.2 Gen 1 (to carrier board)	4 x USB 2.0 (2 x rear, 2 x internal) 4 x USB 3.2 Gen 1 (rear)
	Serial	2 x COM ports (to carrier board)		2 x COM ports (to carrier board)	2 x COM ports COM1 RS-232/422/485, 0V/5V/12V COM2 RS-232, 0V/5V/12V 2 x UART ports (From COM Express module board)
	Parallel	N/A		N/A	1
	PS/2	N/A		N/A	1 (wafer connector)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V		8-bits (4 x GPI; 4 x GPO), 5V	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x16	1 x PCI Express x16 GEN. 3.0 lanes (Configurable to 1 x16 or 2 x8 or 1 x8 + 2 x4)		N/A	1
	PCIe x8	N/A		N/A	N/A
	PCIe x1	8 x PCI Express GEN. 3.0 lanes (Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4)		8 x PCI Express GEN. 3.0 lanes (Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4)	6
	PCI	N/A		N/A	N/A
	M.2	N/A		N/A	N/A
	Mini-PCIe	N/A		N/A	2 x Full-size
Storage	SATA	4 x SATA 3.0		3 x SATA 3.0	4 x SATA
	mSATA	N/A		32GB eMMC 5.0 (by BOM option)	N/A
	DC	N/A		N/A	N/A
Power Supply	ATX	ATX +12 V and +5 VSB (standby power) AT: +12 V		ATX +12 V and +5 VSB (standby power) AT: +12 V	ATX-24P, 12V-4P
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		-20 ~ 70°C Note: Thermal w/ Airflow:0.7m/s	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	125 x 95 mm (COM Express Type 6 Basic module)		95 x 95 mm (COM Express Type 6 compact module)	305 x 244 mm (ATX)
	Weight	0.113 kg		0.105 kg	0.60 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 (64-bit) Linux (Support by request)		Windows 7 (32/64-bit) (Skylake-ULT Only) Windows 8.1 (64-bit) (Skylake-ULT Only) Windows 10 (64-bit) Linux (Support by request)	Depends on CPU Module Board



NEW



Model		MS-CF16		MS-9816	
		Pico-ITX Board			
Processor	CPU	Alder Lake -N SKUs	Amston Lake SKU	Apollo Lake SKUs	Apollo Lake-I SKU
		Intel® IOTG Alder Lake-N Processor N97, QC, 12W Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W	Intel® IOTG Amston Lake Atom, X7433RE, QC, 9W	Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W	Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W
	Frequency	N97, 2.0GHz, up to 3.6 GHz x7425E, 1.5GHz, up to 3.4 GHz	X7433RE, 1.5GHz, up to 3.4 GHz	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz	E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz
	L2 Cache	6MB		2MB	
	CPU Type	BGA		BGA	
	Chipset	Integrated in SoC		Integrated in SoC	
Memory	BIOS	AMI		AMI	
	Technology	Single-channel LPDDR5 4800 MHz		Single-channel LPDDR4 2133MHz	
Memory	Max. Capacity	Up to 16GB		Up to 4GB	
	Socket	Onboard		Onboard	
Display	Controller	Intel® HD Graphics		Intel® HD Graphics	
	Graphic Memory	Depends on CPU		Depends on CPU	
	LVDS	Dual Channel 18/24-bit		Dual Channel 18/24-bit	
	eDP	1 (Signal shared with LVDS)		N/A	
	VGA	N/A		N/A	
	DVI	N/A		N/A	
	HDMI	1		1	
	DisplayPort	N/A		1 (Mini-DP)	
	Multiple Display	2 independent displays		3 independent displays	
	Display Interface	LVDS/eDP up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz		LVDS up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz Mini-DP up to 4096 x 2160 @60Hz	
Ethernet	Controller	1 x Realtek® RTL8125BG-CG 2.5GbE LAN 1 x Realtek® RTL8111K-CG 1GbE LAN	1 x Realtek® RTL8125BI-CG 2.5GbE LAN 1 x Realtek® RTL8111KI-CG 1GbE LAN	2 x Intel® 211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
Audio	Controller	Realtek® ALC897 High Definition Audio Codec		Realtek® ALC887-VD2-CG HD Audio Codec	
Super I/O	Controller	Fintek F81966AB-I		Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer	
	Smart Fan	N/A		N/A	
TPM	Controller	Infineon® SLB 9672VU2.0	Infineon® SLB 9672XU2.0	Pin header	
I/O Interface	USB	2 x USB 3.2 ports (rear) (Bottom layer USB 3.2 Gen 2 x 1, Top layer USB 3.2 Gen 1) 2 x USB 2.0 ports (internal)		2 x USB 2.0 (internal) 2 x USB 3.2 Gen 1 (rear)	
	Serial	1 x COM port (internal) COM: RS-232/422/485, 0V/5V/12V		2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V	
	Parallel	N/A		N/A	
	PS/2	N/A		N/A	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V	
Expansion Slot	PCIe x1	N/A		3	
	PCI	N/A		N/A	
	M.2	1 x E key 2230 (PCIe x1 + USB 2.0) 1 x B key 2242/3042 (PCIe x1/SATA 3.0 + USB 3.2 Gen 2 + USB 2.0)		N/A	
	Mini-PCIe	1 x E key 2230 (PCIe x1 + USB 2.0) 1 x B key 2242/3042 (PCIe x1/SATA 3.0 + USB 3.2 Gen 2 + USB 2.0)		1 x Full-size (Mini-PCIe Full-size Slot w/ NANO SIM-Holder) 1 x Half-size (Mini-PCIe Half-size Slot w/ mSATA)	
Storage	SATA	1 x SATA 3.0		1 x SATA 3.0	
	mSATA	N/A		1 (Shared with Mini-PCIe Half-size)	
Power Supply	DC	DC-in 12V		DC-in 12V	
	ATX	N/A		N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 12W.	-40 ~ 70°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 9W. 3. -40 ~ 85°C by request	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s
		Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	101 x 73 mm (Pico-ITX)		101 x 73 mm (Pico-ITX)	
	Weight	0.30 kg		0.27 kg	
Certification	EMC	CE, FCC Class B, BSMI, VCCI, RCM, UKCA, IC		FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 10 IoT Enterprise 21H2 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request)		Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	

NEW



Model		MS-CF17		MS-98M3		MS-98L3
		Embedded SKUs	Industrial SKUs	3.5" Board		
Processor	CPU	Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i7-1365UE / i5-1345UE / i5-1335UE / i3-1315UE / U300E, 28W	Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i7-1365UE / i5-1345UE / i3-1315UE, 28W	11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i7-1185G7E/i5-1145G7E, QC, 28W 11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i3-1115G4E, DC, 28W 11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Celeron® 6305E, DC, 15W	11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i7-1185GRE/i5-1145GRE, QC, 28W 11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i3-1115GRE, DC, 28W	8th Gen Intel® IOTG Mobile Whiskey Lake-U Core™ i7-8665UE/i5-8365UE, QC, 15W & i3-8145UE/ Celeron® 4305UE, DC, 15W
	Frequency	P-Core: 4.3GHz~4.9GHz (Depends on CPU) E-Core: 3.2GHz~3.7GHz (Depends on CPU)				1.8GHz~4.6GHz (Depends on CPU)
	L2 Cache	8M~12M (Depends on CPU)		4MB~12MB (Depends on CPU)	6MB~12MB (Depends on CPU)	4MB~8MB (Depends on CPU)
	CPU Type	BGA		BGA		BGA
	Chipset	Integrated in SoC		N/A		N/A
Memory	BIOS	AMI				AMI
	Technology	Single-channel DDR5 5200MHz		Dual-channel DDR4 3200MHz		Single-channel DDR4 2400MHz
	Max. Capacity	Up to 32GB		Up to 64GB		Up to 32GB
Display	Socket	1 x 262-pin SO-DIMM				1 x 260-pin SO-DIMM
	Controller	Intel® UHD Graphics		Intel® Iris® Xc Graphics (For i7/i5 SKUs) Intel® UHD Graphics (For i3/ Celeron SKUs)	Intel® Iris® Xc Graphics (For i7/i5 SKUs) Intel® UHD Graphics (For i3 SKU)	Intel® HD Graphics
	Graphic Memory	Depends on CPU		Depends on CPU		Depends on CPU
	LVDS	1		2 x Dual Channel 18/24-bit (Connector shared with eDP)		Dual Channel 18/24-Bit
	eDP	1 x eDP (Connector shared with LVDS)		2 x eDP (Connector shared with LVDS)		N/A
	VGA	N/A		N/A		N/A
	DVI	N/A		N/A		N/A
	HDMI	4		1		1
	DisplayPort	N/A		1		1 (Support DP++)
	Multiple Display	4 independent displays		4 independent displays		3 independent displays
Ethernet	Display Interface	LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60 Hz HDMI 2.0 up to 4096 x 2340 @60Hz		LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60 Hz HDMI up to 4096 x 2160 @30Hz DP up to 7680 x 4320 @60Hz		LVDS up to 1920 x 1200 @60 Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2160 @60Hz
	Controller	4 x Intel® I226-LM GbE LAN	4 x Intel® I226-IT 2.5 GbE LAN	2 x Intel® I225-LM 2.5 GbE LAN	2 x Intel® I225-IT 2.5 GbE LAN (LAN Speed running at 1000/100/10Mbps when OP TEMP. over 70°C)	1 x Intel® I219LM GbE-PHY LAN (AMT 12.0 supported by i7/i5 SKUs) 3 x Intel® I210-AT GbE LAN
Audio	Controller	Realtek® ALC897 HD Audio Codec (Co-lay ALC888S)		Realtek® ALC888-VD2-GR HD Audio Codec		Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81966AB-I		Fintek F81966AB-I		Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer		256-level Watchdog Timer
	Smart Fan	Yes				Yes
TPM	Controller	Infineon SLB9672VU2.0		Infineon SLB9670VQ2.0		Infineon SLB9670TT2.0
I/O Interface	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 2 (rear)		4 x USB 2.0 (internal) 4 x USB 3.2 Gen 2 (rear)		4 x USB 2.0 (internal) 4 x USB 3.2 Gen 2 (rear)
	Serial	4 x COM ports (internal) COM1~4: RS-232/422/485, 0V/5V/12V, support auto flow control		4 x COM ports (internal) COM1~4: RS-232/422/485, 0V/5V/12V, support auto flow control		4 x COM ports (internal) COM1~4: RS-232/422/485, 0V/5V/12V, support auto flow control
	Parallel	N/A		N/A		N/A
	PS/2	N/A		N/A		N/A
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V
Expansion Slot	PCIe x1	N/A		N/A		N/A
	PCI	N/A		N/A		N/A
	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0, w/CNV), 2230		1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (SATA 3.0, PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0), 2230		1 x M.2 M key (SATA), 2242 1 x M.2 B key (PCIe x1, USB 3.2 Gen 2, USB 2.0 w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0, w/CNV), 2230
Storage	Mini-PCIe	N/A		N/A		N/A
	SATA	1 x SATA 3.0		1 x SATA 3.0		2 x SATA 3.0 (RAID 0/1 supported by i7/i5 SKUs)
Power Supply	mSATA	N/A		N/A		N/A
	DC	DC-in 12~24V (OCP & OVP)		DC-in 12~24V (OCP & OVP)		DC-in 12~24V (OCP & OVP)
Environment	ATX	N/A		N/A		N/A
	Operating Temperature	0 ~ 60°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 15W.	-40 ~ 70°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 15W. 3. -40 ~ 85°C by request	-10 ~ 60°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 15W.	-40 ~ 70°C (w/Turbo disabled) Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 15W. 3. -40 ~ 85°C by request	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C		-20 ~ 80°C
Form Factor	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		10 ~ 90%, non-condensing
	Dimensions (W x D x H)	146 x 102 mm (3.5")		146 x 102 mm (3.5")		146 x 102 mm (3.5")
	Weight	0.67 kg		0.65 kg		0.64 kg
Certification	EMC	CE, FCC Class A, RCM, VCCI, BSMI, UKCA, IC		FCC, CE, RCM, VCCI, BSMI, UKCA, IC		FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, Pre-scan) Linux (Support by request)		Windows 10 IoT Enterprise 2019 LTSC (64-bit, RS5) Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 21H2, Pre-scan) Linux (Support by request)		Windows 10 IoT Enterprise LTSC/ SAC 1809 (64-bit, RS5) Linux (Support by request)

Panel PC

Tablet PC

Industrial Computer

COM Express Board

Pico-ITX Board

3.5" Board

EPIC Board

Mini-ITX Board

Micro-ATX Board

ATX Board



		MS-98H3	MS-CF03	MS-98J8
Model		3.5" Board		
Processor	CPU	7th/6th Gen Intel® Embedded Mobile Kaby Lake-U/Skylake-U Core™ i7/i5/i3/Celeron® Processor, DC, 15W	Intel® IOTG Alder Lake-N Processor N97, QC, 12W Intel® IOTG Alder Lake-N Processor N200, QC, 6W Intel® IOTG Alder Lake-N Core i3-N305, OC, 9W up to 15W Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W	Intel® Pentium® Processor N4200 , QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W Intel® Atom™ X5-E3940 Processor, QC, 9.5W Intel® Atom™ X5-E3930 Processor, DC, 6.5W
	Frequency	2.0GHz~3.4GHz (Depends on CPU)	N97, 2.0GHz, up to 3.6GHz N200, 1.0GHz, up to 3.7GHz i3-N305, 1.8GHz, up to 3.8GHz x7425E, 1.5GHz, up to 3.4GHz	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz
	L2 Cache	2MB~4MB (Depends on CPU)	6MB	2M
	CPU Type	BGA	BGA	BGA
	Chipset	N/A	Integrated in SoC	Integrated in SoC
	BIOS	AMI	AMI	AMI
Memory	Technology	Single-channel DDR4 2133MHz	Single Channel for DDR5 4800MT/s	Single Channel for DDR3L 1866/1600 MHz
	Max. Capacity	Up to 16GB	Up to 16GB	Up to 8GB
	Socket	1 x 260-pin SO-DIMM	1 x 262-pin SO-DIMM	1 x 204pin SO-DIMM
	Controller	Intel® HD Graphics	Intel® UHD Graphics	Intel® HD Graphics
Display	Graphic Memory	Depends on CPU	Depends on CPU	Depends on CPU
	LVDS	Dual Channel 18/24-bit	1 x Dual Channel 18/24-bit	Dual Channel 18/24-bit
	eDP	1 (Share with LVDS Singnal)	1 x eDP	N/A
	VGA	N/A	N/A	N/A
	DVI	N/A	N/A	N/A
	HDMI	1 (HDMI1 Co-lay DP1 & HDMI2 Co-lay DP2 by option)	1	1
	DisplayPort	1 (Support DP++, DP1 Co-lay HDMI1 & DP2 Co-lay HDMI2 by option)	1	1
	Multiple Display	3 independent displays	3 independent displays	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz HDMI1/HDMI2 HDMI1.4 up to 4096 x 2160 @24Hz DP1/DP2 up to 4096 x 2304 @60Hz	LVDS up to 1920 x 1200 @60Hz eDP up to 1920 x 1080 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz	LVDS up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz
Ethernet	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I219LM GbE-PHY LAN (AMT 11.x supported)	2 x Intel® I225-V 2.5 GbE LAN	2 x Realtek® RTL8111H GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC897 HD Audio Codec	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I	Fintek F81966AB-I	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes	Yes	Yes
TPM	Controller	Pin header	Infineon SLB9672VU2.0	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)
I/O Interface	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)	6 x USB 2.0 (internal) 2 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (rear)	2 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V, support auto flow control COM2~6: RS-232, 0V/5V/12V (RS-422/485 Optional)	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232	4 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~4: RS-232
	PS/2	N/A	N/A	1 (wafer connector)
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	8-bit (4 x GPI; 4 x GPO), 5V	8-Bit (4 x GPI, 4 x GPO), 5V
Expansion Slot	M.2	N/A	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230	1 x M.2 E key (PCIe x1, USB 2.0), 2230
	Mini-PCIe	2 x Full-size (one w/NANO SIM-Holder & one w/mSATA)	N/A	1 x Full-size (w/ mSATA)
Storage	SATA	2 x SATA 3.0	1 x SATA 3.0	1 x SATA 3.0
	mSATA	1 (Shared with Mini-PCIe)	N/A	1 (Shared with Mini-PCIe)
Power Supply	DC	DC-in 12~24V	DC-in 9~36V	DC-in 9~36V
	ATX	N/A	N/A	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	146 x 102 mm (3.5")	146 x 102 mm (3.5")	146 x 102 mm (3.5")
	Weight	0.59 kg	0.58 kg	0.33 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	CE, FCC Class B, BSMI, VCCI, RCM, UKCA	CE, FCC Class B, BSMI, VCCI, RCM
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-ULT Only) Windows 8.1 (64-bit) (Skylake-ULT Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	Windows 10 IoT Enterprise LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)



Model		MS-98E6		MS-98I8	MS-98G6
		3.5" Board			
Processor	CPU	Apollo Lake SKUs Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W	Apollo Lake-I SKUs Intel® Atom™ x7 Processor E3950, QC, 12W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W	Intel® Celeron® Processor N3160, QC, 6W Intel® Celeron® Processor N3010, DC, 4W	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz	3950, 1.6 GHz, up to 2.0 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz	N3160, 1.6 GHz up to 2.24 GHz N3010, 1.04 GHz up to 2.24 GHz	J1900, 2 GHz N2930, 1.83 GHz
	L2 Cache	1M~2M (Depends on CPU)		2MB	2MB
	CPU Type	BGA		BGA	BGA
	Chipset	Integrated in SoC		Integrated in SoC	N/A
	BIOS	AMI		AMI	AMI
Memory	Technology	Single-channel DDR3L 1866/1600 MHz		Single-channel DDR3L 1600MHz	Single-channel for DDR3L 1600 MHz
	Max. Capacity	Up to 8GB		Up to 8GB	Up to 8GB
	Socket	1 x 204-pin SO-DIMM		1 x 204-pin SO-DIMM	1 x 204-pin SO-DIMM
Display	Controller	Intel® HD Graphics		Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Depends on CPU		Depends on CPU	Depends on CPU
	LVDS	2 x Dual Channel 18/24-bit (LVDS1 Share with eDP Signal, LVDS2 Share with DP1 Signal)		Dual Channel 18/24-bit	Dual channel 18/24-bit
	VGA	N/A		N/A	N/A
	DVI	N/A		N/A	1 (DVI-I)
	HDMI	1 (HDMI1 Co-lay DP1/LVDS2 & HDMI2 Co-lay DP2 by option)		1	N/A
	DisplayPort	1 (DP1 Co-lay HDMI1/LVDS2 & DP2 Co-lay HDMI2 by option)		1	N/A
	Multiple Display	3 independent displays		3 independent displays	2 independent displays
	Display Interface	LVDS1/LVDS2 up to 1920 x 1200 @60Hz eDP up to 4096 x 2160 @60Hz HDMI1/HDMI2 up to 3840 x 2160 @30Hz DP1/DP2 up to 4096 x 2160 @60Hz		LVDS up to 1920 x 1200 @60Hz HDMI up to 2560 x 1600 @60Hz; up to 3840 x 2160 @30Hz DP1.1a up to 2560 x 1600 @60Hz; up to 3840 x 2160 @30Hz	LVDS up to 1920 x 1200 @60Hz DVI-I up to 1920 x 1200 @60Hz
	Ethernet	Controller	2 x Intel® I211-AT GbE LAN 2 x Intel® I210-IT GbE LAN	2 x Realtek® RTL8111G GbE LAN	2 x Intel® I210-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec		Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81867AD-I		Fintek F81866AD-I	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes		Yes	Yes
I/O Interface	USB	2 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)		2 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)	7 x USB 2.0 (4 x internal, 3 x rear) 1 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (Internal) COM1: RS-232/422/485, 0V/5V/12V, support auto flow control COM2-6: RS-232, 0V/5V/12V (RS-422/485 by Optional)		4 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2-4: RS-232	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232, 0V/5V/12V
	PS/2	N/A		1 (box header)	1 (wafer connector)
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V		8-bits (4 x GPI; 4 x GPO), 5V	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	M.2	N/A		N/A	N/A
	Mini-PCIe	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)		2 x Full-size (one w/ mSATA)	2 x Full-size (one w/ mSATA)
Storage	SATA	1 x SATA 3.0		1 x SATA 3.0	1 x SATA 2.0
	mSATA	1 (Shared with Mini-PCIe)		1 (Shared with Mini-PCIe)	1
Power Supply	DC	DC-in 12~24V (Box header with 4pin)	DC-in 12~24V (Phoenix connector with 2pin)	DC-in 9~36V	DC-in 12V/19V/24V
	ATX	N/A		N/A	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C	-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	146 x 102 mm (3.5")		146 x 102 mm (3.5")	146 x 102 mm (3.5")
	Weight	0.34 kg	0.59 kg	0.33 kg	0.31 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)		Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux (Support by request)	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux (Support by request)



NEW

Model		MS-98F6	MS-98H5		CF13				
		3.5" Board	EPIC Board		Mini-ITX Board				
Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W	Apollo Lake SKUs	Apollo Lake-I SKUs	SKU1	SKU2	SKU3	SKU4	
			Intel® Celeron® Processor J3455, QC, 10W	Intel® Atom™ x7 Processor E3950, QC, 12W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W	Intel® IOTG Alder Lake-N Processor N97, QC, 12W		Intel® IOTG Alder Lake-N Core i3-N305, QC, 9W up to 15W	Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W	
	Frequency	J1900, 2 GHz N2930, 1.83 GHz	J3455, 1.5 GHz, up to 2.3 GHz	E3950, 1.6 GHz, up to 2.0 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz		N97, 2.0GHz, up to 3.6GHz		i3-N305, 1.8GHz, up to 3.8GHz	x7425E, 1.5GHz, up to 3.4GHz
	L2 Cache	2MB	2M		6MB				
	CPU Type	BGA	BGA		BGA				
	Chipset	N/A	Integrated in SoC		Integrated in SoC				
	BIOS	AMI	AMI		AMI UEFI				
Memory	Technology	Single-channel DDR3L 1333 MHz	Single-channel LPDDR4 2133 MHz		Single Channel for DDR5 4800MHz				
	Max. Capacity	Up to 8GB	Onboard up to 4 GB		Up to 16GB				
	Socket	1 x 204-pin SO-DIMM	Onboard		1 x 262-pin DDR5 SO-DIMM				
Display	Controller	Intel® HD Graphics	Intel® HD Graphics		Intel® UHD Graphics				
	Graphic Memory	Depends on CPU	Depends on CPU		Depends on CPU				
	LVDS	Dual Channel 18/24-bit	Dual Channel 18/24-bit		1 x Dual channel 18/24-bit (Connector shared with eDP)				
	eDP	N/A	N/A		1 (Connector shared with LVDS)				
	VGA	1	N/A		N/A				
	DVI	N/A	1 (DVI-D)		N/A				
	HDMI	1	1 (by BOM option)		N/A	1			
	DisplayPort	N/A	N/A		2	1			
	Multiple Display	2 independent displays	3 independent displays		3 independent displays				
	Display Interface	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 @60Hz LVDS up to 1920 x 1200 @60Hz	LVDS up to 1920 x 1200 @60 Hz DVI-D up to 1920 x 1200 @60 Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz		LVDS up to 1920 x 1200 @60Hz eDP up to 1920 x 1080 @60Hz DP up to 4096 x 2304 @60Hz		LVDS up to 1920 x 1200 @60Hz eDP up to 1920 x 1080 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz		
Ethernet	Controller	2 x Intel® I210-AT GbE LAN	2 x Intel® I210-AT GbE LAN	2 x Intel® I210-IT GbE LAN (W/ PoE IEEE 802.3af)	2 x Intel® I226-V 2.5GbE LAN				
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC888 HD Audio Codec		Realtek® ALC897 Audio Codec (Co-lay ALC888S)				
Super I/O	Controller	Fintek F81866AD-I	Fintek F81867D-I		Fintek F81966AB-I				
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer				
	Smart Fan	N/A	Yes		Yes				
TPM	Controller	N/A	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)	Infineon SLB9665XT 2.0 (Default)	Infineon® SLB 9672VU2.0				
I/O Interface	USB	7 x USB 2.0 (4 x internal, 3 x rear) 1 x USB 3.2 Gen 1 (rear)	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)		2 x USB 3.2 Gen 2 (rear) 1 x USB 3.2 Gen 1 (rear) 1 x USB 2.0 (rear) 2 x USB 2.0 (internal)				
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V	6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V		6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232				
	PS/2	1 (wafer connector)	N/A		N/A				
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	16-bits (8 x GPI; 8 x GPO), 5V		8-bit (4 x GPI; 4 x GPO), 5V				
Expansion Slot	M.2	N/A	1 x M Key (SATA 3.0), 2242 1 x B Key (PCIe x1, USB2.0), 2242/3042		1 x M.2 B key (SATA/PCIe x1, USB 3.2 Gen 2 x 1, USB 2.0 w/NANO SIM-Holder), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230				
	Mini-PCIe	2 x Full-size (one w/ mSATA)	1 x Full-size (w/ SIM holder)		N/A				
Storage	SATA	1 x SATA 2.0	1 x SATA 3.0		1 x SATA 3.0				
	mSATA	1	N/A		N/A				
Power Supply	DC	DC-in 12V/19V/24V	DC-in 12V~48V		DC-in 12V				
	ATX	N/A	N/A		N/A				
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s				
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing				
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C	-40 ~ 85°C	-20 ~ 80°C				
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing				
Form Factor	Dimensions (W x D x H)	146 x 102 mm (3.5")	165 x 115 mm (EPIC)		170 x 170 mm (Mini-ITX)				
	Weight	0.31 kg	0.41 kg	0.72 kg	0.51 kg				
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI		CE, FCC Class B, BSMI, RCM, VCCI, UKCA				
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux (Support by request)	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)		Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, pre-scan) Linux (Support by request)				



Model		MS-98N1				MS-9892		MS-98B1	
		Mini-ITX Board							
Processor	CPU	SKU1	SKU2	SKU3	SKU4	SKU1	SKU2	Intel® Celeron® Processor N3350, DC, 6W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Celeron® Processor J3455, QC, 10W	
		Intel® Celeron® Processor J6412, QC, 10W Intel® Celeron® Processor N6210, DC, 6.5W			Intel Atom® x6211E Processor, DC, 6W	Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W Intel® Atom™ x5 Processor E3940, QC, 9W	Intel® Atom™ x5 Processor E3940, QC, 9W Intel® Atom™ x5 Processor E3930, DC, 6W		
	Frequency	J6412, 2.0 GHz, up to 2.6 GHz N6210, 1.2 GHz, up to 2.6 GHz x6211E, 1.3 GHz, up to 3.0 GHz				N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz E3940, 1.6 GHz, up to 1.8 GHz	E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz	N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz J3455, 1.5 GHz, up to 2.3 GHz	
	L2 Cache	1.5MB				1MB~2MB (Depends on CPU)		2MB	
	CPU Type	BGA				BGA		BGA	
Memory	Chipset	Integrated in SoC				Integrated in SoC		Integrated in SoC	
	BIOS	AMI				AMI		AMI	
	Technology	Dual-channel DDR4 3200 MHz				Dual-channel DDR3L 1866 MHz		Dual-channel DDR3L 1866 MHz	
	Max. Capacity	Up to 32 GB				Up to 8 GB		Up to 8 GB	
Display	Socket	2 x 260-pin DDR4 SO-DIMMs				2 x 204-pin SO-DIMMs		2 x 204-pin SO-DIMMs	
	Controller	Intel® UHD Graphics				Intel® HD Graphics		Intel® HD Graphics	
	Graphic Memory	Depends on CPU				Depends on CPU		Shared system memory up to 1.7 GB SDRAM	
	LVDS	1 x Dual channel 18/24-bit (Connector shared with eDP)				1 x Dual channel 18/24-bit		1 x Dual channel 18/24-bit (Signal shared w/ eDP)	
	eDP	1 (Connector shared with LVDS)				1 (co-lay with LVDS)		1 (by BOM option)	
	VGA	N/A	1	N/A		N/A		N/A	
	DVI	N/A				N/A		N/A	
	HDMI	1				1 (co-lay with DP)		1 (co-lay DP)	
	DisplayPort	1	N/A	1		1 (co-lay with HDMI)		2 (One Signal shared w/ eDP)	
	Multiple Display	3 independent displays				3 independent displays		3 independent displays	
Ethernet	Controller	2 x Intel® I225-V 2.5 GbE LAN			2 x Intel® I225-IT 2.5 GbE LAN	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN	2 x Intel® I211-AT co-lay I210-AT GbE LAN	
		Realtek® ALC897 Audio Codec (Co-lay ALC888S)				Realtek® ALC887-VD2-CG HD Audio Codec		Realtek® ALC887-VD2-CG HD Audio Codec	
Audio	Controller	Fintek F81966D-I				Fintek F81867D-I		Fintek F81867D-I	
Super I/O	Watchdog Timer	256-level Watchdog Timer				256-level Watchdog Timer		256-level Watchdog Timer	
H/W Monitor	Smart Fan	Yes				Yes		Yes	
	TPM	Controller	Infineon® SLB9672VU 2.0				Infineon® SLB9665TT 2.0	Infineon® SLB9665XT 2.0	Pin header (default) Infineon® SLB9665TT 2.0 (by BOM option)
I/O Interface	USB	5 x USB 2.0 (1 x rear, 4 x internal) 3 x USB 3.2 Gen 1 (rear)				6 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)		5 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)	
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, RI/0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V COM3-6: RS-232, W/O Power				6 x COM ports (internal) COM1/2: RS-232/422/485, 0V/5V/12V COM3-6: RS-232, W/O Power		6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, w/o Power	
	PS/2	1 (pin header)				1 (pin header)		1 (pin header)	
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V				GPIO 1: 8-bits (4 x GPI; 4 x GPO), 3.3V GPIO 2: 8-bits (4 x GPI; 4 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V	
Expansion Slot	M.2	1 x M key (SATA), 2242 1 x B key (PCIe x1, USB 3.2 Gen 1 x 1, USB 2.0 w/NANO SIM-Holder), 2242/3042 1 x E key (PCIe x1, USB 2.0), 2230				N/A		1 x M key (SATA 3.0), 2242 1 x E key (PCIe x1, USB 2.0), 2230	
	Mini-PCIe	N/A				2 x Full-size (one w/SIM holder & one w/mSATA)		N/A	
Storage	SATA	1 x SATA 3.0				2 x SATA 3.0 (SATA2 share with mSATA)		2 x SATA 3.0 (SATA2 share with M.2 M Key)	
	mSATA	N/A				1 (shared w/SATA2)		N/A	
Power Supply	DC	DC-in 12/19/24V				DC-in 12V~24V		DC-in 12/19/24V	
	ATX	N/A				N/A		N/A	
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			-20 ~ 70°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C				-20 ~ 80°C		-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)				170 x 170 mm (Mini-ITX)		170 x 170 mm (Mini-ITX)	
	Weight	0.50 kg				0.38 kg	0.45 kg	0.37 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI, UKCA, IC				FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Linux (Support by request)				Windows 10 IoT Enterprise LTSC/ SAC 1809 (64-bit, RS5) Linux (Support by request)		Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	



Model		MS-98J0			MS-98F1		MS-98I0	
		SKU1	SKU2	SKU3	Mini-ITX Board			
Processor	CPU	Intel® Celeron® Processor J3455, QC, 10W	Intel® Celeron® Processor N3350, DC, 6W	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Pentium processor N3710, QC, 6W Intel® Celeron processor N3160, QC, 6W Intel® Celeron processor N3060, DC, 6W Intel® Celeron processor N3010, DC, 4W		Intel® Pentium processor N3710, QC, 6W Intel® Celeron processor N3160, QC, 6W Intel® Celeron processor N3060, DC, 6W Intel® Celeron processor N3010, DC, 4W	
	Frequency	J3455, 1.5 GHz, up to 2.3 GHz	N3350, 1.1 GHz, up to 2.4 GHz	E3940, 1.6 GHz, up to 1.8 GHz	N3710, 1.6 GHz, up to 2.56 GHz N3160, 1.6 GHz, up to 2.24 GHz N3060, 1.6 GHz, up to 2.48 GHz N3010, 1.04 GHz, up to 2.24 GHz		N3710, 1.6 GHz, up to 2.56 GHz N3160, 1.6 GHz, up to 2.24 GHz N3060, 1.6 GHz, up to 2.48 GHz N3010, 1.04 GHz, up to 2.24 GHz	
	L2 Cache	2MB			2MB		2MB	
	CPU Type	BGA			BGA		BGA	
	Chipset	Integrated in SoC			Integrated		Integrated	
	BIOS	AMI			AMI		AMI	
Memory	Technology	Dual-channel DDR3L 1866 MHz			Dual-channel DDR3L 1333/1600 MHz	Dual-channel DDR3L 1066/1333 MHz	Dual-channel DDR3L 1333/1600 MHz	
	Max. Capacity	Up to 8 GB			Up to 8 GB		Up to 8 GB	
	Socket	2 x 204-pin SO-DIMMs			2 x 204-pin SO-DIMMs		2 x 204-pin SO-DIMMs (1 slot for opt SKU)	
Display	Controller	Intel® HD Graphics			Intel® HD Graphics		Intel® HD Graphics	
	Graphic Memory	Depends on CPU			Depends on CPU		Depends on CPU	
	LVDS	1 x Dual channel 18/24-bit			2 x Dual channel 18/24-bit		Dual channel 24-bit	
	eDP	N/A (by option)			1 (colay with LVDS)		N/A	
	VGA	1	N/A (by BOM option)		NA		N/A	
	DVI	N/A			NA		1 (DVI-D)	
	HDMI	1			NA		1 (co-lay with DP)	
	DisplayPort	N/A(by option)	1		1		1 (co-lay with HDMI)	
	Multiple Display	3 independent displays			3 independent displays		3 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz VGA up to 1920 x 1080 @60Hz			LVDS up to 1920 x 1200 @60 Hz DP up to 3840 x 2160 @30Hz eDP up to 2560 x 1600 @60Hz		LVDS up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @30Hz HDMI up to 1920 x 1200 @60Hz DVI up to 1920 x 1200 @60Hz	
Ethernet	Controller	2 x Realtek® RTL8111H-CG GbE LAN			2 x Intel® I210-AT GbE LAN	1 x Intel® I210-AT GbE LAN	2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)	
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec			Realtek® ALC887 co-lay ALC888S		Realtek® ALC887 co-lay ALC888S	
Super I/O	Controller	Fintek F81867D-I			Fintek F81866AD-I		Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			256-level Watchdog Timer		256-level Watchdog Timer	
	Smart Fan	Yes			Yes		Yes	
TPM	Controller	Pin header (default) Infineon® SLB9665TT 2.0 (by BOM option)			Pin header (default) Infineon® SLB9635TT 1.2 (by BOM option)		Pin header (default) Infineon® SLB9635TT 1.2 (by BOM option)	
I/O Interface	USB	3 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)			4 x USB 2.0 (internal) 4 x USB 3.1 Gen 1 (rear)	2 x USB 2.0 (internal) 4 x USB 3.1 Gen 1 (rear)	5 x USB 2.0 (internal) 2 x USB 3.1 Gen 1 (rear)	
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, w/o Power			6 x COM ports (COM1~3: rear, COM4~6: internal) COM1&5: RS-232/422/485, 0V/5V/12V COM2~4: RS-232, 0V/5V/12V COM6: RS-232 w/o power	4 x COM ports (COM1: rear, COM4~6: internal) COM1&5: RS-232/422/485, 0V/5V/12V COM4: RS-232, 0V/5V/12V COM6: RS-232 w/o power	6 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, w/o power	
	Parallel	1 (pin header)			1		1 (by BOM option)	
	PS/2	1 (pin header)			1 (pin header)		1 (pin header)	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V			8-bits (4 x GPI; 4 x GPO), 5V		8-bits (4 x GPI; 4 x GPO), 5V	
Expansion Slot	M.2	1 x M key (SATA 3.0), 2242 1 x E key (PCIe x1, USB 2.0), 2230			N/A		N/A	
	Mini-PCIe	N/A			2 x Full/Half-size (one w/ SIM holder & one w/mSATA)		1 x Full-size co-lay mSATA (support Half-size card)	
Storage	SATA	1 x SATA 3.0			1 x SATA 3.0		1 x SATA 3.0	
	mSATA	N/A			1 (support by Mini-PCIe slot)		1 (support by Mini-PCIe slot)	
Power Supply	DC	DC-in 12V			DC-in 12/19/24V		DC-in 12V	
	ATX	N/A			ATX Power 20P		N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing			10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C			-20 ~ 80°C		-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing			10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)			170 x 170 mm (Mini-ITX)		170 x 170 mm (Mini-ITX)	
	Weight	0.37 kg			0.37 kg		0.37 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI			FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI	
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux (Support by request)		Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux (Support by request)	



Model		MS-98E3	MS-98F5
		Mini-ITX Board	
Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	J1900, 2.0 GHz, up to 2.42 GHz N2930, 1.83 GHz, up to 2.16 GHz	J1900, 2.0 GHz, up to 2.42 GHz N2930, 1.83 GHz, up to 2.16 GHz
	L2 Cache	2 MB	2 MB
	CPU Type	BGA	BGA
	Chipset	Integrated	Integrated
	BIOS	AMI	AMI
Memory	Technology	Dual-channel DDR3L 1333/1066 MHz	Dual-channel DDR3L 1333/1066 MHz
	Max. Capacity	Up to 8 GB	Up to 8 GB
	Socket	2 x 204-pin SO-DIMMs	2 or 1 x 204-pin SO-DIMMs (depends on SKU)
Display	Controller	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Depends on CPU	Depends on CPU
	LVDS	Dual Channel 24-bit (add chrontel 7511B chipset)	Dual Channel 24-bit (add chrontel 7511B chipset)
	VGA	1	1
	DVI	N/A	N/A
	HDMI	1	N/A
	Multiple Display	2 independent displays	2 independent displays
	Display Interface	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 LVDS up to 1920 x 1200	VGA up to 2560 x 1600 @60Hz LVDS up to 1920 x 1200 @60Hz
Ethernet	Controller	2 x Intel® i210-AT GbE LAN	2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)
Audio	Controller	Realtek® ALC887 HD Audio Codec	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes	Yes
TPM	Controller	Pin header	Pin header
I/O Interface	USB	8 x USB 2.0 (4 x internal, 4 x rear) 1 x USB 3.1 Gen 1 (internal)	8 x USB 2.0 (4 x internal, 4 x rear)
	Serial	6 x COM ports (COM1~2: rear, COM3~6: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V	6 x COM ports (COM1: rear, COM2~6: internal) COM1: RS-232, 0V/5V/12V COM2~6: RS-232, w/o power
	Parallel	N/A	1 (Pin header)
	PS/2	1 (Pin header)	1 (Pin header)
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V	8-bits (4 x GPI, 4 x GPO), 3.3V
Expansion Slot	PCIe x16	N/A	N/A
	PCI	1	N/A
	M.2	N/A	N/A
	Mini-PCIe	1 x Full-size, mSATA	1 x Full-size, mSATA
Storage	SATA	1 x SATA 2.0	1 x SATA 2.0
	CFast	N/A	N/A
	mSATA	1	1
Power Supply	DC	DC-in 12/19/24V	DC-in 12V
	ATX	ATX-Power 20P	N/A
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)	170 x 170 mm (Mini-ITX)
	Weight	0.37 kg	0.37 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)	Windows 8 (32/64-bit) Windows 10 (64-bit)



NEW

Model		MS-CF10			MS-CF02		
		Mini-ITX Board					
Processor		SKU1	SKU2	SKU3	SKU1	SKU2	SKU3
	CPU	14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3 IOTG Series Processor, Max 65W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W 12th Gen Intel® Alder Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W			12th Gen Intel® Alder Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W		
	Frequency	1.6GHz~5.1GHz (Depends on CPU)			1.6GHz~5.1GHz (Depends on CPU)		
	L2 Cache	2MB~30MB (Depends on CPU)			2MB~30MB (Depends on CPU)		
	CPU Type	Socket (LGA 1700)			Socket (LGA 1700)		
	Chipset	Intel® R680E	Intel® Q670E	Intel® H610E	Intel® R680E	Intel® Q670E	Intel® H610E
BIOS	AMI UEFI			AMI UEFI			
Memory	Technology	Dual-channel DDR5 (ECC/non-ECC) 5200MT/s	Dual-channel DDR5 (non-ECC) 5200MT/s		Dual-channel DDR4 (ECC/non-ECC) 3200MT/s	Dual-channel DDR4 (non-ECC) 3200MT/s	
	Max. Capacity	Up to 64GB			Up to 64GB		
	Socket	2 x 262-pin DDR5 SO-DIMMs			2 x 260-pin DDR4 SO-DIMMs		
Display	Controller	Intel® UHD Graphics			Intel® UHD Graphics		
	Graphic Memory	Depends on CPU			Depends on CPU		
	LVDS	1 x Dual channel 18/24-bit (Connector shared with eDP)			1 x Dual channel 18/24-bit (Connector shared with eDP)		
	eDP	1 (Connector shared with LVDS)			1 (Connector shared with LVDS)		
	VGA	N/A			N/A		
	DVI	N/A			N/A		
	HDMI	2			1		
	DisplayPort	2			2		
	Multiple Display	4 independent displays			3 independent displays		3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz HDMI 2.0 up to 4096 x 2304 @60Hz DP up to 4096 x 2304 @60Hz			LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz		
Ethernet	Controller	3 x Intel® I226-LM 2.5GbE LAN	1 x Intel® I226-LM 2.5GbE LAN 2 x Intel® I226-V 2.5GbE LAN	3 x Intel® I226-V 2.5GbE LAN	3 x Intel® I225-LM 2.5GbE LAN		2 x Intel® I225-V 2.5GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)			Realtek® ALC897 Audio Codec (Co-lay ALC888S)		
Super I/O	Controller	Fintek F81966D-I			Fintek F81966AB-I		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			256-level Watchdog Timer		
TPM	Smart Fan	Yes			Yes		
	Controller	Infineon® SLB 9672VU2.0			Infineon® SLB 9670VQ2.0		
I/O Interface	USB	6 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (internal) 3 x USB 2.0 (internal with one Vertical Type-A)		2 x USB 3.2 Gen2 (rear) 2 x USB 3.2 Gen1 (rear) 2 x USB 2.0 (rear) 3 x USB 2.0 (internal with one Vertical Type-A)	6 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (internal) 2 x USB 2.0 (internal)		2 x USB 3.2 Gen2 (rear) 2 x USB 3.2 Gen1 (rear) 2 x USB 2.0 (rear) 2 x USB 2.0 (internal)
	Serial	4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2~4: RS-232/422/485, 0V/5V/12V, Auto-flow Control	4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2~4: RS-232, 0V/5V/12V		4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2~4: RS-232/422/485, 0V/5V/12V, Auto-flow Control		4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~4: RS-232, 0V/5V/12V (RS-232/422/485 by option)
	Parallel	N/A			N/A		
	PS/2	N/A			N/A		
	GPIO	16-bits (8 x GPI; 8 x GPO), 3.3V			16-bits (8 x GPI; 8 x GPO), 5V		
	PCI	N/A			N/A		
Expansion Slot	M.2	1 x M key (PCIe x4 NVMe, SATA-3.0), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230 1 x B key (PCIe x1, USB 3.2 Gen 2 x 1, USB 2.0), 3042 (with SIM Holder)		1 x M key (PCIe x4 NVMe, SATA-3.0), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230	1 x M key (PCIe x4 NVMe), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230 1 x B key (PCIe x1, USB 3.2 Gen 2 x 1, USB 2.0), 3042 (with SIM Holder)		1 x M key (PCIe x4 NVMe), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230
	Mini-PCIe	N/A			N/A		
Storage	SATA	2 x SATA 3.0 (Support RAID 0/1/5, RAID 5 with M.2 M Key) (Support AHCI Mode)		2 x SATA 3.0 (Support AHCI Mode)	3 x SATA 3.0 (Support RAID 0/1/5)		3 x SATA 3.0 (Support AHCI Mode)
	mSATA	N/A			N/A		
Power Supply	DC	DC-in 8-48V			N/A		
	ATX	N/A			ATX-Power 24P, 12V-4P		
Environment	Operating Temperature	0 ~ 60°C Note: Thermal Test w/ Airflow:0.7m/s			-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		
	Operating Humidity	10 ~ 90%, non-condensing			10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C			-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing			10 ~ 90%, non-condensing		
Form Factor	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)			170 x 170 mm (Mini-ITX)		
	Weight	0.42 kg			0.43 Kg		0.41 Kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA			CE, FCC Class B, BSMI, RCM, VCCI, UKCA		
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, Pre-scan) Linux (Support by request)			Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise LTSC (64-bit) Linux (Support by request)		

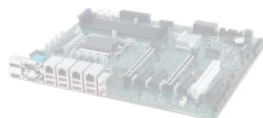


Model		MS-98L1				MS-98K1			MS-98E1	
		Mini-ITX Board				Mini-ITX Board			Mini-ITX Board	
Processor	CPU	SKU1	SKU2	SKU3	SKU4	SKU1	SKU2	SKU3	C236 SKU	H110 SKU
		8th Gen Intel® Coffee Lake-S Xeon™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W 9th Gen Intel® Coffee Lake Refresh-S Xeon™ i7/i5/i3/Pentium®/Celeron® IOTG Processor, Max 65W		8th Gen Intel® Coffee Lake-S i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W 9th Gen Intel® Coffee Lake Refresh-S i7/i5/i3/Pentium®/Celeron® IOTG Processor, Max 65W		7th Gen Intel® Desktop Kaby Lake-S i7-7700/i7-7700T/i5-7500/i5-7500T/i3-7101E/i3-7101TE, Max 65W 6th Gen Intel® Desktop Skylake-S i7-6700/i7-6700TE/i5-6500/i5-6500TE/i3-6100/i3-6100TE/G4400/G4400TE/G3900/G3900TE, Max 65W			7th/6th Gen Intel® Desktop Kaby Lake/Skylake Xeon®/i7/i5/i3/Pentium®/Celeron® Series Processor, Max. 95W	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max. 95W
		Frequency				2.3GHz~4.0GHz (Depends on CPU)			2.3GHz~4.0GHz (Depends on CPU)	
		L2 Cache				2M ~ 8M (Depends on CPU)			2M ~ 8M (Depends on CPU)	
		CPU Type				Socket (LGA 1151)			Socket (LGA 1151)	
	Chipset		Intel® C246 Express	Intel® Q370 Express	Intel® H310 Express		Intel® Q170 Express	Intel® H110 Express		Intel® C236 Express
Memory	BIOS	AMI UEFI				AMI			AMI	
	Technology	Dual-channel DDR4 (ECC/non-ECC) 2666MHz		Dual-channel DDR4 (non-ECC) 2666MHz		Dual-channel DDR4 (non-ECC) 2133/2400MHz			Dual-channel DDR4 (ECC) 2133/2400MHz (7th Gen)	Dual-channel DDR4 (non-ECC) 2133/2400MHz (7th Gen)
	Max.Capacity	Up to 64 GB				Up to 32 GB			Up to 32GB	
Display	Socket	2 x 240-pin UDIMMs				2 x 260-pin SO-DIMMs			2 x 260-pin SO-DIMMs	
	Controller	Intel® UHD Graphics				Intel® HD Graphics			Intel® HD Graphics	
	Graphic Memory	Depends on CPU				Depends on CPU			Depends on CPU	
	LVDS	1 x Dual channel 18/24-bit			N/A	1 x Dual channel 18/24-bit			1 x Dual channel 18/24-bit	
	VGA	N/A				N/A			1	
	DVI	N/A				2 (DVI-D)			1 (DVI-D)	
	HDMI	1 (Co-lay with DP by Optional)				1 (Co-lay with DP by Optional)			1	
	DisplayPort	1				1			N/A	
	Multiple Display	3 independent displays			2 independent displays		3 independent displays	2 independent displays		
Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz			HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz		LVDS up to 1920 x 1200 @60Hz DVI-D up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2160 @60Hz			LVDS up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DVI-D up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz	
	Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I210-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I211-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN	4 x Intel® I210-AT GbE LAN (Front LAN LED Supported)	4 x Intel® I211-AT GbE LAN (Front LAN LED Supported)	2 x Intel® I211-AT GbE LAN (Front LAN LED Supported)	1 x Intel® I219-LM GbE-PHY 1 x Intel® I211-AT PCIe GbE LAN(Co-lay I210-AT)
Audio	Controller	Realtek® ALC887 Audio Codec (Co-lay ALC888S)				Realtek® ALC887 HD Audio Codec			Realtek® ALC887 HD Audio Codec	
Super I/O	Controller	Fintek F81866AD-I				Fintek F81866AD-I			Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer				256-level Watchdog Timer			256-level Watchdog Timer	
	Smart Fan	Yes				Yes			Yes	
TPM	Controller	Infineon® SLB9665TT2.0		Box header (Default) Infineon® SLB9665TT2.0 (by BOM option)		Infineon® SLB9665TT 2.0	Pin header (Default) Infineon® SLB9665TT 2.0 (by BOM option)		Pin header	
I/O Interface	USB	2 x USB 2.0 (internal) 6 x USB 3.2 Gen 1 (4 x rear, Signal Share with Internal Box Header; 2 x internal) 4 x USB 3.2 Gen 2 (rear)		4 x USB 2.0 (rear) 4 x USB 3.2 Gen 1 (rear)		3 x USB 2.0 (internal) 8 x USB 3.2 Gen 1 (rear)	5 x USB 2.0 (4 x rear, 1 x internal) 4 x USB 3.2 Gen 1 (rear)		5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 (rear)	
	Serial	6 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3-6: RS-232, 0V/5V/12V (RS-232/422/485 by option)		4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2-4: RS-232, 0V/5V/12V (RS-232/422/485 by option)	2 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2: RS-232, 0V/5V/12V (RS-232/422/485 by option)	4 x COM ports (internal) COM1: RS-232/422/485, RI/5V/12V COM2-4: RS-232/422/485, 0V/5V/12V		5 x COM ports (COM1: rear, COM2-4: internal) COM1: RS-232/422/485, 0V/5V/12V COM2-5: RS-232, 0V/5V/12V		
		N/A		N/A		N/A		N/A		
		N/A		N/A		N/A		1		
		16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V		8-bits (4 x GPI, 4 x GPO), 5V		
	Expansion Slot	PCI	N/A				N/A			1
M.2		1 x M Key (PCIe x4 NVme, SATA), 2242/2280 1 x E Key (PCIe x1, USB 2.0, CNVi), 2230		1 x M Key (SATA), 2242/2280		1 x M Key (PCIe x4, SATA3.0), 2242/2280	1 x M Key (SATA3.0), 2242/2280		1 x M Key (PCIe x4, SATA3.0), 2242	N/A
Mini-PCIe		1 x Full-size (w/SIM holder)		1 x Full-size		1 x Full-size (w/ SIM holder)			1 x Full-size (mSATA)	
Storage	SATA	3 x SATA 3.0 (Support RAID 0/1/5/10, AHCI Mode, RAID 10 Configured with M.2 M Key)		3 x SATA 3.0 (Support AHCI Mode)		2 x SATA 3.0			4 x SATA 3.0	3 x SATA 3.0
	mSATA	N/A				N/A			1 (shared w/ Mini-PCIe)	
Power Supply	DC	N/A				DC-in 12 ~24V			N/A	
	ATX	ATX-Power 24P, 12V-8P				N/A			ATX-Power 24P, 12V-4P	
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s				-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing			10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C				-20 ~ 80°C			-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing			10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)				170 x 170 mm (Mini-ITX)			170 x 170 mm (Mini-ITX)	
	Weight	0.405 kg	0.375 kg	0.39 kg	0.375 kg	0.42 kg	0.42 kg	0.39 kg	0.37 kg	
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI				FCC, CE , RCM, VCCI, BSMI (Class A)			FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)				Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	



Model		MS-CF09				MS-98L2			MS-98E2				
		Micro-ATX Board											
Processor	CPU	SKU1	SKU2	SKU3	SKU4	SKU1	SKU2	SKU3	C236 SKU	H110 SKU			
		12th Gen Intel® IOTG Alder Lake-S Processor Core i9/i7/i5/i3, Pentium, Celeron, Max 125W 13th Gen Intel® IOTG Raptor Lake-S Processor Core i9/i7/i5/i3, Pentium, Celeron, Max 125W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 125W				8th Gen Intel® Desktop Coffee Lake-S Xeon®/Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		8th Gen Intel® Desktop Coffee Lake-S Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		1.1GHz~3.7 GHz (Depends on CPU)	7th/6th Gen Intel® Desktop Kaby Lake®/Skylake Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		
		P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)				2.1GHz~4.7GHz(Depends on CPU)			2.3GHz~4.0GHz (Depends on CPU)				
		4MB~30MB (Depends on CPU)				2MB~12MB (Depends on CPU)			2M ~ 8M (Depends on CPU)				
		Socket (LGA1700)				Socket (LGA 1151)			Socket (LGA 1151)				
		Intel® R680E Express		Intel® Q670E Express		Intel® H610E Express		Intel® C246 Express		Intel® Q370 Express		Intel® C236 Express	Intel® H110 Express
Memory	BIOS	AMI UEFI				AMI UEFI			AMI				
		Technology	Dual-channel DDR5 (ECC/non-ECC) 4400 Mhz		Dual-channel DDR5 (non-ECC) 4400 MHz		Dual-channel DDR4 (ECC/non-ECC) 2666MHz		Dual-channel DDR4 (non-ECC) 2666MHz		Dual-channel DDR4 (ECC) 2133MHz/ 2400MHz (7th Gen)	Dual-channel DDR4 (non-ECC) 2133MHz/ 2400MHz (7th Gen)	
		Max. Capacity	Up to 128GB		Up to 64GB		Up to 128 GB		Up to 64 GB		Up to 32 GB	Up to 32 GB	
		Socket	4 x 288-pin UDIMMs		2 x 288-pin UDIMMs		4 x 288-pin UDIMMs		4 x 288-pin UDIMMs		4 x 288-pin UDIMMs	4 x 288-pin UDIMMs	
Display	Controller	Intel® UHD Graphics Depends on CPU				Intel® HD Graphics Depends on CPU			Intel® HD Graphics Depends on CPU				
		Graphic Memory	N/A				N/A			1			N/A
		LVDS	1				N/A			N/A			
		eDP	N/A				N/A			1			
		VGA	N/A				N/A			1			
		DVI	N/A				1			1 (DVI-D)			
		HDMI	2				N/A			N/A			
		DisplayPort	1				1			1			
		Multiple Display	4 independent displays		3 independent displays		3 independent displays			3 independent displays		2 independent displays	
		Display Interface	HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz eDP up to 4096 x 2160 @60Hz				VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz			LVDS up to 1920 x 1200 @ 60Hz DP up to 4096 x 2304 @ 60Hz DVI-D up to 1920 x 1200 @ 60Hz VGA up to 1920 x 1200 @ 60Hz		DP up to 4096 x 2304 @ 60Hz DVI-D up to 1920 x 1200 @ 60Hz VGA up to 1920 x 1200 @ 60Hz	
Ethernet	Controller	4 x Intel® i226-LM 2.5GbE LAN		2 x Intel® i226-LM 2.5GbE LAN		4 x Intel® i226-V 2.5GbE LAN		2 x Intel® i226-V 2.5GbE LAN		1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I210-AT GbE LAN		1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN	
Audio	Controller	Realtek® ALC897 Audio Codec				Realtek® ALC887 HD Audio Codec			Realtek® ALC887 HD Audio Codec				
Super I/O	Controller	Fintek F81966D-I				Fintek F81866AD-I			Fintek F81866AD-I + F81216H		Fintek F81866AD-I		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer				256-level Watchdog Timer			256-level Watchdog Timer				
TPM	Smart Fan	Yes				Yes			Yes				
	Controller	Infineon® SLB9672VU2.0				Box header (Default) Infineon SLB9665TT2.0 (by BOM option)			Pin header				
I/O Interface	USB	8 x USB 3.2 Gen 2 x1 Ports (8 x rear) 2 x USB 3.2 Gen 1 Ports (2 x internal) 4 x USB 2.0 Ports (2 x internal, 2 x Vertical Type-A Connector)		2 x USB 3.2 Gen 2 x1 Ports (2 x rear) 2 x USB 3.2 Gen 1 Ports (2 x rear) 6 x USB 2.0 Ports (4 x rear, 2 x internal)		5 x USB 2.0 (5 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 Type-A (rear) 4 x USB 3.2 Gen 2 Type-A (rear)			6 x USB 2.0 (2 x rear, 4 x internal) 6 x USB 3.2 Gen 1 (4 x rear, 2 x internal)		6 x USB 2.0 (2 x rear, 4 x internal) 4 x USB 3.2 Gen 1 (rear)		
		Serial	6 x COM ports (internal) COM1~2: RS-232/422/485 with Ring/0V/5V/12V Auto-flow Control COM3~6: RS-232/422/485 with 0V/5V/12V Auto-flow Control		6 x COM ports (internal) COM1~2: RS-232/422/485 with Ring/0V/5V/12V Auto-flow Control COM3~6: RS-232 with 0V/5V/12V		4 x COM ports (internal) COM1: RS-232/422/485 with Ring/0V/5V/12V Auto-flow Control COM2~4: RS-232 with 0V/5V/12V		6 x COM ports (COM1: rear, COM2~6: internal) COM1: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V		6 x COM ports (COM1: rear, COM2~9: internal) COM1: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM2~6: RS-232, 0V/5V/12V, Auto-flow Control COM7~10: RS-232, without power		6 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM2~6: RS-232, 0V/5V/12V
		Parallel	Yes				1			N/A			
		PS/2	1 x PS/2 port by Y-cable for keyboard and mouse				1 x PS/2 port by Y-cable for keyboard and mouse			1			
		GPIO	16-bits (8 x GPI; 8 x GPO), 5V				16-bits (8 x GPI; 8 x GPO), 5V			8-bits (4 x GPI, 4 x GPO), 5V			
Expansion Slot	PCIe x16	1				1			1				
	PCIe x8	N/A				N/A			1*PCIe x8 (x4 signal)			1*PCIe x8 (x1 signal)	
	PCIe x1	N/A				N/A			1				
	PCI	N/A				N/A			1				
	M.2	1 x M.2 M key (PCIe x4 NVMe; Signal from CPU), 2280/22110 2 x M.2 M key (PCIe x4 NVMe; Signal from PCH), 2242/2280		1 x M.2 M key (PCIe x4 NVMe; Signal from CPU), 2280/22110 1 x M.2 M key (PCIe x4 NVMe; Signal from PCH), 2242/2280		N/A		1 x M Key (PCIe x4 NVMe, SATA 3.0), 2242/2260/2280			1 x M Key (PCIe x4, SATA3.0), 2242/2260/2280	N/A	
		Mini-PCIe	N/A				1 x Full-size/Half-size			1 x Full-size (mSATA)			
		Storage	SATA	4 x SATA 3.0 (RAID 0/1/5/10)		4 x SATA 3.0		4 x SATA 3.0			6 x SATA 3.0		3 x SATA 3.0
Power Supply	CFast	N/A				N/A			N/A				
	DC	N/A				N/A			N/A				
Environment	ATX	ATX-Power 24P, 12V-8P				ATX-Power 24P, 12V-8P			ATX-Power 24P, 12V-8P				
	Operating Temperature	0 ~ 60°C Note: Thermal Test w/ Airflow:0.7m/s				-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s				
	Operating Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing			10 ~ 90%, non-condensing				
	Storage Temperature	-20 ~ 80°C				-20 ~ 80°C			-20 ~ 80°C				
Form Factor	Storage Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing			10 ~ 90%, non-condensing				
	Dimensions	244 x 244mm (uATX)				244 x 244 mm (uATX)			244 x 244 mm (uATX)				
Certification	Weight	0.659 kg		0.625 kg		0.600 kg		0.73 kg					
	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA				CE, FCC Class B, BSMI, RCM, VCCI			FCC, CE, RCM, VCCI, BSMI				
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise LTSC 24H2 (64-bit) Linux (Support by request)				Windows 10 IoT Enterprise 2019 SAC (64-bit, RS5) Linux (Support by request)			Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 IoT Enterprise LTSC/ SAC 1809 (64-bit, RS5) Linux (Support by request)				

NEW

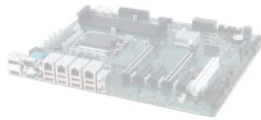


NEW



Model		MS-CF20		MS-CF05 V2.0	MS-CF05	
				ATX Board		
Processor	CPU	SKU1	SKU2		SKU1	SKU2
		15th Gen Intel® Arrow Lake-S Core™ Ultra 9/7/5/ Pentium®/Celeron® IOTG Series Processor, Max 125W		12th Gen Intel® Alder Lake-S i9/i7/i5/ i3/Pentium®/Celeron® IOTG Series Processor, Max 125W 13th Gen Intel® Raptor Lake-S i9/i7/ i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 125W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 125W	12th Gen Intel® Alder Lake-S i9/i7/i5/i3/Pentium®/ Celeron® IOTG Series Processor, Max 125W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/Pentium®/ Celeron® IOTG Series Processor, Max 125W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 125W	
		P-Core 1.4GHz~5.6GHz (Depends on CPU) E-Core 1.2GHz~4.6GHz (Depends on CPU)		P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)	P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)	
		3MB~36MB (Depends on CPU)		4MB~30MB (Depends on CPU)	4MB~30MB (Depends on CPU)	
		Socket (LGA1851)		Socket (LGA 1700)	Socket (LGA1700)	
		Intel® W880		Intel® R680E Express	Intel® R680E Express	Intel® Q670E Express
	AMI UEFI		AMI UEFI	AMI UEFI		
Memory	Technology	Dual-channel DDR5 (ECC/non-ECC) 5600 MT/s (ECC support will depend on CPU)		Dual-channel DDR5 (ECC/non-ECC) 4400 MT/s (ECC support will depend on CPU)	Dual-channel DDR5 (ECC/ non-ECC) 4400 MT/s (ECC support will depend on CPU)	Dual-channel DDR5 (non-ECC) 4400 MT/s
	Max. Capacity	Up to 192GB		Up to 128GB	Up to 128GB	
	Socket	4 x 288-pin UDIMMs		4 x 288-pin UDIMMs	4 x 288-pin UDIMMs	
	Controller	Intel® UHD Graphics		Intel® UHD Graphics	Intel® UHD Graphics	
Display	Graphic Memory	Depends on CPU		Depends on CPU	Depends on CPU	
	VGA	1		1	1	
	HDMI	1		1	1	
	DisplayPort	1		1	1	
	Multiple Display	3 independent displays		3 independent displays	3 independent displays	
	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz		VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz	
Ethernet	Controller	4 x Intel® I226-LM 2.5GbE LAN	2 x Intel® I226-LM 2.5GbE LAN	4 x Intel® I225-LM 2.5GbE LAN	2 x Intel® I225-LM 2.5GbE LAN	
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)		Realtek® ALC897 Audio Codec (Co-lay ALC888S)	Realtek® ALC897 Audio Codec (Co-lay ALC888S)	
Super I/O	Controller	FINTEK F81967D-I		FINTEK F81966D-I	FINTEK F81966D-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes		Yes	Yes	
TPM	Controller	Infineon® SLB9672VU2.0		Infineon® SLB9672VU2.0	Infineon® SLB9672VU2.0	
I/O Interface	USB	8 x USB 3.2 Gen 2 x1 (8 x rear) 2 x USB 3.2 Gen 1 (2 x internal) 3 x USB 2.0 (3 x internal with one Vertical Type-A Connector)		8 x USB 3.2 Gen 2 x1 (8 x rear) 2 x USB 3.2 Gen 1 Ports (2 x internal) 3 x USB 2.0 (3 x internal with one Vertical Type-A Connector)	8 x USB 3.2 Gen 2 x1 (8 x rear) 2 x USB 3.2 Gen 1 Ports (2 x internal) 3 x USB 2.0 (3 x internal with one Vertical Type-A Connector)	
		Serial	10 x COM ports (1 x rear, 9 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232, 0V/5V/12V, Auto-flow Control (Default set to Ring) COM7~10: RS-232, 0V/5V/12V, Auto-flow Control	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232, 0V/5V/12V, Auto-flow Control	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232/422/485, 0V/5V/12V, Auto-flow Control	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232, 0V/5V/12V, Auto-flow Control
	Parallel		N/A		Yes	Yes
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse		1 x PS/2 port by Y-cable for keyboard and mouse	1 x PS/2 port by Y-cable for keyboard and mouse	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V	16-bits (8 x GPI; 8 x GPO), 5V	
	Expansion Slot	PCIe x16	2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)		2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)	2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)
PCIe x4		4		4	4	
PCIe x1		N/A		N/A	1	N/A
PCIe		1		1	N/A	
M.2		1 x M key (Signal from CPU) 2280, 1 x M key (Signal Shared by PCIe Slot5) 2280 1 x E key (PCIe x1), 2230		1 x M key (Signal from CPU) 2280/22110, 1 x M key (Signal Shared by PCIe Slot5) 2242/2280 1 x E key (PCIe x1), 2230 1 x B key (PCIe x2), 2242/2280	1 x M key (Signal from CPU) 2280/22110, 1 x M key (Signal Shared by PCIe Slot5) 2242/2280 1 x E key (PCIe x1), 2230 1 x B key (PCIe x2), 2242/2280	1 x M key (Signal from CPU) 2280/22110, 1 x M key (Signal Shared by PCIe Slot5) 2242/2280
Storage	SATA	4 x SATA 3.0 (RAID 0/1/5/10)		4 x SATA 3.0 (RAID 0/1/5/10)	4 x SATA 3.0 (RAID 0/1/5/10)	
Power Supply	ATX	ATX-Power 24P, 12V-8P		ATX-Power 24P, 12V-8P	ATX-Power 24P, 12V-8P	
	Operating Temperature	0 ~ 60°C		0 ~ 60°C	0 ~ 60°C	
Environment	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	
	Dimensions	305 x 244 mm (ATX)		305 x 244 mm (ATX)	305 x 244 mm (ATX)	
Form Factor	Weight	0.780 Kg		0.779 Kg	0.779 Kg	
	EMC	CE, FCC Class B, BSMI, RCM, VCCI		CE, FCC Class B, BSMI, RCM, VCCI	CE, FCC Class B, BSMI, RCM, VCCI, UKCA, CN	
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request) Noted : All driver base on Intel & chio vendor supported		Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request) Noted : All driver base on Intel & chio vendor supported	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request) Noted : All driver base on Intel & chio vendor supported	

NEW



NEW



Model		MS-CF22	MS-CF06
		ATX Board	
Processor	CPU	15th Gen Intel® Arrow Lake-S Core Ultra 9/7/5 Series Processor, Max 65W	12th Gen Intel® Alder Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W
	Frequency	Depends on CPU	P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)
	L2 Cache	Depends on CPU	4MB~30MB (Depends on CPU)
	CPU Type	Socket (LGA1851)	Socket (LGA1700)
	Chipset	Intel® H810 Express	Intel® H610E Express
	BIOS	AMI UEFI	AMI UEFI
Memory	Technology	Dual-channel DDR5 (non-ECC) 6400 MT/s	Dual-channel DDR5 (non-ECC) 5600 MHz
	Max. Capacity	Up to 96GB	Up to 64GB
	Socket	2 x 288-pin UDIMMs	2 x 288-pin UDIMMs
Display	Controller	Intel® UHD Graphics	Intel® UHD Graphics
	Graphic Memory	Depends on CPU	Depends on CPU
	LVDS	N/A	N/A
	eDP	N/A	N/A
	VGA	1	1
	DVI	N/A	N/A
	HDMI	1	1
	DisplayPort	1	N/A
	Multiple Display	3 independent displays	2 independent displays
	Display Interface	HDMI up to 4096 x 2160 @30Hz DP up to 4096 x 2304 @60Hz VGA up to 1920 x 1200 @60Hz	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I226V 2.5 GbE LAN	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I225-V 2.5GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)	Realtek® ALC897 Audio Codec (Co-lay ALC888S)
Super I/O	Controller	Fintek F81966D-I	FINTEK F81966D-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes	Yes
TPM	Controller	Infineon® SLB 9672VU2.0	Infineon® SLB9672VU2.0
I/O Interface	USB	2 x USB 3.2 Gen 2 x1 Ports (2 x rear) 2 x USB 3.2 Gen 1 x1 Ports (2 x rear) 5 x USB 2.0-Ports (2 x rear, 3 x internal with one Vertical Type-A)	2 x USB 3.2 Gen 2 x1 (2 x rear) 2 x USB 3.2 Gen 1 x1 (2 x rear) 5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A)
	Serial	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485 Auto-flow Control Supported COM3~6: RS-232, 0V/5V/12V	6 x COM ports (2 rear, 4 x internal) COM1: RS-232/422/485 0V/5V/12V, Auto-flow Control COM2~6: RS-232, 0V/5V/12V
	Parallel	N/A	N/A
	PS/2	N/A	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	8-bit, 4 x GPI & 4 x GPO, Default	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x16	1	1
	PCIe x4	1	1
	PCIe x1	N/A	N/A
	PCIe	5	5
	M.2	1 x M.2 M key (PCIe x4 NVMe), 2280	N/A
Storage	Mini-PCIe	N/A	N/A
	SATA	4 x SATA 3.0	4 x SATA 3.0
	mSATA	N/A	N/A
Power Supply	DC	N/A	N/A
	ATX	ATX-Power 24P, 12V-8P	ATX-Power 24P, 12V-8P
Environment	Operating Temperature	0 ~ 60°C	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions	305 x 244 mm (ATX)	305 x 244 mm (ATX)
	Weight	TBD	0.728 Kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA, CN	CE, FCC Class B, BSMI, RCM, VCCI, UKCA, CN
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 22H2 (64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported



Model		MS-98N9		MS-98K9 V2.1		MS-98K9			
				ATX Board					
Processor	CPU	SKU1	SKU2	SKU1	SKU2	SKU1	SKU2	SKU3	
		10th Gen Intel® Comet Lake-S Xeon®, Core™ i9/ i7/i5/i3, Pentium®, Celeron® Processor, Max 125W	10th Gen Intel® Comet Lake-S Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor, Max 125W	9th/8th Gen Intel® Coffee Lake Refresh-S/Coffee Lake-S Xeon®, Core™ i7/i5/i3, Pentium®, Celeron® Processor, Max 95W	9th/8th Gen Intel® Coffee Lake Refresh-S/Coffee Lake-S Xeon®, Core™ i7/i5/i3, Pentium®, Celeron® Processor, Max 95W	8th Gen Intel® Desktop Coffee Lake-S Xeon®, Core™ i7/i5/i3/Pentium®/ Celeron® Series Processor, Max 95W	8th Gen Intel® Desktop Coffee Lake-S i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		
		Frequency		2.1GHz~4.7GHz (Depends on CPU)		2.1GHz~4.7GHz (Depends on CPU)			
		L2 Cache		2MB~12MB (Depends on CPU)		2MB~12MB (Depends on CPU)			
		CPU Type		Socket (LGA 1200)		Socket (LGA 1151)			
		Chipset	Intel® W480E Express	Intel® Q470E Express	Intel® C246 Express	Intel® Q370 Express	Intel® C246 Express	Intel® Q370 Express	Intel® Q370 Express
Memory		BIOS	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI			
		Technology	Dual-channel DDR4 (ECC/non-ECC) 2933 MHz	Dual-channel DDR4 (non-ECC) 2933 MHz	Dual-channel DDR4 (ECC/non-ECC) 2666 MHz	Dual-channel DDR4 (non-ECC) 2666 MHz	Dual-channel DDR4 (ECC/non-ECC) 2666 MHz	Dual-channel DDR4 (non-ECC) 2666 MHz	
		Max. Capacity	Up to 128GB		Up to 128GB		Up to 64GB		
		Socket	4 x 288-pin UDIMMs		4 x 288-pin UDIMMs		4 x 288-pin UDIMMs		
Display		Controller	Intel® UHD Graphics		Intel® UHD Graphics		Intel® UHD Graphics		
		Graphic Memory	Depends on CPU		Depends on CPU		Depends on CPU		
		LVDS	N/A		N/A		N/A		
		eDP	1		N/A		N/A		
		VGA	1		1		1		
		DVI	N/A		N/A		1		
		HDMI	1		1		1		
		DisplayPort	1		2		2		
		Multiple Display	3 independent displays		3 independent displays		3 independent displays		
		Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @30Hz DP up to 4096 x 2304 @60Hz eDP up to 4096 x 2304 @60Hz		VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @30Hz DP up to 4096 x 2304 @60Hz		VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz		HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I210-AT GbE LAN		1 x Intel® I219-LM GbE LAN PHY 2 x Intel® I210-AT GbE LAN		1 x Intel® I219-LM GbE LAN PHY 2 x Intel® I210-AT GbE LAN		1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	
		Realtek® ALC888S-VD2-GR Audio Codec		Realtek® ALC887-VD2-CG Audio Codec		Realtek® ALC887-VD2-CG Audio Codec			
Audio	Controller	Fintek F81966D-I		Fintek F81866AD-I		Fintek F81866AD-I			
Super I/O	Controller								
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer		256-level Watchdog Timer			
		Smart Fan	Yes		Yes		Yes		
TPM	Controller	Infineon SLB 9670VQ2.0		Infineon SLB 9665TT2.0		Infineon SLB 9665TT2.0 TPM 2.0		Box header (Default) Infineon SLB9665TT2.0 (by BOM option)	
I/O Interface	USB	6 x USB 3.2 Gen 2 (6 x rear) 2 x USB 3.2 Gen 1 (2 x internal) 5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A Connector)		7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A) 6 x USB 3.2 Gen 2 (rear)		7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A) 6 x USB 3.2 Gen 2 (rear)		7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 2 (rear)	
		Serial	10 x COM ports (1 x rear, 9 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232/422/485 with 0V/5V/12V Auto-flow Control COM7~10: RS-232, 0V/5V/12V		6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V		10 x COM ports (internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~10: RS-232, 0V/5V/12V		6 x COM ports (internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V
			Yes				Yes		
			1 (wafer Connector)		1 x PS/2 port by Y-cable for keyboard and mouse		1 x PS/2 port by Y-cable for keyboard and mouse		
			16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V		
			1 (Signal configured as 1 PCIe x16 or 2 PCIe x8)		2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)		3 (Signal configured as 1 PCIe x16 or 2 PCIe x8 or 1 PCIe x8 + 2 PCIe x4)		
Expansion Slot		PCIe x16	N/A		N/A		N/A		
		PCIe x8	N/A		N/A		N/A		
		PCIe x4	3		3 (PCIe x16 Slot Type; 2*PCIe x4 NVMe)		2 (PCIe x16 Slot Type)		
		PCIe x1	N/A		N/A		2		
		PCI	2		2		N/A		
		M.2	3 x M.2 M key (PCIe x4 NVMe, signal shared with PCIe Slot 1 & 3 & 5), 2 with 2242/2260/2280, 1 with 2242/2260/2280/22110		1 x M.2 M key (PCIe x4 NVMe, Intel® Optane™ Memory Support, SATA 3.0), 2242/2260/2280		1 x M key (PCIe x4 NVMe, SATA 3.0), 2242/2260/2280 1 x E key (PCIe x1, USB 2.0), 2230		
		Mini-PCIe	1 x Full/Half-size (mSATA)		N/A		N/A		
		SATA	4 x SATA 3.0 (RAID 0/1/5/10)		4 x SATA 3.0 (RAID 0/1/5/10, SATA port 4 share with M.2 M Key)		6 x SATA 3.0 (RAID 0/1/5/10, SATA port 6 share with M.2 M Key)		
Power Supply		mSATA	N/A		N/A		N/A		
		DC	N/A		N/A		N/A		
Environment	ATX	ATX-Power 24P, 12V-8P		ATX-Power 24P, 12V-8P		ATX-Power 24P, 12V-8P			
		Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		
		Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		
		Storage Temperature	-20 ~ 80°C		-20 ~ 80°C		-20 ~ 80°C		
Form Factor	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		10 ~ 90%, non-condensing			
		Dimensions	305 x 244 mm (ATX)		305 x 244 mm (ATX)		305 x 244 mm (ATX)		
Certification	Weight	0.735 Kg		0.70 kg		0.70 kg			
		EMC	CE, FCC Class B, BSMI, RCM, VCCI		CE, FCC Class B, BSMI, RCM, VCCI		CE, FCC Class B, BSMI, RCM, VCCI		
Software Platform	OS Support	Windows 10 IoT Enterprise 2019 SAC (64-bit, RS5) Windows 10 Enterprise LTSC (64-bit, RS5) Windows 11 IoT Enterprise LTSC (64-bit) Linux (Support by request)		Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)		Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)			



Model		MS-98L9 V2.0	MS-98L9
		ATX Board	
Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 65W
	Frequency	2.3GHz~4.2GHz (Depends on CPU)	2.3GHz~4.2GHz (Depends on CPU)
	L2 Cache	2MB~8MB (Depends on CPU)	2MB~8MB (Depends on CPU)
	CPU Type	Socket (LGA 1151)	Socket (LGA 1151)
	Chipset	Intel® H110 Express	Intel® H110 Express
	BIOS	AMI UEFI	AMI UEFI
Memory	Technology	Dual-channel DDR4 2133/2400 MHz	Dual-channel DDR4 2133/2400 MHz
	Max. Capacity	Up to 32GB	Up to 32GB
	Socket	2 x 288-pin UDIMMs	2 x 288-pin UDIMMs
Display	Controller	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Depends on CPU	Depends on CPU
	LVDS	N/A	N/A
	eDP	N/A	N/A
	VGA	1	1
	DVI	N/A	N/A
	HDMI	1	1
	DisplayPort	N/A	1
	Multiple Display	2 independent displays	2 independent displays
Ethernet	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz
	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG Audio Codec	Realtek® ALC887-VD2-CG Audio Codec
Super I/O	Controller	Fintek F81866AD-I	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes	Yes
TPM	Controller	Box header	Box header
I/O Interface	USB	5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 (rear)	6 x USB 2.0 (2 x rear, 4 x internal) 4 x USB 3.2 Gen 1 (4 x rear, 2 x internal)
	Serial	6 x COM ports (2 x rear, 4 x internal) COM1: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM2~6: RS-232, COM2: 0V/5V/12V	6 x COM ports (2 x rear, 4 x internal) COM1: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM2~6: RS-232, COM2: 0V/5V/12V
	Parallel	N/A	N/A
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	GPIO 1: 8-bits (4 x GPI; 4 x GPO by default), 5V GPIO 2 : 8-bits (8 x GPI or 8 x GPO by request), 5V	8-bits (4 x GPI; 4 x GPO by default), 5V 8-bits (8 x GPI or 8 x GPO by request), 5V
Expansion Slot	PCIe x16	1	1
	PCIe x8	N/A	N/A
	PCIe x4	1 (PCIe x16 Slot Type)	1
	PCIe x1	N/A	N/A
	PCI	5	5
	M.2	N/A	N/A
	Mini-PCIe	N/A	N/A
Storage	SATA	4 x SATA 3.0	4 x SATA 3.0
	mSATA	N/A	N/A
Power Supply	DC	N/A	N/A
	ATX	ATX-Power 24P, 12V-8P	ATX-Power 24P, 12V-8P
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions	305 x 244 mm (ATX)	305 x 244 mm (ATX)
	Weight	0.70 kg	0.70 kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI	CE, FCC Class B, BSMI, RCM, VCCI
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)



Model		MS-98H9 V2.0	MS-98H9			MS-98M9		
			ATX Board					
Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Xeon® i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		2nd/1st Gen Intel® Cascade Lake/Skylake Xeon® Scalable Processors, Max 205W		
		Frequency	2.6GHz~4.5GHz(Depends on CPU)			1.9GHz~2.5GHz (Depends on CPU)		
		L2 Cache	2MB~8MB (Depends on CPU)			11MB~27.5MB (Depends on CPU)		
		CPU Type	Socket (LGA 1151)			Socket (LGA 3647)		
		Chipset	Intel® Q170 Express	Intel® C236 Express	Intel® Q170 Express	Intel® H110 Express	Intel® C622 Express	Intel® C621 Express
		BIOS	AMI UEFI		AMI UEFI			
Memory	Technology	Dual-channel DDR4 (non-ECC) 2133 MHz	Dual-channel DDR4 (ECC) 2133 MHz		Dual-channel DDR4 (non-ECC) 2133 MHz	Six-channel DDR4 (ECC) 2666 MHz		
	Max. Capacity	Up to 64 GB	Up to 64 GB		Up to 32 GB	Up to 192GB		
	Socket	4 x 288-pin UDIMMs	4 x 288-pin UDIMMs		2 x 288-pin UDIMMs	6 x 288-pin RDIMMs		
Display	Controller	Intel® HD Graphics	Intel® HD Graphics		N/A			
	Graphic Memory	Depends on CPU	Depends on CPU		N/A			
	VGA	1 (Non PnP)	1 (Non PnP)		N/A			
	DVI	1 (DVI-D)	1 (DVI-D)		N/A			
	DisplayPort	2	2		N/A			
	Multiple Display	3 independent displays	3 independent displays		2 independent displays	N/A		
	Display Interface	VGA up to 1920 x 1080 @ 60Hz DVI-D up to 1920 x 1200 @ 60Hz DP up to 4096 x 2304 @ 60Hz	VGA up to 1920 x 1080 @ 60Hz DVI-D up to 1920 x 1200 @ 60Hz DP up to 4096 x 2304 @ 60Hz		N/A			
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN		1 x Intel® PHY X557-AT2 GbE LAN 2 x Intel® I210-AT GbE LAN	2 x Intel® I210-AT GbE LAN		
Audio	Controller	Realtek® ALC887 HD Audio Codec	Realtek® ALC887 HD Audio Codec			Realtek® ALC887-VD2-CG HD Audio Codec		
Super I/O	Controller	Fintek F81866AD-I	Fintek F81866AD-I			Fintek F81866AD-I		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer			256-level Watchdog Timer		
	Smart Fan	Yes	Yes			Yes		
TPM	Controller	Box header	Box header		Infineon SLB9665TT2.0			
I/O Interface	USB	6 x USB 2.0 (2 x rear, 4 x internal) 6 x USB 3.2 Gen 1 (4 x rear, 2 x internal)	6 x USB 2.0 (2 x rear, 4 x internal) 6 x USB 3.2 Gen 1 (4 x rear, 2 x internal)		4 x USB 2.0 (2 x rear, 2 x internal) 4 x USB 3.2 Gen 1 (rear)	7 x USB 2.0 (7 x internal with one Vertical Type-A) 6 x USB 3.2 Gen 1 (rear)		
		Serial	6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V		6 x COM ports (2 x rear, 4 x internal) COM1: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V			
	Parallel	Yes	1		N/A			
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	1 x PS/2 port by Y-cable for keyboard and mouse			1 x PS/2 port by Y-cable for keyboard and mouse		
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	8-bits (4 x GPI; 4 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V			
Expansion Slot	PCIe x16	1	1		2 (Signal configured as 2 PCIe x16 or 4 PCIe x8 or 1 PCIe x16 + 2 PCIe x8)			
	PCIe x8	N/A	N/A		3 (Slot3&5 single shared with PCIe x16)			
	PCIe x4	N/A	2		1	2		
	PCIe x1	N/A	N/A		N/A			
	PCI	6	4		N/A			
	M.2	N/A	N/A		N/A			
	Mini-PCIe	2 x Full-size (one w/ mSATA)	2 x Full-size (one w/ mSATA)		N/A	1 x Full/Half-size (mSATA)		
Storage	SATA	5 x SATA 3.0 (RAID 0/1/5/10)	5 x SATA 3.0 (RAID 0/1/5/10)		4 x SATA 3.0	8 x SATA 3.0 (RAID 0/1/5/10)		
	mSATA	1	1		N/A	1 (shared w/ Mini-PCIe)		
Power Supply	DC	N/A	N/A		N/A			
	ATX	ATX-Power 24P, 12V-8P	ATX-Power 24P, 12V-8P		ATX-Power 24P, 12V-8P			
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C	-20 ~ 80°C		-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing			
Form Factor	Dimensions	305 x 244 mm (ATX)	305 x 244 mm (ATX)		305 x 244mm (ATX)			
	Weight	0.70 kg	0.70 kg		0.90 kg			
Certification	EMC	FCC, CE, RCM, VCCI, BSMI (Class B)	FCC, CE, RCM, VCCI, BSMI (Class B)			CE, FCC Class B, BSMI, RCM, VCCI		
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			Windows Server 2012 (64-bit) (Skylake-SP Series CPU Only) Windows Server 2016 (64-bit) (Skylake-SP & Cascade Lake Series CPU) Windows Server 2019 (64-bit) (Cascade Lake Series CPU) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) (by request) Linux (Support by request)		

MS-1A91

10.1" Front IP65 Fanless HMI Panel PC with Intel® Alder Lake N Series

NEW



Features

- Intel® Alder Lake N CPU
- Panel Size: 10.1"
- Fully Flat Panel / Fanless & Ultra Slim Design
- Resistive Type Touch
- IP65 Front Panel and IP41 for Rear
- Rich I/O
- Intel® WLAN Support



Stand (Optional)



Vesa Mount (Optional)

Specifications

Display	LCD Size	10.1"
	Resolution	1024 x 600
	Brightness (cd/m2)	500
	Contrast Ratio	500
	Support Colors	16.7M
	Pixel Pitch (H/Vmm)	0.217 x 0.208
	Viewing Angle	70/70/60/60
Touch Panel		5-Wire Resistive
System Processor	CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz , QC ,12W Intel® Atom X7425E 1.5GHz , QC, 12W
	Frequency	3.2 up to 3.80 GHz
	L2 Cache	6MB
	Chipset	SoC
Memory	Technology	Single-channel DDR5 MHz
	Max. Capacity	Up to 16GB
	Socket	1 x 262-pin SO-DIMM
Graphic	Display Interface	HDMI up to 3840 x 2160 DP up to 4096 x 2160
Ethernet	Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Expansion Slot	Mini-PCIe	N/A
	M.2	1 M.2 E key (reserved for WiFi)
Storage	SATA	N/A
	M.2	1 x M.2 B key (reserved for storage)
	mSATA	N/A
	CFast	N/A
	CompactFlash	N/A
I/O Interface	RJ-45	2
	Audio	1 x Line-out 1 x MIC-in
	USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
	Serial	1 x COM (1 x edge I/O) COM1: RS-232/422/485, 0V/5V/12V
	Parallel	N/A
	PS/2	N/A
	HDMI	1
	DVI	N/A
	DisplayPort	1
	VGA	N/A
	Antenna	Inside
Power Supply	DC Input	DC-in 12~24V
	IP Rating	Front IP65 / Rear 41
Environment	Operating Temperature	0°C ~ 40°C
	Operating Humidity	20%~90% RH
	Storage Temperature	-20°C ~ 60°C
	Storage Humidity	10% ~ 90% non-condensing
Physical haracteristics	Housing	Plastic / Metal
	Dimensions (L x W x D)	272 x 178 x 42 mm
	Weight	1.6kg (3.53lbs)
	Mounting	VESA 75 x 75, 100 x 100 mm (Optional)
Certification	EMC	FCC, CE, BSMI, VCCI
	Safety	PSE
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise 2022

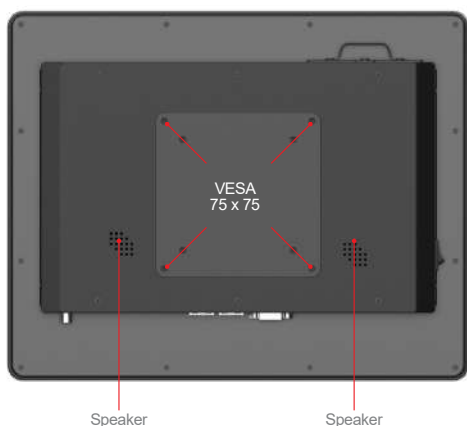
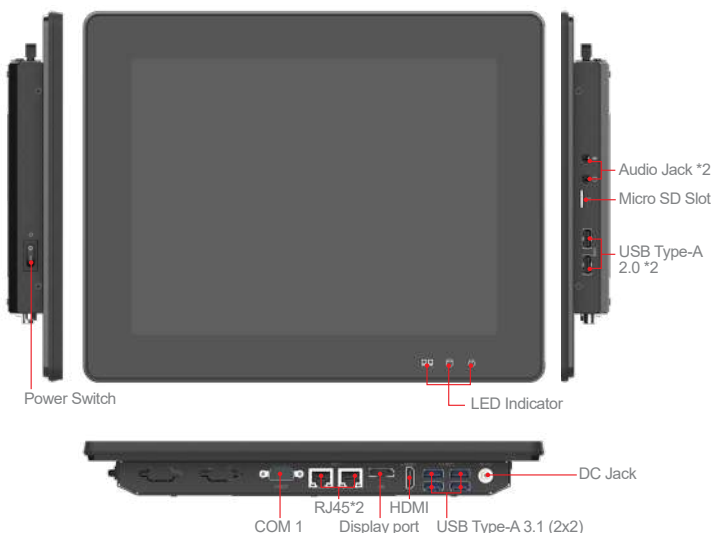
MS-1A22

12.1" Front IP65 Fanless HMI Panel PC with Intel® Alder Lake N Series

NEW

Specifications

Display	LCD Size	12.1"
	Resolution	1024 x 768
	Brightness (cd/m2)	500
	Contrast Ratio	700
	Support Colors	16.7M
	Pixel Pitch (H/Vmm)	0.24 x 0.24
	Viewing Angle	80/80/70/70
Touch Panel		Projective Capacitive 5-Wire Resistive
System Processor	CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz , QC , 12W Intel® Atom X7425E 1.5GHz , QC, 12W Intel® Core i3-N305 1.8GHz , 8C, 15W
	Frequency	3.2 up to 3.80 GHz
	L2 Cache	6MB
	Chipset	SoC
Memory	Technology	Single-channel DDR5 MHz
	Max. Capacity	Up to 16GB
	Socket	So-DIMM Slot (262-Pin)
Graphic	Display Interface	HDMI up to 3840 x 2160 DP up to 4096 x 2160
Ethernet	Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Expansion Slot	Mini-PCIe	N/A
	M.2	1 M.2 E key (reserved for WiFi)
Storage	SATA	1 x 2.5" HDD (Option)
	M.2	1 x M.2 B key (reserved for storage)
	mSATA	N/A
	CFast	N/A
	CompactFlash	N/A
I/O Interface	RJ-45	2
	Audio	1 x Line-out 1 x MIC-in
	USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
	Serial	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)
	Parallel	N/A
	PS/2	N/A
	HDMI	1
	DVI	N/A
	DisplayPort	1
	VGA	N/A
Power Supply	Antenna	Inside
	DC Input	DC-in 12~24V
Environment	IP Rating	Front IP65 / Rear 41
	Operating Temperature	0°C ~ 40°C
	Operating Humidity	20%~90% RH
	Storage Temperature	-20°C ~ 60°C
	Storage Humidity	10% ~ 90% non-condensing
Physical haracteristics	Housing	Plastic / Metal
	Dimensions (L x W x D)	251 x 313 x 13.45 mm
	Weight	2.3kg (5.07lbs)
	Mounting	VESA 75 x 75, 100 x 100 mm (Optional)
Certification	EMC	FCC, CE, BSMI, VCCI
	Safety	PSE
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise 2022



Features

- Intel® Alder Lake N CPU
- Panel Size: 12.1"
- Fully Flat Panel / Fanless & Ultra Slim Design
- Capacitive / Resistive Type Touch
- IP65 Front Panel and IP41 for Rear
- Backup Battery for 60 mins at idle state (Option)
- Rich I/O
- Dual Storage: HDD+SSD (Optional)
- Intel® WLAN Support



Stand (Optional)

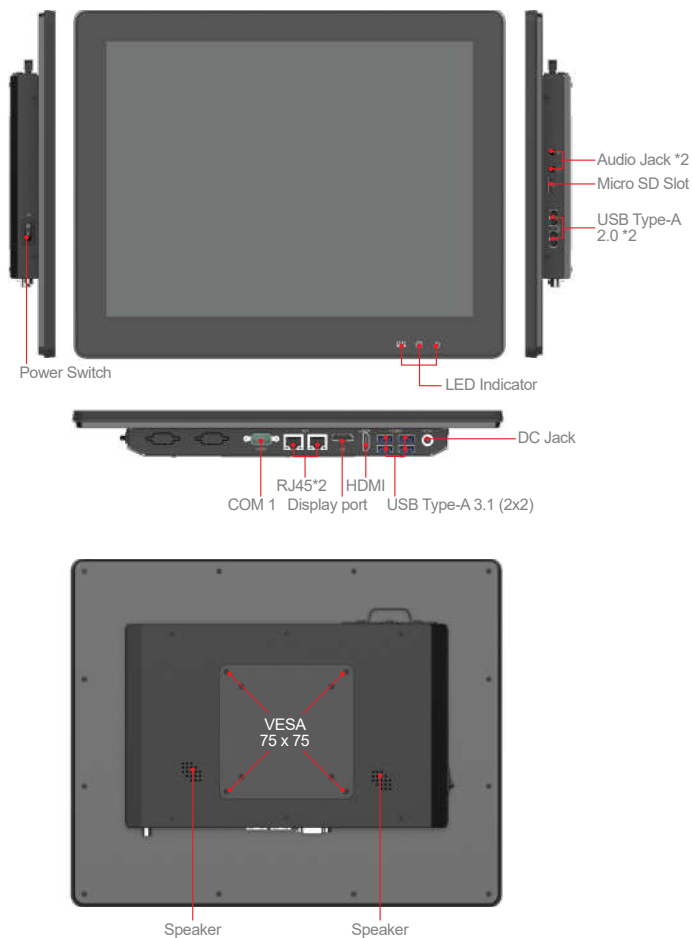


Vesa Mount (Optional)

MS-1A32

15" Front IP65 Fanless HMI Panel PC with Intel® Alder Lake N Series

NEW



Features

- Intel® Alder Lake N CPU
- Panel Size: 15"
- Fully Flat Panel / Fanless & Ultra Slim Design
- Capacitive / Resistive Type Touch
- IP65 Front Panel and IP41 for Rear
- Backup Battery for 60 mins at idle state (Option)
- Rich I/O
- Dual Storage: HDD+SSD (Optional)
- Intel® WLAN Support



Stand (Optional)



Vesa Mount (Optional)



Rear Cover(Optional)

Specifications

Display	LCD Size	15"
	Resolution	1024 x 768
	Brightness (cd/m2)	350
	Contrast Ratio	800
	Support Colors	16.2M
	Pixel Pitch (H/ Vmm)	0.297 x 0.297
	Viewing Angle	80/80/70/80
Touch Panel		Projective Capacitive 5-Wire Resistive
System Processor	CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz , QC , 12W Intel® Atom X7425E 1.5GHz , QC, 12W Intel® Core i3-N305 1.8GHz , 8C, 15W
	Frequency	3.2 up to 3.80 GHz
	L2 Cache	6MB
	Chipset	SoC
Memory	Technology	Single-channel DDR5 MHz
	Max. Capacity	Up to 16GB
	Socket	So-DIMM Slot (262-Pin)
Graphic	Display Interface	HDMI up to 3840 x 2160 DP up to 4096 x 2160
	Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Expansion Slot	Mini-PCIe	N/A
	M.2	1 M.2 E key (reserved for WiFi)
Storage	SATA	1 x 2.5" HDD (Option)
	M.2	1 x M.2 B key (reserved for storage)
	mSATA	N/A
	CFast	N/A
	CompactFlash	N/A
I/O Interface	RJ-45	2
	Audio	1 x Line-out 1 x MIC-in
	USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
	Serial	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)
	Parallel	N/A
	PS/2	N/A
	HDMI	1
	DVI	N/A
	DisplayPort	1
	VGA	N/A
	Antenna	Inside
Power Supply	DC Input	DC-in 12~24V
	IP Rating	Front IP65 / Rear 41
Environment	Operating Temperature	0°C ~ 40°C
	Operating Humidity	20%~90% RH
	Storage Temperature	-20°C ~ 60°C
	Storage Humidity	10% ~ 90% non-condensing
Physical haracteristics	Housing	Plastic / Metal
	Dimensions (L x W x D)	291.5 x 359.50 x 38.1 mm
	Weight	3kg (6.61lbs)
	Mounting	VESA 75 x 75, 100 x 100 mm (Optional)
Certification	EMC	FCC, CE, BSMI, VCCI
	Safety	PSE
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise 2022

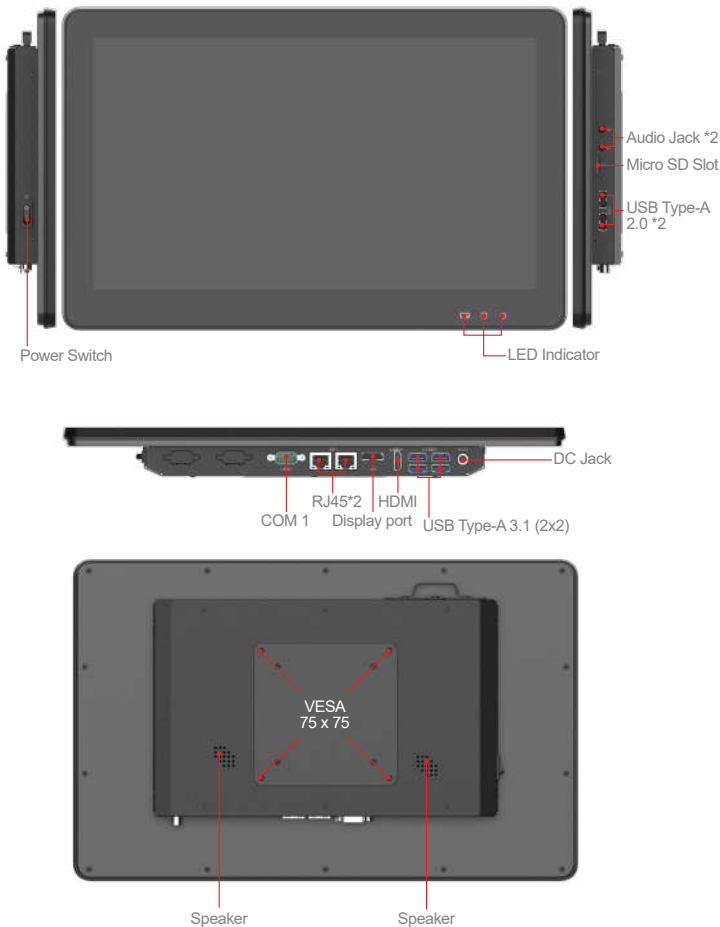
MS-1A71

15.6" Front IP65 Fanless HMI Panel PC with Intel® Alder Lake N Series

NEW

Specifications

Display	LCD Size	15.6"
	Resolution	1920 x 1080
	Brightness (cd/m2)	500
	Contrast Ratio	1000
	Support Colors	16.2M
	Pixel Pitch (H/Vmm)	0.17925 x 0.17925
	Viewing Angle	89/89/89/89
Touch Panel		Projective Capacitive
System Processor	CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz , QC ,12W Intel® Atom X7425E 1.5GHz , QC, 12W Intel® Core i3-N305 1.8GHz , 8C, 15W
	Frequency	3.2 up to 3.80 GHz
	L2 Cache	6MB
	Chipset	SoC
Memory	Technology	Single-channel DDR5 MHz
	Max. Capacity	Up to 16GB
	Socket	So-DIMM Slot (262-Pin)
Graphic	Display Interface	HDMI up to 3840 x 2160 DP up to 4096 x 2160
Ethernet	Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Expansion Slot	Mini-PCIe	N/A
	M.2	1 M.2 E key (reserved for WiFi)
Storage	SATA	1 x 2.5" HDD (Option)
	M.2	1 x M.2 B key (reserved for storage)
	mSATA	N/A
	CFast	N/A
	CompactFlash	N/A
I/O Interface	RJ-45	2
	Audio	1 x Line-out 1 x MIC-in
	USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
	Serial	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)
	Parallel	N/A
	PS/2	N/A
	HDMI	1
	DVI	N/A
	DisplayPort	1
	VGA	N/A
	Antenna	Inside
Power Supply	DC Input	DC-in 12~24V
	IP Rating	Front IP65 / Rear 41
Environment	Operating Temperature	0°C ~ 40°C
	Operating Humidity	20%~90% RH
	Storage Temperature	-20°C ~ 60°C
	Storage Humidity	10% ~ 90% non-condensing
Physical haracteristics	Housing	Plastic / Metal
	Dimensions (L x W x D)	255.6 x 399.7 x 38.1 mm
	Weight	2.71kg (5.97lbs)
	Mounting	VESA 75 x 75, 100 x 100 mm (Optional)
Certification	EMC	FCC, CE, BSMI, VCCI
	Safety	PSE
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise 2022



Features

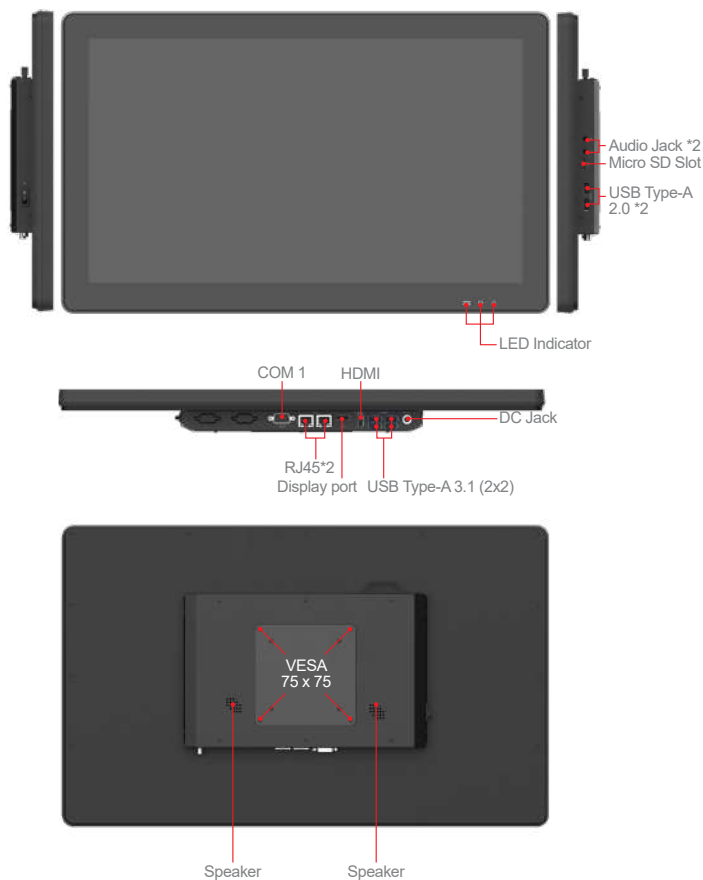
- Intel® Alder Lake N CPU
- Panel Size: 15.6"
- Fully Flat Panel / Fanless & Ultra Slim Design
- Capacitive Type Touch
- IP65 Front Panel and IP41 for Rear
- Backup Battery for 60 mins at idle state (Option)
- Rich I/O
- Dual Storage: HDD+SSD (Optional)
- Intel® WLAN Support



Stand (Optional)



Vesa Mount (Optional)



Features

- Intel® Alder Lake N CPU
- Panel Size: 21.5"
- Fully Flat Panel / Fanless & Ultra Slim Design
- Capacitive Type Touch
- Backup Battery for 60 mins at idle state (Option)
- Rich I/O
- Dual Storage: HDD+SSD (Optional)
- Intel® WLAN Support



Stand (Optional)



Vesa Mount (Optional)

Specifications

Display	LCD Size	21.5"
	Resolution	1920 x 1080
	Brightness (cd/m2)	500
	Contrast Ratio	1000
	Support Colors	16.7M
	Pixel Pitch (H/Vmm)	247.95 x 247.95 (um)
	Viewing Angle	89/89/89/89
Touch Panel		Projective Capacitive
System Processor	CPU	Intel® Alder Lake N Series Intel® processor N97 2.0GHz , QC ,12W Intel® Atom X7425E 1.5GHz , QC, 12W Intel® Core i3-N305 1.8GHz , 8C, 15W
	Frequency	3.2 up to 3.80 GHz
	L2 Cache	6MB
	Chipset	SoC
	Technology	Single-channel DDR5 MHz
Memory	Max. Capacity	Up to 16GB
	Socket	So-DIMM Slot (262-Pin)
	Graphic	Display Interface HDMI up to 3840 x 2160 DP up to 4096 x 2160
Ethernet	Controller	2 x Intel® I225V Co-Lay Intel® I225LM PCIe 2.5GbE LAN
Expansion Slot	Mini-PCIe	N/A
	M.2	1 M.2 E key (reserved for WiFi)
Storage	SATA	1 x 2.5" HDD (Option)
	M.2	1 x M.2 B key (reserved for storage)
	mSATA	N/A
	CFast	N/A
	CompactFlash	N/A
I/O Interface	RJ-45	2
	Audio	1 x Line-out 1 x MIC-in
	USB	2 x Dual Stacked Type-A USB 3.1 2 x USB 2.0
	Serial	3 x COM (1 x edge I/O, 2 x internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3: RS-232, 0V/5V/12V (COM2~3 Option with cable)
	Parallel	N/A
	PS/2	N/A
	HDMI	1
	DVI	N/A
	DisplayPort	1
	VGA	N/A
	Antenna	Inside
	Power Supply	DC Input DC-in 12~24V
Environment	IP Rating	N/A
	Operating Temperature	0°C ~ 40°C
	Operating Humidity	20%~90% RH
	Storage Temperature	-20°C ~ 60°C
	Storage Humidity	10% ~ 90% non-condensing
Physical characteristics	Housing	Plastic / Metal
	Dimensions (L x W x D)	333.01 x 538.55 x 41.95 mm
	Weight	5.6kg (12.34lbs)
	Mounting	VESA 75 x 75, 100 x 100 mm (Optional)
Certification	EMC	FCC, CE, BSMI, VCCI
	Safety	PSH11:H69
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise 2022



LAN, USB3.0*2, VGA, RS232,
USB2.0*2, DC Jack, Kensington Lock



Docking with Battery Charger



Protection Jacket with Handstrap and Stylus Pen(MPP1.51)



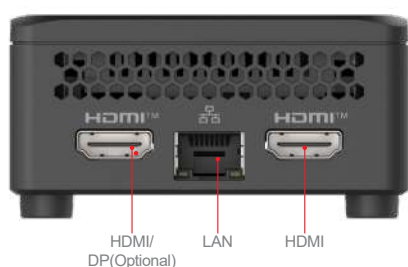
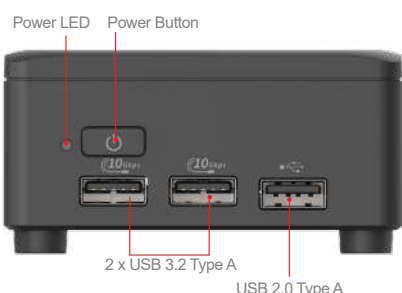
Features

- Intel® Apollo lake Pentium N4200
- 1 x DDR3L SO-DIMM slot Up to 8GB
- 10.1" 1280 x 800 w/Pcap touch +MPP1.51 pen solution
- 2 x USB 3.0 , 1 x Micro HDMI , 1 Audio combo jack , 1 x RJ-45 LAN
- 1 x Smart card reader, 1 x SD card reader
- 2M Pixel front camera, 5M Pixel rear camera
- Option for Office Docking I/O : 2 x USB 3.0, 2 x USB 2.0, 1 x LAN , 1 x VGA , 1 X RS232 (Option for NFC, Barcode Scanner)
- DC-IN 12~24V
- Accessories : Protection cover, VESA mount , Active Pen
- Detachable Battery design

Specifications

Key features	Dimension	279 x 192.5 x 17.9 mm
	Weight	990g
	Display	10 inch, 16:10 ratio
	Sealing	IP65
	Drop/Shock	MIL-STD-810G 4-feet drop
	Battery life	Up to 9 hours
	Operating Temp	0~40 degree
	Storage Temp	-20~60 degree
Specification	CPU	Intel Apollolake Pentium N4200
	System Memory	Default DDR3L 4GB. Max 8GB
	Storage	10.1" 800 x 1280 Projected Capacitive Touch Screen. Multi touch 10 points Microsoft pen protocol (MPP) supported
	Button	Power, Barcode Scanner
	Power	AC: support 100~240V DC: support 12/19/24V
	Audio	1w x 2, Stereo type Internal Microphone: Stereo (set with Camera module)
	Sensors	Light Sensor, E-Compass Sensor, G-Sensor, Gyro Sensor
	I/O ports	USB x2 (Ver.3.0) Headphone out x1 (headphone/microphone combo jack, 3.5Ø, iPhone Type) Power jack x 1(19V & 24V) Micro SD slot x1, SDXC type, (SD 4.0) SIM Slot Pogo pin: x1 RJ45: x1, Intel WGI211AT Micro HDMI (Output) x 1
	Battery	Battery 1 Li-Polymer, 41W/h, 5550mAh, Pack swappable Battery Life: over: 9 hrs
	Security	Kensington x1, TPM 2.0
Data collection	Wireless LAN + BT	802.11 ac/a/b/g/n, Intel 8260 , Ver4.2
	Camera	2M Pixel front camera w/ ALS and D-MIC *2 5M Pixel rear camera +Auto Focus
	Smart card reader	Support
	Option	NFC / Barcode scanner / LTE
	OS	Microsoft® Windows 10 IoT / Ubuntu
	Office Docking I/O	USB 3.0 x 2, USB 2.0 x 2, Power Jack x 1, LAN Port x1, POGO Pin x 1, VGA output x1, RS232 x 1
Accessories	Protection cover	
	Vesa mount	
	Active Stylus Pen	

NEW



Features

- Intel® Alder Lake-N N100 Processor
- LPDDR5 4800 MHz up to 4GB
- Dual independent displays: 1 HDMI 2.0 output support CEC Power On/Off, 1 DP or HDMI (option)
- 1 GbE LAN with RJ-45
- eMMC 128G storage
- 2 USB 10Gbps Type-A, 1 USB 2.0
- fTPM 2.0
- Palm-Sized 80 x 80 x 39.5 mm for easy handling and easily concealed behind your monitor
- SD Slot for external storage (Max. 2TB)
- WiFi 6E & BT 5.2 inside (option)

Specifications

System Processor	CPU	Intel® Mobile Alder Lake-N N100 Processor, 6W
	Frequency	0.8 GHz~3.4 GHz
	L2 Cache	6MB
	CPU Type	BGA
	Chipset	Integrated in SoC Process
	BIOS	AMI
Memory	Technology	Single-channel LPDDR5 4800 MHz
	Max. Capacity	Up to 4 GB
	Socket	N/A
Graphic	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	Multiple Display	2 independent displays
	Display Interface	HDMI 2.0b up to 4096 x 2160 @60Hz DP 1.4a up to 4096 x 2304 @60Hz (option)
Ethernet	Controller	1 x Realtek® RTL8111H-CG
Audio	Controller	N/A
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A
TPM	Controller	N/A
Expansion Slot	M.2	N/A
Storage	SATA	N/A
I/O Interface	RJ-45	1
	Audio	N/A
	USB	1 x USB 2.0 2 x USB 10Gbps
	Serial	N/A
	GPIO	N/A
	HDMI	2 or 1 (option)
	DisplayPort	1 (option)
	Antenna	2 internal reserved for antennas
Power Supply	DC Input	DC-in 12V
	AC Input	N/A
Environment	Operating Temperature	0 ~ 40°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	0 ~ 60°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	Operating: 0.25 Grms, 5-300Hz, 3axes
	Shock	Operating: 3 G, half sine 11 ms duration
Physical Characteristics	Dimensions (WxDxH)	80 x 80 x 39.5 mm
	Weight	0.22 kg
	Mounting	VESA mount
Certification	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC
	Safety	BSMI
Software Platform	OS Support	Windows 11 IoT Enterprise LTSC (Pre-test)

* SD Slot

Ordering Information

Part Number	Description
Coming Soon	

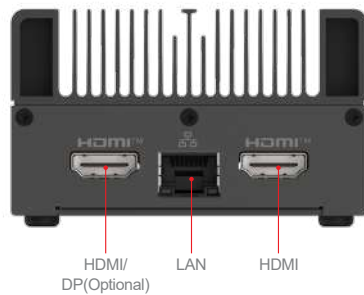
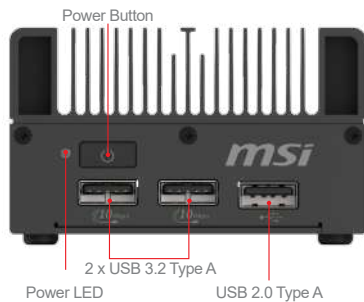
Packing List

Part Number	Description
Coming Soon	

MS-C918S

Palm-Size Box PC with Intel® Alder Lake-N N100 Processor for Ultra Low-Power Fanless Solution

NEW



Features

- Intel® Alder Lake-N N100 Processor
- LPDDR5 4800 MHz up to 4GB
- Dual independent displays: 1 HDMI 2.0 output support CEC Power On/Off, 1 DP or HDMI (option)
- 1 GbE LAN with RJ-45
- eMMC 128G storage
- 2 USB 10Gbps Type-A, 1 USB 2.0
- fTPM 2.0
- Palm-Sized 80 x 78 x 48 mm for easy handling and easily concealed behind your monitor
- SD Slot for external storage (Max. 2TB)
- WiFi 6E & BT 5.2 inside (option)

Specifications

System Processor	CPU	Intel® Mobile Alder Lake-N N100 Processor, 6W
	Frequency	0.8 GHz~3.4 GHz
	L2 Cache	6MB
	CPU Type	BGA
	Chipset	Integrated in SoC Process
	BIOS	AMI
Memory	Technology	Single-channel LPDDR5 4800 MHz
	Max. Capacity	Up to 4 GB
	Socket	N/A
Graphic	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	Multiple Display	2 independent displays
	Display Interface	HDMI 2.0b up to 4096 x 2160 @60Hz DP 1.4a up to 4096 x 2304 @60Hz (option)
Ethernet	Controller	1 x Realtek® RTL8111H-CG
Audio	Controller	N/A
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A
TPM	Controller	N/A
Expansion Slot	M.2	N/A
Storage	SATA	N/A
	RJ-45	1
	Audio	N/A
	USB	1 x USB 2.0 2 x USB 10Gbps
	Serial	N/A
	GPIO	N/A
	HDMI	2 or 1 (option)
	DisplayPort	1 (option)
	Antenna	2 internal reserved for antennas
	DC Input	DC-in 12V
Power Supply	AC Input	N/A
	Operating Temperature	0 ~ 55°C Note: Thermal w/ Airflow:0.7m/s
Environment	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	0 ~ 60°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	Operating: 0.25 Grms, 5-300Hz, 3axes
	Shock	Operating: 3 G, half sine 11 ms duration
	Dimensions (WxDxH)	80 x 78 x 48 mm
Physical Characteristics	Weight	0.35 kg
	Mounting	VESA mount
Certification	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC
	Safety	BSMI
Software Platform	OS Support	Windows 11 IoT Enterprise LTSC (Pre-test)

* SD Slot

Ordering Information

Part Number	Description
Coming Soon	

Packing List

Part Number	Description
Coming Soon	

MS-C909

Compact-Size Box PC with Intel® Celeron® Elkhart Lake J6412 Processor for Ultra Low-Power Fanless Solution

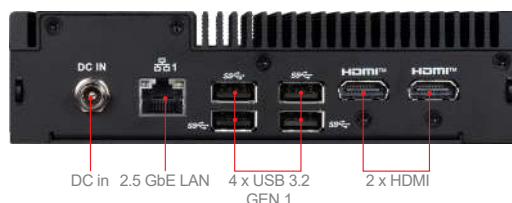
NEW



Front side I/O



Rear side I/O



Features

- Intel® Celeron® Elkhart Lake J6412 SoC
- DDR4 3200 MHz SODIMM Slot up to 16GB
- Dual independent displays: 2 HDMI
- 1 2.5 GbE LAN with RJ-45
- 1 M.2 B Key, 1 M.2 E Key Slot
- 4 USB 3.2 Gen 1, 1 COM, GPIO
- 1 Innodisk EZ2N-0XL1-W1 (Optional)
- 2 opening reserved for antennas
- Anti-Vibration & Shockproof Design to Compliance IEC 61373
- Wide Voltage DC-IN 12~24V
- Ultra-Compact with fanless design

Ordering Information

Part Number	Description
936-C909-003	MS-C909/706-C909-020/826-C909-007 11 STD, Intel Elkhart Lake J6412, 1*DDR4,2*HDMI,1*M.2 B key,1*M.2 E key, 1*2.5GbE LAN, 4*USB 3.2,2*COM,TPM 2.0,DC-in 12-24V, IN Door Adaptor
936-C909-004	MS-C909/706-C909-020/826-C909-008 11 STD, Intel Elkhart Lake J6412, 1*DDR4,2*HDMI,1*M.2 B key,1*M.2 E key, 1*2.5GbE LAN, 4*USB 3.2,2*COM,TPM 2.0,DC-in 12-24V, OUT Door Adaptor

Specifications

System Processor	CPU	Intel® Celeron® Processor J6412, QC, 10W
	Frequency	2.0 GHz, up to 2.6 GHz
	L2 Cache	1.5MB
	CPU Type	BGA
	Chipset	Integrated in SoC Process
	BIOS	AMI
Memory	Technology	Single-Channel DDR4 3200 MHz
	Max. Capacity	Up to 16 GB
	Socket	1 x 260-pin DDR4 SO-DIMM
Graphic	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	Multiple Display	2 Independent displays
	Display Interface	HDMI up to 3840 x 2160 @30Hz
Ethernet	Controller	1 x Intel® I226-V 2.5 GbE LAN
Audio	Controller	N/A
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A
TPM	Controller	Infineon SLB9672V/U2.0
Expansion Slot	M.2	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230
Storage	SATA	1 x M.2 B key (SATA), 2242/3042/2280
I/O Interface	RJ-45	1 x 2.5GbE LAN 1 x Innodisk EZ2N-0XL1-W1 (Optional)
	Audio	N/A
	USB	4 x USB 3.2 Gen 1
	Serial	1 x COM port COM1: RS-232/422/485, 0V/5V/12V
	GPIO	8-bit (4 x GPI; 4 x GPO), 5V
	HDMI	2
	Antenna	2 openings reserved for antennas
	DC Input	DC-in 12~24V with Lockable DC Jack
	AC Input	N/A
Environment	Operating Temperature	-10~60°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	IEC61373 Category 1, Class B
Physical characteristics	Shock	IEC61373 Category 1, Class B
	Dimensions (WxDxH)	130 x 155 x 40 mm
	Weight	0.91 kg
Certification	Mounting	Wall mount (STD)/DIN-rail mount(STD)
	EMC	CE, FCC, RCM, VCCI, BSMI, UKCA, IC
Software Platform	Safety	BSMI
	OS Support	Windows 10 IoT Enterprise LTSC (64-bit, 21H2) Linux (Support by request)

Packing List

Part Number	Description	Quantity
S93-0401780-S14	Adaptor (19V/65W) for in Door SKU	1
S93-0401B20-MD7	Adaptor (12V/80W) for out Door SKU	1
E22-9A59010-LA2	Wall Mounting Bracket	2
E49-1064008-P65	Screw for Wall Mounting	4
E25-9B01030-K23	Rubber for Wall Mounting	4
E26-C909020-Z36	Thermal pad for memory	1

MS-C906

Compact-Size Box PC with Intel® Raptor Lake-P U Series Processor for Ultra Low-Power Fanless Solution



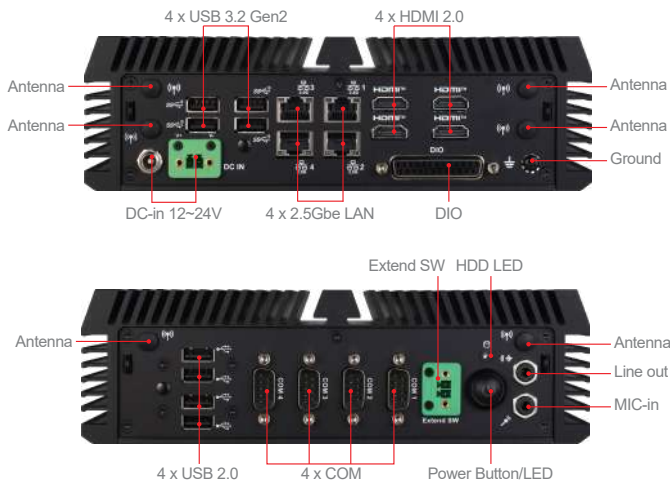
NEW

Specifications

		Embedded SKUs	Industrial SKUs
		Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i5-1345UE / i3-1315UE	Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i5-1345URE / i3-1315URE
System Processor	CPU		
	Frequency	3.30 GHz~4.6 GHz (Depends on CPU)	
	L2 Cache	6M~12M (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Integrated in SoC Process	
	BIOS	AMI	
Memory	Technology	Single-channel DDR5 5200 MHz	
	Max. Capacity	Up to 32 GB	
	Socket	1 x 262-pin SO-DIMMs	
Graphic	Controller	Intel® UHD Graphics	
	Graphic Memory	Depends on CPU	
	Multiple Display	4 independent displays	
Ethernet	Display Interface	HDMI 2.0 up to 4096 x 2340 @60Hz	
	Controller	4 x Intel® I226-LM GbE LAN	4 x Intel® I226-IT 2.5 GbE LAN
Audio	Controller	Realtek® ALC897 HD Audio Codec (Co-lay ALC888S)	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	N/A	
TPM	Controller	Infineon SLB9672/U2.0	Infineon SLB9672XU2.0
Expansion Slot	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0, w/CNV1), 2230	
Storage	SATA	1 x 2.5" SSD Bay	
	RJ-45	4	
I/O Interface	Audio	1 x Mic-in 1 x Line-out	
	USB	4 x USB 2.0 4 x USB 3.2 Gen 2	
	Serial	4 x COM ports COM1~4: RS-232/422/485, 0V/5V/12V	
	GPIO	16-bit (Default 8 x GPI, 8 x GPO), 5V	
	HDMI	4	
	Antenna	6 openings reserved for antennas	
Power Supply	DC Input	DC-in 12V~24V Wide-Range (OCP & OVP) Phoenix pluggable connectors with latch (V+, V-)	
	AC Input	N/A	
Environment	Operating Temperature	0 ~ 50°C (w/ 2.5" SATA SSD (Ta: 85°C)) 0 ~ 45°C (w/ M.2 NVMe SSD (Ta: 85°C)) Note: Thermal w/ Airflow:0.7m/s	-20 ~ 70°C (w/ WT M.2 NVMe SSD (Ta: 85°C), w/ WT MEM (Ta: 95°C)) Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Vibration	IEC61373 Category 1, Class B	
	Shock	IEC61373 Category 1, Class B	
Physical characteristics	Dimensions (WxDxH)	215 x 155 x 65 mm	
	Weight	2.25 kg	
	Mounting	Wall mount (STD)/DIN-rail mount(STD)/ VESA mount(by BOM option)	
Certification	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC	
	Safety	BSMI	
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, Pre-scan) Linux (Support by request)	

Packing List

Part Number	Description	Quantity
S93-0406700-S14	Adaptor 19V/90W	1
K1D-3011007-V03	SATA Cable with Power, 300mm	1
E22-9A59010-LA2	Wall Mounting Bracket	2
E49-1065009-P65	Screw for Wall Mounting	4
E25-9B01030-K23	Rubber for Wall Mounting	4
E24-9B02010-P09	DIN Rail	2
E41-1356002-P65	Screw for DIN Rail	4
NA1-1020141-SR2	Phoenix Terminal Plugged	2
E49-1303007-P65	Screw for HDD	4



Features

- Intel® 13th Gen Raptor Lake-P Embedded/Industrial SKU Series
- 1 DDR5 5200 MHz SODIMM Slots up to 32GB
- Quadruple independent displays: 4 HDMI
- 4 2.5GbE LAN with RJ-45
- 1 M.2 B key (with NANO SIM-holder) support 5G/LTE, 1 M.2 E key
- 1 M.2 M key, 1 SATA 3.0 for storage (2.5" SSD)
- 4 USB 3.2 Gen 2, 4 USB 2.0, 4 COM, Audio
- Onboard TPM 2.0
- 6 opening resrved for antennas
- Anti-Vibration & Shockproof Design to Compliance IEC 61373
- Wide operating temperature: -20~70°C
- Wide Voltage DC-IN 12~24V (OCP & OVP)
- Ultra-Compact with fanless design
- Support EDID Lock Display Function

Ordering Information

Part Number	Description
936-C906-001	MS-C906/706-C906-010/826-C906-010 VER 11, Barebone, Fanless, Intel Raptor Lake-P i3-1315UE, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, BLACK w/o LOGO msi, SINGLE 6-PACK
936-C906-002	MS-C906/706-C906-020/826-C906-011 VER 11, Barebone, Fanless, Intel Raptor Lake-P i5-1345UE, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, BLACK w/o LOGO msi, SINGLE 6-PACK
936-C906-003	MS-C906/706-C906-030/826-C906-014 VER 11, Barebone, Fanless, Intel Raptor Lake-P i3-1315URE, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, BLACK w/o LOGO msi, SINGLE 6-PACK
936-C906-004	MS-C906/706-C906-040/826-C906-015 VER 11, Barebone, Fanless, Intel Raptor Lake-P i5-1345URE, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, BLACK w/o LOGO msi, SINGLE 6-PACK

Optional Item

Part Number	Description
E22-9A95080-C22	VESA Mounting

MS-C903

Compact-Size Box PC with Intel® Tiger Lake-UP3 Processor for Ultra Low-Power Fanless Solution



NEW

Specifications

System Processor	CPU	Embedded SKUs	Industrial SKUs
		Intel® Mobile 11th Gen Tiger Lake-UP3 Series Processors, Core™ i3-1115G4E / i5-1145G7E / i7-1185G7E	Intel® Mobile 11th Gen Tiger Lake-UP3 Series Processors, Core™ i3-1115GRE / i5-1145GRE
Memory	Frequency	2.20 GHz~4.4 GHz (Depends on CPU)	
	L2 Cache	6M~12M (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Integrated in SoC Process	
	BIOS	AMI	
Graphic	Technology	Dual-channel DDR4 3200 MHz	
	Max. Capacity	Up to 64 GB	
	Socket	2 x 260-pin SO-DIMMs	
	Controller	Intel® Iris® Xe Graphics (For i5/ i7 SKU) Intel® UHD Graphics (For i3 SKU)	
Ethernet	Graphic Memory	Depends on CPU	
	Multiple Display	2 Independent displays	
	Display Interface	HDMI 1.4 up to 4096 x 2160 @30Hz DP up to 7680 x 4320 @60Hz	
Audio	Controller	2 x Intel® I225-LM GbE LAN	
	Watchdog Timer	Realtek® ALC888S-VD2-GR HD Audio Codec	
H/W Monitor	Smart Fan	256-level Watchdog Timer	
	TPM	N/A	
Expansion Slot	Controller	Infineon SLB9670VQ2.0/ FW7.85	
	PCIe x16	N/A	
Storage	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (SATA 3.0, PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0), 2230	
	Mini-PCIe	N/A	
I/O Interface	SATA	1 x 2.5" SSD Bay	
	RJ-45	2	
	Audio	1 x Mic-in 1 x Line-out	
	USB	4 x USB 2.0 4 x USB 3.2 Gen 2	
	Serial	6 x COM ports COM1~4 RS-232/422/485, 0V/5V/12V COM5~6: Option by M.2 Module	
	GPIO	16-bit (Default 8 x GPI, 8 x GPO), 5V/0.5A	
	CANbus	1 (Option by M.2 Module)	
	HDMI	1	
	DVI	N/A	
	DisplayPort	1	
Power Supply	DC Input	6 openings reserved for antennas DC-in 12V~24V Wide-Range (OCP & OVP) Phoenix pluggable connectors with latch (V+, V-)	
	Operating Temperature	-10~50°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	-20~70 °C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s
Environment	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Vibration	IEC61373 Category 1, Class B	
Physical Characteristics	Shock	IEC61373 Category 1, Class B	
	Dimensions (WxDxH)	215 x 155 x 65 mm	
Certification	Weight	2.24 kg	
	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)	
Software Platform	EMC	CE, FCC Class A, VCCI, RCM, UKCA, BSMI	
	Safety	BSMI	
Packing List	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	
	OS Support		

Packing List

Part Number	Description	Quantity
S93-0406700-S14	Adaptor 19V/90W	1
K1D-3012023-V03	SATA Cable with Power, 230mm	1
E22-9A59010-LA2	Wall Mounting Bracket	2
E49-1065009-P65	Screw for Wall Mounting	4
E25-9B01030-K23	Rubber for Wall Mounting	4
E24-9B02010-P09	DIN Rail	2
E41-1356002-P65	Screw for DIN Rail	4
NA1-1020141-SR2	Phoenix Terminal Plugged	2
E49-1303007-P65	Screw for HDD	4



Features

- Intel® 11th Gen Tiger Lake-UP3 Embedded/Industrial SKU Series
- 2 DDR4 3200 MHz SODIMM Slots up to 64GB
- Dual independent displays: DP++ , HDMI
- 2 2.5GbE LAN with RJ-45
- 1 M.2 B key (with NANO SIM-holder) support 5G/LTE, 1 M.2 E key
- 1 M.2 M key, 1 SATA 3.0 for storage (2.5" SSD)
- 4 USB 3.2 Gen 2, 4 USB 2.0, 4 COM (4 RS-485), 2 COM or 1 CANbus (Option by M.2 Module), DIO, Audio
- Onboard TPM 2.0
- 6 opening resrved for antennas
- Anti-Vibration & Shockproof Design to Compliance IEC 61373
- Wide operating temperature: -20~70°C
- Wide Voltage DC-IN 12~24V (OCP & OVP)
- Ultra-Compact with fanless design

Ordering Information

Part Number	Description
936-C903-001	MS-C903/706-C903-010/826-C903-010 1.0 STD, 3.5-INCH BARE BONE, FANLESS, INTEL TIGER LAKE-UP3 i3-1115G4E, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, W/O MSI LOGO, SINGLE
936-C903-002	MS-C903/706-C903-020/826-C903-011 1.0 OPTA, 3.5-INCH BARE BONE, FANLESS, INTEL TIGER LAKE-UP3 i5-1145G7E, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, W/O MSI LOGO, SINGLE
936-C903-003	MS-C903/706-C903-030/826-C903-012 1.0 OPTB, 3.5-INCH BARE BONE, FANLESS, INTEL TIGER LAKE-UP3 i7-1185G7E, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, W/O MSI LOGO, SINGLE
936-C903-004	MS-C903/706-C903-040/826-C903-013 1.0 OPTC, 3.5-INCH BARE BONE, FANLESS, INTEL TIGER LAKE-UP3 i3-1115GRE, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, W/O MSI LOGO, SINGLE
936-C903-005	MS-C903/706-C903-050/826-C903-014 1.0 OPTD, 3.5-INCH BARE BONE, FANLESS, INTEL TIGER LAKE-UP3 i5-1145GRE, 19V/90W ADAPTER, 1*SATA CABLE, 1*WALL MOUNT, 1*DIN-RAIL, 2*TERMINAL BLOCK, W/O MSI LOGO, SINGLE

Optional Item

Part Number	Description
E22-9A95080-C22	VESA Mounting

MS-9A89

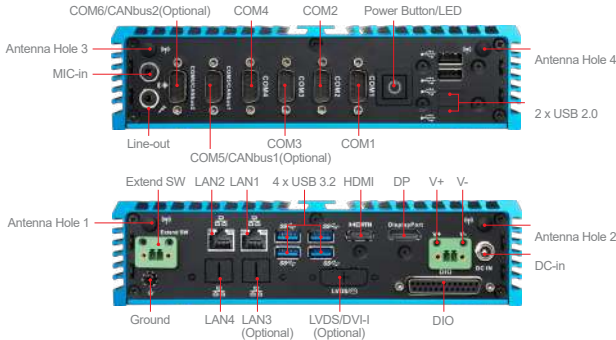
Compact-Size Box PC with Intel® Kaby Lake-U/Skylake-U or Apollo Lake-I Series Processor for Ultra Low-Power Fanless Solution



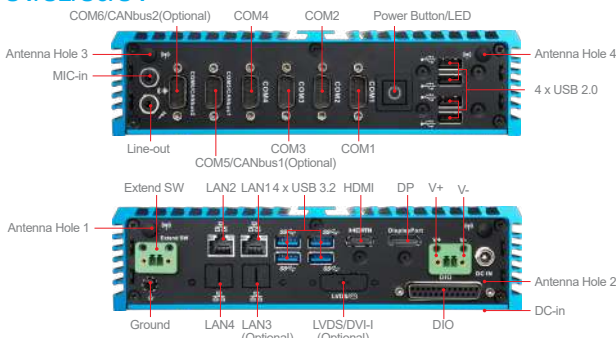
EN50155



A1/A2/A3



U1/U2/U3/U4



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
 - DDR3L 1866/1600 MHz SODIMM Slot up to 8GB
 - Triple independent displays: DP++, HDMI, LVDS/DVI-I (by option)
 - 2 GbE LAN with RJ-45, 2 GbE LAN by Mini-PCIe expansion card with RJ-45 (by option)
 - Mini-PCIe (Full size, with mSATA), Mini-PCIe (Full size, with Nano SIM Holder) Slots
 - SATA 3.0 storage (2.5" SSD/HDD), micro SD for storage
 - 4 USB 3.2 Gen 1, 2 USB 2.0, 6 COM (1 RS-485), GPIO, Audio
 - 4 opening reserved for antennas
 - Anti-Vibration & Shockproof Design to Compliance IEC 61373
 - Railway design to Compliance EN50155 TX Class
 - Wide operating temperature: -20~70°C
 - Wide Voltage DC-IN 12~24V
 - Ultra-Compact with fanless design
- Intel® 7th/6th Gen Kaby Lake-U/Skylake-U Series
 - DDR4 2133 MHz SODIMM Slot up to 16GB
 - Triple independent displays: DP++, HDMI, LVDS/DVI-I (by option)
 - 2 GbE LAN with RJ-45, 2 GbE LAN by Mini-PCIe expansion card with RJ-45 (by option)
 - Mini-PCIe (Full size, with mSATA), Mini-PCIe (Full size, with Nano SIM Holder) Slots
 - 2 SATA 3.0 storage (2.5" SSD/HDD), micro SD for storage SATA RAID 0/1
 - 4 USB 3.2 Gen 1, 4 USB 2.0, 6 COM (1 RS-485), GPIO, Audio
 - 4 opening reserved for antennas
 - Anti-Vibration & Shockproof Design to Compliance IEC 61373
 - Railway design to Compliance EN50155 TX Class
 - Wide Voltage DC-IN 12~24V
 - Ultra-Compact with fanless design

Specifications

Processor	CPU	MS -9A89-A1	MS -9A89-A2	MS -9A89-A3	MS -9A89-U1	MS -9A89-U2	MS -9A89-U3	MS -9A89-U4	
		Intel® Atom™ x7 Processor E3950, QC, 12W	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor J3455, QC, 10W	Intel® Kaby Lake-U Core™ i3-7100U Processor, DC, 15W	Intel® Skylake-U Core™ i5-6300U Processor, DC, 15W	Intel® Skylake-U Core™ i3-6100U Processor, DC, 15W	Intel® Skylake-U Core™ i7-6600U Processor, DC, 15W	
		Frequency	1.6 GHz up to 2.0 GHz	1.6 GHz up to 1.8 GHz	1.5 GHz, up to 2.3 GHz	2.4 GHz	2.6 GHz		
		L2 Cache	2MB			3MB			
		CPU Type	BGA						
		Chipset	Integrated in SoC Process			Integrated in Process			
Memory	BIOS	AMI							
	Technology	Single-channel DDR3L 1866/1600 MHz			Single-channel DDR4 2133 MHz				
	Max. Capacity	Up to 8GB			Up to 16GB				
Display	Socket	1 x 204-pin SO-DIMMs			1 x 260-pin SO-DIMMs				
	Controller	Intel® HD Graphics							
	Graphic Memory	Depends on CPU							
	Multiple Display	3 independent displays							
	Display Interface	HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz LVDS up to 1920 x 1200 @60Hz (optional by cable) DVI-I up to 1920 x 1200 @60Hz (optional by MS-99C0)			HDMI1.4 up to 4096 x 2160 @24Hz DP up to 3840 x 2160 @60Hz (Support DP++) LVDS up to 1920 x 1200 @60Hz (optional by cable) DVI-I up to 1920 x 1200 @60Hz (optional by MS-99C0)				
Ethernet	Controller	2 x Intel® I210-AT GbE LAN		1 x Intel® I210-AT GbE LAN 1 x Intel® I219-LM GbE LAN PHY					
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec							
H/W Monitor	Watchdog Timer	256-level Watchdog Timer							
TPM	Controller	N/A							
Expansion Slot	Mini-PCIe	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)							
Storage	SATA	1 x 2.5" HDD/SSD Bay							
	mSATA	1 x Full-size							
I/O Interface	RJ-45	4 (LAN1/2 Standard, LAN3/4 by Option)							
	PoE	2 x 802.11af (Option by Request)							
	Audio	1 x Line-out 1 x Mic-in			4 x USB 2.0				
	USB	4 x USB 2.0 2 x USB 3.2 Gen 1			4 x USB 3.2 Gen 1				
	Serial	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232, 0V/5V/12V							
	GPIO	16-bit (8*GP; 8*GPO), 5V							
	CANbus	2 x CAN 2.0B (Option)							
	HDMI	1							
	LVDS	1 (optional)							
	DVI	1 (DVI-I by option)							
	DisplayPort	1							
	Antenna	4 openings reserved for antennas							
Power Supply	DC Input	DC-IN 12V~24V							
Environment	Operating Temperature	-10~45°C (HDD) -20~70°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	-10~45°C (HDD) -10~60°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	-10~45°C (HDD) -10~60°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s					
	Operating Humidity	10 ~ 90%, non-condensing							
	Storage Temperature	-20 ~ 80°C							
	Storage Humidity	10 ~ 90%, non-condensing							
	Vibration	IEC61373 Category 1, Class B							
Form Factor	Shock	IEC61373 Category 1, Class B							
	Dimensions (Wx DxH)	215 x 155 x 55 mm							
	Weight	1.55 kg							
Certification	Mounting	Wall mount (STD)/DIN-rail mount (STD)/VESA mount (by BOM option)							
	EMC Safety	CE, FCC, VCCI, RCM, BSMI, EN50155 BSMI							
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)							

Ordering Information

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Packing List

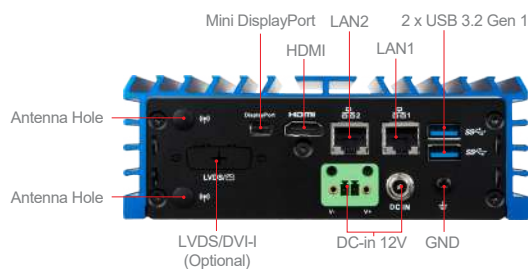
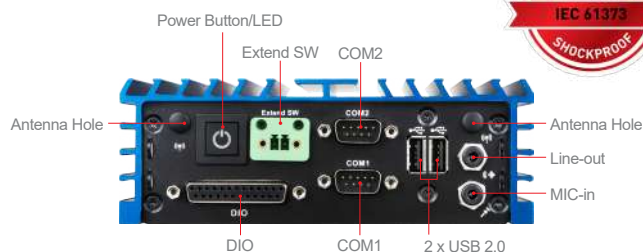
Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Optional Item

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

MS-9A79

Palm-Size Box PC with Intel® Apollo Lake/Apollo Lake-I Series SoC Platform for Ultra Low-Power Fanless Solution



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- LPDDR4 2133 MHz onboard memory up to 4GB
- Triple independent displays: Mini-DP, HDMI, LVDS
- 2 GbE LAN with RJ-45
- Mini-PCIe (Full size with NANO SIM-Holder), Mini-PCIe (Half size with mSATA) Slots
- SATA 3.0 (2.5" SSD/HDD) for storage
- 2 USB 3.2 Gen 1, 2 USB 2.0, 2 COM (2 RS-485), GPIO, Audio
- 4 opening reserved for antennas
- Anti-Vibration & Shockproof Design to Compliance IEC 61373
- Wide operating temperature : -20 ~ 70°C
- Compliance EN60068-2-1, EN60068-2-2, EN60068-2-30 TX Class
- DC-IN 12V

Ordering Information

Part Number	Description
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Please check MSI IPC website at <http://ipc.msi.com> for details.

Packing List

Part Number	Description
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Please check MSI IPC website at <http://ipc.msi.com> for details.

Optional Item

Part Number	Description
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Please check MSI IPC website at <http://ipc.msi.com> for details.

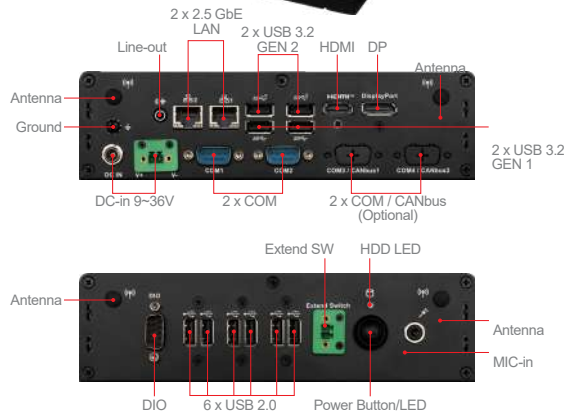
Specifications

		MS-9A79-A1	MS-9A79-A2	MS-9A79-A3
System Processor	CPU	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor N3350, DC, 6W	Intel® Celeron® Processor J3455, QC, 10W
	Frequency	1.6 GHz up to 1.8 GHz	1.1 GHz up to 2.4 GHz	1.5 GHz, up to 2.3 GHz
	L2 Cache	2MB		
	CPU Type	BGA		
	Chipset	Integrated in SoC Process		
	BIOS	AMI		
Memory	Technology	Single-channel LPDDR4 2133 MHz		
	Max. Capacity	Onboard 4 GB		
	Socket	N/A		
Graphic	Controller	Intel® HD Graphics		
	Graphic Memory	Depends on CPU		
	Multiple Display	2 or 3 independent displays		
	Display Interface	HDMI up to 3840 x 2160 @30 Hz Mini-DP up to 4096 x 2160 @60 Hz LVDS up to 1920 x 1200 @60 Hz (optional by cable) DVI-I up to 1920 x 1200 @60 Hz (optional by MS-99C0)		
Ethernet	Controller	2 x Intel® I210-IT GbE LAN	2 x Intel® I211-AT GbE LAN	
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		
TPM	Controller	Pin Header		
Expansion Slot	M.2	N/A		
	Mini-PCIe	1 x Full-size (w/ NANO SIM-Holder) 1 x Half-size (Shared w/ mSATA)		
Storage	SATA	1 x 2.5" HDD/SSD Bay		
	mSATA	1 x Half-size (Shared w/ Mini-PCIe)		
I/O Interface	RJ-45	2		
	PoE	N/A		
	Audio	1 x Line-out 1 x Mic-in		
	USB	2 x USB 2.0 2 x USB 3.2 Gen 1		
	Serial	2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V		
	GPIO	16-bit (8*GPI; 8*GPO), 5V		
	CANbus	CAN 2.0B (by BOM option)		
	HDMI	1		
	LVDS	1 (by BOM option)		
	VGA	N/A		
Antenna	4 openings reserved for antennas			
Power Supply	DC Input	DC-in 12V Jack (5.5mm/2.5mm) / Phoenix pluggable with latch (Support OCP/OVP Protection)		
	AC Input	N/A		
	IP Rating	N/A		
Environment	Operating Temperature	-10~45°C (HDD) -20~70°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	-10 ~ 45°C (HDD) -10 ~ 55°C (SSD/mSATA) Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-40 ~ 80°C	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing		
	Vibration	IEC61373 Category 1, Class A		
	Shock	IEC61373 Category 1, Class A		
Physical haracteristics	Dimensions (WxDxH)	155 x 110 x 55 mm		
	Weight	1.1 kg		
	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)		
Certification	EMC	FCC, CE, RCM, VCCI, BSMI		
	Safety	BSMI		
Software Platform		Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)		
	OS Support			

MS-C907

Compact-Size Box PC with Intel® IOTG Alder Lake-N Processor for Ultra Low-Power Fanless Solution

NEW



Features

- Intel® Alder Lake-N PC Client Series SoC
- DDR5 4800 MHz SODIMM Slot up to 16GB
- Dual independent displays: DP, HDMI
- 2 x 2.5 GbE LAN with RJ-45
- 1 M.2 B Key, 1 M.2 E Key Slot
- SATA 3.0 for storage (2.5" SSD/HDD)
- 2 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 6 USB 2.0, 2 COM (1 RS-485), GPIO, Audio
- 2 COM or 2 CANbus (Option by M.2 Module)
- 4 opening reserved for antennas
- Anti-Vibration & Shockproof Design to Compliance IEC 61373
- Wide Voltage DC-IN 9~36V
- Ultra-Compact with fanless design

Ordering Information

Part Number	Description
936-C907-006	MS-C907/706-C907-010/826-C907-013 10 STD, Intel Alder Lake-N N97, HDMI, DP, COM*2, USB3.2*4, USB2.0*6, DUAL INTEL 2.5GbE LAN, DIO, MIC-In, Line-out, ROHS, SINGLE, W/O MSI LOGO
936-C907-007	MS-C907/706-C907-020/826-C907-014 10 OPTA, Intel Alder Lake-N Core i3-N305, HDMI, DP, COM*2, USB3.2*4, USB2.0*6, DUAL INTEL 2.5GbE LAN, DIO, MIC-In, Line-out, ROHS, SINGLE, W/O MSI LOGO
936-C907-008	*MS-C907/706-C907-010/826-C907-015, 10 STD, Intel Alder Lake-N N97, HDMI, DP, COM*2, USB3.2*4, USB2.0*6, DUAL INTEL 2.5GbE LAN, DIO, MIC-In, Line-out, ROHS, SINGLE, W/ USA POWER CORD, W/O MSI LOGO,
936-C907-009	*MS-C907/706-C907-020/826-C907-016, 10 OPTA, Intel Alder Lake-N Core i3-N305, HDMI, DP, COM*2, USB3.2*4, USB2.0*6, DUAL INTEL 2.5GbE LAN, DIO, MIC-In, Line-out, ROHS, SINGLE, W/ USA POWER CORD, W/O MSI LOGO,

Packing List

Part Number	Description	Quantity
S93-0401780-S14	Adaptor (19V/65W)	1
K1D-1012115-V03	SATA Cable with Power, 230mm	1
NA1-1020141-SR2	Phoenix Terminal Plugged	2
E22-9A69040-815	Wall Mounting Bracket	2
E24-9B02010-P09	DIN Rail	2
E41-1356002-P65	Screw for DIN Rail	4
E31-0005930-K08	M.2 SSD Heat Spreader	1
E26-C907020-Z36	M.2 SSD Thermal Pad	1
E26-C907020-Z36	M.2 SSD Thermal Pad	1

Specifications

System Processor	CPU	Intel® IOTG Alder Lake-N Processor N97, QC, 12W	Intel® IOTG Alder Lake-N Core i3-N305, OC, 12W up to 15W
	Frequency	2 GHz, up to 3.6 GHz	1.8 GHz, up to 3.8 GHz
	L2 Cache	6MB	
	CPU Type	BGA	
	Chipset	Integrated in SoC Process	
Memory	BIOS	AMI	
	Technology	Single Channel DDR5 4800 MHz	
	Max. Capacity	Up to 16GB	
Display	Socket	1 x 262-pin SO-DIMM	
	Controller	Intel® UHD Graphics	
	Graphic Memory	Depends on CPU	
Ethernet	Multiple Display	2 independent displays	
	Display Interface	HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz	
Audio	Controller	2 x Intel® I225-V 2.5 GbE LAN	
	Controller	Realtek® ALC897 HD Audio Codec	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
TPM	Smart Fan	N/A	
Expansion Slot	Controller	Infineon SLB9672VU2.0	
	M.2	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230	
Storage	SATA	1 x 2.5" HDD/SSD Bay	
	mSATA	N/A	
	CFast	N/A	
	CompactFlash	N/A	
I/O Interface	RJ-45	2	
	PoE	N/A	
	Audio	1 x Line-out 1 x Mic-in	
	USB	6 x USB 2.0 2 x USB 3.2 Gen 2 2 x USB 3.2 Gen 1	
	Serial	4 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232 COM3~4: Option by M.2 Module	
	Parallel	N/A	
	PS/2	N/A	
	GPIO	8-bit (4*GPIO, 4*GPO), 5V	
	CANbus	2 (Option by M.2 Module)	
	HDMI	1	
	LVDS	N/A	
	DVI	N/A	
	DisplayPort	1	
	VGA	N/A	
	Antenna	4 openings reserved for antennas	
Power Supply	DC Input	DC-in 9~36V with Lockable DC Jack Phoenix pluggable connectors with latch (V+, V-)	
	AC Input	N/A	
	IP Rating	N/A	
Environment	Operating Temperature	-10 ~ 40°C -10 ~ 55°C (w/ WT devices) Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Vibration	IEC61373 Category 1, Class B	
Form Factor	Shock	IEC61373 Category 1, Class B	
	Dimensions (W x D x H)	200 x 150 x 55 mm	
	Weight	1.38 kg	
Certification	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount (by option)	
	EMC	CE, FCC, RCM, VCCI, BSMI, UKCA, IC	
Software Platform	Safety	BSMI	
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	

Optional Item

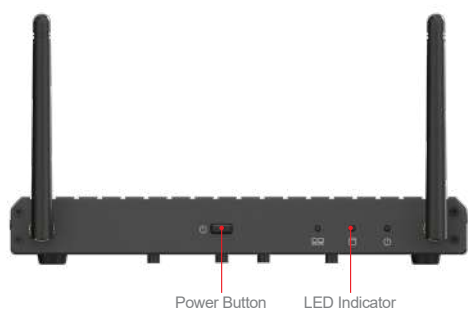
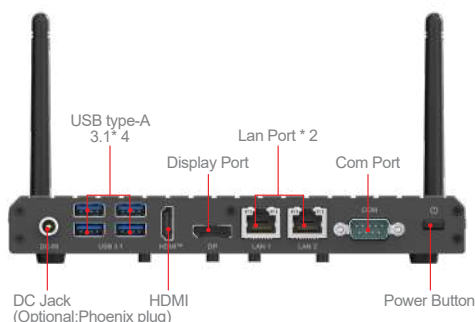
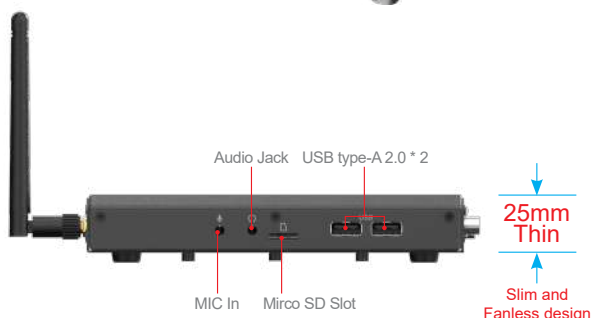
Part Number	Description
E22-9A95080-C22	VESA Mounting

MS-1P17

(MS-C924)

Ultra Slim Size Box PC with Intel® IOTG Alder Lake-N Processor for Ultra Low-Power Fanless Solution

NEW



Features

- Intel® Alder Lake-N PC Client Series SoC
- DDR5 4800 MHz SODIMM Slot up to 16GB
- Dual independent displays: DP, HDMI
- 2 2.5 GbE LAN with RJ-45
- 1 M.2 B Key, 1 M.2 E Key Slot
- 4 USB 3.1, 2 USB 2.0, 2 COM (1 RS-485), Audio
- 2 opening reserved for antennas
- DC-IN 12~24V
- Ultra Slim with fanless design

Specifications

System Processor	CPU	Intel® IOTG Alder Lake-N Processor N97, QC, 12W	Intel® IOTG Alder Lake-N Atom® X7425E, QC, 12W	Intel® IOTG Alder Lake-N Core i3-N305, OC, to 15W
	Frequency	2 GHz, up to 3.6 GHz	3.4 GHz	1.8 GHz, up to 3.8 GHz
	L2 Cache	6MB		
	CPU Type	BGA		
	Chipset	Integrated in SoC Process		
Memory	BIOS	AMI		
	Technology	Single-Channel DDR5 4800 MHz		
	Max. Capacity	Up to 16 GB		
	Socket	1 x 262-pin SO-DIMM		
Graphics	Controller	Intel® UHD Graphics		
	Graphic Memory	Depends on CPU		
	Multiple Display	2 independent displays		
Ethernet	Display Interface	HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz		
	Controller	2 x Intel® I225-V 2.5 GbE LAN		
Audio	Controller	Realtek® ALC256 HD Audio Codec		
	Watchdog Timer	256-level Watchdog Timer		
H/W Monitor	Smart Fan	N/A		
TPM	Controller	Infineon SLB9672VU2.0		
Expansion Slot	M.2	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230		
	RJ-45	2 x 2.5GbE LAN		
I/O Interface	PoE	N/A		
	Audio	1 x Line-out 1 x Mic-in		
	USB	4 x USB 3.1 2 x USB 2.0		
	Serial	1 x COM port COM1: RS-232/422/485, 0V/5V/12V		
	GPIO	N/A		
	HDMI	1		
	DisplayPort	1		
	Antenna	2 openings reserved for antennas		
	Operating Temperature	0~40 °C		
	Operating Humidity	10 ~ 90%, non-condensing		
Environment	Storage Temperature	-20 ~ 80 °C		
	Storage Humidity	10 ~ 90%, non-condensing		
	DC Input	DC-in 12~24V with Lockable DC Jack		
Power Supply	Dimensions (W x D x H)	197 x 162.8 x 25 mm		
	Weight	0.91 kg		
Physical Characteristics	Mounting	Stand/VESA mount (by BOM option)		
	EMC	CE, FCC, RCM, VCCI, BSMI, UKCA		
Certification	Safety	BSMI		
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)		

* SD card reader X 1

Accessories

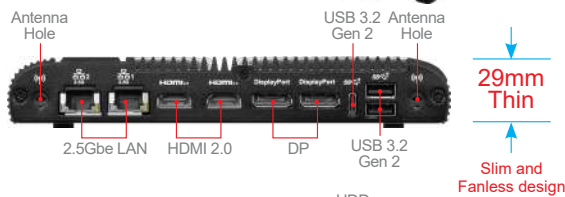


MS-C902

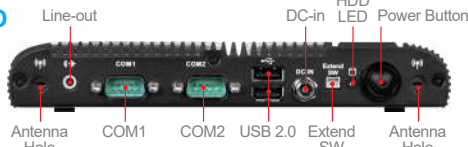
Slim Fanless Box PC with Intel® Alder Lake-P Platform U-Series, High Performance & Low-Power for 4K2K Digital Signage, KIOSK, Automation & AIoT Edge Computer



Left IO



Right IO



Features

- Intel® 12th Gen Alder Lake-P U-series
- 2 DDR4 3200 MHz SODIMM slots up to 64GB
- Quadruple independent displays: 2 HDMI, 2 DP
- 2 2.5GbE LAN with RJ-45
- 1 M.2 B key (with NANO SIM-holder), 1 M.2 E key
- 1 M.2 M key, 1 SATA 3.0 (2.5" SSD, 7mm) for storage
- 3 USB 3.2 Gen 2, 2 USB 2.0, 2 COM, Line-out
- Onboard TPM 2.0
- Easy access all on bottom side for 2 Memory, 3 M.2, 2.5"SSD
- Cableless design with proprietary board
- DC-IN 19V
- Slim & fanless design with thinness 29mm

Ordering Information

Part Number	Description
936-C902-001	MS-C902 VER 1.0, WINDBOX, Barebone, Fanless, Intel Alder Lake i5-1235U, LOGO msi, BLACK, 2*ANTENNA, VESA MOUNT, POWER CORD USA
936-C902-002	MS-C902 VER 1.0 WINDBOX, Barebone, Fanless, Intel Alder Lake i5-1235U, LOGO msi, BLACK, 2*ANTENNA, VESA MOUNT, POWER CORD EU
936-C902-003	MS-C902 VER 1.0 WINDBOX, Barebone, Fanless, Intel Alder Lake i5-1245UE, LOGO msi, BLACK, 2*ANTENNA, VESA MOUNT, POWER CORD USA
936-C902-004	MS-C902 VER 1.0 WINDBOX, Barebone, Fanless, Intel Alder Lake i5-1245UE, LOGO msi, BLACK, 2*ANTENNA, VESA MOUNT, POWER CORD EU
936-C902-005	MS-C902 VER 1.0 WINDBOX, Barebone, Fanless, Intel Alder Lake i3-1215UE, LOGO msi, BLACK, 2*ANTENNA, VESA MOUNT, POWER CORD USA
936-C902-006	MS-C902 VER 1.0 WINDBOX, Barebone, Fanless, Intel Alder Lake i3-1215UE, LOGO msi, BLACK, 2*ANTENNA, VESA MOUNT, POWER CORD EU

Packing List

Part Number	Description	Quantity
S93-0406700-S14	Adaptor 19V/90W	1
K33-3001020-I45	Power Cord, USA, 1800mm	1
K33-3001021-I45	Power Cord, EU, 1800mm	1
E22-9A95080-C22	VESA Mounting Bracket	1
E41-1406003-P65	VESA Mounting Screw	4
E43-1304047-P65	2.5" HDD/SSD Screw	2
S79-0000360-V03	ANTENNA	2

Specifications

System Processor	CPU	12th Gen Intel® Mobile Alder Lake-P U-series Core™ i5/i3/ Celeron® Processor, DC, 15W
	Frequency	1.0 GHz~4.4 GHz (Depends on CPU)
	L2 Cache	8MB~12MB (Depends on CPU)
	CPU Type	BGA
	Chipset	Integrated
Memory	BIOS	AMI
	Technology	Dual-channel DDR4 3200 MHz
	Max. Capacity	Up to 64GB
Graphic	Socket	2 x 260-pin SO-DIMMs
	Controller	Intel® Iris® Xe Graphics (For i5 SKUs) Intel® UHD Graphics (For i3/Celeron SKUs)
	Graphic Memory	Depends on CPU
	Multiple Display	4 independent displays
Ethernet	Display Interface	HDMI 2.0 up to 4096 x 2304 @60Hz DP up to 7680 x 4320 @60Hz
	Controller	2 x Intel® i226-LM 2.5 GbE LAN
Audio	Controller	Realtek® ALC888-VD2-GR HD Audio Codec (Co-lay ALC897)
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A
TPM	Controller	Infineon SLB9670VQ 2.0
Expansion Slot	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe, SATA 3.0), 2242/2280 1 x M.2 B key (PCIe x1, USB 3.2, USB 2.0 w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0), 2230
	Mini-PCIe	N/A
Storage	SATA	1 x 2.5" SSD (7mm)
	mSATA	N/A
I/O Interface	RJ-45	2
	PoE	N/A
	Audio	1 x Line-out (Mic-in by AP driver)
	USB	2 x USB 3.2 Gen2, Type-A 1 x USB 3.2 Gen2, Type-C 2 x USB 2.0, Type-A
	Serial	2 x COM ports COM1/2: RS-232/422/485, 0V/5V/12V
	GPIO	N/A
	CANbus	N/A
	HDMI	2
	DVI	N/A
	DisplayPort	2
Power Supply	VGA	N/A
	Antenna	4 openings reserved for antennas
	DC Input	DC-in 19V with Lockable DC Jack
	AC Input	N/A
Environment	IP Rating	Full IP40
	Operating Temperature	-10 ~ 50°C (SSD) Note: Thermal Test w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Physical characteristics	Vibration	Operating: IEC 60068-2-64: 2 Grms, 5 ~ 500 Hz, 1hr/axis (w/ SSD)
	Shock	Operating: IEC 60068-2-27: 50G, half sine, 11ms (w/ SSD)
	Dimensions (W x D x H)	196 x 285 x 29mm
	Weight	2.24 kg
Certification	Mounting	VESA/Wall mount
	EMC	FCC Class B, CE, RCM, BSMI, VCCI, UKCA, IC
Software Platform	Safety	BSMI
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)

MS-9B05

Slim Fanless Box PC with Intel® Whiskey Lake ULT, 3 Display Outputs & Easy Maintenance for Digital Signage & Automation



Left IO

SKU 1



SKU 2



Right IO



Features

- Intel® 8th Gen Whiskey Lake-U Series
- 2 DDR4 2400 MHz (by option) SODIMM slots up to 32GB
- Triple independent displays: HDMI(DVI-D by option), 2 HDMI(DP by option)
- HDMI 2.0
- 2 GbE LAN with RJ-45
- Expansion slots: 1 M.2 E Key, 1 M.2 M Key, 1 Mini-PCle (Full/Half size, with SIM Holder), 1 Mini-PCle (Full/Half size, with mSATA) slots
- mSATA, M.2 M key, SATA 3.0 (2.5" SSD/HDD, 7mm) for storage
- 2 USB 3.2 Gen 2 (by option), 4 USB 2.0, 2 COM(2 RS485), Audio
- Onboard TPM 2.0 (by option)
- ESD: Contact 8KV/ Air 15KV
- Easy access:
 - Only 2 screws to fix/remove bottom cover within 6 secs
- Quick Assembly all on bottom side: 2 x Memory, 2 x Mini-PCle, 2 x M.2, 1 x 2.5" HDD/SSD, SIM Card Slot
- 4 openings reserved for WiFi/BT/LTE antennas
- Compliance IEC 61373
- Wide Voltage DC-IN 9~36V
- Ultra-Slim & fanless design with thinness 27mm

Ordering Information

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Specifications

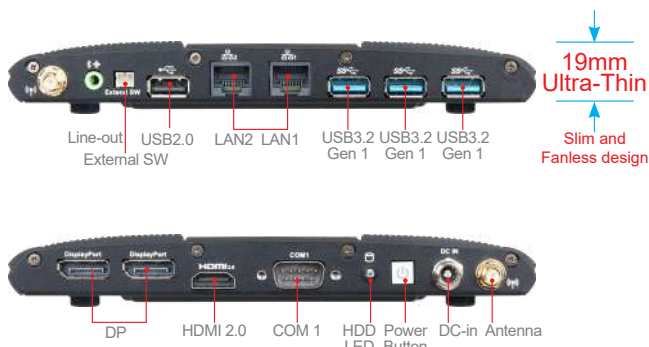
System Processor	CPU	8th Gen Intel® Mobile Whiskey Lake-U Core™ i5 Processor, QC, 15W
	Frequency	Depends on CPU
	L2 Cache	Depends on CPU
	CPU Type	BGA
	Chipset	Integrated
Memory	BIOS	AMI
	Technology	Dual-channel DDR4 2400 MHz
	Max. Capacity	Up to 32GB
	Socket	2 x 260-pin SO-DIMMs
	Controller	Intel® UHD Graphics 620
Display	Graphic Memory	Depends on CPU
	Multiple Display	3 independent displays
	Display Interface	HDMI 2.0 up to 4096 x 2160 @60Hz HDMI 1.4 up to 4096 x 2160 @24Hz
Ethernet	Controller	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
H/W	Watchdog Timer	256-level Watchdog Timer
Monitor	Smart Fan	N/A
TPM	Controller	Infineon SLB9665TT2.0 (by BOM option)
	PCI	N/A
Expansion Slot	M.2	1 x E key (2x PCIe x1, USB 2.0), 2230 1 x M key (PCIe x4), 2242
	Mini-PCle	1 x Half/Full-size (w/ mSATA) 1 x Half/Full-size (w/ Nano-SIM holder)
		1 x 2.5" HDD/SSD
Storage	SATA	1 x Full-size (shared with mini-PCle)
	mSATA	N/A
	CFast	N/A
	CompactFlash	N/A
I/O Interface	RJ-45	2
	PoE	N/A
	Audio	1 x SPDIF-out/Line-out 1 x Mic-in/Line-in
	USB	4 x USB 2.0 2 x USB 3.2 Gen 2
	Serial	2 x COM ports COM1/2: RS-232/422/485, 0V/5V/12V
	Parallel	N/A
	PS/2	N/A
	GPIO	N/A
	CANbus	N/A
	HDMI	3
	LVDS	N/A
	DVI	N/A
	DisplayPort	N/A
	VGA	N/A
Power Supply	Antenna	4 openings reserved for antennas
	DC Input	DC-in 9~36V with Lockable DC Jack
	AC Input	N/A
Environment	IP Rating	Full IP40
	Operating Temperature	-10 ~ 40°C (HDD) -10 ~ 50°C (SSD) Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	IEC61373 Category 1, Class A Operating: IEC 60068-2-64: 2 Grms, 5 ~ 500 Hz, 1hr/axis (w/ SSD)
	Shock	IEC61373 Category 1, Class A Operating: IEC 60068-2-27: 50G, half sine, 11ms (w/ SSD)
Form Factor	Dimensions (W x D x H)	260 x 185 x 27 mm
	Weight	1.77 kg
	Weight	VESA/DIN Rail(STD), Wall mount (by BOM option)
Certification	EMC	FCC, CE, RCM, VCCI, BSMI Class A
	Safety	BSMI
Software Platform		Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5)
	OS Support	Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)

Packing List

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

MS-9A85

Ultra-Slim & Featherweight Fanless Box PC with Intel® Apollo Lake Platform, Low-Power for Digital Signage



Features

- Intel® Apollo Lake Series SoC
- 1 DDR3L 1866/1600 MHz SODIMM slot up to 8GB
- Triple independent displays: 2 DP, HDMI 2.0
- 2 GbE LAN with RJ-45
- 1 M.2 E Key, 1 Mini-PCle(Full-size, with SIM Holder) slot
- M.2 M key, SATA 3.0 (2.5" SSD/HDD, 7mm) for storage
- 3 USB 3.2 Gen 1, USB 2.0, COM(RS485), Audio
- Onboard TPM 2.0 (by option)
- Easy access HDD, Memory, SIM Card, Mini-PCle, M.2 slots
- DC-IN 19V
- Ultra-slim, cableless & low power fanless design with thinness 19mm

Ordering Information

Part Number	Description
939-9A85-004	MS-9A85/709-9A85-020/829-9A85-007 OPT:C Ver 11, WindBOX Barebone, Fanless, ApolloLake J3455, BLACK, 2*ANTENNA, Adaptor 19V/65W, Single

Packing List

Part Number	Description	Quantity
S93-0401780-S14	Adaptor 19V/65W	1
S79-0000360-V03	ANTENNA	2
E27-9A85020-Z36	THERMAL PAD	1
E22-9A95080-C22	VESA Mount Bracket	1
E41-1406003-P65	VESA Mount Screw	4
E22-9A85051-LA2	VESA Support Bracket	1
E43-1306058-P65	VESA Support Screw	4
E41-1303501-P65	2.5" HDD/SSD Screw	2

Optional Item

Part Number	Description
K33-3001020-I45	USA power cord
K33-3001021-I45	EU power cord

Specifications

System Processor	CPU	Intel® Celeron® Processor J3455, QC, 10W
	Frequency	1.5 GHz, up to 2.3 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated
Memory	BIOS	AMI
	Technology	Single-Channel DDR3L1600/1866 MHz
	Max. Capacity	Up to 8 GB
	Socket	1 x 204-pin SO-DIMM
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	Multiple Display	3 independent displays
	Display Interface	HDMI 2.0 up to 3840 x 2160 @60Hz* DP 1.2 up to 4096 x 2160 @60Hz (Resolution combination depends on various application) (*HDMI resolution for 30Hz or 60Hz depends on monitor)
Ethernet	Controller	2 x Intel® I211-AT GbE LAN
Audio	Controller	Realtek® ALC887/888S HD Audio Codec
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A
TPM	Controller	Infineon SLB9665TT2.0 (by BOM option)
Expansion Slot	M.2	1 x E Key (PCIe x2, USB 2.0), 2230 1 x M Key (SATA only), 2280
	Mini-PCle	1 x Full-size (with SIM holder)
Storage	SATA	1 x 2.5" HDD/SSD
	mSATA	N/A
I/O Interface	RJ-45	2
	Audio	1 x Line-out (Mic-in by AP driver)
	USB	1 x USB 2.0 3 x USB 3.2 Gen 1
	Serial	1 x COM port COM1: RS-232/422/485, 0V/5V/12V
	Parallel	N/A
	PS/2	N/A
	GPIO	N/A
	CANbus	N/A
	HDMI	1
	LVDS	N/A
	DVI	N/A
	DisplayPort	2
	VGA	N/A
	Antenna	2 openings reserved for antennas
Power Supply	DC Input	DC-in 19V with Lockable DC Jack
	AC Input	N/A
	IP Rating	N/A
Environment	Operating Temperature	0 ~ 40°C (HDD/WT M.2 M key) -10 ~ 50°C (SSD) Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	Operating, 0.25 Grms, 5-300Hz, 3axes (w/ HDD)
	Shock	Operating, 3 G, half sine 11 ms duration (w/ HDD)
Form Factor	Dimensions (W x D x H)	180 x 255 x 19 mm
	Weight	1.17 kg
	Mounting	VESA mount
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
	Safety	BSMI, Energy Star
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

MS-C913

Compact-Size Box PC with NVIDIA® Jetson Orin™ Nano/NX AI Computing Platform with Ultra Low-Power Fanless Solution

NEW



Features

- NVIDIA® Jetson Orin™ Nano 4GB/8GB or NX 8GB/16GB SoM
- Nano 4GB: 64-bit LPDDR5 2133MHz/
Nano 8GB: 128-bit LPDDR5 2133MHz
NX 8GB/16GB: 128-bit LPDDR5 3200MHz
- Single independent display: HDMI
- 2 GbE LAN with RJ-45
- 1 M.2 E-Key ,1 M.2 B-Key ,1 M.2 M-Key Slot
- 4 USB 3.2 Gen2, 1 x Micro USB 2.0 Gen2.0, 1 COM, 1 GPIO, 1 CAN
- 4 opening reserved for antennas
- Wide Voltage DC-IN 19V
- Ultra-Compact with fanless design

Ordering Information

Part Number	Description
Coming soon	

Packing List

Part Number	Description	Quantity
Coming soon		

Optional Item

Part Number	Description
Coming soon	

Specifications

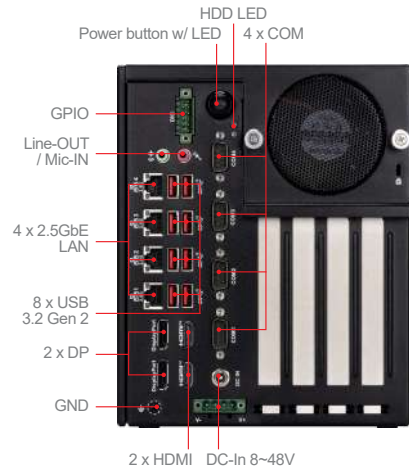
System Processor	CPU	Jetson Orin Nano 4GB/8GB	Jetson Orin NX 8GB/16GB
		6-core Arm® Cortex® - A78AE, 7W	Jetson Orin NX 8GB:6-core Arm® Cortex®-A78AE,10W Jetson Orin NX 16GB:8-core Arm® Cortex®-A78AE,10W
	Frequency	1.5 GHz (Max)	2 GHz (Max)
	L2 Cache	1.5MB	2MB
	CPU Type	Jetson Orin Nano/NX Module	
	Chipset	Integrated in SoC Process	
	BIOS	N/A	
Memory	Technology	Integrated in SoC Process, LPDDR5 DRAM 2133 MHz	Integrated in SoC Process, LPDDR5 DRAM 3200 MHz
	Max. Capacity	4GB/8GB	8GB/16GB
	Socket	N/A	
Graphic	Controller	NVIDIA® Ampere GPU	NVIDIA® Ampere GPU
	Graphic Memory	Depends on GPU	
	Multiple Display	N/A	
	Display Interface	HDMI up to 3840 x 2160 @30Hz	HDMI up to 7680 x 4320 @30Hz
Ethernet	Controller	1 x Broadcom BCM5720 1GbE LAN	
Audio	Controller	N/A	
	Watchdog Timer	N/A	
H/W Monitor	Smart Fan	N/A	
TPM	Controller	Infineon SLB9670VQ 2.0	
Expansion Slot	M.2	1 x M.2 E-key (PCIe/UART), 2230 1 x M.2 B-key (USB 3.0), 3242 1 x M.2 M-key (PCIe), 2280	
	Mini-PCIe	N/A	
Storage	SATA	N/A	
	mSATA	N/A	
	RJ-45	2	
	PoE	N/A	
	Audio	N/A	
I/O Interface	USB	4 x USB 3.2 Gen 2 1 x Micro USB 2.0 Gen 2	
	Serial	1 x DB-9 for COM port COM1: RS-232/422/485	
	GPIO	1 x DB-9 for GPIO	
	CANbus	N/A	
	HDMI	1	
	Antenna	4 x SMA connectors (Optional)	
	DC Input	DC-in 19V	
Power Supply	AC Input	N/A	
	IP Rating	N/A	
Environment	Operating Temperature	0°C ~ 50 °C with 0.7 m/s air flow	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Vibration	2.09Grms @ 5 ~ 500 Hz, random, 30 min/axis	
	Shock	50 G, half sine, 4 ms duration	
	Dimensions (W x D x H)	160 x 140 x 60 mm	
Physical Characteristics	Weight	1.38 kg	
	Mounting	N/A	
Certification	EMC	N/A	
	Safety	N/A	
Software Platform	OS Support	NVIDIA® Jetson Linux 35.5	

MS-C910

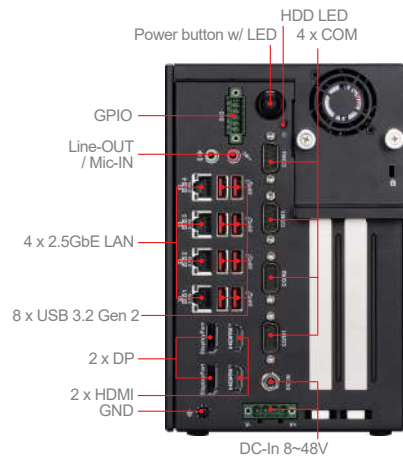
Outperform Fanless Box PC with 12th/13th/14th Gen Intel® Core™ i Processor for Rugged, Scalable & Versatile Solution

NEW

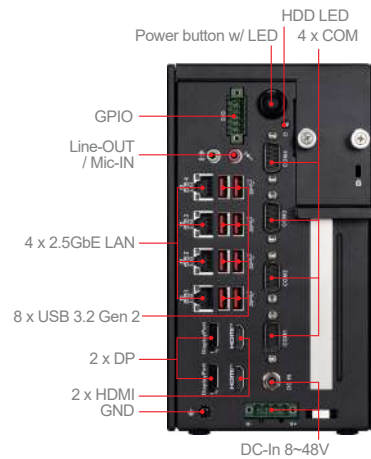
SKU1 – 4 Slots



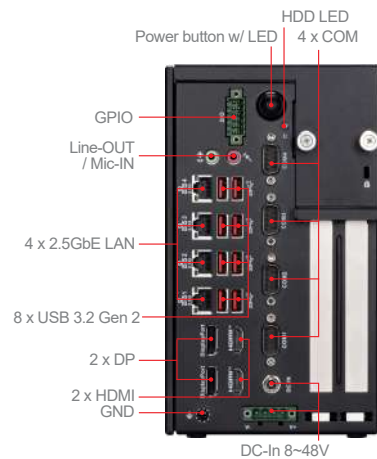
SKU2 – 2 Slots



SKU3 – 1 Slot



SKU4/5 – 2 Slots



Specifications

Processor	CPU	SKU1	SKU2	SKU3	SKU4	SKU5
		Intel® 12th Gen IOTG Alder Lake-S Processor Core i9/i7/i5/i3, Pentium™, Celeron™ Processor, Max. 35W Intel® 13th Gen IOTG Raptor Lake-S Processor Core i9/i7/i5/i3, Max. 35W Intel® 14th Gen IOTG Raptor Lake-S Refresh Processor Core i9/i7/i5/i3, Max. 35W				
Memory	Frequency	P-Core 1.1 GHz~5.5 GHz (Depends on CPU) E-Core 0.8 GHz~4.0 GHz (Depends on CPU)				
	L2 Cache	4M~36M (Depends on CPU)				
	CPU Type	Socket (LGA1700)				
	Chipset	Intel® R680E chipset				
	BIOS	AMI				
Display	Technology	Dual-channel DDR5(ECC/non-ECC) 5600MHz (ECC support & Frequency will depend on CPU)				
	Max. Capacity	Up to 64GB				
	Socket	2 x 262-pin SO-DIMMs				
Ethernet	Controller	Intel® UHD Graphics				
	Graphic Memory	Depends on CPU				
	Multiple Display	4 independent displays				
Audio	Display Interface	HDMI up to 4096 x 2304 @60Hz DP up to 4096 x 2304 @60Hz				
	Controller	1 x Intel® I226LM 2.5GbE LAN (Support Intel® AMT) 3 x Intel® I226V 2.5GbE LAN				
	Watchdog Timer	Realtek® ALC897 HD Audio Codec				
H/W Monitor	Smart Fan	256-level Watchdog Timer				
	Controller	Yes				
	TPM	Infineon SLB9672VU2.0				
Expansion Slot	PCIe x16	1			N/A	
	PCIe x8	N/A			2	
	PCIe x4	N/A				
	PCIe x1	N/A				
	PCI	3	1	N/A		
	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe & SATA 3.0), 2280 1 x M.2 E key (PCIe Gen4 x1, USB2.0), 2230	1 x M.2 M key (PCIe Gen4 x4 NVMe & SATA 3.0), 2280			
	Mini-PCIe	N/A	1 x Full-size	N/A		
Storage	SATA	2 x 2.5" HDD/SSD			N/A	2 x 2.5" HDD/SSD
	mSATA	N/A				
	CFast	N/A				
	CompactFlash	N/A				
I/O Interface	RJ-45	4				
	PoE	N/A				
	Audio	1 x Mic-in 1 x Line-out				
	USB	8 x USB 3.2 Gen 2 2 x USB 3.2 Gen 1 3 x USB 2.0 (Internal, Type-A)				
	Serial	4 x COM ports COM1~2: RS232/422/485, 0V/5V/12V COM3~4: RS-232, 0V				
	PS/2	N/A				
	GPIO	8-bits (4 x GPI; 4 x GPO), 5~35V, isolation 1.3KV				
	CANbus	N/A				
	HDMI	2				
	LVDS	N/A				
	DVI	N/A				
	DisplayPort	2				
Power Supply	Antenna	2 openings reserved for antennas	N/A			
	DC Input	DC-in 8-48V Wide-Range Pluggable connectors with latch (V+, V-)				
	IP Rating	N/A				
Environment	Operating Temperature	-10 ~ 50°C w/ industrial DC power Up to 35W CPU Note: Thermal w/ Airflow:0.7m/s				
	Operating Humidity	10 ~ 90% , non-condensing				
	Storage Temperature	-20 ~ 80°C				
	Storage Humidity	10 ~ 90%, non-condensing				
	Vibration	Operating, IEC 60068-2-64: 2 Grms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD/SSD)				
	Shock	Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD/SSD)				
Form Factor	Dimensions (W x D x H)	178 x 242 x 217 mm	142 x 240 x 217 mm	123 x 240 x 217 mm	127 x 240 x 217 mm	
	Weight	5.0 kg	4.4 kg	4.3 kg	4.4 kg	
	Mounting	Wall mount				
Certification	EMC	FCC Class A, CE, RCM, BSMI, VCCI, UKCA, IC				
	Safety	IEC 62368: CE(LVD) / BSMI				
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)				

Features

- Intel® 12th/13th/14th Gen Alder Lake-S/Raptor Lake-S/Raptor Lake-S Refresh Series with R680E
- 2 DDR5 5600 MHz ECC/non-ECC SODIMM slots up to 64GB
- Quadruple independent displays: 2 HDMI, 2 DP
- 4 2.5 GbE LAN with RJ-45
- SKU1: 1 PCIe x16 (Gen 4), 3 PCI, PCIe E Key (Gen 4) x1
- SKU2: 1 PCIe x16 (Gen 4), 1 PCI, 1 x Mini-PCIe (Full-size)
- SKU3: 1 PCIe x16 (Gen 4)
- SKU4: 2 PCIe x8 (Gen 4)
- SKU5: 2 PCIe x8 (Gen 4)
- 2 SATA 3.0 (2.5" SSD/HDD, 7mm) for storage
- SATA RAID 0/1
- 8 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 3 USB 2.0, 4 COM, Audio, GPIO, System FAN
- Onboard TPM 2.0
- GPIO 8-bit supports, 5~35V, Isolation 1.3KV
- Easy access CPU, HDD, memory, expansion slots
- Anti-Vibration & Shockproof Design to Compliance IEC 60068-2
- Wide Voltage DC-IN 8~48V
- Fanless design

Ordering Information

Part Number	Description
936-C910-001	Intel Alder Lake-S/Raptor Lake-S/Raptor Lake-S Refresh Series with R680E, 4 SLOTS (SKU 1), PCIe16*1, PCI*3, HDMI*2, DP*2, COM*4, USB3.2 Gen2 *8, USB3.2 Gen1 *2, Intel 2.5GbE LAN*4, GPIO, DC-IN 8-48V
936-C910-002	Intel Alder Lake-S/Raptor Lake-S/Raptor Lake-S Refresh Series with R680E, 2 SLOTS (SKU 2), PCIe16*1, PCI*1, HDMI*2, DP*2, COM*4, USB3.2 Gen2 *8, USB3.2 Gen1 *2, Intel 2.5GbE LAN*4, GPIO, DC-IN 8-48V
936-C910-003	Intel Alder Lake-S/Raptor Lake-S/Raptor Lake-S Refresh Series with R680E, 1 SLOT (SKU 3), PCIe16*1, HDMI*2, DP*2, COM*4, USB3.2 Gen2 *8, USB3.2 Gen1 *2, Intel 2.5GbE LAN*4, GPIO, DC-IN 8-48V
936-C910-004	Intel Alder Lake-S/Raptor Lake-S/Raptor Lake-S Refresh Series with R680E, 2 SLOTS (SKU 4), PCIe16*2, HDMI*2, DP*2, COM*4, USB3.2 Gen2 *8, USB3.2 Gen1 *2, Intel 2.5GbE LAN*4, GPIO, DC-IN 8-48V
936-C910-005	Intel Alder Lake-S/Raptor Lake-S/Raptor Lake-S Refresh Series with R680E, 2 SLOTS (SKU 5), PCIe16*2, HDMI*2, DP*2, COM*4, USB3.2 Gen2*8, USB3.2 Gen1*2, Intel 2.5GbE LAN*4, GPIO, 2.5 inch drive bay*2, DC-IN 8-48V

Packing List

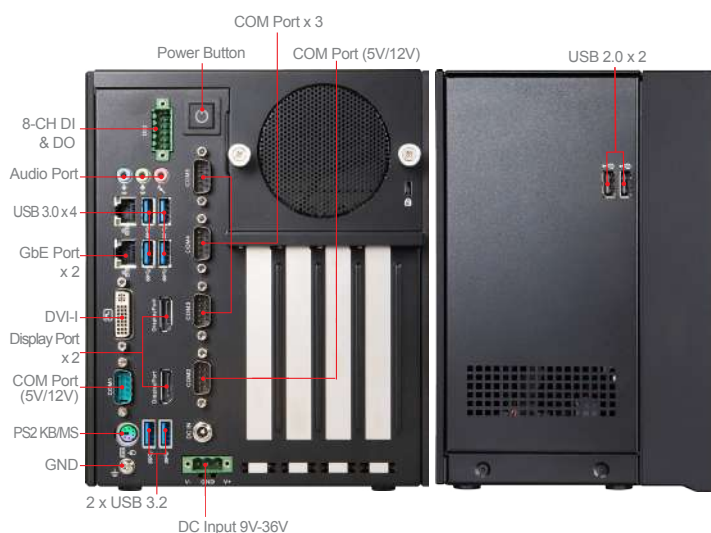
Part Number	Description	936-C910-001	936-C910-002	936-C910-003	936-C910-004	936-C910-005
NA1-2060011-SR2	Phoenix Terminal Plug for DIO, 2*6pin	1	1	1	1	1
NA1-1040063-SR2	Phoenix Terminal Plug for DC-in, 1*4pin	1	1	1	1	1
E22-9A66200-LA2	Wall Mount Bracket	2	2	2	2	2
E22-C910020-LA2	PCI/PCIe Bracket	4	2	1	2	1
E26-C910010-F49	Thermal Pad for CPU	1	1	1	1	1
E26-C910030-Z36	Thermal Pad for M.2 SSD, 7.5mm	1	1	1	1	1
E26-C910020-Z36	Thermal Pad for M.2 SSD, 6.25mm	1	1	1	1	1
E26-9A66031-F49	Thermal Pad for HDD	2	2	2	0	2
309-9A51214-MF1	HDD Plastic Support Kit	2	2	2	0	2
E22-9A66290-LA2	HDD Support Tray	2	2	2	0	2
K1D-1008318-V03	SATA Cable, 410mm	1	1	1	0	1
K1D-1008317-V03	SATA Cable, 315mm	1	1	1	0	1
K1D-3008049-V03	SATA Power Cable, 130/350mm	1	1	1	0	1
E22-9A66280-LA2	ROTATE Bracket	0	0	0	0	2
E43-1304016-P65	SCREW	0	0	0	0	4

Optional Item

Part Number	Description
S93-0404420-S14	Adaptor 19V/180W
K33-3001020-I45	Power cord (TWN type)

MS-9A76

Outperform Fanless Box PC with 7th/6th Gen Intel® Core™ i Processor for Rugged, Scalable & Versatile Solution



Features

- Intel® 7th/6th Gen Kaby Lake-S/Skylake-S Series with C236/Q170
- 2 DDR4 2400/2133 MHz ECC/non-ECC SODIMM slots up to 32GB
- Triple independent displays: DVI-I, 2 DP
- 2 GbE LAN with RJ-45
- SKU1: 1 PCIe x16 (Gen 3), 1 PCI, 1 Mini-PCIe (Full size, with mSATA) slots
- SKU2: 1 PCIe x16 (Gen 3), 3 PCI
- SKU3: 2 PCIe x8 (Gen 3), 2 PCI
- mSATA, 2 SATA 3.0 (2.5" SSD/HDD, 7mm) for storage
- SATA RAID 0/1
- 6 USB 3.2 Gen 1, 5 USB 2.0(2 ports by option), 5 COM(2 RS485), Audio, GPIO, PS/2, System FAN
- Onboard TPM 2.0
- GPIO 8-bit supports 5~35V, Isolation 1.5KV
- Easy access CPU, HDD, memory, CFast, expansion slots
- Anti-Vibration & Shockproof Design to Compliance IEC 60068-2
- Wide Voltage DC-IN 9~36V
- Fanless design

Ordering Information

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Packing List

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Optional Item

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Specifications

Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Core™ i7/i5/i3/Celeron™/Pentium® Processor, Max. 65W			
	Frequency	2.3 GHz~3.9 GHz (Depends on CPU)			
	L2 Cache	2M~8M (Depends on CPU)			
	CPU Type	Socket (LGA1151)			
	Chipset	Intel® Q170 Express / Intel® C236 Express			
	BIOS	AMI			
Memory	Technology	Q170: Dual-channel DDR4(non-ECC) 2133/2400MHz C236: Dual-channel DDR4(ECC) 2133/2400MHz			
	Max. Capacity	Up to 32GB			
	Socket	2 x 260-pin SO-DIMMs			
Display	Controller	Intel® HD Graphics			
	Graphic Memory	Depends on CPU			
	Multiple Display	3 independent displays			
	Display Interface	DP up to 3840 x 2160 @60Hz DVI-I up to 1920 x 1200 @60Hz			
Ethernet	Controller	1 x Intel® I219GbE-PHY LAN (Support Intel® AMT) 1 x Intel® I210-AT GbE LAN			
Audio	Controller	Realtek® ALC887 HD Audio Codec			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	N/A			
TPM	Controller	Infineon SLB9665TT2.0			
Expansion Slot	PCIe x16	1	N/A	1	
	PCIe x8	N/A	2	N/A	
	PCIe x4	N/A			
	PCIe x1	N/A			
	PCI	3	2	1	
	M.2	N/A			
	Mini-PCIe	N/A	1 x Full-size (w/ mSATA)		
Storage	SATA	2 x 2.5" HDD/SSD			
	mSATA	N/A	1		
	CFast	1			
	CompactFlash	N/A			
I/O Interface	RJ-45	2			
	PoE	N/A			
	Audio	1 x Mic-in 1 x Line-out 1 x Line-in			
	USB	5 x USB 2.0 (one port w/ security key) 6 x USB 3.2 Gen 1			
	Serial	5 x COM ports COM1~2: RS232/422/485, 0V/5V/12V COM3~5: RS-232, 0V			
	PS/2	1			
	GPIO	8-bits (4 x GPI; 4 x GPO), 5~35V, Isolation 1.5KV			
	CANbus	N/A			
	HDMI	N/A			
	LVDS	N/A			
	DVI	1 (DVI-I)			
	DisplayPort	2			
	Antenna	N/A			
Power Supply	DC Input	DC-in 9-36V Wide-Range Pluggable connectors with latch (GND, V-, V+)			
Environment	IP Rating	Full IP20			
	Operating Temperature	-10 ~ 40°C w/ fan module up to 65W CPU -10 ~ 50°C w/ industrial DC power up to 35W CPU Note: Thermal w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing			
	Vibration	Operating, IEC 60068-2-64: 1.5 Grms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD/SSD)			
	Shock	Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD/SSD)			
Form Factor	Dimensions (Wx DxH)	217 x 226 x 176 mm			217 x 226 x 143 mm
	Weight	4.8 Kg			4.4 Kg
	Mounting	Wall mount			
Certification	EMC	FCC Class A, CE, RCM, VCCI, BSMI			
	Safety	UL			
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 (64-bit)			

MS-98H7

COM Express SBC with 8th Gen Intel® Coffee Lake-H Platform for Type 6 Basic Solution



Features

- Intel® 8th Gen Coffee Lake-H Series with CM246/QM370
- 2 DDR4 2666 MHz ECC/non-ECC SODIMM slots up to 32GB
- Triple independent displays: VGA, LVDS, 3 DDI
- GbE LAN
- 1 PCIe x16 (Gen 3), 8 PCIe x1 (Gen 3)
- 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 4 USB 3.2 Gen 1, 8 USB 2.0, 2 UART
- Onboard TPM 2.0
- iAMT 12.x

Ordering Information

Part Number	Description
919-98H7-001	MS-98H7\609-98H7-010\ 809-98H7-002 VER 10 COM Express Basic M/B Intel Coffee Lake-H CM246 +E2176M, 2*DDR4 SO-DIMM, 3*DDI, 1*VGA, 1*LVDS, 1*TPM2.0, 2*COM Express type 6 connector
919-98H7-002	MS-98H7\609-98H7-020\ 809-98H7-002 VER 10 OPT.A COM Express Basic M/B Intel Coffee Lake-H QM370+I7-8850H, 2*DDR4 SO-DIMM, 3*DDI, 1*VGA, 1*LVDS, 1*TPM2.0, 2*COM Express type 6 connector
919-98H7-003	MS-98H7\609-98H7-030\ 809-98H7-002 VER 10 OPT.B COM Express Basic M/B Intel Coffee Lake-H QM370+I5-8400H, 2*DDR4 SO-DIMM, 3*DDI, 1*VGA, 1*LVDS, 1*TPM2.0, 2*COM Express type 6 connector
919-98H7-004	MS-98H7\609-98H7-040\ 809-98H7-002 VER 10 OPT.C COM Express Basic M/B Intel Coffee Lake-H QM370+I3-8100H, 2*DDR4 SO-DIMM, 3*DDI, 1*VGA, 1*LVDS, 1*TPM2.0, 2*COM Express type 6 connector

Packing List

Part Number	Description	Quantity
E31-2100190-K08	Heat spreader	1
G71-SEDC191-N56/ G71-SEDC191-X03	MS-9A89-A Series Driver DVD	1

Specifications

Processor	CPU	8th Gen Intel® Embedded Coffee Lake-H Xeon™ E-2176M Mobile Processor, HC, 45W	8th Gen Intel® Embedded Coffee Lake-H Core™ i7-8850H/i5-8400H/i3-8100H Mobile Processor, HC/ QC, 45W
	Frequency	2.5GHz~4.4GHz (Depends on CPU)	
	L2 Cache	3MB~4MB (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Intel® CM246 Express	Intel® QM370 Express
Memory	BIOS	AMI	
	Technology	Dual-channel DDR4 (ECC) 2666MHz	Dual-channel DDR4 (Non-ECC) 2666MHz
	Max. Capacity	Up to 32GB	
	Socket	2 x 260-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
Display	Graphic Memory	Depends on CPU	
	LVDS	Dual channel 18/24-bit	
	VGA	1	
	DVI	N/A (3 DDI ports support DVI/HDMI/DP (DDI3 AUX shared with VGA))	
	HDMI	N/A (3 DDI ports support DVI/HDMI/DP (DDI3 AUX shared with VGA))	
	DisplayPort	N/A (3 DDI ports support DVI/HDMI/DP (DDI3 AUX shared with VGA))	
	Multiple Display	3 independent displays	
	Display Interface	LVDS Resolution up to 1920 x 1200 @60Hz VGA Resolution up to 1920 x 1080 @60Hz 3 x DDI: DVI up to 1920 x 1200 @60Hz HDMI 1.4 up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz	
Ethernet	Controller	1 x Intel® I219LM GbE-PHY LAN (AMT 12.x supported)	
Audio	Controller	Support HD audio interface to carrier board	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
TPM	Controller	Infineon SLB9665TT 2.0	
I/O Interface	USB	8 x USB 2.0 (to carrier board) 4 x USB 3.2 Gen 1 (to carrier board)	
	Serial	2 x COM ports (to carrier board)	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	
Expansion Slot	PCIe x16	1 x PCI Express x16 GEN. 3.0 lanes (Configurable to 1 x16 or 2 x8 or 1 x8 + 2 x4)	
	PCIe x1	8 x PCI Express GEN. 3.0 lanes (Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4)	
	M.2	N/A	
Storage	SATA	4 x SATA 3.0	
	DC	N/A	
Power Supply	ATX	ATX +12 V and +5 VSB (standby power) AT: +12 V	
	Operating Temperature	-10 ~ 60°C	
Environment	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	125 x 95mm (COM Express Type 6 Basic module)	
	Weight	0.113 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 10 (64-bit) Linux (Support by request)	

DDR4-SODIMM



CPU FAN

Features

- Intel® 7th/6th Gen Kaby Lake-U/Skylake-U Series
- 2 DDR4 2133/1866 MHz SODIMM slots up to 32GB
- Triple independent displays: VGA, LVDS, 2 DDI
- GbE LAN
- 8 PCIe x1 (Gen 3)
- 3 SATA 3.0, 32GB eMMC 5.0 for storage
- SATA RAID 0/1/5
- 4 USB 3.2 Gen 1, 8 USB 2.0, 2 UART
- Onboard TPM 2.0
- iAMT 11.x

Ordering Information

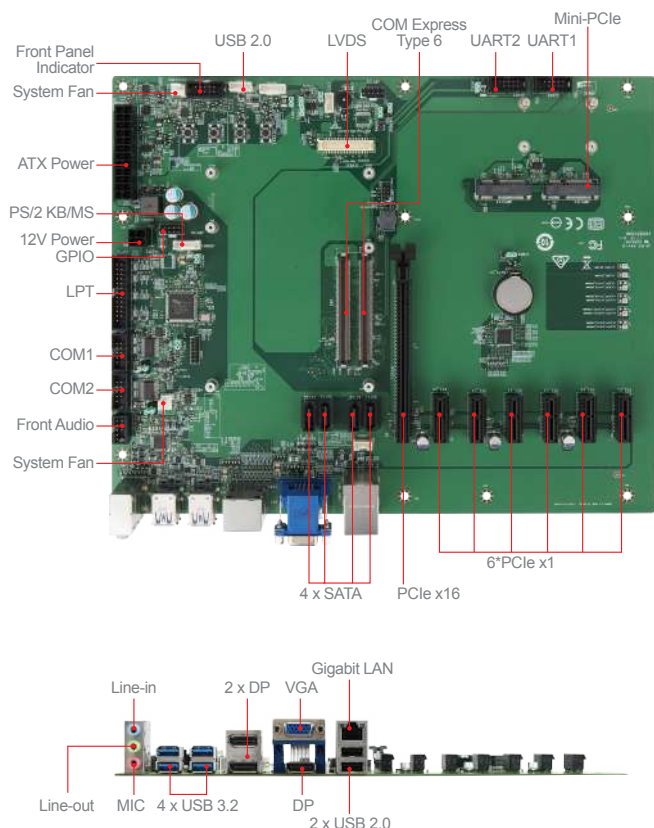
Part Number	Description
919-98F7-001	MS-98F7 10 COM Express Compact M/B Intel KabyLake-U I7-7600U, 2*DDR4 SO-DIMM, DDI /VGA/ LVDS signal, 1*eMMC, 1*TPM2.0, 2*COM Express type 6 connector
919-98F7-002	MS-98F7 10 OPT:A COM Express Compact M/B Intel KabyLake-U I5-7300U, 2*DDR4 SO-DIMM, 2*DDI / LVDS signal, 2*COM Express type 6 connector
919-98F7-003	MS-98F7 10 OPT:B COM Express Compact M/B Intel KabyLake-U I3-7100U, 2*DDR4 SO-DIMM, 2*DDI / LVDS signal, 2*COM Express type 6 connector
919-98F7-004	MS-98F7 10 OPT:C COM Express Compact M/B Intel Skylake-U I7-6600U, 2*DDR4 SO-DIMM, DDI /VGA/ LVDS signal, 1*eMMC, 1*TPM2.0, 2*COM Express type 6 connector

Packing List

Part Number	Description	Quantity
E31-2100190-K08	Heat spreader	1

Specifications

Processor	CPU	7th/6th Gen Intel® Embedded Mobile Kaby Lake-ULT/Skylake-ULT Core™ i7/i5/i3/Celeron Processor, DC, 15W
	Frequency	2.0GHz~3.4GHz (Depends on CPU)
	L2 Cache	2MB~4MB (Depends on CPU)
	CPU Type	BGA
	Chipset	N/A
Memory	BIOS	AMI
	Technology	Dual-channel DDR4 2133MHz
	Max. Capacity	Up to 32GB
	Socket	2 x 260-pin SO-DIMMs
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual channel 24-bit
	eDP	N/A
	VGA	1 (Share with DDI1 Signal, by BOM option)
	DVI	N/A (2 DDI ports support HDMI/DP (DDI1 by BOM option, default is for VGA)
	HDMI	N/A (2 DDI ports support HDMI/DP (DDI1 by BOM option, default is for VGA)
	DisplayPort	N/A (2 DDI ports support HDMI/DP (DDI1 by BOM option, default is for VGA)
	Multiple Display	3 independent displays
	Display Interface	LVDS Resolution up to 1920x1200 @60Hz VGA Resolution up to 1920 x 1080 @60Hz 2 x DDI: HDMI1.4 up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz
Ethernet	Controller	1 x Intel® I219LM GbE-PHY LAN (AMT 11.x supported)
Audio	Controller	Support HD audio interface to carrier board
Super I/O	Controller	N/A
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Yes (TPM2.0, by BOM option)
I/O Interface	USB	8 x USB 2.0 (to carrier board) 4 x USB 3.2 Gen 1 (to carrier board)
	Serial	2 x COM ports (to carrier board)
	Parallel	N/A
	PS/2	N/A
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x16	N/A
	PCIe x4	N/A
	PCIe x1	8 x PCI Express GEN. 3.0 lanes (Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4)
	PCI	N/A
	M.2	N/A
Storage	Mini-PCIe	N/A
	SATA	3 x SATA 3.0
Power Supply	mSATA	32GB eMMC 5.0 (by BOM option)
	DC	N/A
	ATX	ATX +12 V and +5 VSB (standby power) AT: +12 V
Environment	Operating Temperature	-20 ~ 70°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	95 x 95mm (COM Express compact module)
	Weight	0.105 kg
Certification	EMC	FCC, CE,RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-ULT Only) Windows 8.1 (64-bit) (Skylake-ULT Only) Windows 10 (64-bit) Linux (Support by request)



Features

- Triple independent displays: VGA, 3 DP, LVDS
- GbE LAN with RJ-45
- 1 PCIe x16, 6 PCIe x1, 2 Mini-PCle (Full/Half size)
- 4 SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 4 USB 2.0, 2 COM
- iAMT 11.x, SMBus

Ordering Information

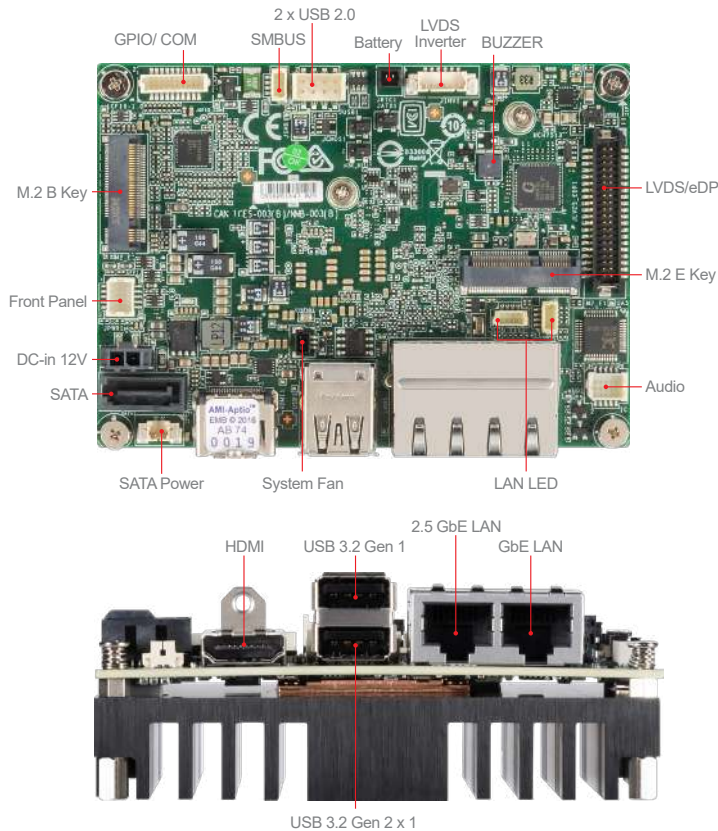
Part Number	Description
919-9988-002	MS-9988 20 COM Express Carrier M/B, 1*PCle x16, 6*PCle x1, 2*Mini-PCle, 3*DP, 1*VGA, 1*LVDS, 4*SATA3.0, 1*LAN, 4*USB3.0, 1*USB 2.0, 2*COM, 2*UART

Packing List

Part Number	Description	Quantity
K14-1018004-V03	COM port cable, 510mm	1
K18-1025011-V03	Parallel port cable, 300mm	1
K1D-1008261-V03	SATA Cable, 500mm	1

Specifications

Processor	CPU	N/A
	BIOS	AMI
Display	Controller	N/A
	LVDS	Dual-channel 24-bit (depends on module board)
	VGA	1
	DisplayPort	3
	Multiple Display	3 independent displays
	Display Interface	Depends on module board
Ethernet	Controller	1 x RJ45 for COM Express module board
Audio	Controller	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header
I/O Interface	USB	4 x USB 2.0 (2 x rear, 2 x internal) 4 x USB 3.2 Gen 1 (rear)
	Serial	2 x COM ports COM1 RS-232/422/485, 0V/5V/12V COM2 RS-232, 0V/5V/12V 2 x UART ports (From COM Express module board)
	Parallel	1
	PS/2	1 (wafer connector)
Expansion Slot	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	PCIe x16	1
	PCIe x1	6
	M.2	N/A
Storage	Mini-PCle	2 x Full-size
	SATA	4 x SATA
Power Supply	DC	N/A
	ATX	ATX-24P, 12V-4P
Environment	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	305 x 244mm (ATX)
	Weight	0.60 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Depends on CPU Module Board



Features

- Intel® Alder Lake-N/ Amston Lake Series SoC
- LPDDR5 4800 MHz onboard memory up to 16GB
- Dual independent displays: HDMI, LVDS/eDP
- 1 2.5 GbE/1 GbE LAN with RJ-45
- 2 USB 3.2 (Bottom layer USB 3.2 Gen 2 x 1, Top layer USB 3.2 Gen 1), 2 USB 2.0, 1 COM (RS-232/422/485), GPIO, Audio
- 1 M.2 B Key, 1 M.2 E Key Slot
- SATA 3.0 for storage
- Wide operating temperature : -40~70°C
- DC-IN 12V

Ordering Information

Part Number	Description
911-CF16-001	MS-CF16/01-CF16-060/806-CF16-012 10 INTEL ADL-N N97, LPDDR5 4GB, 1*HDMI, 1*LVDS/eDP, 1*M.2 E key, 1*M.2 B key, 1*2.5GbE LAN, 1*GbE LAN, 1*SATA 3.0, 1*USB 3.2 Gen 2, 1*USB 3.2 Gen 1, 2*USB2.0, GPIO, 1*COM, TPM2.0, DC-in 12V, Non-WT, Single 12-PACK
911-CF16-002	MS-CF16/01-CF16-010/806-CF16-007 10 Fanless, INTEL ADL-N N97, LPDDR5 8GB, 1*HDMI, 1*LVDS/eDP, 1*M.2 E key, 1*M.2 B key, 1*2.5GbE LAN, 1*GbE LAN, 1*SATA 3.0, 1*USB 3.2 Gen 2, 1*USB 3.2 Gen 1, 2*USB2.0, GPIO, 1*COM, TPM2.0, DC-in 12V, Non-WT, Single 12-PACK
911-CF16-003	MS-CF16/01-CF16-020/806-CF16-008 10 INTEL ADL-N N97, LPDDR5 16GB, 1*HDMI, 1*LVDS/eDP, 1*M.2 E key, 1*M.2 B key, 1*2.5GbE LAN, 1*GbE LAN, 1*SATA 3.0, 1*USB 3.2 Gen 2, 1*USB 3.2 Gen 1, 2*USB2.0, GPIO, 1*COM, TPM2.0, DC-in 12V, Non-WT, Single 12-PACK
911-CF16-004	MS-CF16/01-CF16-030/806-CF16-009 10 INTEL ADL X7425E, LPDDR5 8GB, 1*HDMI, 1*LVDS/eDP, 1*M.2 E key, 1*M.2 B key, 1*2.5GbE LAN, 1*GbE LAN, 1*SATA 3.0, 1*USB 3.2 Gen 2, 1*USB 3.2 Gen 1, 2*USB2.0, GPIO, 1*COM, TPM2.0, DC-in 12V, Non-WT, Single 12-PACK
911-CF16-005	MS-CF16/01-CF16-040/806-CF16-010 10 INTEL ASL X7433RE, LPDDR5 8GB, 1*HDMI, 1*LVDS/eDP, 1*M.2 E key, 1*M.2 B key, 1*2.5GbE LAN, 1*GbE LAN, 1*SATA 3.0, 1*USB 3.2 Gen 2, 1*USB 3.2 Gen 1, 2*USB2.0, GPIO, 1*COM, TPM2.0, DC-in 12V, WT, Single 12-PACK
911-CF16-006	MS-CF16/01-CF16-050/806-CF16-011 10 INTEL ASL X7433RE, LPDDR5 16GB, 1*HDMI, 1*LVDS/eDP, 1*M.2 E key, 1*M.2 B key, 1*2.5GbE LAN, 1*GbE LAN, 1*SATA 3.0, 1*USB 3.2 Gen 2, 1*USB 3.2 Gen 1, 2*USB2.0, GPIO, 1*COM, TPM2.0, DC-in 12V, WT, Single 12-PACK

Specifications

Processor	CPU	Alder Lake -N SKUs	Amston Lake SKU
		Intel® IOTG Alder Lake-N Processor N97, QC, 12W Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W	Intel® IOTG Amston Lake Atom, X7433RE, QC, 9W
Memory	Frequency	N97, 2.0GHz, up to 3.6 GHz x7425E, 1.5GHz, up to 3.4 GHz	X7433RE, 1.5GHz, up to 3.4 GHz
	L2 Cache	6MB	
	CPU Type	BGA	
	Chipset	Integrated in SoC	
	BIOS	AMI	
Display	Technology	Single-channel LPDDR5 4800 MHz	
	Max. Capacity	Up to 16GB	
	Socket	Onboard	
Display	Controller	Intel® HD Graphics	
	Graphic Memory	Depends on CPU	
	LVDS	Dual Channel 18/24-bit	
	eDP	1 (Signal shared with LVDS)	
	HDMI	1	
Ethernet	Multiple Display	2 independent displays	
	Display Interface	LVDS/eDP up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz	
Ethernet	Controller	1 x Realtek® RTL8125BG-CG 2.5GbE LAN 1 x Realtek® RTL8111K-CG 1GbE LAN	1 x Realtek® RTL8125BI-CG 2.5GbE LAN 1 x Realtek® RTL8111KI-CG 1GbE LAN
Audio	Controller	Realtek® ALC897 High Definition Audio Codec	
Super I/O	Controller	Fintek F81966AB-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
TPM	Controller	Infineon® SLB 9672VU2.0	Infineon® SLB 9672XU2.0
I/O Interface	USB	2 x USB 3.2 ports (rear) (Bottom layer USB 3.2 Gen 2 x 1, Top layer USB 3.2 Gen 1) 2 x USB 2.0 ports (internal)	
	Serial	1 x COM port (internal) COM: RS-232/422/485, 0V/5V/12V	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	
Storage	M.2	1 x E key 2230 (PCIe x1 + USB 2.0) 1 x B key 2242/3042 (PCIe x1/SATA 3.0 + USB 3.2 Gen 2 + USB 2.0)	
	SATA	1 x SATA 3.0	
Power Supply	DC	DC-in 12V	
	ATX	N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: 1. Thermal w/ Airflow: 0.7m/s 2. The standard thermal solution only supports TDP up to 12W.	-40 ~ 70°C Note: 1. Thermal w/ Airflow: 0.7m/s 2. The standard thermal solution only supports TDP up to 9W. 3. -40 ~ 85°C by request
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions	101 x 73 mm (Pico-ITX)	
Form Factor	Weight	0.30 kg	
Certification	EMC	CE, FCC Class B, BSMI, VCCI, RCM, UKCA, IC	
Software Platform	OS Support	Windows 10 IoT Enterprise 21H2 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request)	

Packing List

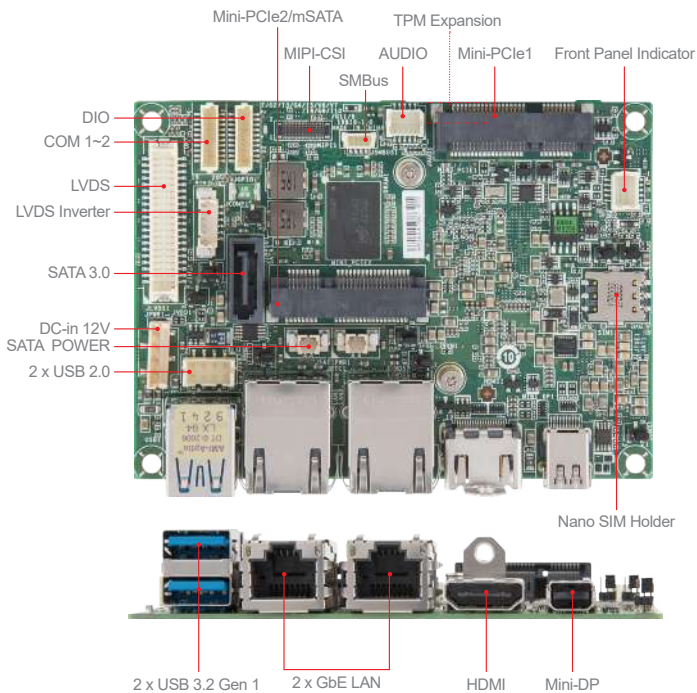
Part Number	Description	Quantity
K14-3018013-V03	COM PORT Cable, 150mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-3010008-V03	SATA Cable with Power, 150mm	1
K1G-3002069-V03	DC Power Cable, 150mm	1
K10-3004466-V03	LAN LED Cable, 150mm	2

Optional Item

Part Number	Description
E31-0807850-K08	Heatspreader

MS-98I6

Pico-ITX SBC with Intel® Apollo Lake/Apollo Lake-I for Fanless, Low-Power, High-Performance, Wide Temperature & Harsh environment Solution



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- LPDDR4 2133 MHz onboard memory up to 4GB
- Triple independent displays: Mini-DP, HDMI, LVDS
- 2 GbE LAN with RJ-45
- 2 USB 3.2 Gen 1, 2 USB 2.0, 2 COM (RS-485), DIO, Audio
- 1 Mini-PCle (Full size with NANO SIM-Holder), 1 Mini-PCle (Half size with mSATA) Slots
- SATA 3.0 for storage
- Wide operating temperature : -40~85°C
- DC-IN 12V

Ordering Information

Part Number	Description
919-98I6-006	MS-98I6 10, Apollo Lake-I E3940 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE
919-98I6-007	MS-98I6 10, Apollo Lake-I E3930 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE
919-98I6-009	MS-98I6 10, Apollo Lake N4200 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE
919-98I6-010	MS-98I6 10, Apollo Lake N3350 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE

Packing List

Part Number	Description	Quantity
K14-3018001-V03	COM PORT Cable, 150mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-3010008-V03	SATA Cable with Power, 150mm	1
K1G-3004057-V03	DC Power Cable, 150mm	1

Specifications

Processor	CPU	Apollo Lake SKUs Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W		Apollo Lake-I SKUs Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5 W	
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz		E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz	
	L2 Cache	2M			
	CPU Type	BGA			
	Chipset	Integrated in SoC			
	BIOS	AMI			
Memory	Technology	Single-channel LPDDR4 2133MHz			
	Max. Capacity	Up to 4GB			
	Socket	Onboard			
Display	Controller	Intel® HD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	Dual Channel 18/24-bit			
	eDP	N/A			
	VGA	N/A			
	DVI	N/A			
	HDMI	1			
	DisplayPort	1 (Mini-Displayport)			
	Multiple Display	3 independent displays			
Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz Mini-DP up to 4096 x 2160 @60Hz				
Ethernet	Controller	2 x Intel® I211-AT GbE LAN		2 x Intel® I210-IT GbE LAN	
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec			
Super I/O	Controller	Fintek F81866AD-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	N/A			
TPM	Controller	Pin header			
I/O Interface	USB	2 x USB 2.0 (internal) 2 x USB 3.2 Gen 1 (rear)			
	Serial	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V			
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V			
Expansion Slot	Mini-PCle	1 x Full-size 1 x Half-size (Mini-PCle Full-size Slot w/ NANO SIM-Holder) (Mini-PCle Half-size Slot w/ mSATA)			
Storage	SATA	1 x SATA 3.0			
	mSATA	1 (Shared with Mini-PCle Half-size)			
Power Supply	DC	DC-in 12V			
	ATX	N/A			
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C		-40 ~ 85°C	
	Storage Humidity	10 ~ 90%, non-condensing			
Form Factor	Dimensions	101 x 73 mm (Pico-ITX)			
	Weight	0.27 kg			
Certification	EMC	FCC, CE, RCM, VCCI, BSMI			
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			

MS-CF17

3.5" SBC with Intel® Raptor Lake-P for Fanless, Ultra Low-Power, High-Performance & Wide Temperature Solution

NEW

Specifications

System Processor	CPU	Embedded SKUs		Industrial SKUs	
		Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i7-1365UE / i5-1345UE / i5-1335UE / i3-1315UE / U300E, 28W		Intel® Mobile 13th Gen Raptor Lake-P U Series Processors, Core™ i7-1365URE / i5-1345URE / i3-1315URE, 28W	
		Frequency	P-Core: 4.3GHz~4.9GHz (Depends on CPU) E-Core: 3.2GHz~3.7GHz (Depends on CPU)		
		L2 Cache	8M~12M (Depends on CPU)		
		CPU Type	BGA		
		Chipset	Integrated in SoC		
Memory	BIOS	AMI			
	Technology	Single-channel DDR5 5200MHz			
	Max. Capacity	Up to 32GB			
Graphic	Socket	1 x 262-pin SO-DIMM			
	Controller	Intel® UHD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	1			
	eDP	1 x eDP (Connector shared with LVDS)			
	HDMI	4			
	DisplayPort	N/A			
	Multiple Display	4 independent displays			
Ethernet	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2160 @60Hz HDMI 2.0 up to 4096 x 2340 @60Hz			
	Controller	4 x Intel® I226-LM GbE LAN	4 x Intel® I226-IT 2.5 GbE LAN		
	Audio	Controller	Realtek® ALC897 HD Audio Codec (Co-lay ALC888S)		
Super I/O	Controller	Fintek F81966AB-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
TPM	Controller	Infineon SLB9672VU2.0		Infineon SLB9672XU2.0	
	PCIe x16	N/A			
Expansion Slot	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (PCIe x1, USB 2.0, w/NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0, w/CNVi), 2230			
	Storage	SATA	1 x SATA 3.0		
I/O Interface	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 2 (rear)			
	Serial	4 x COM ports (internal) COM1~4: RS-232/422/485, 0V/5V/12V, support auto flow control			
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V			
Power Supply	DC Input	DC-in 12~24V (OCP & OVP)			
	AC Input	N/A			
Environment	Operating Temperature	0 ~ 60°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 15W.		-40 ~ 70°C Note: 1. Thermal w/ Airflow:0.7m/s 2. The standard thermal solution only supports TDP up to 15W. 3. -40 ~ 85°C by request	
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C		-40 ~ 85°C	
	Storage Humidity	10 ~ 90%, non-condensing			
Physical characteristics	Dimensions (WxDxH)	146 x 102 mm (3.5")			
	Weight	0.67 kg			
Certification	EMC	CE, FCC Class A, RCM, VCCI, BSMI, UKCA, IC			
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, Pre-scan) Linux (Support by request)			

Optional Item

Part Number	Description
E31-0807750-K08	Heatspreader

Features

- Intel® 13th Gen Raptor Lake-P Embedded/Industrial SKU Series
- 1 DDR5 5200 MHz SODIMM Slot up to 32GB
- Quadruple independent displays: 4HDMI, 1 LVDS/eDP
- 4 2.5GbE LAN with RJ-45
- 1 M.2 B key (with NANO SIM-holder), 1 M.2 E key
- 1 M.2 M key, 1 SATA 3.0 for storage
- 4 USB 3.2 Gen 2, 4 USB 2.0, 4 COM (4 RS-485), DIO, Audio
- Onboard TPM 2.0
- Wide Voltage DC-IN 12~24V (OCP & OVP)
- Wide operating temperature supported

Ordering Information

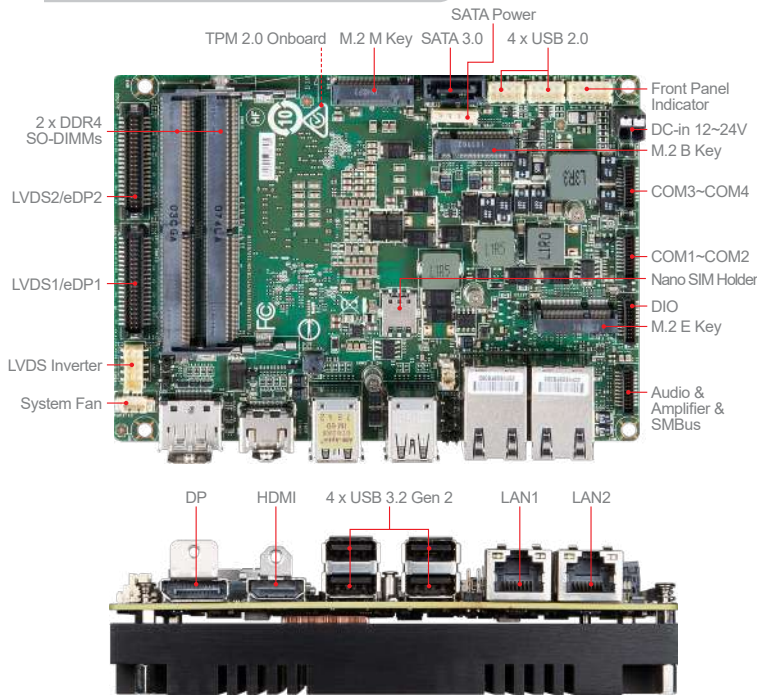
Part Number	Description
916-CF17-001	MS-CF17/606-CF17-010/806-CF17-009 VER 12 Intel Raptor Lake-P/i7-1365UE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, Non-WT, SINGLE
916-CF17-002	MS-CF17/606-CF17-020/806-CF17-010 VER 12 Intel Raptor Lake-P/i5-1345UE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, Non-WT, SINGLE
916-CF17-003	MS-CF17/606-CF17-030/806-CF17-011 VER 12 Intel Raptor Lake-P/i5-1335UE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, Non-WT, SINGLE
916-CF17-004	MS-CF17/606-CF17-040/806-CF17-012 VER 12 Intel Raptor Lake-P/i3-1315UE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, Non-WT, SINGLE
916-CF17-005	MS-CF17/606-CF17-050/806-CF17-013 VER 12 Intel Raptor Lake-P/U300E, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, Non-WT, SINGLE
916-CF17-006	MS-CF17/606-CF17-060/806-CF17-014 VER 12 Intel Raptor Lake-P/i7-1365URE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, WT, SINGLE
916-CF17-007	MS-CF17/606-CF17-070/806-CF17-015 VER 12 Intel Raptor Lake-P/i5-1345URE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, WT, SINGLE
916-CF17-008	MS-CF17/606-CF17-080/806-CF17-016 VER 12 Intel Raptor Lake-P/i3-1315URE, 1*DDR5 SO DIMM+4*HDMI+1*LVDS/eDP+3*M.2+4*2.5GbE LAN+1*SATA3.0+4*USB3.2+4*USB2.0+4*COM, DC 12~24V, WT, SINGLE

Packing List

Part Number	Description	Quantity
K1G-3004116-V03	DC Power Cable, 200mm	1
K14-3018001-V03	COM Port Cable, 150mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-3012023-V03	SATA Cable with Power, 230mm	1

MS-98M3

3.5" SBC with Intel® Tiger Lake-UP3 for Fanless, Ultra Low-Power, High-Performance & Wide Temperature Solution



Features

- Intel® 11th Gen Tiger Lake-UP3 Embedded/Industrial SKU Series
- DDR4 3200 MHz SODIMM Slot up to 64GB
- Quadruple independent displays: DP++ , HDMI, 2 LVDS/eDP
- 2 2.5GbE LAN with RJ-45
- 1 M.2 B key (with NANO SIM-holder), 1 M.2 E key
- 1 M.2 M key, 1 SATA 3.0 for storage
- SATA RAID 0/1 (Supported by i7/i5 SKUs)
- 4 USB 3.2 Gen 2, 4 USB 2.0, 4 COM (4 RS-485), DIO, Audio
- Onboard TPM 2.0
- Wide Voltage DC-IN 12~24V (OCP & OVP)
- Wide operating temperature supported

Ordering Information

Part Number	Description
919-98M3-001	MS-98M3/609-98M3-010/809-98M3-014 VER 1.0 STD Intel Tiger Lake-UP3, i7-1185GRE, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, WT
919-98M3-002	MS-98M3/609-98M3-020/809-98M3-015 VER 1.0 OPT:A Intel Tiger Lake-UP3, i5-1145GRE, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, WT
919-98M3-003	MS-98M3/609-98M3-030/809-98M3-016 VER 1.0 OPT:B Intel Tiger Lake-UP3, i3-1115GRE, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, WT
919-98M3-004	MS-98M3/609-98M3-040/809-98M3-017 VER 1.0 OPT:C Intel Tiger Lake-UP3, i7-1185G7E, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, Non-WT
919-98M3-005	MS-98M3/609-98M3-050/809-98M3-018 VER 1.0 OPT:D Intel Tiger Lake-UP3, i5-1145G7E, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, Non-WT
919-98M3-006	MS-98M3/609-98M3-060/809-98M3-019 VER 1.0 OPT:E Intel Tiger Lake-UP3, i3-1115G4E, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, Non-WT
919-98M3-007	MS-98M3/609-98M3-070/809-98M3-020 VER 1.0 OPT:F Intel Tiger Lake-UP3, Celeron 6305E, 2*DDR4, 1*DP, 1*HDMI, 2*LVDS/eDP, 3*M.2, 2*2.5GbE LAN, 1*SATA3.0, 4*USB3.2 Gen2, 4*USB 2.0, 4*COM, DC 12~24V, Non-WT

Packing List

Part Number	Description	Quantity
K1G-3002057-V03	DC Power Cable, 200mm	1
K14-3018001-V03	COM Port Cable, 150mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-3010223-V03	SATA Cable with Power, 230mm	1

Optional Item

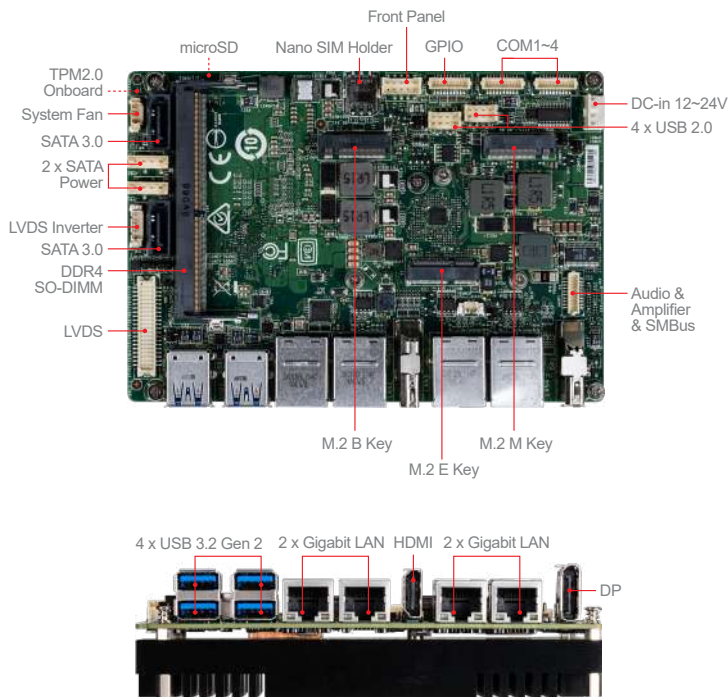
Part Number	Description
E31-0806800-K08	Heatspreader

Specifications

		Embedded SKUs	Industrial SKUs
		11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i7-1185G7E/i5-1145G7E, QC, 28W 11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i3-1115G4E, DC, 28W 11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Celeron® 6305E, DC, 15W	11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i7-1185GRE/i5-1145GRE, QC, 28W 11th Gen Intel® IoTG Mobile Tiger Lake-UP3 Core™ i3-1115GRE, DC, 28W
Processor	CPU		
	Frequency	1.5GHz~4.4GHz (Depends on CPU)	
	L2 Cache	4MB~12MB (Depends on CPU)	6MB~12MB (Depends on CPU)
	CPU Type	BGA	
	Chipset	N/A	
Memory	BIOS	AMI	
	Technology	Dual-channel DDR4 3200MHz	
	Max. Capacity	Up to 64GB	
	Socket	2 x 260-pin SO-DIMMs	
	Controller	Intel® Iris® X® Graphics (For i7/i5 SKUs) Intel® UHD Graphics (For i3/Celeron SKUs)	Intel® Iris® X® Graphics (For i7/i5 SKUs) Intel® UHD Graphics (For i3 SKU)
Display	Graphic Memory	Depends on CPU	
	LVDS	2 x Dual Channel 18/24-bit (Connector shared with eDP)	
	eDP	2 x eDP (Connector shared with LVDS)	
	VGA	N/A	
	DVI	N/A	
	HDMI	1	
	DisplayPort	1	
	Multiple Display	4 independent displays	
Ethernet	Display Interface	LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60 Hz HDMI up to 4096 x 2160 @30Hz DP up to 7680 x 4320 @60Hz	
	Controller	2 x Intel® I225-LM 2.5 GbE LAN	2 x Intel® I225-IT 2.5 GbE LAN (LAN Speed running at 1000/100/10Mbps when OP TEMP. over 70°C)
Audio	Controller	Realtek® ALC888-VD2-GR HD Audio Codec	
Super I/O	Controller	Fintek F81966AB-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
TPM	Controller	Infineon SLB9670VQ2.0	Infineon SLB9670XQ2.0
I/O Interface	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 2 (rear)	
	Serial	4 x COM ports (internal) COM1~4: RS-232/422/485, 0V/5V/12V, support auto flow control	
	Parallel	N/A	
	PS/2	N/A	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
	PCIe x 16	N/A	
	PCIe x 4	N/A	
Expansion Slot	PCIe x 1	N/A	
	PCI	N/A	
	M.2	1 x M.2 M key (PCIe Gen4 x4 NVMe), 2280 1 x M.2 B key (SATA 3.0, PCIe x1, USB 2.0, w/ NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0), 2230	
	Mini-PCIe	N/A	
	SATA	1 x SATA 3.0	
Storage	IDE	N/A	
	eSATA	N/A	
	CFast	N/A	
	mSATA	N/A	
	CompactFlash	N/A	
Power Supply	DC	DC-in 12~24V (OCP & OVP)	
	ATX	N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: 1. Thermal w/ Airflow: 0.7m/s 2. The standard thermal solution only supports TDP up to 15W.	-40 ~ 70°C (w/Turbo disabled) Note: 1. Thermal w/ Airflow: 0.7m/s 2. The standard thermal solution only supports TDP up to 15W. 3. -40 ~ 85°C by request
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions	146 x 102 mm (3.5")	
Form Factor	Weight	0.65 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI, UKCA, IC	
Software Platform	OS Support	Windows 10 IoT Enterprise 2019 LTSC (64-bit, RS5) Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 21H2, Pre-scan) Linux (Support by request)	

MS-98L3

3.5" SBC with Intel® Whiskey Lake-U for Fanless, Ultra Low-Power & High-Performance Solution



Features

- Intel® 8th Gen Whiskey Lake-U Series
- DDR4 2400 MHz SODIMM Slot up to 32GB
- Triple independent displays: DP++ , HDMI, LVDS
- 4 GbE LAN for RJ-45
- 1 M.2 B key (with NANO SIM-holder), 1 M.2 E key (with CNVi)
- M.2 M key, 2 SATA 3.0, Micro SD for storage
SATA RAID 0/1 (Supported by i7/i5 SKUs)
- 4 USB 3.2 Gen 2, 4 USB 2.0, 4 COM (4 RS-485), GPIO, Audio
- Onboard TPM 2.0
- Wide Voltage DC-IN 12~24V (OCP & OVP)

Ordering Information

Part Number	Description
919-98L3-001	MS-98L3/609-98L3-010/809-98L3-006 VER:12 OPT:A Intel Whiskey Lake-U, i7-8665UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Single For Channel
919-98L3-002	MS-98L3/609-98L3-020/809-98L3-007 VER:12 OPT:B Intel Whiskey Lake-U, i5-8365UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Single For Channel
919-98L3-003	MS-98L3/609-98L3-030/809-98L3-008 VER:12 OPT:C Intel Whiskey Lake-U, i3-8145UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Single For Channel
919-98L3-004	MS-98L3/609-98L3-040/809-98L3-009 VER:12 OPT:D Intel Whiskey Lake-U, Celeron 4305UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Single For Channel
919-98L3-102	MS-98L3/609-98L3-010/809-98L3-102 VER:12 OPT:E Intel Whiskey Lake-U, i7-8665UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Bulk For Channel
919-98L3-103	MS-98L3/609-98L3-020/809-98L3-102 VER:12 OPT:F Intel Whiskey Lake-U, i5-8365UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Bulk For Channel
919-98L3-104	MS-98L3/609-98L3-030/809-98L3-102 VER:12 OPT:G Intel Whiskey Lake-U, i3-8145UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Bulk For Channel
919-98L3-105	MS-98L3/609-98L3-040/809-98L3-102 VER:12 OPT:H Intel Whiskey Lake-U, Celeron 4305UE, 1*DDR4, 1*DP, 1*HDMI, 1*LVDS, 3*M.2, 4*LAN, 2*SATA3.0, 4*USB3.2Gen2, 4*USB 2.0, 4*COM, 1*Micro SD, DC 12~24V, Bulk For Channel

Specifications

System Processor	CPU	8th Gen Intel® IOTG Mobile Whiskey Lake-U Core™ i7-8665UE/i5-8365UE, QC, 15W & i3-8145UE/Celeron® 4305UE, DC, 15W
	Frequency	1.8GHz~4.6GHz (Depends on CPU)
	L2 Cache	4MB~8MB (Depends on CPU)
	CPU Type	BGA
	Chipset	N/A
Memory	BIOS	AMI
	Technology	Single-channel DDR4 2400MHz
	Max. Capacity	Up to 32GB
Display	Socket	1 x 260-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual Channel 18/24-Bit
	HDMI	1
	DisplayPort	1 (Support DP++)
Ethernet	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60 Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2160 @60Hz
Audio	Controller	1 x Intel® i219LM GbE-PHY LAN (AMT 12.0 supported by i7/i5 SKUs) 3 x Intel® i210-AT GbE LAN
	Controller	Realtek® ALC887-V2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
TPM	Smart Fan	Yes
	Controller	Infineon SLB9670TT2.0
I/O Interfaces	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 2 (rear)
	Serial	4 x COM ports (internal) COM1~4: RS-232/422/485, 0V/5V/12V, support auto flow control
	Parallel	N/A
	PS/2	N/A
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V
Expansion Slot	PCIe x16	N/A
	PCIe x4	N/A
	M.2	1 x M.2 M key (SATA), 2242 1 x M.2 B key (PCIe x1, USB 3.1, USB 2.0 w/ NANO SIM-Holder), 2242/3042 1 x M.2 E key (PCIe x1, USB 2.0, w/CNVi), 2230
	Mini-PCIe	N/A
	SATA	2 x SATA 3.0 (RAID 0/1 supported by i7/i5 SKUs)
Storage	DC Input	DC-in 12~24V (OCP & OVP)
	AC Input	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions (W x D x H)	146 x 102 mm (3.5")
Form Factor	Weight	0.64 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

Packing List

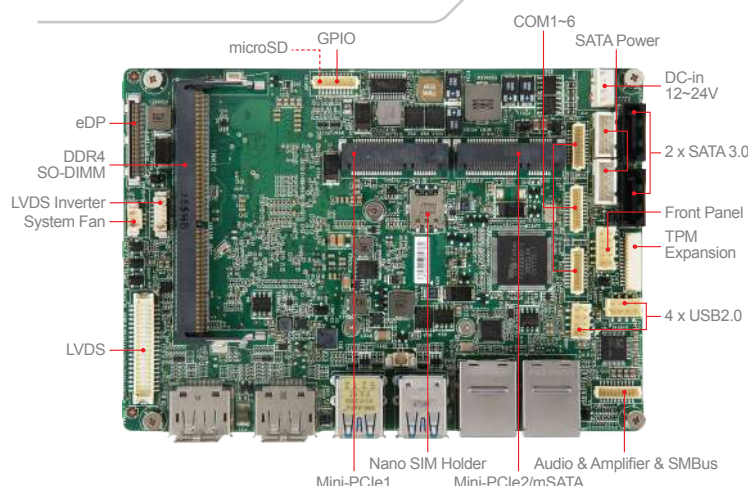
Part Number	Description	Quantity
K1G-3004069-V03	DC Power Cable, 150mm	1
K14-3018001-V03	COM Port Cable, 150mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-3012023-V03	SATA Cable with Power, 230mm	1

Optional Item

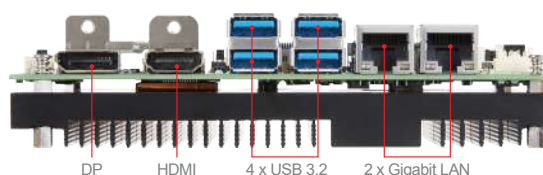
Part Number	Description
E31-0806460-K08	Heatspreader

MS-98H3

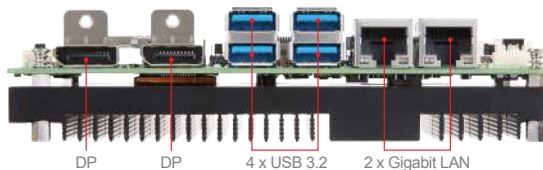
3.5" SBC with Intel® Kaby Lake-U/Skylake-U for Fanless, Ultra Low-Power & High-Performance Solution



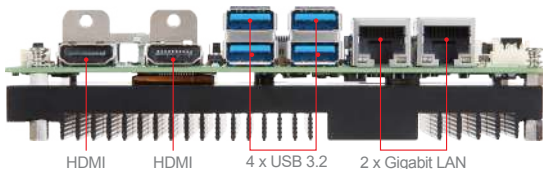
Standard : DP+HDMI



Optional : 2 DP



Optional : 2 HDMI



Features

- Intel® 7th Gen Kaby Lake-U/Skylake-U Series
- DDR4 2133 MHz SODIMM Slot up to 16GB
- Triple independent displays: DP++ , HDMI, LVDS, eDP
- 2 GbE LAN with RJ-45
- 1 Mini-PCle (Full size, with mSATA), 1 Mini-PCle (Full size, with Nano SIM Holder) Slots
- 2 SATA 3.0, Micro SD for storage
SATA RAID 0/1
- 4 USB 3.2 Gen 1, 4 USB 2.0, 6 COM(1 RS-485), GPIO, Audio
- Wide Voltage DC-IN 12~24V

Packing List

Part Number	Description	Quantity
K1G-3004069-V03	DC Power Cable, 150mm	1
K14-3018001-V03	COM Port Cable, 150mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1

Optional Item

Part Number	Description
E31-2100170-K08	Heatspreader

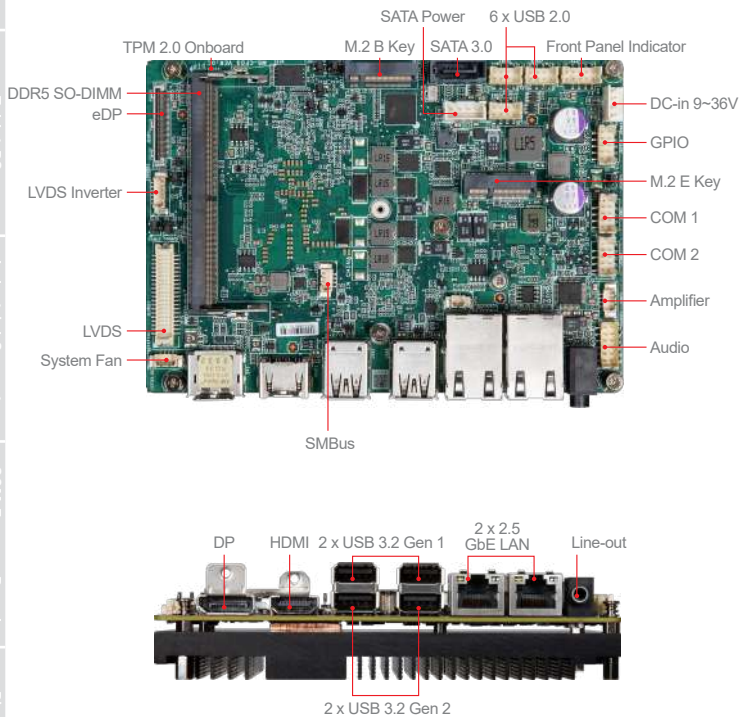
Specifications

Processor	CPU	7th/6th Gen Intel® Embedded Mobile Kaby Lake-U/Skylake-U Core™ i7/i5/i3/Celeron® Processor, DC, 15W
	Frequency	2.0GHz~3.4GHz (Depends on CPU)
	L2 Cache	2MB~4MB (Depends on CPU)
	CPU Type	BGA
	BIOS	AMI
Memory	Technology	Single-channel DDR4 2133MHz
	Max. Capacity	Up to 16GB
	Socket	1 x 260-pin SO-DIMM
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual Channel 18/24-bit
	eDP	1 (Share with LVDS Singnal)
	HDMI	1(HDMI1 Co-lay DP1 & HDMI2 Co-lay DP2 by option)
	DisplayPort	1 (Support DP++, DP1 Co-lay HDMI1 & DP2 Co-lay HDMI2 by option)
	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz HDMI1/HDMI2 HDMI1.4 up to 4096 x 2160 @24Hz DP1/DP2 up to 4096 x 2304 @60Hz
Ethernet	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I219LM GbE-PHY LAN (AMT 11.x supported)
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header
I/O Interface	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V, support auto flow control COM2~6: RS-232, 0V/5V/12V (RS-422/485 Optional)
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V
Expansion Slot	Mini-PCle	2 x Full-size (one w/NANO SIM-Holder & one w/mSATA)
Storage	SATA	2 x SATA 3.0
	mSATA	1 (Shared with Mini-PCle)
Power Supply	DC	DC-in 12~24V
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensaions	146 x 102 mm (3.5")
	Weight	0.59 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-ULT Only) Windows 8.1 (64-bit) (Skylake-ULT Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)

Ordering Information

Part Number	Description
919-98H3-001	MS-98H3 11 Intel Kaby Lake-U i7-7600U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-002	MS-98H3 11 OPT:A Intel Kaby Lake-U i5-7300U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-003	MS-98H3 11 OPT:B Intel Kaby Lake-U i3-7100U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-004	MS-98H3 11 OPT:C Intel Kaby Lake-U 3965U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-005	MS-98H3 11 OPT:D Intel Skylake-U i7-6600U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-006	MS-98H3 11 OPT:E Intel Skylake-U i5-6300U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-007	MS-98H3 11 OPT:F Intel Skylake-U i3-6100U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V
919-98H3-008	MS-98H3 11 OPT:G Intel Skylake-U 3955U,DDR4 SO DIMM+DP+HDMI+LVDS+eDP+2*Mini-PCle+2*LAN+ 2*SATA3.0+4*USB3.0+2*USB 2.0+6*COM+Micro SD,DC 12V~24V

NEW



Features

- Intel® Alder Lake-N PC Client & Embedded Series SoC
- DDR5 4800 MT/s SODIMM Slot up to 16GB
- Triple independent displays: DP, HDMI, LVDS, eDP
- 2 2.5 GbE LAN with RJ-45
- 1 M.2 B Key, 1 M.2 E Key Slot
- SATA 3.0 for storage
- 2 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 6 USB 2.0, 2 COM (1 RS-485), GPIO, Audio, Amplifier-6W
- Wide Voltage DC-IN 9~36V

Ordering Information

Part Number	Description
911-CF03-007	MS-CF03 601-CF03-150 801-CF03-016 10 OPT:K, Intel ADL-N N97, 1*DDR5 SO-DIMM, 1*DP+1*HDMI+1*LVDS+1*eDP, 1*M.2 E key, 1*M.2 B key, 2*2.5GbE LAN, 1*SATA 3.0, 4*USB 3.2, 6*USB 2.0, 2*COM, TPM2.0, DC 9-36V, 3.5 inch
911-CF03-008	MS-CF03 601-CF03-160 801-CF03-017 10 OPT:K, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 1*DP+1*HDMI+1*LVDS+1*eDP, 1*M.2 E key, 1*M.2 B key, 2*2.5GbE LAN, 1*SATA 3.0, 4*USB 3.2, 6*USB 2.0, 2*COM, TPM2.0, DC 9-36V, 3.5 inch
911-CF03-009	MS-CF03 601-CF03-170 801-CF03-018 10 OPT:M, Intel ADL-N Atom x7425E, 1*DDR5 SO-DIMM, 1*DP+1*HDMI+1*LVDS+1*eDP, 1*M.2 E key, 1*M.2 B key, 2*2.5GbE LAN, 1*SATA 3.0, 4*USB 3.2, 6*USB 2.0, 2*COM, TPM2.0, DC 9-36V, 3.5 inch
911-CF03-010	MS-CF03 601-CF03-180 801-CF03-019 10 OPT:N, Intel ADL-N N200, 1*DDR5 SO-DIMM, 1*DP+1*HDMI+1*LVDS+1*eDP, 1*M.2 E key, 1*M.2 B key, 2*2.5GbE LAN, 1*SATA 3.0, 4*USB 3.2, 6*USB 2.0, 2*COM, TPM2.0, DC 9-36V, 3.5 inch

Packing List

Part Number	Description	Quantity
K14-1009062-V03	COM Port Cable, 250mm	1
K1G-3004069-V03	DC Power Cable, 150mm	1
K1D-1012115-V03	SATA Cable with Power, 230mm	1
K1B-3008067-V03	USB Cable, 150mm	1

Optional Item

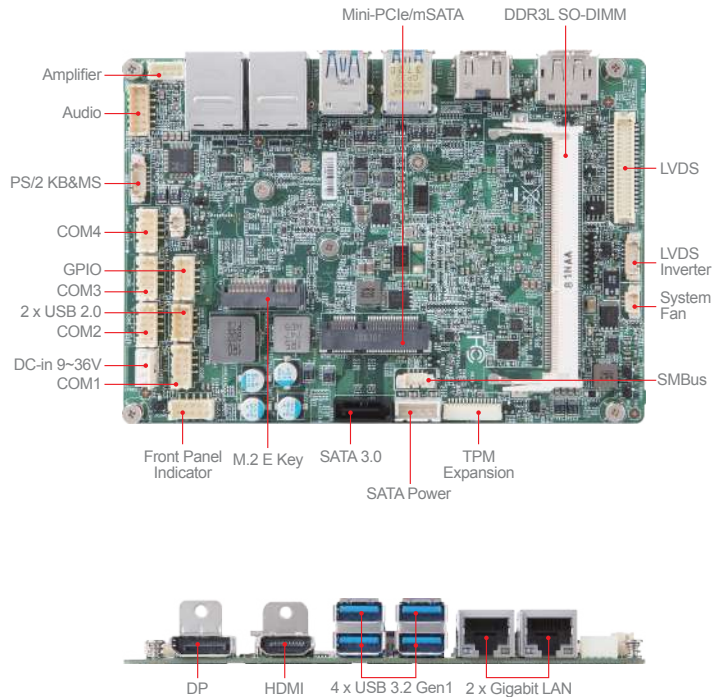
Part Number	Description
E31-0807460-K08	Heatspreader

Specifications

System Processor	CPU	Intel® IOTG Alder Lake-N Processor N97, QC, 12W Intel® IOTG Alder Lake-N Processor N200, QC, 6W Intel® IOTG Alder Lake-N Core i3-N305, OC, 9W up to 15W Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W
	Frequency	N97, 2.0GHz, up to 3.6GHz N200, 1.0GHz, up to 3.7GHz i3-N305, 1.8GHz, up to 3.8GHz x7425E, 1.5GHz, up to 3.4GHz
	L2 Cache	6MB
	CPU Type	BGA
	Chipset	Integrated in SoC
Memory	BIOS	AMI
	Technology	Single Channel for DDR5 4800MT/s
	Max. Capacity	Up to 16GB
	Socket	1 x 262-pin SO-DIMM
Display	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	LVDS	1 x Dual Channel 18/24-bit
	eDP	1 x eDP
	VGA	N/A
	DVI	N/A
	HDMI	1
	Display Port	1
	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 1920 x 1080 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz
Ethernet	Controller	2 x Intel® I225-V 2.5 GbE LAN
Audio	Controller	Realtek® ALC897 HD Audio Codec
Super I/O	Controller	Fintek F81966AB-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Infineon SLB9672VU2.0
I/O Interfaces	USB	6 x USB 2.0 (internal) 2 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (rear)
	Serial	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232
	Parallel	N/A
	PS/2	N/A
	GPIO	8-bit (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x16	N/A
	PCIe x8	N/A
	PCIe x4	N/A
	PCIe x1	N/A
	PCI	N/A
Storage	M.2	1 x M.2 B key (SATA/PCIe x1), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230
	Mini-PCIe	N/A
	SATA	1 x SATA 3.0
	IDE	N/A
	eSATA	N/A
Power Supply	CFAST	N/A
	mSATA	N/A
	CompactFlash	N/A
	DC Input	DC-in 9~36V
Environment	AC Input	N/A
	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	146 x 102 mm (3.5")
	Weight	0.58 kg
Certification	EMC	CE, FCC Class B, BSMI, VCCI, RCM, UKCA
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)

MS-98J8

3.5" SBC with Intel® Apollo Lake/Apollo Lake-I for Fanless, Ultra Low-Power, Wide Voltage Range & High-Performance Solution



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- DDR3L 1866/1600 MHz SODIMM Slot up to 8GB
- Triple independent displays: DP, HDMI, LVDS
- 2 GbE LAN with RJ-45
- 1 M.2 E Key, Mini-PCle (Full size, with mSATA) Slot
- SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 2 USB 2.0, 4 COM (1 RS-485), GPIO, PS/2, Audio
- Wide Voltage DC-IN 9~36V

Ordering Information

Part Number	Description
919-98J8-003	MS-98J8\609-98J8-030\809-98J8-002 VER 1.0 OPT:E Intel Apollo Lake-I E3940, F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*L AN+1*M.2+1*Mini-PCle (with Msata)+2*USB2.0+4*USB3.0+4*COM, Non-WT DC-in 9V~36V, Single
919-98J8-005	MS-98J8\ 609-98J8-050 \809-98J8-005 VER 1.0 OPT:F Intel Apollo Lake J3455, F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*LA N+1*M.2+1*Mini-PCle (with mSATA)+2*USB2.0+4*USB3.0+4*COM, Non-WT DC-in 9V~36V, Single
919-98J8-006	MS-98J8\609-98J8-060\809-98J8-005 VER 1.0 OPT:H Intel Apollo Lake N3350 F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*LA N+1*M.2+1*Mini-PCle (with mSATA)+2*USB2.0+4*USB3.0+4*COM, Non-WT DC-in 9V~36V, Single
919-98J8-008	MS-98J8\609-98J8-100\809-98J8-006 VER 1.1 Intel Apollo Lake J3455, F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*LAN+1*M .2+1*Mini-PCle (with mSATA) +2*USB2.0+4*USB3.0+4*COM,DC-in 9V~36V single for channel
919-98J8-102	MS-98J8\ 609-98J8-050 \809-98J8-105 VER 1.0 OPT:F Intel Apollo Lake J3455, F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*LA N+1*M.2+1*Mini-PCle (with mSATA)+2*USB2.0+4*USB3.0+4*COM, Non-WT DC-in 9V~36V, Bulk
919-98J8-103	MS-98J8\609-98J8-030\809-98J8-105 VER 1.0 OPT:E Intel Apollo Lake-I E3940, F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*L AN+1*M.2+1*Mini-PCle (with mSATA)+2*USB2.0+4*USB3.0+4*COM, Non-WT DC-in 9V~36V, Bulk
919-98J8-104	MS-98J8\609-98J8-060\809-98J8-105 VER 1.0 OPT:H Intel Apollo Lake N3350, F1 stepping, DDR3L, HDMI+LVDS+DP+SATA3.0+2*LA N+1*M.2+1*Mini-PCle (with mSATA)+2*USB2.0+4*USB3.0+4*COM, Non-WT DC-in 9V~36V, Bulk

Packing List

Part Number	Description	Quantity
K14-1009062-V03	COM PORT Cable, 250mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1
K1G-3004069-V03	DC Power Cable, 150mm	1

Specifications

Processor	CPU	Intel® Pentium™ N4200 Processor, QC, 6W Intel® Celeron® N3350 Processor, DC, 6W Intel® Celeron® Processor J3455, QC, 10W Intel® Atom™ X5-E3940 Processor, QC, 9.5W Intel® Atom™ X5-E3930 Processor, DC, 6.5W
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz
	L2 Cache	2M
	CPU Type	BGA
	Chipset	Integrated in SoC
Memory	BIOS	AMI
	Technology	Single Channel for DDR3L 1866/1600 MHz
	Max. Capacity	Up to 8GB
	Socket	1 x 204pin SO-DIMM
	Controller	Intel® HD Graphics
Display	Graphic Memory	Depends on CPU
	LVDS	Dual channel 18/24-bit
	eDP	N/A
	VGA	N/A
	DVI	N/A
	HDMI	1
	DisplayPort	1
	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz
	Ethernet	Controller 2 x Realtek® RTL8111H GbE LAN
Audio	Controller	Realtek® ALC887 HD Audio Codec
	Super I/O	Controller Fintek F81867AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)
	USB	2 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)
I/O Interface	Serial	4 x COM ports (Internal) COM1: RS-232/422/485, 0V/5V/12V COM2~4: RS-232
	Parallel	N/A
	PS/2	1 (wafer connector)
	GPIO	8-bit (4 x GPI; 4 x GPO), 5V
	PCIe x 16	N/A
	PCIe x 4	N/A
Expansion Slot	PCIe x 1	N/A
	PCI	N/A
	M.2	1 x M.2 E key (PCIe x1, USB 2.0), 2230
	Mini-PCle	1 x Full-size (w/ mSATA)
Storage	SATA	1 x SATA 3.0
	IDE	N/A
	eSATA	N/A
	CFast	N/A
Power Supply	mSATA	1 (Shared with Mini-PCle)
	CompactFlash	N/A
	DC	DC-in 9~36V
	ATX	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	146 x 102 mm (3.5")
	Weight	0.33 kg
Certification	EMC	CE, FCC Class B, BSMI, VCCI, RCM
	Software Platform	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

Optional Item

Part Number	Description
E31-0806190-K08	Heatspreader for Apollo Lake
E31-0806191-K08	Heatspreader for Apollo Lake-I

MS-98E6

3.5" SBC with Intel® Apollo Lake/Apollo Lake-I for Fanless, Ultra Low-Power, High-Performance & Wide Temperature Solution

Panel PC

Tablet PC

Industrial Computer

COM Express Board

Pico-ITX Board

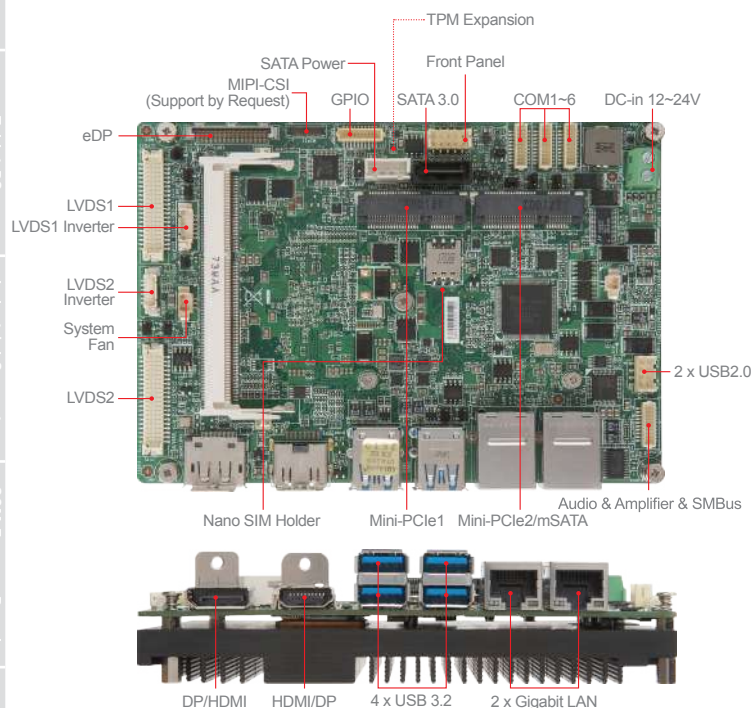
3.5" Board

EPIC Board

Mini-ITX Board

Micro-ATX Board

ATX Board



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- DDR3L 1866/1600 MHz SODIMM Slot up to 8GB
- Triple independent displays: DP, HDMI, LVDS(eDP by option)
- 2 GbE LAN with RJ-45
- 1 Mini-PCle (Full size, with mSATA), 1 Mini-PCle (Full size, with Nano SIM Holder) Slots
- SATA 3.0, Micro SD for storage
- 4 USB 3.2 Gen 1, 2 USB 2.0, 6 COM (1 RS-485), GPIO, Audio
- Wide operating temperature : -40 ~ 85°C
- Wide Voltage DC-IN 12~24V

Ordering Information

Part Number	Description
919-98E6-007	MS-98E6/609-98E6-180/809-98E6-007 VER12 OPT.A Intel Apollo Lake-I E3950,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, WT
919-98E6-008	MS-98E6/609-98E6-190/809-98E6-007 VER12 OPT.B Intel Apollo Lake-I E3940,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, WT
919-98E6-009	MS-98E6/609-98E6-200/809-98E6-007 VER12 OPT.C Intel Apollo Lake-I E3930,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, WT
919-98E6-010	MS-98E6/609-98E6-210/809-98E6-008 VER12 OPT.D Intel Apollo Lake-I E3940,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, Non-WT
919-98E6-011	MS-98E6/609-98E6-220/809-98E6-008 VER12 OPT.E Intel Apollo Lake N4200,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, Non-WT
919-98E6-012	MS-98E6/609-98E6-230/809-98E6-008 VER12 OPT.F Intel Apollo Lake N3350,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, Non-WT
919-98E6-013	MS-98E6/609-98E6-240/809-98E6-008 VER12 OPT.G Intel Apollo Lake J3455,F1,DDR3L SO DIMM+DP+HDMI+2LVDS+eDP+2Mini-PCle+2LAN+SATA3.0+4USB3.0+2USB 2.0+6COM+MIPI+Micro SD, DC 12V~24V, Non-WT

Packing List

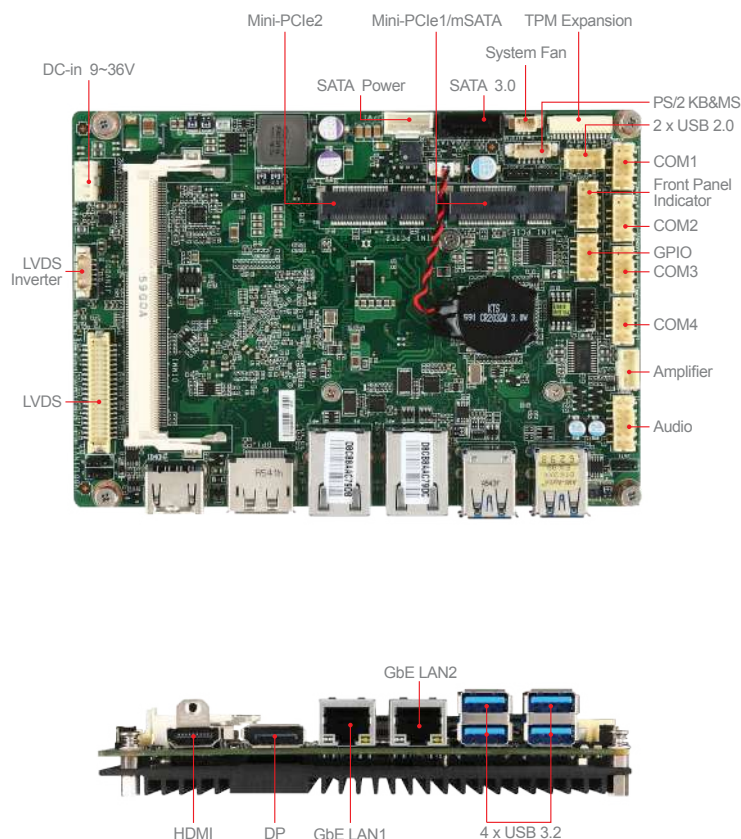
Part Number	Description	Quantity
K1B-3008067-V03	USB Cable, 150mm	1
K1D-1012064-V036	SATA Cable with Power, 200mm	1
K14-3018001-V03	COM PORT Cable, 150mm	1
K1G-3002031-V03	DC Power Cable, 150mm (For 919-98E6-007/008/009)	1
K1G-3004069-V03	DC Power Cable, 150mm (For 919-98E6-010/011/012/013)	1

Specifications

		Apollo Lake SKUs	Apollo Lake-I SKUs
		Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W	Intel® Atom™ x7 Processor E3950, QC, 12W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W
Processor	CPU		
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz	E3950, 1.6 GHz, up to 2.0 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz
	L2 Cache	1M~2M (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Integrated in SoC	
Memory	BIOS	AMI	
	Technology	Single-channel DDR3L 1866/1600 MHz	
	Max. Capacity	Up to 8GB	
Memory	Socket	1 x 204-pin SO-DIMM	
	Controller	Intel® HD Graphics	
	Graphic Memory	Depends on CPU	
Display	LVDS	2 x Dual Channel 18/24-bit (LVDS1 Share with eDP Signal, LVDS2 Share with DP1 Signal)	
	eDP	1 (Share with LVDS1 Signal)	
	VGA	N/A	
	DVI	N/A	
	HDMI	1(HDMI1 Co-lay DP1/LVDS2 & HDMI2 Co-lay DP2 by option)	
	DisplayPort	1(DP1 Co-lay HDMI1/LVDS2 & DP2 Co-lay HDMI2 by option)	
	Multiple Display	3 independent displays	
	Display Interface	LVDS1/LVDS2 up to 1920 x 1200 @60Hz eDP up to 4096 x 2160 @60Hz HDMI1/HDMI2 up to 3840 x 2160 @30Hz DP1/DP2 up to 4096 x 2160 @60Hz	
Ethernet	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
Audio	Controller	Realtek® ALC887-V02-CG HD Audio Codec	
Super I/O	Controller	Fintek F81867AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
TPM	Smart Fan	Yes	
I/O Interface	Controller	Pin header	
	USB	2 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)	
	Serial	6 x COM ports (Internal) COM1: RS-232/422/485, 0V/5V/12V, support auto flow control COM2~6: RS-232, 0V/5V/12V (RS-422/485 by Optional)	
	Parallel	N/A	
	PS/2	N/A	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
	PCle x16	N/A	
	PCI	N/A	
Expansion Slot	M.2	N/A	
	Mini-PCle	2 x Full-size (Mini-PCle1 Slot w/ NANO SIM-Holder) (Mini-PCle2 Slot w/ mSATA)	
Storage	SATA	1 x SATA 3.0	
	mSATA	1 (Shared with Mini-PCle2)	
Power Supply	DC	DC-in 12~24V (Box header with 4pin)	DC-in 12~24V (Phoenix connector with 2pin)
	ATX	N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions	146 x 102 mm (3.5")	
	Weight	0.34 kg	0.59 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5)		
	OS Support	Linux (Support by request) *1 x MIPI-CSI 2.0 (by request) *1 x microSD slot	

Optional Item

Part Number	Description
E31-0805840-K08	Heatspreader (For Apollo Lake-I))
E31-0805850-K08	Heatspreader (For Apollo Lake)



Features

- Intel® Braswell Series SoC
- DDR3L 1333/1600 MHz SODIMM Slot up to 8GB
- Triple independent displays: DP, HDMI, LVDS
- 2 GbE LAN with RJ-45
- 1 Mini-PCIe (Full size, with mSATA), 1 Mini-PCIe (Full size) Slots
- SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 2 USB 2.0, 4 COM (1 RS-485), GPIO, PS/2, Audio
- Wide Voltage DC-IN 9~36V

Ordering Information

Part Number	Description
919-9818-003	MS-9818 10 OPTC, 3.5-INCH, INTEL CELERON N3160, 1*DDR3L SO-DIMM, DP, HDMI, LVDS, 2*MINI-PCIE, 2*LAN, 1*SATA3.0, 1*MSATA, 6*USB (4*USB 3.0+2*USB 2.0), 4*COM, DC-IN 9~36V
919-9818-004	MS-9818 10 OPTC, 3.5-INCH, INTEL CELERON N3010, 1*DDR3L SO-DIMM, DP, HDMI, LVDS, 2*MINI-PCIE, 2*LAN, 1*SATA3.0, 1*MSATA, 6*USB (4*USB 3.0+2*USB 2.0), 4*COM, DC-IN 9~36V

Packing List

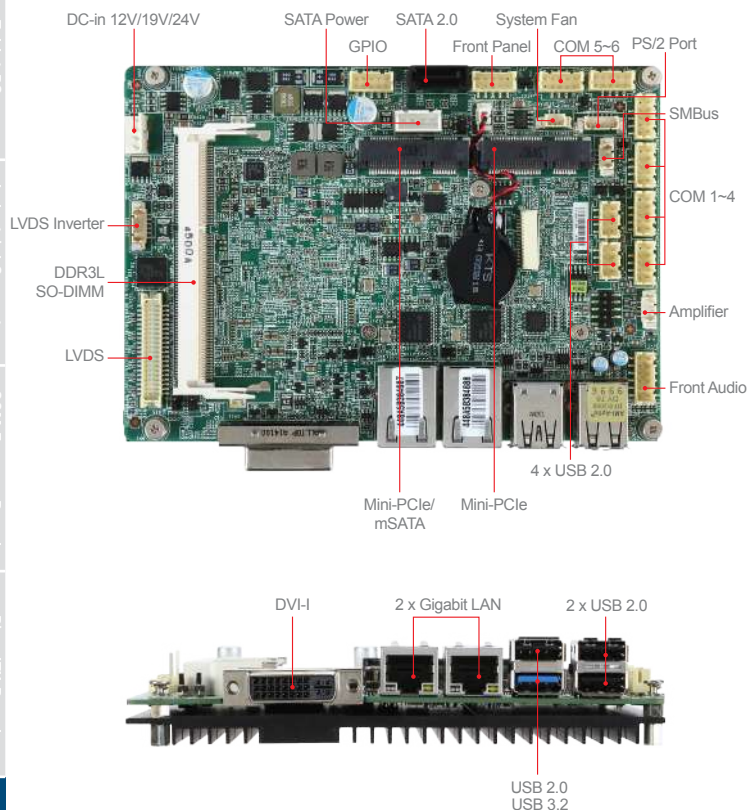
Part Number	Description	Quantity
K10-3002145-V03	DC LOCKABLE CABLE, 120mm	1
K1B-3008067-V03	USB2.0 CABLE, 150mm	1
K14-1009062-V03	INT COM PORT CABLE, 250mm	1
K1D-1012064-V03	SATA Power CABLE, 200mm	1
E31-0806020-K08	Heatsink	1

Specifications

Processor	CPU	Intel® Celeron® Processor N3160, QC, 6W Intel® Celeron® Processor N3010, DC, 4W
	Frequency	N3160, 1.6 GHz up to 2.24 GHz N3010, 1.04 GHz up to 2.24 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated in SoC
Memory	BIOS	AMI
	Technology	Single-channel DDR3L 1600MHz
	Max. Capacity	Up to 8GB
	Socket	1 x 204-pin SO-DIMM
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual Channel 18/24-bit
	HDMI	1
	DisplayPort	1
Ethernet	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 2560 x 1600 @60Hz; up to 3840 x 2160 @30Hz DP1.1a up to 2560 x 1600 @60Hz; up to 3840 x 2160 @30Hz
Ethernet	Controller	2 x Realtek® RTL8111G GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header
I/O Interface	USB	2 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)
	Serial	4 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~4: RS-232
	PS/2	1 (box header)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	M.2	N/A
	Mini-PCIe	2 x Full-size (one w/mSATA)
Storage	SATA	1 x SATA 3.0
	mSATA	1 (Shared with Mini-PCIe)
Power Supply	DC	DC-in 9~36V
	ATX	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	146 x 102 mm (3.5")
	Weight	0.33 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux (Support by request)

MS-98G6

3.5" SBC with Intel® Bay Trail-D/M Series Platform for High-Performance, Low-Power & Fanless Solution



Features

- Intel® Bay Trail-D/M Series SoC
- DDR3L 1333/1600 MHz SODIMM up to 8GB
- Dual independent displays: DVI-I, LVDS
- 2 GbE LAN with RJ-45
- 1 Mini-PCle (Full size, with mSATA), 1 Mini-PCle (Full size) Slots
- SATA 2.0 for storage
- USB 3.2 Gen 1, 7 USB 2.0, 6 COM (1 RS-485), GPIO, PS/2, Audio
- DC-IN 12/19/24V

Ordering Information

Part Number	Description
919-98G6-001	MS-98G6 10 Intel Bay Trail D-J1900, DDR3L SO DIMM+DVI-I+LVDS+2*Mini-PCle+2*LAN+ 1*SA-TA2.0+1*USB3.0+7*USB 2.0+6*COM, DC 12V/19V/24V
919-98G6-002	MS-98G6 10 OPT: A Intel Bay Trail M-N2930,DDR3L SO DIMM+DVI-I+LVDS+2*Mini-PCle+2*LAN+ 1*SA-TA2.0+1*USB3.0+7*USB 2.0+6*COM, DC 12V/19V/24V
919-98G6-003	MS-98G6\609-98G6-050\809-98G6-007\MS-98G6 VER 11 Intel Bay Trail D-J1900 D1,DDR3L SO DIMM+DVI-I+LVDS+2*Mini-PCle+2*LAN+ 1*SA-TA2.0+1*USB3.0+7*USB 2.0+6*COM,DC12V/19V/24V for Channel

Packing List

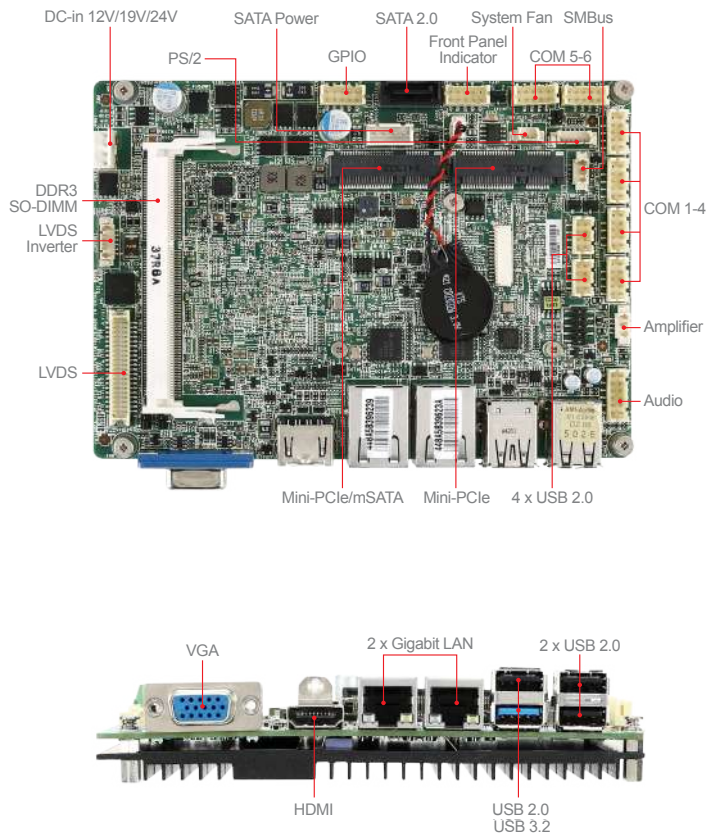
Part Number	Description	Quantity
K10-3002145-V03	DC Power Cable, 120mm	1
K14-1009062-V03	COM Port Cable, 250mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1

Specifications

Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	J1900, 2 GHz N2930, 1.83 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	N/A
Memory	BIOS	AMI
	Technology	Single-channel DDR3L 1333 MHz
	Max. Capacity	Up to 8GB
Display	Socket	1 x 204-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual channel 18/24-bit
	DVI	1 (DVI-I)
	Multiple Display	2 independent displays
Ethernet	Display Interface	LVDS up to 1920 x 1200 @60Hz DVI-I up to 1920 x 1200 @60Hz
	Controller	2 x Intel® I210-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	N/A
I/O Interface	USB	7 x USB 2.0 (4 x internal, 3 x rear) 1 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232, 0V/5V/12V
	Parallel	N/A
	PS/2	1 (wafer connector)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	M.2	N/A
	Mini-PCle	2 x Full-size (one w/mSATA)
Storage	SATA	1 x SATA 2.0
	mSATA	1
Power Supply	DC	DC-in 12/19/24V
	ATX	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
Form Factor	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	146 x 102 mm (3.5")
Certification	Weight	0.31 kg
	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux (Support by request)

MS-98F6

3.5" SBC with Intel® Bay Trail-D/M Series Platform for High-Performance, Low-Power & Fanless Solution



Features

- Intel® Bay Trail-D/M Series SoC
- DDR3L 1333/1600 MHz SODIMM up to 8GB
- Triple independent displays: VGA, HDMI, LVDS
- 2 GbE LAN with RJ-45
- 2 Mini-PCle (Full size, 1 with mSATA)
- SATA 2.0 for storage
- USB 3.2 Gen 1, 7 USB 2.0, 6 COM (1 RS-485), GPIO, PS/2, Audio
- DC-IN 12/19/24V

Ordering Information

Part Number	Description
919-98F6-004	MS-98F6 11 OPT:A Intel Bay Trail M-N2930, DDR3L SO DIMM+VGA+HDMI+LVDS+2*Mini-PCle+2*LAN+ 1*SATA2.0+ 1*USB3.0+7*USB 2.0+6*COM, DC 12V/19V/24V
919-98F6-007	MS-98F6\609-98F6-120\809-98F6-007\STD VER11 OPT:N Intel Bay Trail D-J1900 D1 Stepping, DDR3L SO DIMM+VGA+HDMI+LVDS+2*Mini-PCle+2*LAN+ 1*SATA2.0+1*USB3.0+7*USB 2.0+6*COM, DC 12V/19V/24V
919-98F6-008	MS-98F6\609-98F6-150\809-98F6-011 STD VER12 Intel Bay Trail D-J1900 D1 Stepping,DDR3L SO DIMM+VGA+HDMI+LVDS+2*Mini-PCle+2*LAN+ 1*SATA2.0+1*USB3.0+7*USB 2.0+6*COM,DC 12V/19V/24V, Single

Packing List

Part Number	Description	Quantity
K10-3002145-V03	DC Power Cable, 120mm	1
K14-1009062-V03	COM Port Cable, 250mm	1
K1B-3008067-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1

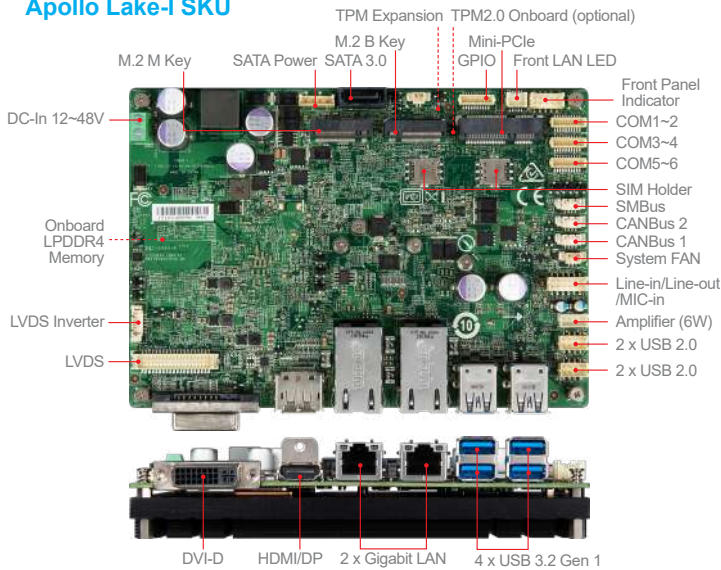
Specifications

Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	J1900, 2 GHz N2930, 1.83 GHz
	L2 Cache	2MB
	CPU Type	BGA
Memory	Chipset	N/A
	BIOS	AMI
	Technology	Single-channel DDR3L 1333 MHz
	Max. Capacity	Up to 8GB
Display	Socket	1 x 204-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual Channel 18/24-bit
	VGA	1
	HDMI	1
	Multiple Display	2 independent displays
Display Interface	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 @60Hz LVDS up to 1920 x 1200 @60Hz	
Ethernet	Controller	2 x Intel® I210-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
TPM	Controller	N/A
I/O Interface	USB	7 x USB 2.0 (4 x internal, 3 x rear) 1 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V
	PS/2	1 (wafer connector)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	M.2	N/A
	Mini-PCle	2 x Full-size (one w/ mSATA)
Storage	SATA	1 x SATA 2.0
	mSATA	1
Power Supply	DC	DC-in 12V/19V/24V
	ATX	N/A
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	146 x 102 mm (3.5")
	Weight	0.31 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux (Support by request)

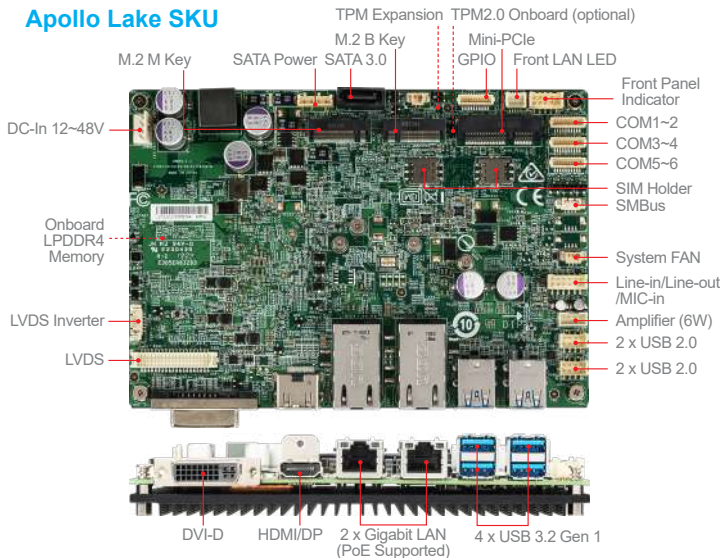
MS-98H5

EPIC SBC with Intel® Apollo Lake/Apollo Lake-I Series for Fanless, Low-Power, PoE, CANBus & Wide Temperature Solution

Apollo Lake-I SKU



Apollo Lake SKU



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- LPDDR4 2133 MHz onboard memory up to 4GB
- Triple independent displays : DVI-D, HDMI 1.4 (DP by option), LVDS
- 2 PoE/GbE LAN with RJ-45 (IEEE 802.11af compliant)
- 1 Mini-PCle (Full size, with NANO SIM-Holder), 1 M.2 B Key (with NANO SIM-Holder)
- SATA 3.0, M.2 M Key for storage
- 4 USB 3.2 Gen 1, 4 USB 2.0, 6 COM (2 RS-485), GPIO, Audio
- Onboard TPM 2.0 (by option)
- ESD: Contact 6KV/ Air 8KV
- Dual channel CANBus 2.0B
- Wide operating temperature : -40~85°C
- Wide voltage DC-IN 12~48V

Packing List

Part Number	Description	Quantity
K1B-3008067-V03	USB Cable, 150mm	1
K14-3018001-V03	COM Cable, 150mm	1
K1G-3002031-V03	DC Power Cable, 150mm (for 919-98H5-002)	1
K1G-3004069-V03	DC Power Cable, 150mm (for 919-98H5-004)	1
K1D-3012023-V03	SATA Cable with Power, 230mm	1

Specifications

Processor	CPU	Apollo Lake SKUs		Apollo Lake-I SKUs	
	Frequency	Intel® Celeron® Processor J3455, QC, 10W		Intel® Atom™ x7 Processor E3950, QC, 12W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W E3950, 1.6 GHz, up to 2.0 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz	
	L2 Cache	2M			
	CPU Type	BGA			
	Chipset	Integrated in SoC			
Memory	BIOS	AMI			
	Technology	Single-channel LPDDR4 2133 MHz			
	Max. Capacity	Onboard up to 4 GB			
Display	Socket	Onboard			
	Controller	Intel® HD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	Dual-channel 18/24-bit			
	eDP	N/A			
	VGA	N/A			
	DVI	1 (DVI-D)			
	HDMI	1			
	DisplayPort	1 (Co-lay HDMI, by BOM option)			
	Multiple Display	3 independent displays			
Ethernet	Display Interface	LVDS up to 1920 x 1200 @60 Hz DVI-D up to 1920 x 1200 @60 Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz			
	Controller	2 x Intel® I210-AT GbE LAN		2 x Intel® I210-T GbE LAN (w/ PoE IEEE 802.3af)	
Audio	Controller	Realtek® ALC888 HD Audio Codec			
Super I/O	Controller	Fintek F81867D-I			
	Watchdog Timer	256-level Watchdog Timer			
H/W Monitor	Smart Fan	Yes			
	TPM	Controller	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)		Infineon SLB9665XT 2.0 (Default)
I/O Interface	USB	4 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)			
	Serial	6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V			
	Parallel	N/A			
	PS/2	N/A			
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V			
Expansion Slot	PCIe x 16	N/A			
	PCIe x 4	N/A			
	PCIe x 1	N/A			
	PCI	N/A			
	M.2	1 x M Key (SATA 3.0), 2242 1 x B Key (PCIe x1, USB2.0), 3042 1 x Full-size (w/ SIM holder)			
Storage	Mini-PCle	1 x Full-size (w/ SIM holder)			
	SATA	1 x SATA 3.0			
	IDE	N/A			
	eSATA	N/A			
	CFast	N/A			
Power Supply	mSATA	N/A			
	CompactFlash	N/A			
	DC	DC-in 12V~48V			
	ATX	N/A			
	Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s
Operating Humidity		10 ~ 90%, non-condensing			
Storage Temperature		-20 ~ 80°C		-40 ~ 85°C	
Storage Humidity		10 ~ 90%, non-condensing			
Form Factor	Dimensions	165 x 115 mm (EPIC)			
	Weight	0.41 kg		0.72 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI			
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			

Ordering Information

Part Number	Description
919-98H5-002	MS-98H51609-98H5-020/809-98H5-005 VER:11 OPT B.4 Inches, Intel Apollo Lake-I E3940, F1 Stepping, 4GB LPDDR4, 4*USB3.0+4*USB2.0+6*COM+HDMI+DVI+2*I210 LAN with POE+1*LVDS+1*mini-PCle+1*SATA, 2*M.2, 2*CANBUS DC12~48V, WT for channel
919-98H5-004	MS-98H51609-98H5-050/809-98H5-004 VER:11 OPT E.4 Inches, Intel Apollo Lake J3455, F1 Stepping, 4GB LPDDR4, 4*USB3.0+4*USB2.0+6*COM+HDMI+DVI+2*I211 LAN+1*LVDS+1*mini-PCle+1*SATA,2*M.2, DC12~48V, Non-WT for channel

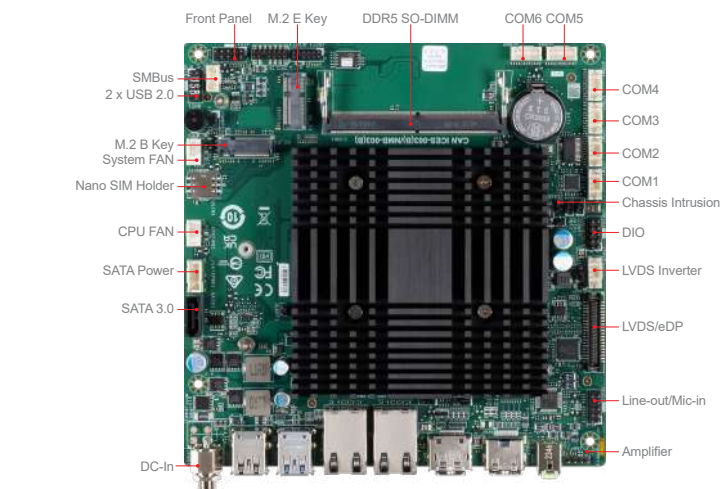
Optional Item

Part Number	Description
E31-0806200-K08	Heatspreader for Apollo Lake
E31-0806210-K08	Heatspreader for Apollo Lake-I

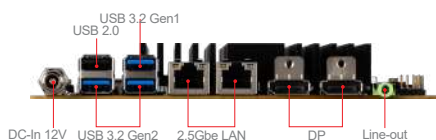
MS-CF13

Mini-ITX with Intel® Alder Lake-N SoC Series for Fanless, Low-Profile, Ultra Low-Power & Multi-Displays Solution

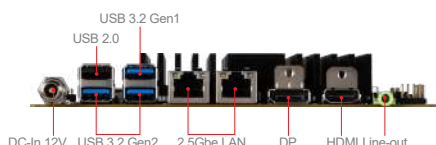
NEW



SKU1



SKU2/3/4



Features

- Intel® Alder Lake-N PC Client & Embedded Series SoC
- DDR5 4800 MHz SODIMM Slot up to 16GB
- Triple independent displays: DP, HDMI/DP, LVDS/eDP
- 2 2.5 GbE LAN with RJ-45
- 1 M.2 E Key Slot, 1 M.2 B Key (with SIM Holder)
- 1 M.2 B key, 1 SATA 3.0 for storage
- 2 USB 3.2 Gen 2, 1 USB 3.2 Gen 1, 3 USB 2.0, 6 COM, GPIO, Audio, Amplifier-3W
- Onboard TPM 2.0
- DC-IN 12V

Ordering Information

Part Number	Description
911-CF13-101	MS-CF13/601-CF13-010/801-CF13-102 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK
911-CF13-102	MS-CF13/601-CF13-020/801-CF13-103 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK
911-CF13-103	MS-CF13/601-CF13-030/801-CF13-103 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK
911-CF13-104	MS-CF13/601-CF13-040/801-CF13-103 10 Fanless, Intel ADL-N Atom X7425E, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC 12V, BULK
911-CF13-105	MS-CF13/601-CF13-050/801-CF13-103 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP +1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK
911-CF13-005	MS-CF13/601-CF13-010/801-CF13-005 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single
911-CF13-006	MS-CF13/601-CF13-020/801-CF13-006 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single
911-CF13-007	MS-CF13/601-CF13-030/801-CF13-007 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single
911-CF13-008	MS-CF13/601-CF13-040/801-CF13-008 10 Fanless, Intel ADL-N Atom X7425E, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC 12V, Single
911-CF13-010	MS-CF13/601-CF13-050/801-CF13-010 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP +1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single

Specifications

		SKU1	SKU2	SKU3	SKU4
		Intel® IOTG Alder Lake-N Processor N97, QC, 12W		Intel® IOTG Alder Lake-N Core i3-N305, QC, 9W up to 15W	Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W
Processor	CPU	N97, 2.0GHz, up to 3.6GHz		i3-N305, 1.8GHz, up to 3.8GHz	x7425E, 1.5GHz, up to 3.4GHz
	Frequency				
	L2 Cache	6MB			
	CPU Type	BGA			
	Chipset	Integrated in SoC			
Memory	BIOS	AMI UEFI			
	Technology	Single Channel for DDR5 4800MHz			
	Max. Capacity	Up to 16GB			
	Socket	1 x 262-pin DDR5 SO-DIMM			
	Controller	Intel® UHD Graphics			
Display	Graphic Memory	Depends on CPU			
	LVDS	1 x Dual channel 18/24-bit (Connector shared with eDP)			
	eDP	1 (Connector shared with LVDS)			
	HDMI	N/A		1	
	DisplayPort	2		1	
Ethernet	Multiple Display	3 independent displays			
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 1920 x 1080 @60Hz DP up to 4096 x 2304 @60Hz		LVDS up to 1920 x 1200 @60Hz eDP up to 1920 x 1080 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2304 @60Hz	
	Controller	2 x Intel® I226-V 2.5GbE LAN			
	Audio	Controller Realtek® ALC897 Audio Codec (Co-lay ALC888S)			
	Super I/O	Controller Fintek F81966AB-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
	TPM	Controller Infineon® SLB 9672VU2.0			
	USB	2 x USB 3.2 Gen 2 (rear) 1 x USB 3.2 Gen 1 (rear) 1 x USB 2.0 (rear) 2 x USB 2.0 (internal)			
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232			
I/O Interface	GPIO	8-bit (4 x GPI; 4 x GPO), 5V			
	M.2	1 x M.2 B key (SATA/PCIe x1, USB 3.2 Gen 2 x 1, USB 2.0 w/NANO SIM-Holder), 2242/3042/2280 1 x M.2 E key (PCIe x1, USB 2.0), 2230			
	Storage	SATA 1 x SATA 3.0			
	Power Supply	DC DC-in 12V			
	ATX	N/A			
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing			
	Dimensions	170 x 170 mm (Mini-ITX)			
Form Factor	Weight	0.51 kg			
	Certification	EMC CE, FCC Class B, BSMI, RCM, VCCI, UKCA			
	Software Platform	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, pre-scan) Linux (Support by request)			
	OS Support				

Optional Item

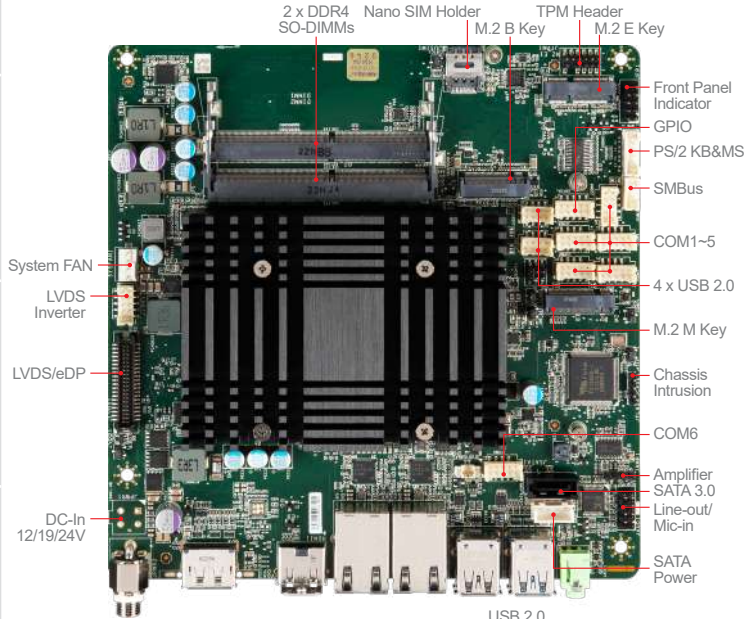
Part Number	Description
K14-1009062-V03	COM Port Cable, 250mm
K14-1018003-V03	COM port cable, 300mm
K1B-3008012-E06	USB 2.0 Cable, 330mm

Packing List

Part Number	Description	Quantity
K1D-1012115-V03	SATA Cable with Power, 230mm	1
E21-CF13010-C22	I/O SHIELDING For DP+HDMI	1
E21-CF13020-C22	I/O SHIELDING For DP+DP	

MS-98N1

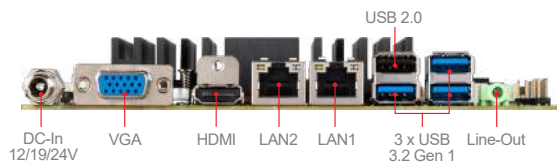
Mini-ITX with Intel® Elkhart Lake SoC Series for Fanless, Low-Power, High-Performance, Multi-Displays & Multi-Functions Solution



SKU 1



SKU 2



Features

- Intel® Elkhart Lake Series SoC
- 2 DDR4 3200MHz SODIMM slots up to 32GB
- Triple independent displays: 1 HDMI, 1 DP/VGA, 1 LVDS/eDP
- 2 2.5GbE LAN with RJ-45
- M.2 E Key, M.2 B Key (with SIM Holder)
- M.2 M Key, 1 SATA 3.0 for storage
- 3 USB 3.2 Gen 1, 5 USB 2.0, 6 COM (2 RS-485), GPIO, PS/2, Audio, System FAN
- Onboard TPM 2.0
- DC-in 12V/19V/24V

Ordering Information

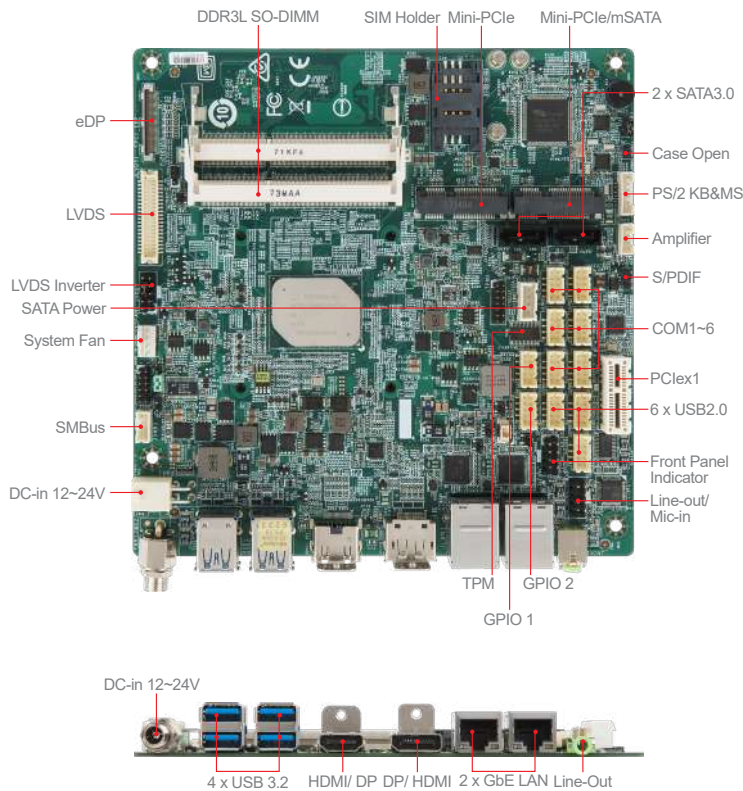
Part Number	Description
919-98N1-101	Intel Elkhart Lake J6412, 2*DDR4 SO-DIMM, 3*USB3.2, 5*USB2.0, 6*COM, 1*eDP/LVDS, 1*DP, 1*HDMI, 2*LAN, 3*M.2, 1*SATA3.0, DC-in 12/19/24V
919-98N1-102	Intel Elkhart Lake J6412, 2*DDR4 SO-DIMM, 3*USB3.2, 5*USB2.0, 6*COM, 1*eDP/LVDS, 1*VGA, 1*HDMI, 2*LAN, 3*M.2, 1*SATA3.0, DC-in 12/19/24V
919-98N1-103	Intel Elkhart Lake N6210, 2*DDR4 SO-DIMM, 3*USB3.2, 5*USB2.0, 6*COM, 1*eDP/LVDS, 1*DP, 1*HDMI, 2*LAN, 3*M.2, 1*SATA3.0, DC-in 12/19/24V
919-98N1-104	Intel Elkhart Lake X6211E, 2*DDR4 SO-DIMM, 3*USB3.2, 5*USB2.0, 6*COM, 1*eDP/LVDS, 1*DP, 1*HDMI, 2*LAN, 3*M.2, 1*SATA3.0, DC-in 12/19/24V, SEMI-WT

Packing List

Part Number	Description	Quantity
K1D-1012064-V03	SATA Cable with Power, 200mm	1
K14-1009062-V03	COM PORT Cable, 250mm	1
K1B-3008067-V03	USB Cable, 150mm	1
E21-98N1010-C22	I/O SHIELDING For DP+HDMI	1
E21-98N1020-C22	I/O SHIELDING For VGA+HDMI	

Specifications

		SKU1	SKU2	SKU3	SKU4
Processor	CPU	Intel® Celeron® Processor J6412, QC, 10W Intel® Celeron® Processor N6210, DC, 6.5W			Intel Atom® x6211E Processor, DC, 6W
	Frequency	J6412, 2.0 GHz, up to 2.6 GHz N6210, 1.2 GHz, up to 2.6 GHz x6211E, 1.3 GHz, up to 3.0 GHz			
	L2 Cache	1.5MB			
	CPU Type	BGA			
	Chipset	Integrated in SoC			
	BIOS	AMI			
Memory	Technology	Dual-channel DDR4 3200 MHz			
	Max. Capacity	Up to 32 GB			
	Socket	2 x 260-pin DDR4 SO-DIMMs			
Display	Controller	Intel® UHD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	1 x Dual channel 18/24-bit (Connector shared with eDP)			
	eDP	1 (Connector shared with LVDS)			
	VGA	N/A	1	N/A	
	DVI	N/A			
	HDMI	1			
	DisplayPort	1	N/A		1
	Multiple Display	3 independent displays			
	Display Interface	LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60 Hz DP up to 4096 x 2160 @60Hz HDMI up to 4096 × 2160 @ 24 Hz VGA up to 1920 x 1200 @60Hz			
Ethernet	Controller	2 x Intel® I225-V 2.5 GbE LAN			2 x Intel® I225-IT 2.5 GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)			
Super I/O	Controller	Fintek F81966D-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
TPM	Controller	Infineon SLB9672VU 2.0			
I/O Interface	USB	5 x USB 2.0 (1 x rear, 4 x internal) 3 x USB 3.2 Gen 1 (rear)			
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, RI/0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V COM3-6: RS-232, W/O Power			
	Parallel	N/A			
	PS/2	1 (pin header)			
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V			
	Expansion Slot	PCIe x 16	N/A		
PCIe x 4		N/A			
PCIe x 1		N/A			
PCI		N/A			
M.2		1 x M key (SATA), 2242 1 x B key (PCIe x1, USB 3.2 Gen 1 x 1, USB 2.0 w/NANO SIM-Holder), 2242/3042 1 x E key (PCIe x1, USB 2.0), 2230			
Mini-PCIe		N/A			
Storage	SATA	1 x SATA 3.0			
	IDE	N/A			
	eSATA	N/A			
	CFast	N/A			
	mSATA	N/A			
	CompactFlash	N/A			
Power Supply	DC	DC-in 12/19/24V			
	ATX	N/A			
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			-20 ~ 70°C Note: Thermal w/ Airflow:0.7m/ s
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing			
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)			
	Weight	0.50 kg			
Certification	EMC	FCC, CE, RCM, VCCI, BSMI, UKCA, IC			
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Linux (Support by request)			



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- 2 DDR3L 1866 MHz SODIMM slots up to 8GB
- Triple independent displays : DP, HDMI, LVDS/eDP
- 2 GbE LAN with RJ-45
- 1 PCIe x1 (Gen 2), 1 Mini-PCle (Full/Half size, with SIM Holder), 1 Mini-PCle (Full size, with mSATA) slots
- mSATA, 2 SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 6 USB 2.0, 6 COM (2 RS-485), GPIO, PS/2, Audio, S/PDIF, System FAN
- Onboard TPM 2.0
- SMBus, Chassis Intrusion
- Wide operating temperature : -40~85°C (by option)
- Wide Voltage DC-IN 12~24V

Ordering Information

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Packing List

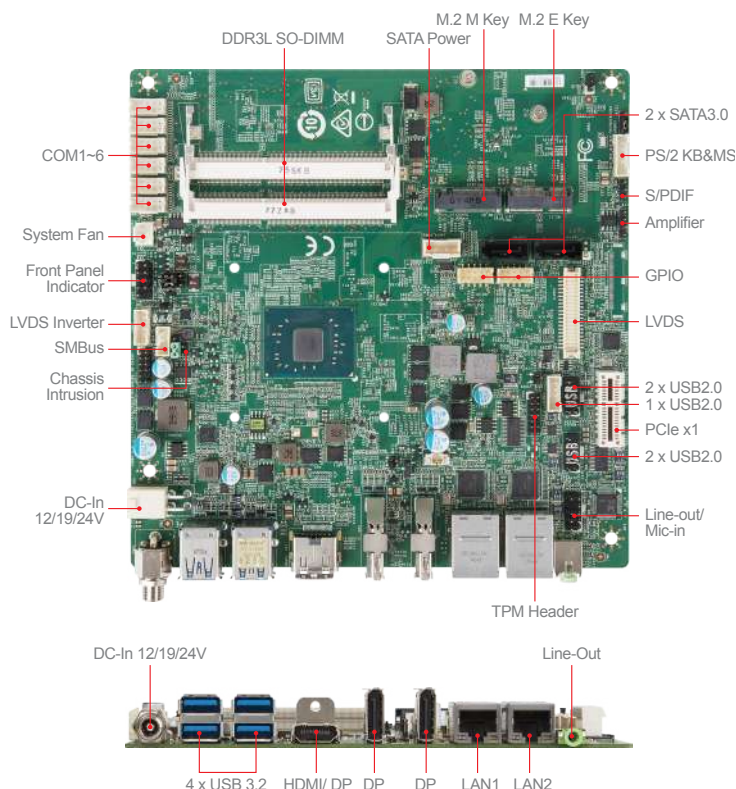
Part Number	Description	Quantity
K14-1018003-V03	COM Port Cable, 300mm	1
K1D-1012115-V03	SATA Cable with Power, 230mm	1
E21-9892010-C22	I/O SHIELDING	1

Specifications

		SKU1	SKU2
		Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W Intel® Atom™ x5 Processor E3940, QC, 9W	Intel® Atom™ x5 Processor E3940, QC, 9W Intel® Atom™ x5 Processor E3930, DC, 6W
System Processor	CPU		
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz E3940, 1.6 GHz, up to 1.8 GHz	E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz
	L2 Cache	1MB~2MB (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Integrated in SoC	
Memory	BIOS	AMI	
	Technology	Dual-channel DDR3L 1866 MHz	
	Max. Capacity	Up to 8 GB	
	Socket	2 x 204-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
Display	Graphic Memory	Depends on CPU	
	LVDS	1 x Dual channel 18/24-bit	
	eDP	1 (co-lay with LVDS)	
	HDMI	1 (co-lay with DP)	
	DisplayPort	1 (co-lay with HDMI)	
Ethernet	Multiple Display	3 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz	
	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
	Audio	Realtek® ALC887-VD2-CG HD Audio Codec	
	Super I/O	Fintek F81867D-I	
I/O Interfaces	Watchdog Timer	256-level Watchdog Timer	
	H/W Monitor	Smart Fan Yes	
	TPM	Controller	Infineon® SLB9665TT 2.0 Infineon® SLB9665XT 2.0
	I/O Interfaces	USB	6 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)
		Serial	6 x COM ports (internal) COM1/2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, W/O Power
		Parallel	N/A
		PS/2	1 (pin header)
		GPIO	GPIO 1: 8-bits (4 x GPI; 4 x GPO), 3.3V GPIO 2: 8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x1	1	
	M.2	N/A	
	Mini-PCle	2 x Full-size (one w/SIM holder & one w/mSATA)	
	Storage	SATA	2 x SATA 3.0 (SATA2 share with mSATA)
		mSATA	1 (shared w/SATA2)
Power Supply	DC	DC-in 12V~24V	
	ATX	N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
	Form Factor	170 x 170 mm (Mini-ITX)	
Certification	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)	
	Weight	0.38 kg	0.45 kg
	EMC	FCC, CE, RCM, VCCI, BSMI	
	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	
	Software Platform		

MS-98B1

Mini-ITX with Intel® Apollo Lake SoC Series for Fanless, Low-Power, High-Performance, Multi-Displays & Multi-Functions Solution



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- 2 DDR3L 1866MHz SODIMM slots up to 8GB
- Triple independent displays: 2 DP, HDMI (DP by option), LVDS (eDP by option)
- 2 GbE LAN with RJ-45
- 1 PCIe x1 (Gen 2), 1 M.2 E Key slots
- M.2 M Key, 2 SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 5 USB 2.0, 6 COM (2 RS-485), GPIO, PS/2, Audio, S/PDIF, System FAN
- Onboard TPM 2.0 (by option)
- SMBus, Chassis Intrusion
- DC-IN 12/19/24V

Ordering Information

Part Number	Description
919-98B1-103	MS-98B1 10 Intel Apollo Lake E3940, F1 stepping, DP3+DP2+HDMI, 2*DDR3L SO-DIMMs, 2*LAN, Audio, 2*M.2 Slot, 4*USB 3.0, 5*USB 2.0, DC in12V/19V/24V

Packing List

Part Number	Description	Quantity
K14-1009062-V03	COM Port Cable, 250mm	1
K1D-1012115-V03	SATA Cable with Power, 230mm	1
E21-98B1010-C22	I/O SHIELDING	1

Optional Item

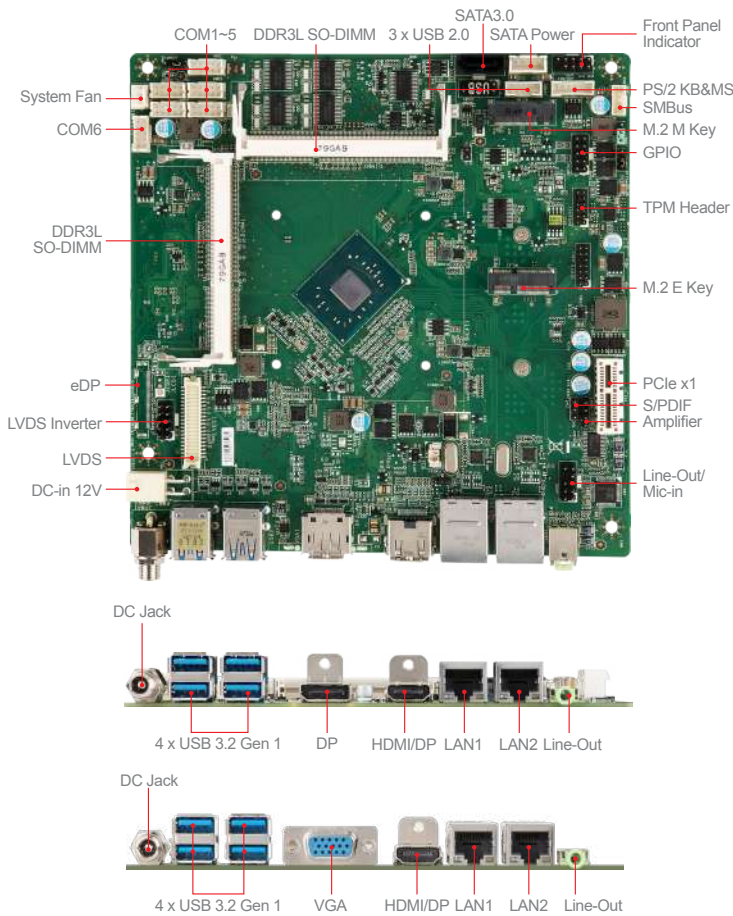
Part Number	Description
K14-1018003-V03	COM port cable, 300mm
K1B-3008012-E06	USB 2.0 Cable, 330mm

Specifications

Processor	CPU	Intel® Celeron® Processor N3350, DC, 6W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Celeron® Processor J3455, QC, 10W
	Frequency	N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz J3455, 1.5 GHz, up to 2.3 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated in SoC
	BIOS	AMI
Memory	Technology	Dual-channel DDR3L 1866 MHz
	Max. Capacity	Up to 8GB
	Socket	2 x 204-pin SO-DIMMs
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	1 x Dual channel 18/24-bit (Signal shared w/ eDP)
	eDP	1 (by BOM option)
	VGA	N/A
	DVI	N/A
	HDMI	1 (Co-lay DP)
	DisplayPort	2 (One Signal shared w/ eDP)
	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60 Hz eDP up to 4096 x 2160 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz
Ethernet	Controller	2 x Intel® I211-AT (colay I210-AT GbE LAN)
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81867AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header (default) Infineon® SLB9665TT 2.0 (by BOM option)
	USB	5 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)
I/O Interface	Serial	6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, w/o Power
	Parallel	N/A
	PS/2	1 (pin header)
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V
	PCIe x16	N/A
Expansion Slot	PCIe x4	N/A
	PCIe x1	1
	PCI	N/A
	M.2	1 x M key (SATA 3.0), 2242 1 x E key (PCIe x1, USB 2.0), 2230
Storage	Mini-PCIe	N/A
	SATA	2 x SATA 3.0 (SATA2 share with M.2 M Key)
Power Supply	mSATA	N/A
	DC	DC-in 12/19/24V
Environment	ATX	N/A
	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)
	Weight	0.37 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

MS-98J0

Mini-ITX with Intel® Apollo Lake SoC Series for Fanless, Low-Profile & Multi-Displays Solution



Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- 2 DDR3L 1866MHz SODIMM slots up to 8GB
- Triple independent displays : VGA (DP by option), HDMI (DP by option), LVDS (eDP by option)
- 2 GbE LAN with RJ-45
- 1 PCIe x1 (Gen 2), 1 M.2 E Key slots
- M.2 M Key, 1 SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 3 USB 2.0, 6 COM (1 RS485), GPIO, PS/2, Audio, S/PDIF, System FAN
- Onboard TPM 2.0 (by option)
- SMBus, Chassis Intrusion
- DC-IN 12V

Ordering Information

Part Number	Description
919-98J0-103	MS-98J0 10 Intel Apollo Lake-I E3940, F1 stepping, DP2+HDMI+LVDS, 2*DDR3L SO-DIMM, 2*LAN, 1*SATA-3.0, Audio, 2*M.2 Slot, 4*USB 3.2 Gen 1, 3*USB 2.0, DC-in12V
919-98J0-107	MS-98J0 10 Intel Apollo Lake J3455, F1 stepping, VGA+HDMI+LVDS, 2*DDR3L SO-DIMM, 2*LAN, 1*SATA-3.0, Audio, 2*M.2 Slot, 4*USB 3.0, 3*USB 2.0, DC-in12V
919-98J0-105	MS-98J0 10 Intel Apollo Lake N3350, F1 stepping, DP2+HDMI+LVDS, 2*DDR3L SO-DIMM, 2*LAN, 1*SATA-3.0, Audio, 2*M.2 Slot, 4*USB 3.0, 3*USB 2.0, DC-in12V

Optional Item

Part Number	Description
K14-1009062-V03	COM Port Cable, 250mm
K14-1018003-V03	COM port cable, 300mm
K1B-3008012-E06	USB 2.0 Cable, 330mm

Specifications

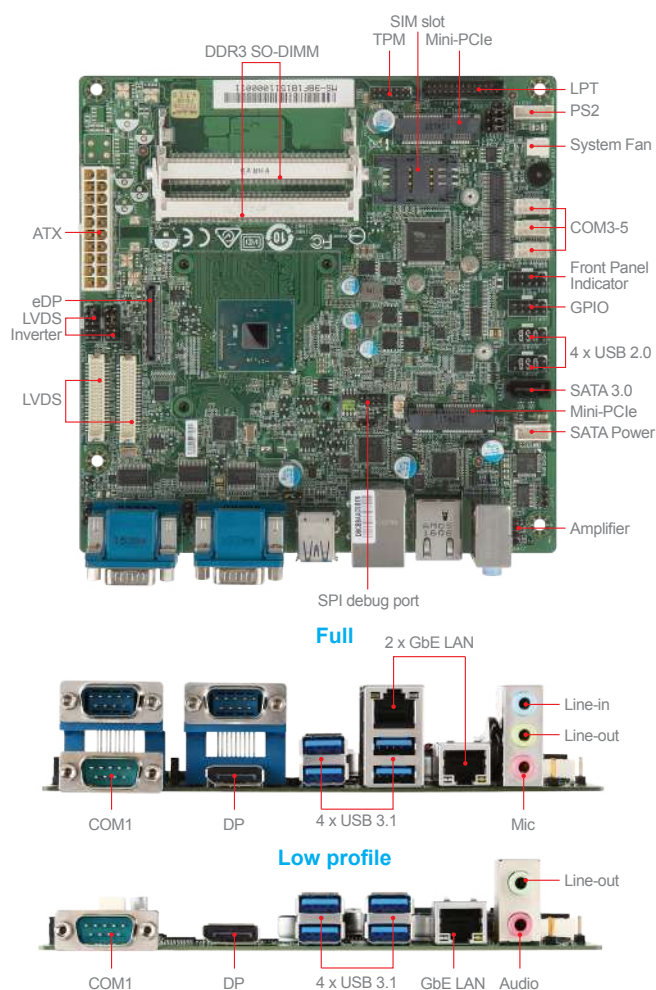
Processor	CPU	Intel® Celeron® Processor J3455, QC, 10W		Intel® Celeron® Processor N3350, DC, 6W	Intel® Atom™ x5 Processor E3940, QC, 9.5W
	Frequency	J3455, 1.5 GHz, up to 2.3 GHz		N3350, 1.1 GHz, up to 2.4 GHz	E3940, 1.6 GHz, up to 1.8 GHz
	L2 Cache	2MB			
	CPU Type	BGA			
	Chipset	Integrated in SoC			
Memory	BIOS	AMI			
	Technology	Dual-channel DDR3L 1866 MHz			
	Max. Capacity	Up to 8GB			
	Socket	2 x 204-pin SO-DIMMs			
Display	Controller	Intel® HD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	1 x Dual channel 18/24-bit			
	eDP	N/A (by option)			
	VGA	1	N/A (by BOM option)		
	DVI	N/A			
	HDMI	1			
	DisplayPort	N/A(by option)	1		
	Multiple Display	3 independent displays			
	Display Interface	LVDS up to 1920 x 1200 @60 Hz			
		eDP up to 4096 x 2160 @60Hz			
HDMI up to 3840 x 2160 @30Hz					
Ethernet	Controller	2 x Realtek® RTL8111H-CG GbE LAN			
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec			
Super I/O	Controller	Fintek F81867D-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
TPM	Controller	Pin header (default) Infineon® SLB9665T 2.0 (by BOM option)			
I/O Interface	USB	3 x USB 2.0 (internal) 4 x USB 3.2 Gen 1 (rear)			
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, w/o Power			
	Parallel	N/A			
	PS/2	1 (pin header)			
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V			
Expansion Slot	PCIe x 16	N/A			
	PCIe x 4	N/A			
	PCIe x 1	1			
	PCI	N/A			
	M.2	1 x M Key (SATA 3.0), 2242 1 x E Key (PCIe x1, USB2.0), 2230			
Storage	Mini-PCIe	N/A			
	SATA	1 x SATA 3.0			
	IDE	N/A			
	eSATA	N/A			
	CFast	N/A			
Power Supply	mSATA	N/A			
	CompactFlash	N/A			
	DC	DC-in 12V			
	ATX	N/A			
	Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		
Operating Humidity		10 ~ 90%, non-condensing			
Storage Temperature		-20 ~ 80°C			
Storage Humidity		10 ~ 90%, non-condensing			
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)			
	Weight	0.37 kg			
Certification	EMC	FCC, CE, RCM, VCCI, BSMI			
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			

Packing List

Part Number	Description	Quantity
K1D-1012115-V03	SATA Cable with Power, 230mm	1
E21-98J0010-C22	I/O SHIELDING	1

MS-98F1

Mini-ITX with Intel® Atom™ Braswell Platform for Rich I/O ports, Multi-Displays, Low-Power, Fanless & DC/ATX Solution



Features

- Intel® Braswell Series SoC
- 2 DDR3L 1600/1333 MHz SODIMM slots up to 8GB
- Triple independent displays: DP, LVDS, LVDS(eDP by option)
- 2 GbE LAN with RJ-45
- 1 Mini-PCle (Full/Half size, with SIM Holder), 1 Mini-PCle (Full/Half size, with mSATA) slots
- mSATA, SATA 3.0 for storage SATA RAID 0/1
- 4 USB 3.2 Gen 1, 4 USB 2.0, 6 COM(2 RS485, 4 ports by option), GPIO, LPT, PS/2, Audio, S/PDIF, System FAN
- Onboard TPM 1.2 (by option)
- 2 LVDS for dual independent panels
- DC-IN 12V/19V/24V (ATX Power by option)

Ordering Information

Part Number	Description
919-98F1-104	MS-98F1/609-98F1-040/809-98F1-105/VER 11 OPT:D Intel N3160,2*DDR3L,1*DP,1*LVDS,1*LVDS colay eD-P,6*COM,4*USB3.0, 4*USB2.0, 2*GbE LAN,1*SATA3.0, 2*Mini-PCle,ATX Power,1*SATA cable, 1*I/O Shield, Bulk, For channel
919-98F1-103	MS-98F1/609-98F1-030/809-98F1-104/VER 11 OPT:C Intel N3060,2*DDR3L,1*DP,1*LVDS,1*LVDS colay eDP,4*COM,4*USB3.0, 4*USB2.0, 1*GbE LAN,1*SATA3.0, 2*Mini-PCle,DC Power, 1*SATA cable,1*Power cable,1*I/O Shield,Bulk, For Channel

Packing List

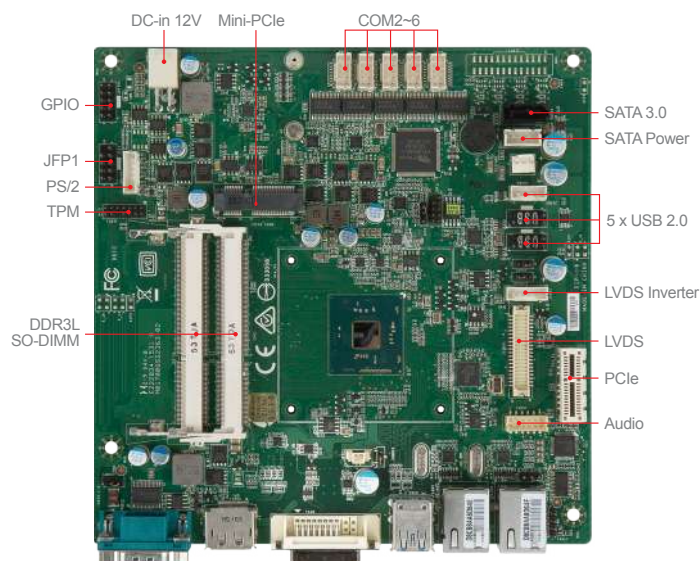
Part Number	Description
K1D-1012064-V03	SATA CABLE
K10-3004215-V03	DC POWER CABLE For OPT: C
E21-98F1010-C22	I/O SHIELDING For OPT: C
E21-98F1020-C22	I/O SHIELDING For OPT: D

Specifications

Processor	CPU	Intel® Pentium processor N3710, QC, 6W Intel® Celeron processor N3160, QC, 6W Intel® Celeron processor N3060, DC, 6W Intel® Celeron processor N3010, DC, 4W	
	Frequency	N3710, 1.6 GHz, up to 2.56 GHz N3160, 1.6 GHz, up to 2.24 GHz N3060, 1.6 GHz, up to 2.48 GHz N3010, 1.04 GHz, up to 2.24 GHz	
	L2 Cache	2MB	
	CPU Type	BGA	
	Chipset	Integrated	
	BIOS	AMI	
Memory	Technology	Dual-channel DDR3L 1333/1600 MHz	
	Max. Capacity	Up to 8GB	
	Socket	2 x 204-pin SO-DIMM	
	Controller	Intel® HD Graphics	
Display	Graphic Memory	Depends on CPU	
	LVDS	2 x dual channel 18/24-bit	
	eDP	1 (colay with LVDS)	
	DisplayPort	1	
	Multiple Display	3 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @30Hz eDP up to 2560 x 1600 @60Hz	
Ethernet	Controller	2 x Intel® i210-AT GbE LAN	1 x Intel® i210-AT GbE LAN
Audio	Controller	Realtek® ALC887 co-lay ALC888S	
Super I/O	Controller	Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
TPM	Controller	Pin header (default) Infineon® SLB9635TT 1.2 (by BOM option) Pin header	
	USB	4 x USB 2.0 (internal)	2 x USB 2.0 (internal)
		4 x USB 3.1 Gen 1 (rear)	4 x USB 3.1 Gen 1 (rear)
		6 x COM ports (COM1~3: rear, COM4~6: internal)	4 x COM ports (COM1: rear, COM4~6: internal)
		COM1&5: RS-232/422/485, 0V/5V/12V	COM1&5: RS-232/422/485, 0V/5V/12V
		COM2~4: RS-232, 0V/5V/12V	COM4: RS-232, 0V/5V/12V
I/O Interface	Serial	COM6: RS-232 w/ o power	COM6: RS-232 w/ o power
		Parallel	1
		PS/2	1 (pin header)
		GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	Expansion Slot	M.2	N/A
		Mini-PCle	2 x Full/Half-size (one w/ SIM holder & one w/mSATA)
Storage	SATA	1 x SATA 3.0	
	mSATA	1 (support by mini PCIe slot)	
	CompactFlash	N/A	
Power Supply	DC	DC-in 12V/19V/24V	
	ATX	ATX Power 20P	
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)	
	Weight	0.37 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux (Support by request)	

Optional Item

Part Number	Description
K14-1018003-V03	COM port cable, 300mm
K18-3008012-E06	USB 2.0 Cable, 330mm

**919-9810-103****919-9810-104****Features**

- Intel® Braswell Series SoC
- 2 DDR3L 1600/1333 MHz SODIMM slots up to 8GB
- Triple independent displays:
DVI-D, DP(HDMI by option), LVDS
- 2 GbE LAN with RJ-45
- 1 PCIe x1(Gen 2), 1 Mini-PCle (Full/Half size, with mSATA) slots
- mSATA, SATA 3.0 for storage
SATA RAID 0/1
- 2 USB 3.2 Gen 1, 5 USB 2.0, 6 COM(1 RS485), GPIO, LPT(by option), PS/2, Audio, S/PDIF, System FAN
- Onboard TPM 1.2 (by option)
- DC-IN 12V

Ordering Information

Part Number	Description
919-9810-103	MS-9810/609-9810-030/809-9810-103 STD VER 1.0, FANLESS, Braswell CPU N3160, 1*SATA CABLE, 1*Power CABLE, I/O Shield, BULK
919-9810-104	MS-9810/609-9810-040/809-9810-104 STD VER 1.0, FANLESS, Braswell CPU N3060, 1*SATA CABLE, 1*Power CABLE, I/O Shield, BULK

Packing List

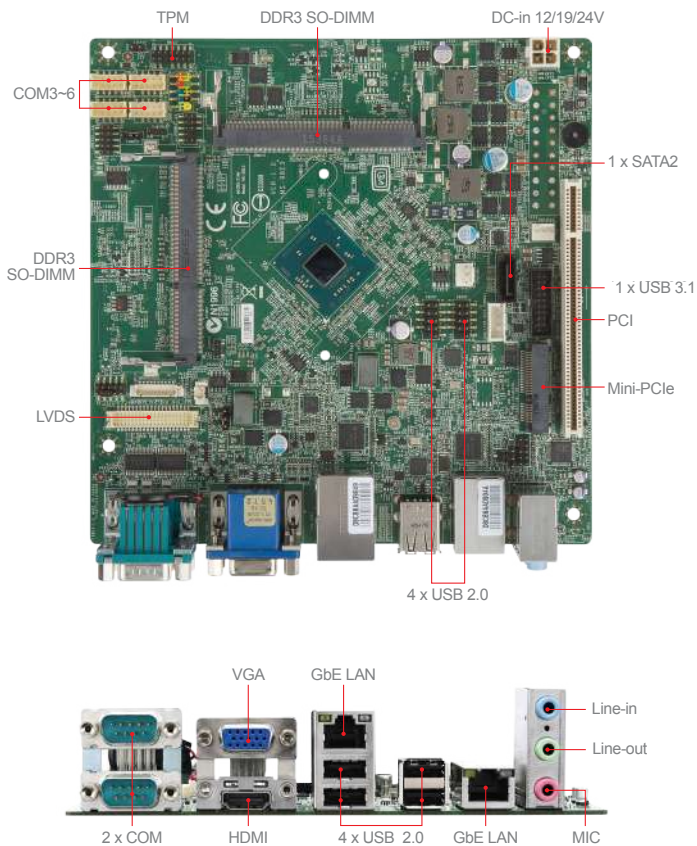
Part Number	Description
E21-9810010-C22	I/O Shielding (2 x LAN)
E21-9810020-C22	I/O Shielding (1 x LAN)
K1D-1012064-V03	SATA Cable, 200mm
K10-3004215-V03	DC power cable, 160mm

Specifications

Processor	CPU	Intel® Pentium processor N3710, QC, 6W Intel® Celeron processor N3160, QC, 6W Intel® Celeron processor N3060, DC, 6W Intel® Celeron processor N3010, DC, 4W
	Frequency	N3710, 1.6 GHz, up to 2.56 GHz N3160, 1.6 GHz, up to 2.24 GHz N3060, 1.6 GHz, up to 2.48 GHz N3010, 1.04 GHz, up to 2.24 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated
Memory	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1600 MHz
	Max. Capacity	Up to 8GB
Display	Socket	2 x 204-pin SO-DIMMs (1 slot for opt SKU)
	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual channel 24-bit
	DVI	1 (DVI-D)
	HDMI	1 (colay with DP)
	DisplayPort	1 (colay with HDMI)
	Multiple Display	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @30Hz HDMI up to 1920 x 1200 @60Hz DVI up to 1920 x 1200 @60Hz
	Ethernet	Controller 2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)
Audio	Controller	Realtek® ALC887 co-lay ALC888S
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header (default) Infineon® SLB9635TT 1.2 (by BOM option)
I/O Interface	USB	5 x USB 2.0 (internal) 2 x USB 3.1 Gen 1 (rear)
	Serial	6 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, w/o power
	Parallel	1 (by BOM option)
	PS/2	1 (pin header)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x 1	1
	M.2	N/A
	Mini-PCle	1 x Full-size co-lay mSATA (support Half-size card)
Storage	SATA	1 x SATA 3.0
	mSATA	1 (support by Mini-PCle slot)
Power Supply	DC	DC-in 12V
	ATX	N/A
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)
	Weight	0.37 kg
Certification	EMC	FCC, CE, RCM, VCCI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux (Support by request)

Optional Item

Part Number	Description
K14-1018003-V03	COM port cable, 300mm
K1B-3008012-E06	USB 2.0 Cable, 330mm



Features

- Intel® Bay Trail Series SoC
- 2 DDR3L 1333/1066 MHz SODIMM slots up to 8GB
- Dual independent displays: VGA, HDMI, LVDS
- 2 GbE LAN with RJ-45
- 1 PCI, 1 Mini-PCle (Full size, with mSATA) slots
- mSATA, SATA 2.0 for storage
- USB 3.2 Gen 1, 8 USB 2.0, 6 COM (1 RS485), GPIO, PS/2, Audio
- Wide Voltage DC-IN 12/19/24V(ATX Power by option)

Ordering Information

Part Number	Description
919-98E3-001	MS-98E3 10 Intel Bay Trail D sku-J1900, DC, 1*Mini PCI_E+2*DDR3L SO DIMM, 1*PCI, 1*mini PCIe (with msata function), 8*USB 2.0, 1*USB 3.0, 6*COM
919-98E3-002	MS-98E3 10 OPT: A Intel Bay Trail D sku-J1900, ATX-, 1*Mini PCI_E+2*DDR3L SO DIMM, 1*PCI, 1*mini PCIe (with msata function), 8*USB 2.0, 1*USB 3.0, 6*COM

Packing List

Part Number	Description	Quantity
K10-3004215-V03	DC power cable, 160mm	1
K1D-1012064-V03	SATA cable, 200mm	1
E21-98E3020-C22	I/O shield	1

Specifications

Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	J1900, 2.0 GHz, up to 2.42 GHz N2930, 1.83 GHz, up to 2.16 GHz
	L2 Cache	2 MB
	CPU Type	BGA
	Chipset	Integrated
Memory	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1066 MHz
	Max. Capacity	Up to 8GB
	Socket	2 x 204-pin SO-DIMMs
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Daul Channel 24-bit (add chrontel 7511B chipset)
	VGA	1
	HDMI	1
	Multiple Display	2 independent displays
Ethernet	Display Interface	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 @60Hz LVDS up to 1920 x 1200 @60Hz
	Controller	2 x Intel® i210-AT GbE LAN
	Controller	Realtek® ALC887 HD Audio Codec
	Controller	Fintek F81866AD-I
Super I/O	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header
I/O Interface	USB	8 x USB 2.0 (4 x internal, 4 x rear) 1 x USB 3.1 Gen 1 (internal)
	Serial	6 x COM ports (COM1~2: rear, COM3~6: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V
	PS/2	1 (Pin header)
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V
Expansion Slot	PCI	1
	M.2	N/A
	Mini-PCle	1 x Full-size (w/ mSATA)
Storage	SATA	1 x SATA 2.0
	mSATA	1
Power Supply	DC	DC-in 12/19/24V
	ATX	ATX-Power 20P
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)
	Weight	0.37 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)

Optional Item

Part Number	Description
K14-1018003-V03	COM port cable, 300mm
K1B-3008012-E06	USB2.0 cable, 330mm

MS-98F5

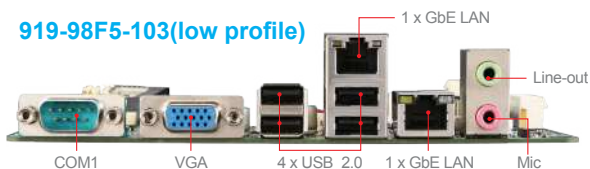
Mini-ITX with Intel® Atom™ Bay Trail for Low-Power, Slim/Low-Profile & Fanless Solution



919-98F5-101(low profile)



919-98F5-103(low profile)



Features

- Intel® Bay Trail Series SoC
- 2 DDR3L 1333/1066 MHz SODIMM slots up to 8GB
- Dual independent displays: VGA, LVDS
- 2 GbE LAN with RJ-45(1 by option)
- 1 PCI x1 (Gen2), 1 Mini-PCle (Full size, with mSATA) slots
- mSATA, SATA 2.0 for storage
- 8 USB 2.0, 6 COM , GPIO, LPT, PS/2, Audio
- DC-IN 12V

Ordering Information

Part Number	Description
919-98F5-101	MS-98F5/MS-98F5/609-98F5-010/809-98F5-102/MS-98F5 VER 10 OPT A FOR MS-98F5 STD SKU, 1 LAN, 1 SO-DIMM BULK
919-98F5-103	MS-98F5/MS-98F5/609-98F5-020/809-98F5-101/MS-98F5 VER 10 OPT B FOR MS-98F5 STD SKU, 2 LAN, 2 SO-DIMM BULK

Packing List

Part Number	Description
E21-98F5010-C22	I/O Shield (2 x LAN)
E21-98F5020-C22	I/O Shield (1 x LAN)
K10-3004215-V03	DC power cable, 160mm
K1D-1012064-V03	SATA cable, 200mm

Specifications

Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	J1900, 2.0 GHz, up to 2.42 GHz N2930, 1.83 GHz, up to 2.16 GHz
	L2 Cache	2 MB
	CPU Type	BGA
	Chipset	Integrated
Memory	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1066 MHz
	Max. Capacity	Up to 8GB
Display	Socket	2 or 1 x 204-pin SO-DIMMs (depends on SKU)
	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	Dual Channel 24-bit (add chrontel 7511B chipset)
	VGA	1
Ethernet	Multiple Display	2 independent displays
	Display Interface	VGA up to 2560 x 1600 @60Hz LVDS up to 1920 x 1200 @60Hz
	Controller	2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)
Audio	Controller	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Pin header
I/O Interface	USB	8 x USB 2.0 (4 x internal, 4 x rear)
	Serial	6 x COM ports (COM1: rear, COM2-6: internal) COM1: RS-232, 0V/5V/12V COM2-6: RS-232, w/o power
	Parallel	1 (Pin header)
	PS/2	1 (Pin header)
	GPIO	8-bits (4 x GPI, 4 x GPO), 3.3V
	PCIe x1	1
Expansion Slot	M.2	N/A
	Mini-PCle	1 x Full-size (w/ mSATA)
Storage	SATA	1 x SATA 2.0
	mSATA	1
Power Supply	DC	DC-in 12V
	ATX	N/A
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ airflow: 0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)
	Weight	0.37 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)

Optional Item

Part Number	Description
K14-1018003-V03	COM port cable, 300mm
K1B-3008012-E06	USB 2.0 cable, 330mm

MS-CF10

Mini-ITX with 14th/13th/12th Gen Intel® Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor & Intel® R680E/Q670E/H610E for High-Performance & DC Power Solution

NEW

Specifications

System Processor	CPU	SKU1	SKU2	SKU3	
		14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3 IOTG Series Processor, Max 65W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W 12th Gen Intel® Alder Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W			
		Frequency			1.6GHz~5.1GHz (Depends on CPU)
		L2 Cache			2MB~30MB (Depends on CPU)
		CPU Type			Socket (LGA 1700)
		Chipset	Intel® R680E	Intel® Q670E	Intel® H610E
		BIOS	AMI UEFI		
Memory	Technology	Dual-channel DDR5 (ECC/ non-ECC) 5200MT/s		Dual-channel DDR5 (non-ECC) 5200MT/s	
	Max. Capacity	Up to 64GB			
	Socket	2 x 262-pin DDR5 SO-DIMMs			
Graphic	Controller	Intel® UHD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	1 x Dual channel 18/24-bit (Connector shared with eDP)			
	eDP	1 (Connector shared with LVDS)			
	HDMI	2			
	DisplayPort	2			
	Multiple Display	4 independent displays		3 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz HDMI 2.0 up to 4096 x 2304 @60Hz DP up to 4096 x 2304 @60Hz			
Ethernet	Controller	3 x Intel® I226-LM 2.5GbE LAN 2 x Intel® I226-V 2.5GbE LAN	1 x Intel® I226-LM 2.5GbE LAN 2 x Intel® I226-V 2.5GbE LAN	3 x Intel® I226-V 2.5GbE LAN	
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)			
Super I/O	Controller	Fintek F81966D-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
TPM	Smart Fan	Yes			
	Controller	Infineon® SLB 9672V/U2.0			
Expansion Slot	PCIe x16	1 x PCIe x16 (Gen 5)			
	M.2	1 x M key (PCIe x4 NVMe, SATA-3.0), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230 1 x B key (PCIe x1, USB 3.2 Gen 2 x 1, USB 2.0), 3042 (with SIM Holder)		1 x M key (PCIe x4 NVMe, SATA-3.0), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230	
Storage	SATA	2 x SATA 3.0 (Support RAID 0/1/5, RAID 5 with M.2 M Key) (Support AHCI Mode)		2 x SATA 3.0 (Support AHCI Mode)	
I/O Interface	USB	6 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (internal) 3 x USB 2.0 (internal with one Vertical Type-A)		2 x USB 3.2 Gen2 (rear) 2 x USB 3.2 Gen1 (rear) 2 x USB 2.0 (rear) 3 x USB 2.0 (internal with one Vertical Type-A)	
	Serial	4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2~4: RS-232/422/485, 0V/5V/12V, Auto-flow Control	4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2~4: RS-232, 0V/5V/12V		
Power Supply	GPIO	16-bits (8 x GPI; 8 x GPO), 3.3V			
	DC Input	DC-in 8-48V			
	AC Input	N/A			
Environment	Operating Temperature	0 ~ 60°C Note: Thermal Test w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing			
Physical haracteristics	Dimensions (WxDxH)	170 x 170 mm (Mini-ITX)			
Certification	Weight	0.42 kg			
Software Platform	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA			
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise (64-bit, 23H2, Pre-scan) Linux (Support by request)			

Features

- Intel® 14th/13th/12th Gen Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S Series with R680E/Q670E/H610E
- 2 DDR5 5200 MT/s ECC/non-ECC SODIMM slots up to 64GB
- Quadruple independent displays: 2DP, 2HDMI 2.0, LVDS/eDP
- 3 2.5GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5) Slot, 1 M.2 E key (with CNVi), 1 M.2 B key (with SIM Holder) slots
- M.2 M key, 2 SATA 3.0 for storage
- SATA RAID 0/1/5
- 6 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 3 USB 2.0, 4 COM (4 RS-485), GPIO, Audio, System FAN
- Onboard TPM 2.0
- SMBus, iAMT 16.x
- Wide Voltage DC-IN 8-48V

Ordering Information

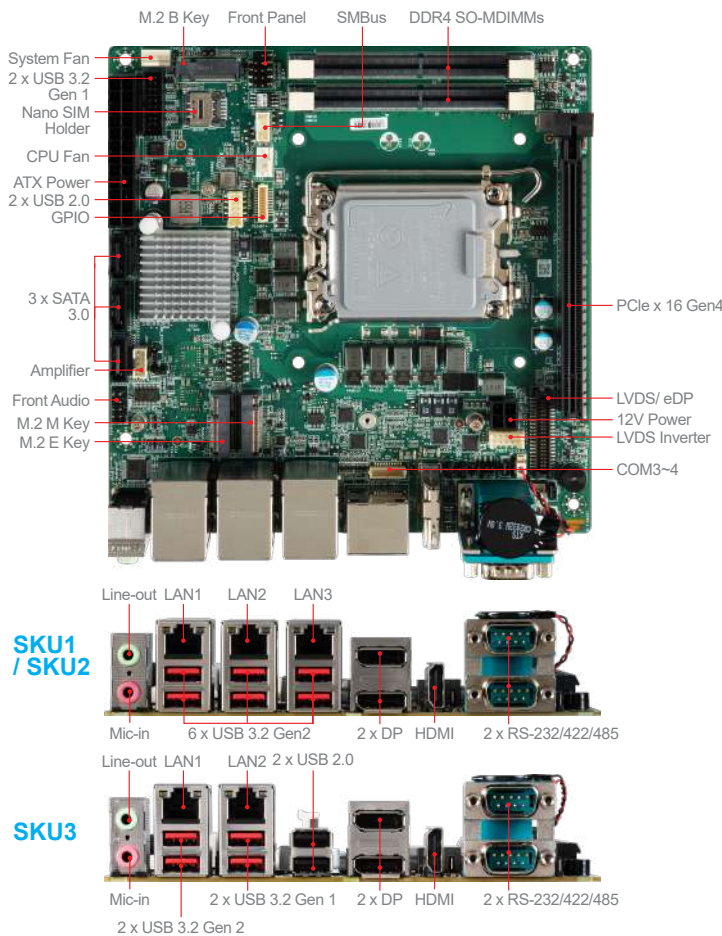
Part Number	Description
911-CF10-001	601-CF10-010/801-CF10-007 11, Intel Raptor Lake-S R680E, 2"D-DR5 SO-DIMM, 2"HDMI+2"DP+1"eDP/LVDS, 8"USB 3.2, 3"USB 2.0, 4"COM, 3"2.5GbE LAN, 2"SATA 3.0, 1"M.2 E key, 1"M.2 M key, 1"M.2 B key, 1"PCIe x16, TPM2.0, DC 8-48V, SINGLE For Channel
911-CF10-002	601-CF10-020/801-CF10-008 11, Intel Raptor Lake-S Q670E, 2"D-DR5 SO-DIMM, 2"HDMI+2"DP+1"eDP/LVDS, 8"USB 3.2, 3"USB 2.0, 4"COM, 3"2.5GbE LAN, 2"SATA 3.0, 1"M.2 E key, 1"M.2 M key, 1"M.2 B key, 1"PCIe x16, TPM2.0, DC 8-48V, SINGLE For Channel
911-CF10-003	601-CF10-030/801-CF10-009 11, Intel Raptor Lake-S H610E, 2"D-DR5 SO-DIMM, 2"HDMI+2"DP+1"eDP/LVDS, 4"USB 3.2, 5"USB 2.0, 4"COM, 3"2.5GbE LAN, 2"SATA 3.0, 1"M.2 E key, 1"M.2 M key, 1"PCIe x16, TPM2.0, DC 8-48V, SINGLE For Channel

Packing List

Part Number	Description	Quantity
K1D-3012023-V03	SATA CABLE, 230mm	1
K14-3018004-V03	COM PORT CABLE, 250mm	1
K1G-3008092-V03	POWER CABLE, 250mm	1
E21-CF10010-C22	I/O SHIELDING, H610E	1
E21-CF10020-C22	I/O SHIELDING, R680E/Q670E	1

MS-CF02

Mini-ITX with 14th/13th/12th Gen Intel® Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor & Intel® R680E/Q670E/H610E for High-Performance Solution



Features

- Intel® 14th/13th/12th Gen Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S Series with R680E/Q670E/H610E
- 2 DDR4 3200 MT/s ECC/non-ECC SODIMM slots up to 64GB
- Quadruple independent displays: 2DP, HDMI, LVDS/eDP
- 3/2 2.5GbE LAN with RJ-45
- 1 PCIe x16 (Gen 4) Slot, 1 M.2 E key (with CNVi), 1 M.2 B key (with SIM Holder) slots
- M.2 M key, 3 SATA 3.0 for storage
- SATA RAID 0/1/5
- 6 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 2 USB 2.0, 4 COM (4 RS-485), GPIO, Audio, System FAN
- Onboard TPM 2.0
- SMBus, iAMT 16.x
- ATX Power

Ordering Information

Part Number	Description
911-CF02-001	MS-CF02/601-CF02-010/801-CF02-005 10 Intel Raptor Lake-S, R680E, 2*DDR4 SO DIMM, 1*HDMI, 2*DP, 1*eDP, 1*LVDS, 1*M.2 E key, 1*M.2 M key, 1*M.2 B key, 1*PCIe x16, 3*2.5GbE LAN, 3*SATA 3.0, 8*USB 3.2, 2*USB 2.0, 4*COM, TPM2.0, Mini-ITX
911-CF02-002	MS-CF02/601-CF02-020/801-CF02-006 10 OPT:A Intel Raptor Lake-S, H610E, 2*DDR4 SO DIMM, 1*HDMI, 2*DP, 1*eDP, 1*LVDS, 1*M.2 E key, 1*M.2 M key, 1*PCIe x16, 2*2.5GbE LAN, 3*SATA 3.0, 4*USB 3.2, 4*USB 2.0, 4*COM, TPM2.0, Mini-ITX
911-CF02-003	MS-CF02/601-CF02-030/801-CF02-007 10 OPT:B Intel Raptor Lake-S, Q670E, 2*DDR4 SO DIMM, 1*HDMI, 2*DP, 1*eDP, 1*LVDS, 1*M.2 E key, 1*M.2 M key, 1*M.2 B key, 1*PCIe x16, 3*2.5GbE LAN, 3*SATA 3.0, 8*USB 3.2, 2*USB 2.0, 4*COM, TPM2.0, Mini-ITX

Packing List

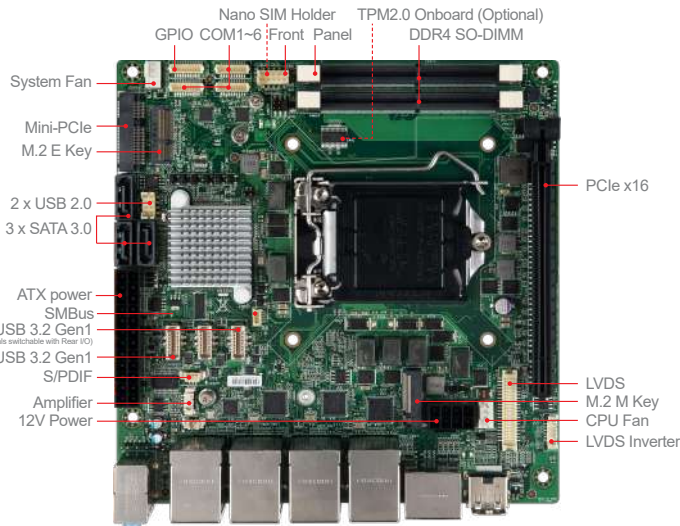
Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable, 500mm	1
K14-3018004-V03	COM Port Cable, 250mm	1
E21-CF02010-C22	I/O Shielding (For SKU 1&2)	1
E21-CF02010-C22	I/O Shielding (For SKU 3)	1

Specifications

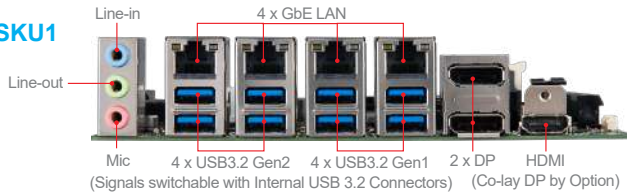
System Processor	CPU	SKU1	SKU2	SKU3
		12th Gen Intel® Alder Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W		
		13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W		
		14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W		
		Frequency	1.6 GHz~5.1 GHz (Depends on CPU)	
Memory	L2 Cache	2MB~30MB (Depends on CPU)		
	CPU Type	Socket (LGA 1700)		
	Chipset	Intel® R680E	Intel® Q670E	Intel® H610E
	BIOS	AMI UEFI		
	Technology	Dual-channel DDR4 (ECC/ non-ECC) 3200MT/s	Dual-channel DDR4 (non-ECC) 3200MT/s	
Graphic	Max. Capacity	Up to 64GB		
	Socket	2 x 260-pin DDR4 SO-DIMMs		
	Controller	Intel® UHD Graphics		
	Graphic Memory	Depends on CPU		
	LVDS	1 x Dual channel 18/24-bit (Connector shared with eDP)		
	eDP	1 (Connector shared with LVDS)		
	HDMI	1		
	DisplayPort	2		
	Multiple Display	4 independent displays		3 independent displays
	Display Interface	LVDS up to 1920 x 1200@60Hz eDP up to 4096 x 2304@60Hz HDMI up to 4096 x 2160@24Hz DP up to 4096 x 2304@60Hz		
Ethernet	Controller	3 x Intel® I225-LM 2.5GbE LAN		2 x Intel® I225-V 2.5GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)		
Super I/O	Controller	Fintek F81966D-I		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	Yes		
TPM	Controller	Infineon® SLB 9670VQ2.0		
	PCIe x16	1 x PCIe x16 (Gen 4)		
Expansion Slot	M.2	1 x M key (PCIe x4 NVMe), 2242/2280		1 x M key (PCIe x4 NVMe), 2242/2280
		1 x E key (PCIe x1, USB 2.0, CNVi), 2230		1 x E key (PCIe x1, USB 2.0, CNVi), 2230
Storage	SATA	3 x SATA 3.0 (Support RAID 0/1/5)		3 x SATA 3.0 (Support AHCI Mode)
	USB	6 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (internal) 2 x USB 2.0 (internal)		2 x USB 3.2 Gen2 (rear) 2 x USB 3.2 Gen1 (rear) 2 x USB 2.0 (rear) 2 x USB 2.0 (internal)
I/O Interface	Serial	4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2~4: RS-232/422/485, 0V/5V/12V, Auto-flow Control		4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~4: RS-232, 0V/5V/12V (RS-232/422/485 by option)
		GPIO		
	DC Input	N/A		
Power Supply	AC Input	ATX-Power 24P, 12V-4P		
	Operating Temperature	0 ~ 60°C Note: Thermal Test w/ Airflow:0.7m/s		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
Environment	Storage Humidity	10 ~ 90%, non-condensing		
	Dimensions (WxDxH)	170 x 170 mm (Mini-ITX)		
	Weight	0.43 Kg		0.41 Kg
Physical haracteristics Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA		
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise LTSC (64-bit) Linux (Support by request)		

MS-98L1

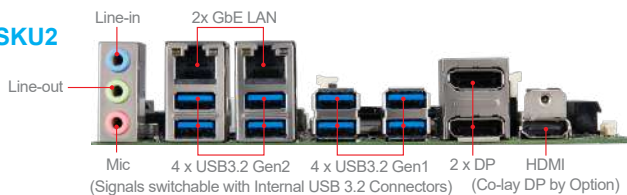
Mini-ITX with 9th/8th Gen Intel® Coffee Lake Refresh-S/Coffee Lake-S Xeon®, Core™ i7/i5/i3, Pentium®, Celeron® Processor & Intel® C246/Q370/H310 for High-Performance Solution



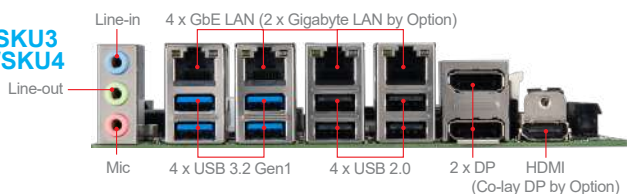
SKU1



SKU2



SKU3/SKU4



Features

- Intel® 8th/9th Gen Coffee Lake-S/Coffee Lake Refresh-S Series with C246/Q370/H310
- 2 DDR4 2666 MHz ECC/non-ECC SODIMM slots up to 64GB
- Triple independent displays: 2DP, HDMI (DP by option), LVDS
- 4 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3) Slot, M.2 E key (with CNVi), 1 Mini-PCle (Full-size, with SIM Holder) slots
- M.2 M key, 3 SATA 3.0 for storage
- SATA RAID 0/1/5/10 (RAID 10 Configured with M.2 M Key)
- 4 USB 3.2 Gen 2, 6 USB 3.2 Gen 1, 2 USB 2.0, 6 COM (2 RS-485), GPIO, Audio, S/PDIF, System FAN
- Onboard TPM 2.0 (by option)
- SMBus, iAMT 12.x
- ATX Power

Ordering Information

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Packing List

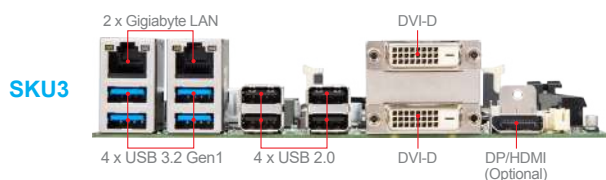
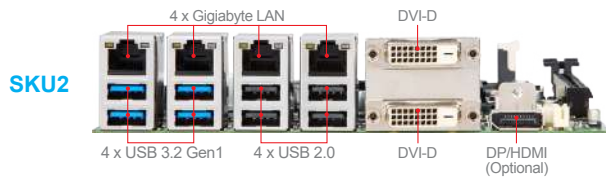
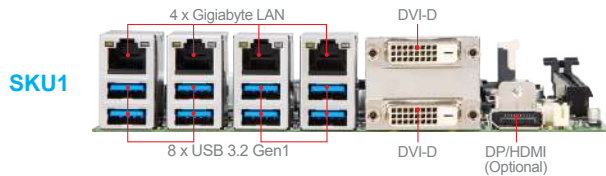
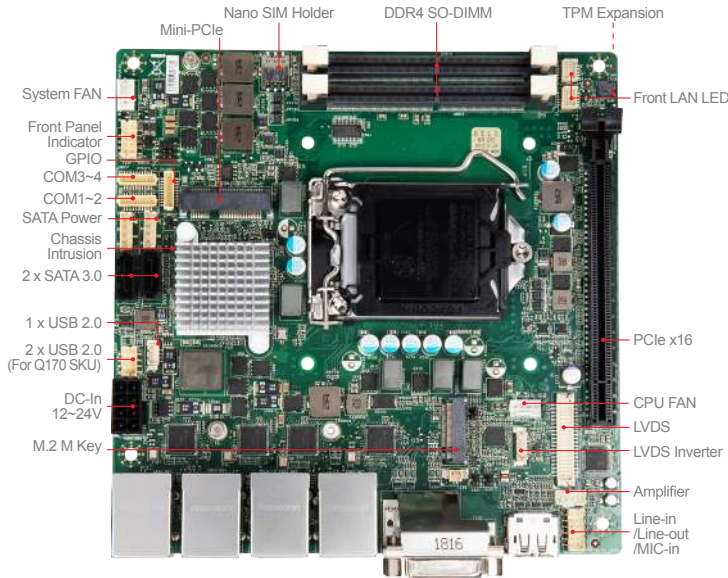
Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Specifications

System Processor		SKU1	SKU2	SKU3	SKU4
	CPU	8th Gen Intel® Coffee Lake-S Xeon® i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W 9th Gen Intel® Coffee Lake Refresh-S Xeon® i7/i5/i3/Pentium®/Celeron® IOTG Processor, Max 65W	8th Gen Intel® Coffee Lake-S i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W 9th Gen Intel® Coffee Lake Refresh-S i7/i5/i3/Pentium®/Celeron® IOTG Processor, Max 65W		
	Frequency	2.0GHz~4.7GHz (Depends on CPU)			
	L2 Cache	2MB~16MB (Depends on CPU)			
	CPU Type	Socket (LGA 1151)			
	Chipset	Intel® C246 Express	Intel® Q370 Express	Intel® H310 Express	
Memory	BIOS	AMI UEFI			
	Technology	Dual-channel DDR4 (ECC/ non-ECC) 2666MHz	Dual-channel DDR4 (non-ECC) 2666MHz		
	Max. Capacity	Up to 64 GB			
	Socket	2 x 260-pin DDR4 SO-DIMMs			
	Controller	Intel® UHD Graphics			
	Graphic Memory	Depends on CPU			
Display	LVDS	1 x Dual-channel 18/24-bit		N/A	
	HDMI	1 (Co-lay with DP by Optional)			
	DisplayPort	2			
	Multiple Display	3 independent displays		2 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz		HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz	
	Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I210-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I211-AT GbE LAN
Audio Super I/O		Controller Controller	Realtek® ALC887 Audio Codec (Co-lay ALC888S) Fintek F81866AD-I		
H/W Monitor	Watchdog Timer Smart Fan	256-level Watchdog Timer Yes			
TPM	Controller	Infineon® SLB9665TT2.0		Box header (Default) Infineon® SLB9665TT2.0 (by BOM option)	
I/O Interfaces	USB	2 x USB 2.0 (internal) 6 x USB 3.2 Gen 1 (4 x rear, Signal Share with Internal Box Header, 2 x internal) 4 x USB 3.2 Gen 2 (rear)		4 x USB 2.0 (rear) 4 x USB 3.2 Gen1 (rear)	
	Serial	6 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V (RS-232/422/485 by option)		4 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2-4: RS-232, 0V/5V/12V (RS-232/422/485 by option)	2 x COM ports COM1: RS-232/422/485, RI/5V/12V, Auto-flow Control COM2: RS-232, 0V/5V/12V (RS-232/422/485 by option)
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V			
	PCIe x16	1			
Expansion Slot	M.2	1 x M key (PCIe x4 NVMe, SATA), 2242/2280 1 x E key (PCIe x1, USB 2.0, CNVi), 2230		1 x M key (SATA), 2242/2280	
	Mini-PCIe	1 x Full-size (w/SIM holder)		1 x Full-size	
Storage	SATA	3 x SATA 3.0 (Support RAID 0/1/5/10, AHCI Mode, RAID 10 Configured with M.2 M Key)		3 x SATA 3.0 (Support AHCI Mode)	
Power Supply	AC Input	ATX-Power 24P, 12V-8P			
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
Form Factor	Humidity	10 ~ 90%, non-condensing			
	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)			
	Weight	0.405 kg	0.375 kg	0.39 kg	0.375 kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI			
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			

MS-98K1

Mini-ITX with 7th/6th Gen Intel® Kaby Lake/Skylake Processor with Multi-LAN, Expansion Capability, Wide Voltage & High-Performance Solution



Features

- Intel® 7th/6th Gen Skylake-S/Kaby Lake-S Series with Q170/H110
- 2 DDR4 2400 MHz SODIMM slots up to 32GB
- Triple independent displays: 2 DVI-D, DP (HDMI by option), LVDS
- 4 GbE LAN with RJ-45
- 1 PCIe x16 (Gen3), 1 Mini-PCle (Full size, with SIM Holder) slots
- M.2 M Key, 2 SATA 3.0 for storage
- SATA RAID 0/1/5 (RAID 5 Configured with M.2 M Key)
- 8 USB 3.2 Gen 1, 3 USB 2.0, 4 COM (4 RS-485), GPIO, Audio, System FAN
- Onboard TPM 2.0 (by option)
- SMBus, Chassis Intrusion
- Wide Voltage DC-IN 12~24V

Ordering Information

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Packing List

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

Specifications

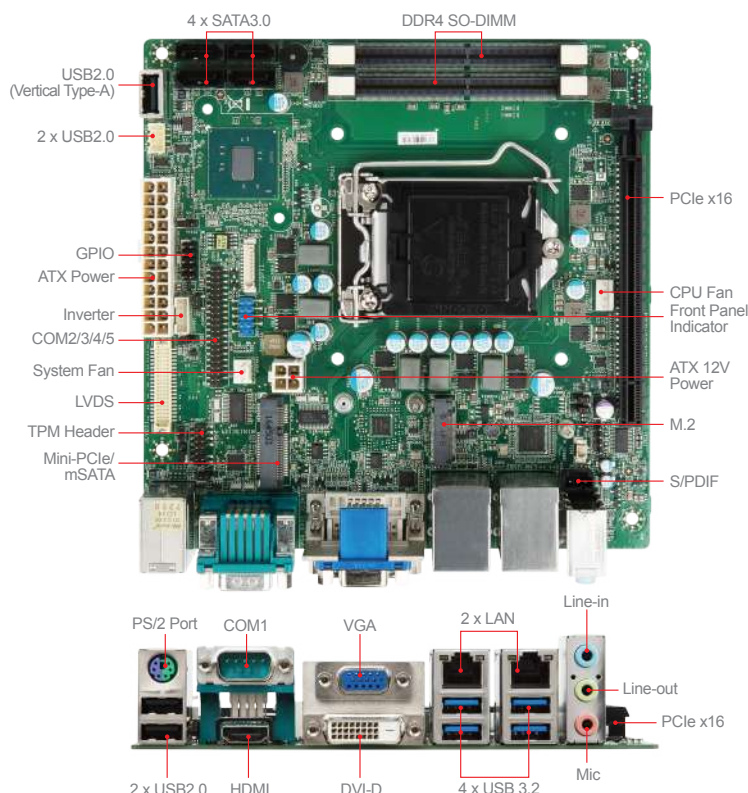
		SKU1	SKU2	SKU3
System Processor	CPU	7th Gen Intel® Desktop Kaby Lake-S i7-7700/i7-7700T/i5-7500/i5-7500T/i3-7101E/i3-7101TE, Max 65W 6th Gen Intel® Desktop Skylake-S i7-6700/i7-6700TE/i5-6500/i5-6500TE/i3-6100/i3-6100TE/G4400/G4400TE/G3900/G3900TE, Max 65W		
	Frequency	2.3GHz~4.0GHz (Depends on CPU)		
	L2 Cache	2M ~ 8M (Depends on CPU)		
	CPU Type	Socket (LGA 1151)		
	Chipset	Intel® Q170 Express	Intel® H110 Express	
	BIOS	AMI		
Memory	Technology	Dual-channel DDR4 (non-ECC) 2133MHz/2400MHz		
	Max. Capacity	Up to 32 GB		
	Socket	2 x 260-pin SO-DIMMs		
Display	Controller	Intel® HD Graphics		
	Graphic Memory	Depends on CPU		
	LVDS	1 x Dual channel 18/24-bit		
	DVI	2 (DVI-D)		
	HDMI	1 (Co-lay with DP by Optional)		
	DisplayPort	1		
Ethernet	Controller	3 independent displays	2 independent displays	
		4 x Intel® I210-AT GbE LAN (Front LAN LED Supported)	4 x Intel® I211-AT GbE LAN (Front LAN LED Supported)	2 x Intel® I211-AT GbE LAN (Front LAN LED Supported)
Audio	Controller	Realtek® ALC887 HD Audio Codec		
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	Yes		
I/O Interfaces	USB	3 x USB 2.0 (internal) 8 x USB 3.2 Gen 1 (rear)	5 x USB 2.0 (4 x rear, 1 x internal) 4 x USB 3.2 Gen 1 (rear)	
	Serial	4 x COM ports (internal) COM1: RS-232/422/485, RI/5V/12V COM2~4: RS-232/422/485, 0V/5V/12V	4 x COM ports (internal) COM1: RS-232/422/485, RI/5V/12V COM2~4: RS-232, 0V/5V/12V	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V		
	TPM	Controller	Infineon® SLB9665TT 2.0	Pin header (Default) Infineon® SLB9665TT 2.0 (by BOM option)
Expansion Slot	PCIe x16	1 (Maximum 75W Supported)		
	M.2	1 x M key (PCIe x4 NVMe, SATA 3.0), 2242/2280	1 x M key (SATA 3.0), 2242/2280	
	Mini-PCIe	1 x Full-size (w/ SIM holder)		
Storage	SATA	2 x SATA 3.0		
Power Supply	DC Input	DC-in 12 ~24V		
	AC Input	N/A		
	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		
Form Factor	Dimensions (W x D x H)	170 x 170 mm (Mini-ITX)		
	Weight	0.42 kg	0.42 kg	0.39 kg
Certification	EMC	FCC, CE , RCM, VCCI, BSMI (Class A)		
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)		

Optional Item

Part Number	Description
Please check MSI IPC website at http://ipc.msi.com for details.	

MS-98E1

Mini-ITX with 7th/6th Gen Intel® Kaby Lake/Skylake Processor with Superior I/O & Expansion Capability for High-Performance Solution



Features

- Intel® 7th/6th Gen Skylake-S/Kaby Lake-S Series with C236/H110
- 2 DDR4 2400 MHz SODIMM slots up to 32GB
- Triple independent displays: VGA, DVI-D, HDMI, LVDS
- 2 GbE LAN with RJ-45
- 1 PCIe x16 (Gen3), 1 Mini-PCle (Full size, with SIM Holder), 1 Mini-PCle (Half size) slots
- mSATA, M.2 M Key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 4 USB 3.2 Gen 1, 5 USB 2.0, 5 COM (1 RS-485), GPIO, PS/2, Audio, System FAN
- iAMT 11.x
- ATX Power

Ordering Information

Part Number	Description
919-98E1-001	V1.1 Intel KabyLake-S/Skylake-S + C236+2*DDR4 LVDS+HDMI+DVI-D+VGA+4*SATAIII+2*GbE LAN+5*COM+1*mini-PCle +1*M.2+ATX, SINGLE
919-98E1-002	V1.1 OPT:A Intel KabyLake-S/Skylake-S +H110+2*DDR4 LVDS+HDMI+DVI-D+VGA+3*SATAIII+2*GbE LAN+5*COM+1*mini-PCle +ATX, SINGLE

Packing List

Part Number	Description
K1D-1008261-V03	SATA Cable, 500mm
E21-98E1010-C22	I/O SHIELD

Optional Item

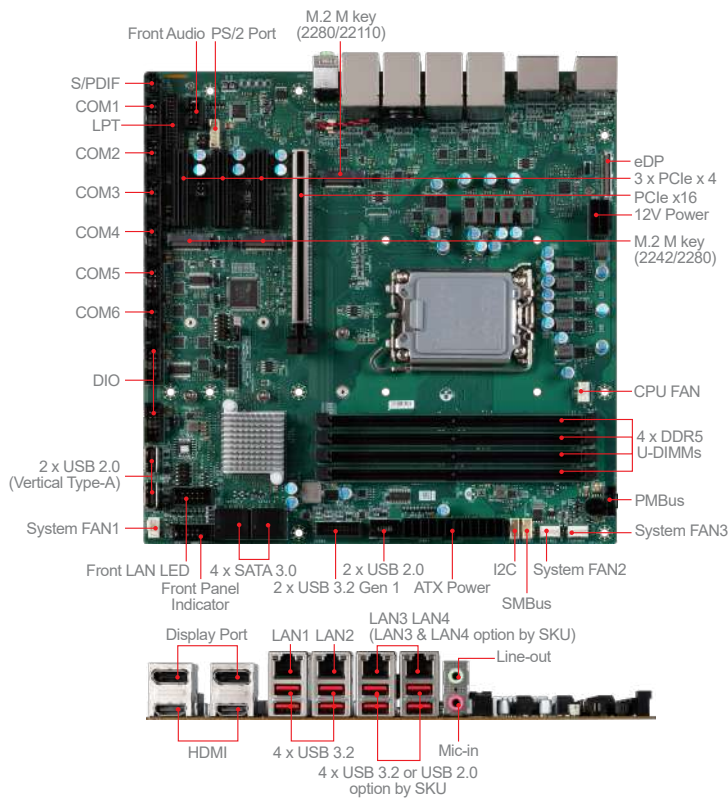
Part Number	Description
K14-1036005-V03	COM Port Cable, 500mm

Specifications

		C236 SKU	H110 SKU
		7th/6th Gen Intel® Desktop Kaby Lake/Skylake Xeon/i7/i5/i3/Pentium®/Celeron® Series Processor, Max. 95W	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max. 95W
Processor	CPU		
	Frequency	2.3GHz~4.0GHz (Depends on CPU)	
	L2 Cache	2M ~ 8M (Depends on CPU)	
	CPU Type	Socket (LGA 1151)	
	Chipset	Intel® C236 Express	Intel® H110 Express
Memory	BIOS	AMI	
	Technology	Dual-channel DDR4 (ECC) 2133/2400MHz	Dual-channel DDR4 (non-ECC) 2133/2400MHz
	Max. Capacity	Up to 32GB	
	Socket	2 x 260-pin SO-DIMMs	
Display	Controller	Intel® HD Graphics	
	Graphic Memory	Depends on CPU	
	LVDS	1 x Dual channel 18/24-bit	
	eDP	N/A	
	VGA	1	
	DVI	1 (DVI-D)	
	HDMI	1	
	DisplayPort	N/A	
	Multiple Display	3 independent displays	2 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DVI-D up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz	
Ethernet	Controller	1 x Intel® I219-LM GbE-PHY 1 x Intel® I211-AT PCIe GbE LAN(Co-lay I210-AT)	
Audio	Controller	Realtek® ALC887 HD Audio Codec	
Super I/O	Controller	Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
TPM	Controller	Pin header	
I/O Interface	USB	5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 (rear)	
	Serial	5 x COM ports (COM1: rear, COM2~4: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~5: RS-232, 0V/5V/12V	
	Parallel	N/A	
	PS/2	1	
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V	
	PCIe x 16	1	
Expansion Slot	M.2	1 x M key (PCIe x4, SATA 3.0), 224	N/A
	Mini-PCle	1 x Full-size, mSATA	
Storage	SATA	4 x SATA 3.0	3 x SATA 3.0
	mSATA	1 (shared w/ Mini-PCle)	
Power Supply	DC	N/A	
	ATX	ATX-Power 24P, 12V-4P	
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions	170 x 170 mm (Mini-ITX)	
	Weight	0.37 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	

MS-CF09

Micro-ATX with 14th/13th/12th Gen Intel® Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor & Intel® R680E/Q670E/H610E for High-Performance Solution



Features

- Intel® 14th/13th/12th Gen Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S Series with R680E/Q670E/H610E
- 4 DDR5 4400 MT/s ECC/non-ECC UDIMM slots up to 128GB
- Quadruple independent displays: 2DP, 2HDMI, eDP
- 4 2.5GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5) Slot, 2 PCIe x4 (Gen 4), 1 PCIe x4 (Gen 3) slots
- 3 M.2 M key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 8 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 4 USB 2.0, 6 COM (6 RS-485), GPIO, PS/2, Audio, 3 System FAN
- Onboard TPM 2.0
- SMBus, I2C, PMBus, iAMT 16.x, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
911-CF09-001	MS-CF09/601-CF09-010/801-CF09-010 VER 10 OPT:STD Intel RPL-S, R680E, 4*DDR5, HDMI+DP+eDP, 3*M.2 M key, 1*PCIe x16, 3*PCIe x4, 4*2.5GbE LAN, 4*SATA 3.0, 10*USB 3.2, 4*USB 2.0, 6*COM, TPM2.0, Micro-ATX For Channel
911-CF09-002	MS-CF09/601-CF09-020/801-CF09-011 VER 10 OPT:A Intel RPL-S, Q670E, 4*DDR5, HDMI+DP+eDP, 2*M.2 M key, 1*PCIe x16, 3*PCIe x4, 2*2.5GbE LAN, 4*SATA 3.0, 10*USB 3.2, 4*USB 2.0, 6*COM, TPM2.0, Micro-ATX For Channel
911-CF09-003	MS-CF09/601-CF09-030/801-CF09-012 VER 10 OPT:B Intel RPL-S, H610E, 2*DDR5, HDMI+DP+eDP, 1*PCIe x16, 1*PCIe x4, 4*2.5GbE LAN, 4*SATA 3.0, 4*USB 3.2, 6*USB 2.0, 4*COM, TPM2.0, Micro-ATX For Channel
911-CF09-004	MS-CF09/601-CF09-040/801-CF09-013 VER 10 OPT:C Intel RPL-S, H610E, 2*DDR5, HDMI+DP+eDP, 1*PCIe x16, 1*PCIe x4, 2*2.5GbE LAN, 4*SATA 3.0, 4*USB 3.2, 6*USB 2.0, 4*COM, TPM2.0, Micro-ATX For Channel

Packing List

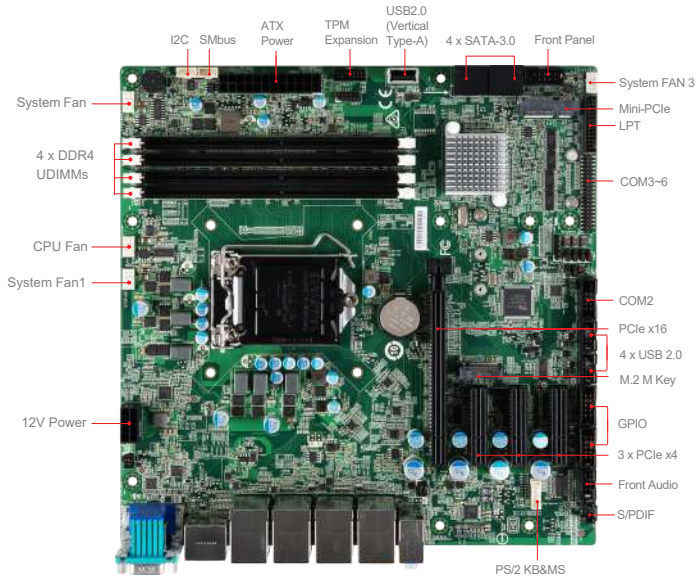
Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable ,500mm	2
E21-CF09010-C22	I/O SHIELDING For R680E SKU	1
E21-CF09020-C22	I/O SHIELDING For Q670E 2LANs SKU	1
E21-CF09030-C22	I/O SHIELDING For H610E 4LANs SKU	1
E21-CF09040-C22	I/O SHIELDING For H610E 2LANs SKU	1

Specifications

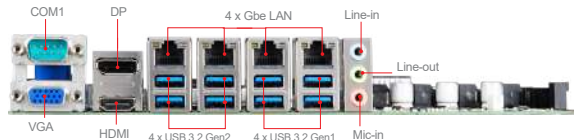
		SKU1	SKU2	SKU3	SKU4
System Processor	CPU	12th Gen Intel® IOTG Alder Lake-S Processor Core i9/i7/i5/i3, Pentium, Celeron, Max 125W 13th Gen Intel® IOTG Raptor Lake-S Processor Core i9/i7/i5/i3, Pentium, Celeron, Max 125W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 125W			
	Frequency	P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)			
	L2 Cache	4MB~30MB (Depends on CPU)			
	CPU Type	Socket (LGA1700)			
	Chipset	Intel® R680E Express	Intel® Q670E Express	Intel® H610E Express	
	BIOS	AMI UEFI			
Memory	Technology	Dual-channel DDR5 (ECC/non-ECC) 4400 MHz	Dual-channel DDR5 (non-ECC) 4400 MHz		
	Max. Capacity	Up to 128GB		Up to 64GB	
	Socket	4 x 288-pin UDIMMs		2 x 288-pin UDIMMs	
Graphic	Controller	Intel® UHD Graphics			
	Graphic Memory	Depends on CPU			
	LVDS	N/A			
	eDP	1			
	HDMI	2			
	DisplayPort	2			
	Multiple Display	4 independent displays		3 independent displays	
	Display Interface	HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz eDP up to 4096 x 2160 @60Hz			
Ethernet	Controller	4 x Intel® i226-LM 2.5GbE LAN	2 x Intel® i226-LM 2.5GbE LAN	4 x Intel® i226-V 2.5GbE LAN	2 x Intel® i226-V 2.5GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec			
Super I/O	Controller	Fintek F81966D-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
TPM	Controller	Infineon® SLB9672VU2.0			
Expansion Slot	PCIe x16	1			
	PCIe x4	3		1	
	M.2	1 x M.2 M key (PCIe x4 NVMe; Signal from CPU), 2280/22110 2 x M.2 M key (PCIe x4 NVMe; Signal from PCH), 2242/2280"	1 x M.2 M key (PCIe x4 NVMe; Signal from CPU), 2280/22110 1 x M.2 M key (PCIe x4 NVMe; Signal from PCH), 2242/2280"	N/A	
Storage	SATA	4 x SATA 3.0 (RAID 0/1/5/10)		4 x SATA 3.0	
I/O Interface	USB	8 x USB 3.2 Gen 2 x1 Ports (8 x rear) 2 x USB 3.2 Gen 1 Ports (2 x internal) 4 x USB 2.0 Ports (2 x internal, 2 x Vertical Type-A Connector)		2 x USB 3.2 Gen 2 x1 Ports (2 x rear) 2 x USB 3.2 Gen 1 Ports (2 x rear) 6 x USB 2.0 Ports (4 x rear, 2 x internal)	
	Serial	6 x COM ports (internal) COM1~2: RS-232/422/485 with Ring/0V/5V/12V Auto-flow Control COM3~6: RS-232/422/485 with 0V/5V/12V Auto-flow Control	6 x COM ports (internal) COM1~2: RS-232/422/485 with Ring/0V/5V/12V Auto-flow Control COM3~6: RS-232 with 0V/5V/12V	4 x COM ports (internal) COM1: RS-232/422/485 with Ring/0V/5V/12V Auto-flow Control COM2~4: RS-232 with 0V/5V/12V	
	Parallel	Yes			
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse			
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V			
	Power Supply	DC Input	N/A		
	AC Input	ATX-Power 24P, 12V-8P			
Environment	Operating Temperature	0 ~ 60°C Note: Thermal Test w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing			
Physical haracteristics	Dimensions (WxDxH)	244 x 244mm (uATX)			
	Weight	0.659 kg			
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA			
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit, 21H2) Windows 11 IoT Enterprise LTSC 24H2 (64-bit) Linux (Support by request)			

MS-98L2

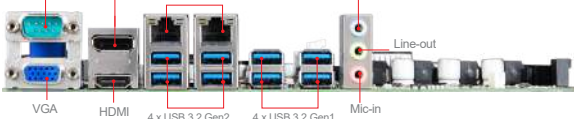
Micro-ATX with 8th Gen Intel® Coffee Lake-S Xeon, Core™ i7/i5/i3, Pentium®, Celeron® Processor for Superior I/O & Expansion Capability for High-Performance Solution



SKU1/SKU2



SKU3



Features

- Intel® 8th Gen Coffee Lake-S Series with C246/Q370
- 4 DDR4 2666 MHz ECC/non-ECC UDIMM slots up to 128GB
- Triple independent displays: VGA, DP, HDMI
- 4 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3), 3 PCIe x4 (Gen 3), 1 Mini-PCle (Full/Half size) slots
- M.2 M Key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 4 USB 3.2 Gen 2, 4 USB 3.2 Gen 1, 5 USB 2.0, 6 COM (2 RS-485), GPIO, LPT, PS/2, Audio, S/PDIF, 3 System FAN
- Onboard TPM 2.0 (by option)
- SMBus, I2C, iAMT12.x
- ATX Power

Ordering Information

Part Number	Description
919-98L2-001	MS-98L2\609-98L2-020\809-98L2-010 VER 10 OPT:A Intel Coffee Lake-S LGA1151, Q370, 4*DDR4 UDIMM, 1*PCle x16, 3*PCle x4, HDMI, DP, VGA, 4*LAN, 4*USB 3.2 Gen 2, 4*USB 3.2 Gen 1, 5*USB 2.0, 4*SATA 3.0, M.2, Mini-PCle, 6*COM, Micro-ATX, RoHS, SINGLE, For Channel
919-98L2-006	MS-98L2\609-98L2-030\809-98L2-014 VER 10 OPT:C Intel Coffee Lake-S LGA1151, Q370, 4*DDR4 UDIMM, 1*PCle x16, 3*PCle x4, HD-MI™, DP, VGA, 2*LAN, 4*USB 3.2 Gen 2, 4*USB 3.2 Gen 1, 5*USB 2.0, 4*SATA 3.0, M.2, Mini-PCle, 6*COM, Micro-ATX, RoHS, SINGLE, For Channel
919-98L2-005	MS-98L2\609-98L2-010\809-98L2-013 VER 10 Intel Coffee Lake-S LGA1151, C246, 4*DDR4 UDIMM, 1*PCle x16, 3*PCle x4, HDMI, DP, VGA, 4*LAN, 4*USB 3.2 Gen 2, 4*USB 3.2 Gen 1, 5*USB2.0, 4*SATA3.0, M.2, Mini-PCle, 6*COM, Micro-ATX, RoHS, SINGLE, For Channel

Packing List

Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable, 500mm	2
E21-98L2020-C22	I/O SHIELDING	1

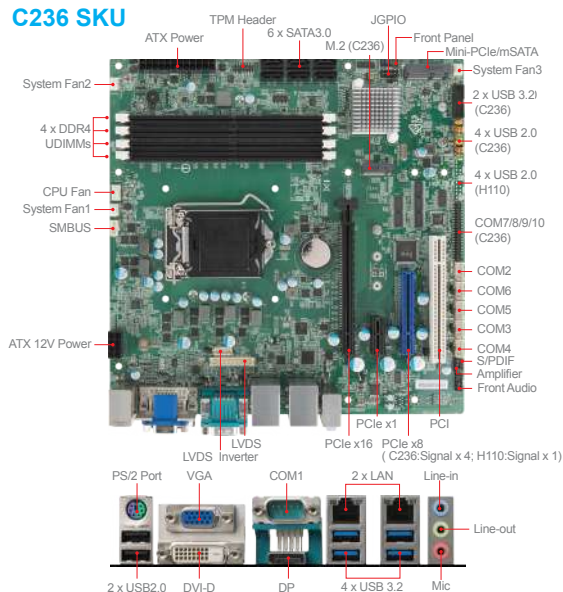
Optional Item

Part Number	Description
K14-1018004-V03	COM Port Cable, 510mm
K1B-3008012-E06	USB 2.0 Cable, 330mm

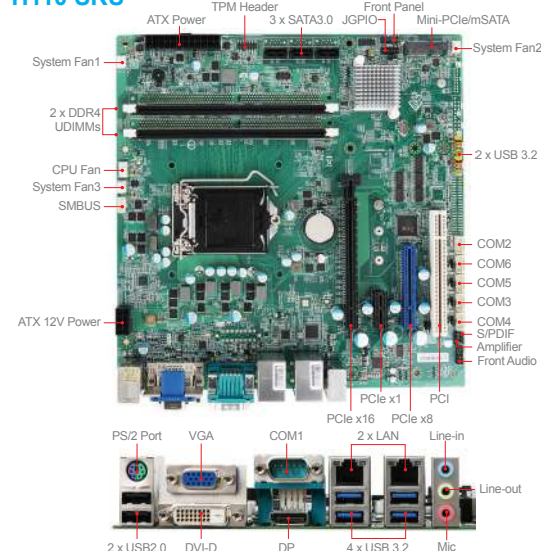
Specifications

System Processor	CPU	SKU1	SKU2	SKU3	
		8th Gen Intel® Desktop Coffee Lake-S Xeon [®] /Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W	8th Gen Intel® Desktop Coffee Lake-S Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		
		Frequency	2.1GHz~4.7GHz(Depends on CPU)		
		L2 Cache	2MB~12MB (Depends on CPU)		
		CPU Type	Socket (LGA 1151)		
	Chipset	Intel® C246 Express	Intel® Q370 Express		
	BIOS	AMI UEFI			
Memory	Technology	Dual-channel DDR4 (ECC/ non-ECC) 2666 MHz	Dual-channel DDR4 (non-ECC) 2666 MHz		
	Max. Capacity	Up to 128 GB			
	Socket	4 x 288-pin UDIMMs			
Display	Controller	Intel® HD Graphics			
	Graphic Memory	Depends on CPU			
	VGA	1			
	HDMI	1			
	DisplayPort	1			
	Multiple Display	3 independent displays			
	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz			
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 3 x Intel® I210-AT GbE LAN		1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN	
Audio	Controller	Realtek® ALC887 HD Audio Codec			
Super I/O	Controller	Fintek F81866AD-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
TPM	Controller	Box header (Default) Infineon SLB9665TT2.0 (by BOM option)			
I/O Interfaces	USB	5 x USB 2.0 (5 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 Type-A (rear) 4 x USB 3.2 Gen 2 Type-A (rear)			
	Serial	6 x COM ports (COM1: rear, COM2~6: internal) COM1: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V		6 x COM ports (COM1: rear, COM2~6: internal) COM1: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM2~6: RS-232, 0V/5V/12V	
	Parallel	1			
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse			
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V			
	PCle x16	1			
Expansion Slot	PCle x4	3 (Slot2 signal shared with M.2; 2*PCle x4 NVMe)			
	M.2	1 x M key (PCle x4 NVMe, SATA 3.0), 2242/2260/2280			
	Mini-PCle	1 x Full-size/Half-size			
	Storage	SATA	4 x SATA 3.0		
Power Supply	DC Input	N/A			
	AC Input	ATX-Power 24P, 1 2V-8P			
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
	Storage Humidity	10 ~ 90%, non-condensing			
Form Factor	Dimensions (W x D x H)	244 x 244 mm (uATX)			
	Weight	0.625 kg		0.39 kg	
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI			
Software Platform	OS Support	Windows 10 IoT Enterprise 2019 SAC (64-bit, RS5) Linux (Support by request)			

C236 SKU



H110 SKU



Features

- Intel® 7th/6th Gen Skylake-S/Kaby Lake-S Series with C236/H110
- 4 DDR4 2666 MHz ECC/non-ECC UDIMM slots up to 64GB
- Triple independent displays: VGA, DVI-D, DP, LVDS
- 2 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3), 1 PCIe x8 (Gen 3), 1 PCIe x1 (Gen 3), 1 PCI, 1 Mini-PCIe (Full size, with mSATA) slots
- M.2 M Key, 6 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 1, 5 USB 2.0, 10 COM (1 RS-485), GPIO, PS/2, Audio, S/PDIF, 3 System FAN
- SMBus, iAMT11.x
- ATX Power

Ordering Information

Part Number	Description
919-98E2-001	VER 1.1 OPTA, 9.6-INCH, Intel Skylake-S/KabyLake-S +C236, 4*DDR4, DP, VGA, LVDS, DVI, 1*M.2, 1*Mini-PCIe, 2*LAN, 6*SATA3.0, 6*USB3.0, 6*USB2.0, 10*COM, ATX Power, single for channel
919-98E2-002	VER 1.1 OPTB, 9.6-INCH, Intel Skylake-S/KabyLake-S +H110, 2*DDR4, DP, VGA, DVI, 1*Mini-PCIe, 2*LAN, 3*SATA3.0, 4*USB3.0, 6*USB2.0, 6*COM, ATX Power, single for channel

Specifications

		C236 SKU	H110 SKU
Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/ Skylake Xeon/i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W	7th/6th Gen Intel® Skylake Core™ i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W
	Frequency	2.3GHz~4.0GHz (Depends on CPU)	
	L2 Cache	2M ~ 8M (Depends on CPU)	
	CPU Type	Socket (LGA 1151)	
	Chipset	Intel® C236 Express	Intel® H110 Express
Memory	BIOS	AMI	
	Technology	Dual-channel DDR4 (ECC) 2133/2400 MHz(7th Gen)	Dual-channel DDR4 (non-ECC) 2133/2400 MHz(7th Gen)
	Max. Capacity	Up to 64 GB	Up to 32 GB
	Socket	4 x 288-pin UDIMMs	4 x 288-pin UDIMMs
	Controller	Intel® HD Graphics	
Display	Graphic Memory	Depends on CPU	
	LVDS	1	N/A
	eDP	N/A	
	VGA	1	
	DVI	1 (DVI-D)	
	DisplayPort	1	
	Multiple Display	3 independent displays	2 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz DP up to 4096 x 2304 @60Hz DVI-D up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz	DP up to 4096 x 2304 @60Hz DVI-D up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz
	Ethernet	1 x Intel® I219-LM GbE-PHY 1 x Intel® I210-AT PCIe GbE LAN	1 x Intel® I219-LM GbE-PHY 1 x Intel® I211-AT PCIe GbE LAN
	Audio	Realtek® ALC887 HD Audio Codec	
Super I/O	Controller	Fintek F81866AD-1 + F81216H	Fintek F81866AD-1
	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
TPM	Controller	Pin header	
	USB	6 x USB 2.0 (2 x rear, 4 x internal) 6 x USB 3.2 Gen 1 (4 x rear, 2 x internal)	6 x USB 2.0 (2 x rear, 4 x internal) 4 x USB 3.2 Gen 1 (rear)
I/O Interface	Serial	10 x COM ports (COM1: rear, COM2~9: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V COM7~10: RS-232, without power	6 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V
	Parallel	N/A	
	PS/2	1	
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V	
	PCIe x16	1	
Expansion Slot	PCIe x8	1*PCIe x8 (x4 signal)	
	PCIe x4	N/A	
	PCIe x1	1	
	PCI	1	
	M.2	1 x M key (PCIe x4, SATA 3.0), 2242/2260/2280	N/A
Storage	Mini-PCIe	1 x Full-size (mSATA)	
	SATA	6 x SATA 3.0	3 x SATA 3.0
Power Supply	mSATA	1 (shared w/ Mini-PCIe)	
	DC	N/A	
Environment	ATX	ATX-Power 24P, 12V-8P	
	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow: 0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions	244 x 244 mm (uATX)	
	Weight	0.73 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)	

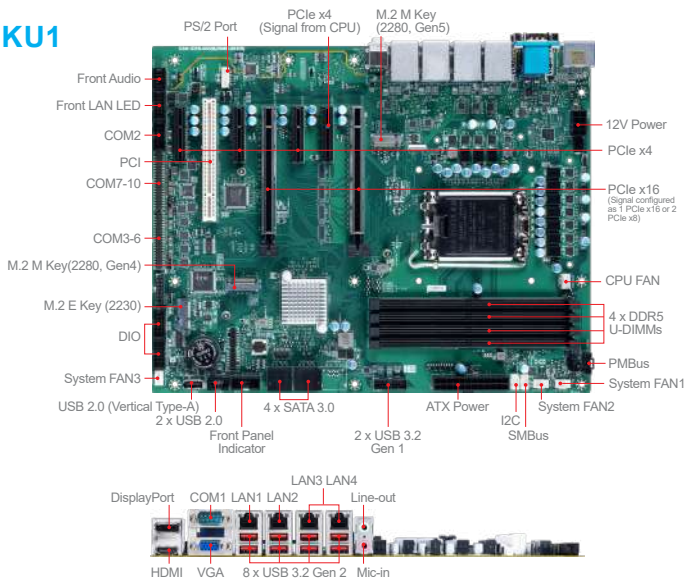
Packing List

Part Number	Description
K1D-1008261-V03	SATA Cable, 500mm
K14-1018003-V03	COM PORT Cable, 300mm
E21-98E2010-C22	I/O SHIELD

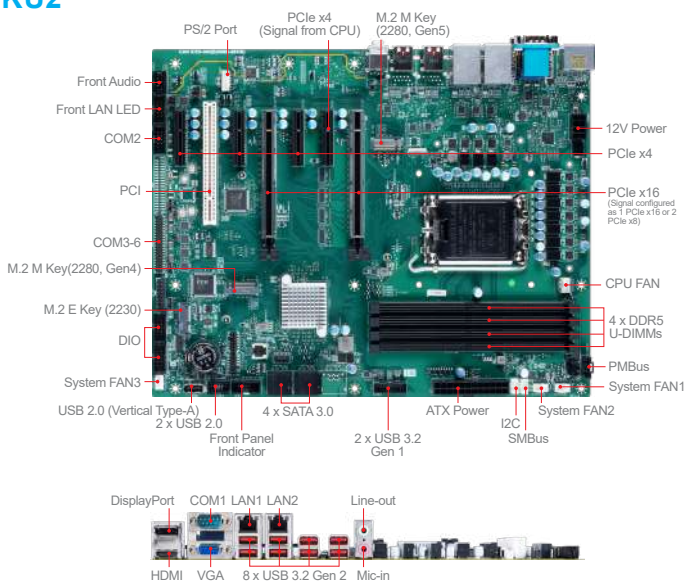
Optional Item

Part Number	Description
K14-1036004-V03	COM Port Cable, 200mm
K1B-3008012-E06	USB 2.0 Cable, 330mm

SKU1



SKU2



Features

- Intel® 15th Gen Arrow Lake-S Series with W880
- 4 DDR5 5600 MT/s ECC/non-ECC UDIMM slots up to 192GB
- Triple independent displays: VGA, DP, HDMI
- 4 2.5GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5) Slot or 2 PCIe x8 (Gen 5), 4 PCIe x4 (Gen 4, 1 signal from CPU, 3 signal from PCH), 1 M.2 E key slots
- 2 M.2 M key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 8 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 3 USB 2.0, 10 COM (2 RS-485 / 8 RS-232), GPIO, PS/2, Audio, 3 System FAN
- Onboard TPM 2.0
- SMBus, I2C, PMBus, iAMT 19.x, Chassis Intrusion
- ATX Power

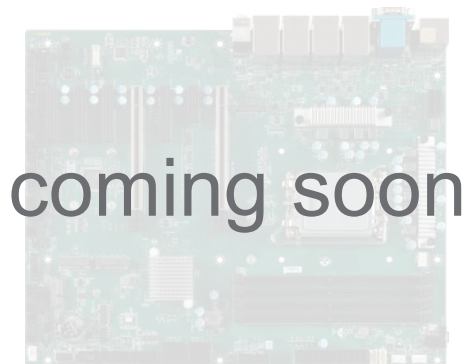
NEW

Specifications

		SKU1	SKU2
Processor	CPU	15th Gen Intel® Arrow Lake-S Core™ Ultra 9/7/5/Pentium®/Celeron® IOTG Series Processor, Max 125W	
	Frequency	P-Core 1.4GHz~5.6GHz (Depends on CPU) E-Core 1.2GHz~4.6GHz (Depends on CPU)	
	L2 Cache	3MB~36MB (Depends on CPU)	
	CPU Type	Socket (LGA1851)	
	Chipset	Intel® W880	
Memory	BIOS	AMI UEFI	
	Technology	Dual-channel DDR5 (ECC/non-ECC) 5600 MT/s (ECC support will depend on CPU)	
	Max. Capacity	Up to 192GB	
	Socket	4 x 288-pin UDIMMs	
	Controller	Intel® UHD Graphics	
Display	Graphic Memory	Depends on CPU	
	VGA	1	
	HDMI	1	
	DisplayPort	1	
	Multiple Display	3 independent displays	
Ethernet	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz	
	Controller	4 x Intel® I226-LM 2.5GbE LAN	2 x Intel® I226-LM 2.5GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)	
Super I/O	Controller	FINTek F81967D-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
TPM	Smart Fan	Yes	
I/O Interface	Controller	Infineon® SLB9672VU2.0	
	USB	8 x USB 3.2 Gen 2 x1 (8 x rear) 2 x USB 3.2 Gen 1 (2 x internal) 3 x USB 2.0 (3 x internal with one Vertical Type-A Connector)	
	Serial	10 x COM ports (1 x rear, 9 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232, 0V/5V/12V, Auto-flow Control (Default set to Ring) COM7~10: RS-232, 0V/5V/12V, Auto-flow Control	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232, 0V/5V/12V, Auto-flow Control
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
Expansion Slot	PCIe x16	2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)	
	PCIe x4	4	
	PCIe	1	
	M.2	1 x M key (Signal from CPU) 2280, 1 x M key (Signal Shared by PCIe Slot5) 2280 1 x E key (PCIe x1), 2230	
Storage	SATA	4 x SATA 3.0 (RAID 0/1/5/10)	
	ATX	ATX-Power 24P, 12V-8P	
Power Supply	Operating Temperature	0 ~ 60°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions	305 x 244 mm (ATX)	
	Weight	0.780 Kg	
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI	
	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported	

MS-CF05 V2.0

ATX with 14th/13th/12th Gen Intel® Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor & Intel® R680E/Q670E for High-Performance Solution



coming soon

NEW

Specifications

Processor	CPU	12th Gen Intel® Alder Lake-S i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 125W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 125W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/ i3/Pentium®/Celeron® IOTG Series Processor, Max 125W
	Frequency	P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)
	L2 Cache	4MB~30MB (Depends on CPU)
	CPU Type	Socket (LGA 1700)
	Chipset	Intel® R680E Express
	BIOS	AMI UEFI
Memory	Technology	Dual-channel DDR5 (ECC/non-ECC) 4400 MT/s (ECC support will depend on CPU)
	Max. Capacity	Up to 128GB
	Socket	4 x 288-pin UDIMMs
Display	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	VGA	1
	HDMI	1
	DisplayPort	1
	Multiple Display	3 independent displays
Display Interface	VGA	VGA up to 1920 x 1200 @60Hz
	HDMI	HDMI up to 4096 x 2160 @60Hz
Display Interface	DP	DP up to 4096 x 2304 @60Hz
	Display Interface	3 independent displays
Ethernet	Controller	2 x Intel® i226-LM 2.5GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)
Super I/O	Controller	FINTEK F81966D-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
TPM	Smart Fan	Yes
	Controller	Infineon® SLB9672VU2.0
I/O Interface	USB	8 x USB 3.2 Gen 2 x1 (8 x rear) 2 x USB 3.2 Gen 1 Ports (2 x internal) 3 x USB 2.0 (3 x internal with one Vertical Type-A Connector)
	Serial	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring) COM3~6: RS-232, 0V/5V/12V
	Parallel	Yes
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V
	PCIe x16	2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)
Expansion Slot	PCIe x4	4
	PCIe	1
	M.2	1 x M key (Signal from CPU) 2280/22110, 1 x M key (Signal Shared by PCIe Slot5) 2242/2280 1 x E key (PCIe x1), 2230 1 x B key (PCIe x2), 2242/2280
Storage Power Supply	SATA	4 x SATA 3.0 (RAID 0/1/5/10)
	ATX	ATX-Power 24P, 12V-8P
Environment	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	305 x 244 mm (ATX)
	Weight	0.779 Kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI
Software Platform	OS Support	Windows 10 IoT Enterprise 21H2 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC(64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported

Features

- Intel® 14th/13th/12th Gen Raptor Lake-S Refresh/Raptor Lake-S/
Alder Lake-S Series with R680E/Q670E
- 4 DDR5 4400 MT/s ECC/non-ECC UDIMM slots up to 128GB
- Triple independent displays: VGA, DP, HDMI
- 4 2.5GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5) Slot or 2 PCIe x8 (Gen 5), 1 PCIe x4 (Gen 4),
3 PCIe x4 (Gen 3), 1 M.2 E key, 1 M.2 B key slots
- 2 M.2 M key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 8 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 3 USB 2.0,
6 COM (6 RS-485), GPIO, PS/2, Audio, 3 System FAN
- Onboard TPM 2.0
- SMBus, I2C, PMBus, iAMT 16.x, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
Coming Soon	

Packing List

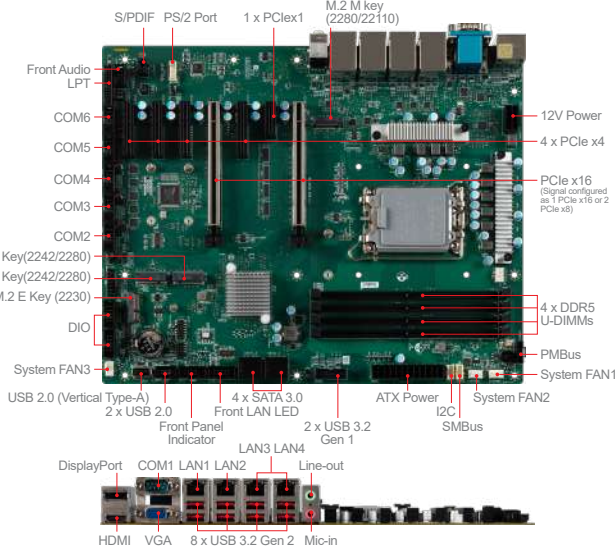
Part Number	Description
Coming Soon	

MS-CF05

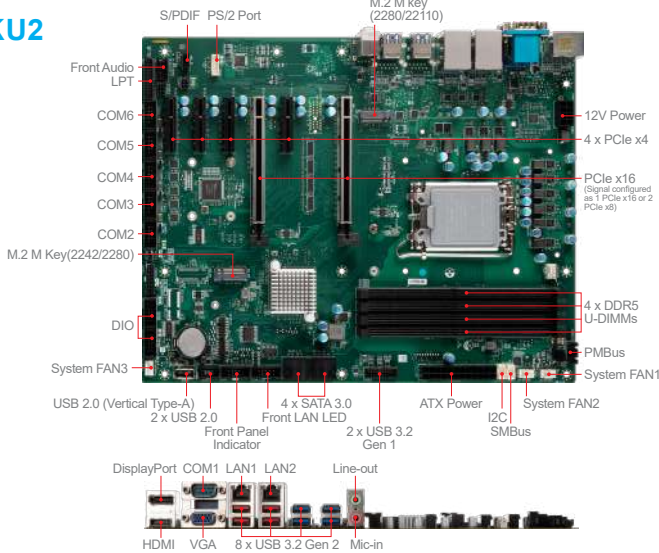
ATX with 14th/13th/12th Gen Intel® Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor & Intel® R680E/Q670E for High-Performance Solution

SKU1

NEW



SKU2



Features

- Intel® 14th/13th/12th Gen Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S Series with R680E/Q670E
- 4 DDR5 4400 MT/s ECC/non-ECC UDIMM slots up to 128GB
- Triple independent displays: VGA, DP, HDMI
- 4 2.5GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5) Slot or 2 PCIe x8 (Gen 5), 1 PCIe x4 (Gen 4), 3 PCIe x4 (Gen 3), 1 M.2 E key, 1 M.2 B key slots
- 2 M.2 M key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 8 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 3 USB 2.0, 6 COM (6 RS-485), GPIO, PS/2, Audio, 3 System FAN
- Onboard TPM 2.0
- SMBus, I2C, PMBus, iAMT 16.x, Chassis Intrusion
- ATX Power

Ordering Information

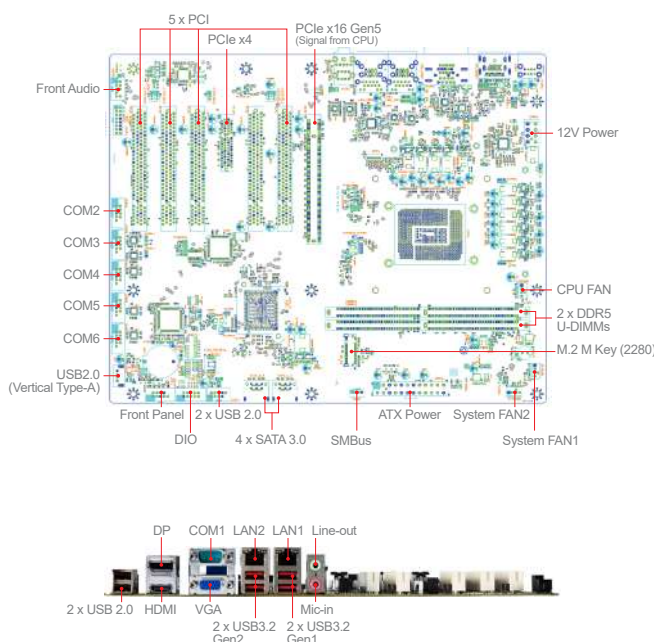
Part Number	Description
911-CF05-001	Intel ADL-S, RPL-S, R680E, 4*DDR5, HDMI+DP+VGA, 2*M.2 M key, 1*M.2 B key, 2*M.2 E key, 1*PCIe x16, 1*PCIe x8, 4*PCIe x4, 1*PCIe x1, 4*2.5GbE LAN, 4*SATA 3.0, 10*USB 3.2, 3*USB 2.0, 6*COM, TPM2.0, ATX SINGLE
911-CF05-002	Intel ADL-S, RPL-S, Q670E, 4*DDR5, HDMI+DP+VGA, 2*M.2 M key, 1*PCIe x16, 1*PCIe x8, 4*PCIe x4, 2*2.5GbE LAN, 4*SATA 3.0, 10*USB 3.2, 3*USB 2.0, 6*COM, TPM2.0, ATX SINGLE
911-CF05-101	Intel ADL-S, RPL-S, R680E, 4*DDR5, HDMI+DP+VGA, 2*M.2 M key, 1*M.2 B key, 2*M.2 E key, 1*PCIe x16, 1*PCIe x8, 1*PCIe x1, 4*2.5GbE LAN, 4*SATA 3.0, 10*USB 3.2, 3*USB 2.0, 6*COM, TPM2.0, ATX BULK
911-CF05-102	Intel ADL-S, RPL-S, Q670E, 4*DDR5, HDMI+DP+VGA, 2*M.2 M key, 1*PCIe x16, 1*PCIe x8, 4*PCIe x4, 2*2.5GbE LAN, 4*SATA 3.0, 10*USB 3.2, 3*USB 2.0, 6*COM, TPM2.0, ATX BULK

Specifications

		SKU1	SKU2
Processor	CPU	12th Gen Intel® Alder Lake-S i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 125W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 125W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/ i3/Pentium®/Celeron® IOTG Series Processor, Max 125W	
	Frequency	P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)	
	L2 Cache	4MB~30MB (Depends on CPU)	
	CPU Type	Socket (LGA 1700)	
	Chipset	Intel® R680E Express	Intel® Q670E Express
Memory	BIOS	AMI UEFI	
	Technology	Dual-channel DDR5 (ECC/non-ECC) 4400 MT/s (ECC support will depend on CPU)	Dual-channel DDR5 (non-ECC) 4400 MT/s
	Max. Capacity	Up to 128GB	
	Socket	4 x 288-pin UDIMMs	
	Controller	Intel® UHD Graphics	
Display	Graphic Memory	Depends on CPU	
	VGA	1	
	HDMI	1	
	DisplayPort	1	
	Multiple Display	3 independent displays	
Ethernet	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz	
	Controller	4 x Intel® I225-LM 2.5GbE LAN	2 x Intel® I225-LM 2.5GbE LAN
	Audio	Realtek® ALC897 Audio Codec (Co-lay ALC885)	
	Super I/O	FINTEK F81966D-I	
	Watchdog Timer	256-level Watchdog Timer	
I/O Interface	H/W Monitor	Yes	
	TPM	Infineon® SLB9672VU2.0	
	USB	8 x USB 3.2 Gen 2 x1 (8 x rear) 2 x USB 3.2 Gen 1 Ports (2 x internal) 3 x USB 2.0 (3 x internal with one Vertical Type-A Connector)	
	Serial	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring)	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control (Default set to Ring)
	Parallel	Yes	
Expansion Slot	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
	PCIe x16	2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)	
	PCIe x4	4	
	PCIe x1	1	
Storage	M.2	1 x M key (Signal from CPU) 2280/22110, 1 x M key (Signal Shared by PCIe Slot5) 2242/2280 1 x E key (PCIe x1), 2230 1 x B key (PCIe x2), 2242/2280	1 x M key (Signal from CPU) 2280/22110, 1 x M key (Signal Shared by PCIe Slot5) 2242/2280
	SATA	4 x SATA 3.0 (RAID 0/1/5/10)	
	Power Supply	ATX ATX-Power 24P, 12V-8P	
	Operating Temperature	0 ~ 60°C	
	Operating Humidity	10 ~ 90%, non-condensing	
Environment	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions	305 x 244 mm (ATX)	
	Weight	0.779 Kg	
	EMC	CE, FCC Class B, BSMI, RCM, VCCI	
Software Platform	Certification	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 22H2 (64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported	
	OS Support		

Packing List

Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable 500mm	2
K1B-3008012-E06	USB 2.0 Cable, 330mm	1
E21-CF05010-C22	I/O SHIELDING For 4 LANs	1
E21-CF05020-C22	I/O SHIELDING For 2 LANs	

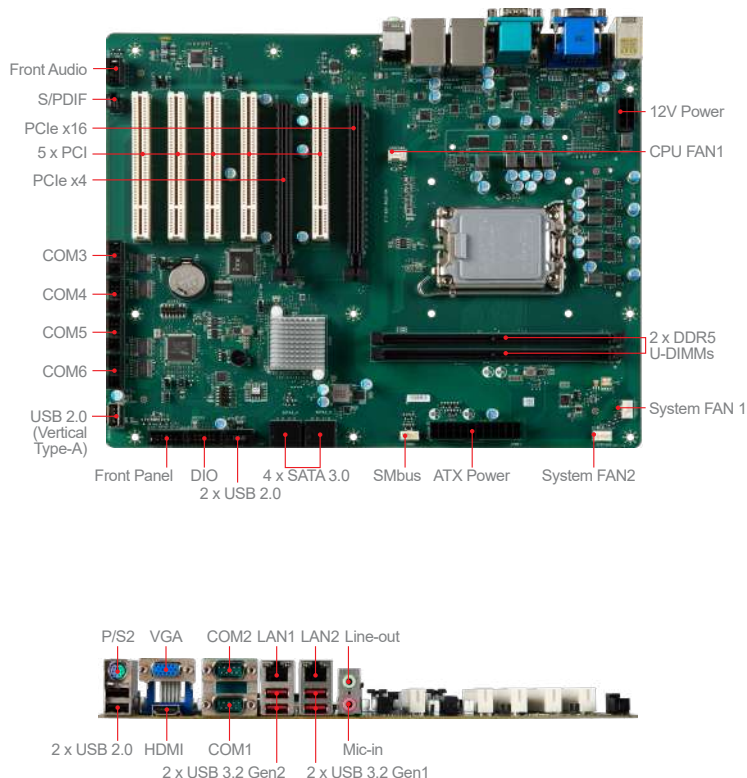


Features

- Intel® 15th Gen Arrow Lake-S/Arrow Lake-S Refresh Core Ultra 9/7/5 Series with H810
- 2 DDR5 6400 MT/s non-ECC UDIMM slots up to 96GB
- 3 independent displays : VGA, HDMI, DP
- 1 2.5GbE LAN with RJ-45, 1 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5) , 1 PCIe x4 (Gen4), 5 PCI
- 4 SATA 3.0 for storage
- 2 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 5 USB 2.0, 6 COM (2 RS-485), GPIO, Audio, 2 System FAN
- Onboard TPM 2.0
- SMBus, Chassis Intrusion
- ATX Power

Specifications

Processor	CPU	15th Gen Intel® Arrow Lake-S Core Ultra 9/7/5 Series Processor, Max 65W
	Frequency	Depends on CPU
	L2 Cache	Depends on CPU
	CPU Type	Socket (LGA1851)
	Chipset	Intel® H810 Express
Memory	BIOS	AMI UEFI
	Technology	Dual-channel DDR5 (non-ECC) 6400 MT/s
	Max. Capacity	Up to 96GB
	Socket	2 x 288-pin UDIMMs
Display	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	VGA	1
	HDMI	1
	DisplayPort	1
	Multiple Display	3 independent displays
	Display Interface	HDMI up to 4096 x 2160 @30Hz DP up to 4096 x 2304 @60Hz VGA up to 1920 x 1200 @60Hz
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I226V 2.5 GbE LAN
Audio	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)
Super I/O	Controller	Fintek F81966D-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Infineon® SLB 9672VU2.0
I/O Interface	USB	2 x USB 3.2 Gen 2 x1 Ports (2 x rear) 2 x USB 3.2 Gen 1 x1 Ports (2 x rear) 5 x USB 2.0-Ports (2 x rear, 3 x internal with one Vertical Type-A)
	Serial	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485 Auto-flow Control Supported COM3~6: RS-232, 0V/5V/12V
	GPIO	8-bit, 4 x GPI & 4 x GPO, Default
	PCIe x16	1
Expansion Slot	PCIe x4	1
	PCI	5
	M.2	1 x M.2 M key (PCIe x4 NVMe), 2280
Storage	SATA	4 x SATA 3.0
	ATX	ATX-Power 24P, 12V-8P
Power Supply	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Environment	Dimensions	305 x 244 mm (ATX)
	Weight	TBD
Form Factor		
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA, CN
		Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 24H2 LTSC (64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported
Software Platform	OS Support	



Features

- Intel® 14th/13th/12th Gen Raptor Lake-S Refresh/Raptor Lake-S/Alder Lake-S Series with H610E
- 2 DDR5 5600 MHz non-ECC UDIMM slots up to 64GB
- Dual independent displays: VGA, HDMI
- 1 2.5GbE LAN with RJ-45, 1 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 5), 1 PCIe x4 (Gen3), 5 PCI
- 4 SATA 3.0 for storage
- 2 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 5 USB 2.0, 6 COM (1 RS-485), GPIO, PS/2, Audio, 2 System FAN
- Onboard TPM 2.0
- SMBus, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
911-CF06-101	Intel Intel Alder Lake-S, Raptor Lake-S, H610E, 2*DDR5,HDMI+VGA,1*PCIe x16,1*PCIe x 4,5*PCI,1*GbE,1*2.5GbELAN,4*SATA 3.0, 4*USB 3.2,5*USB 2.0,4*COM,TPM2.0, ATX BULK
911-CF06-001	Intel Intel Alder Lake-S, Raptor Lake-S, H610E, 2*DDR5,HDMI+VGA,1*PCIe x16,1*PCIe x 4,5*PCI,1*GbE,1*2.5GbELAN,4*SATA 3.0, 4*USB 3.2,5*USB 2.0,4*COM,TPM2.0, ATX SINGLE

Packing List

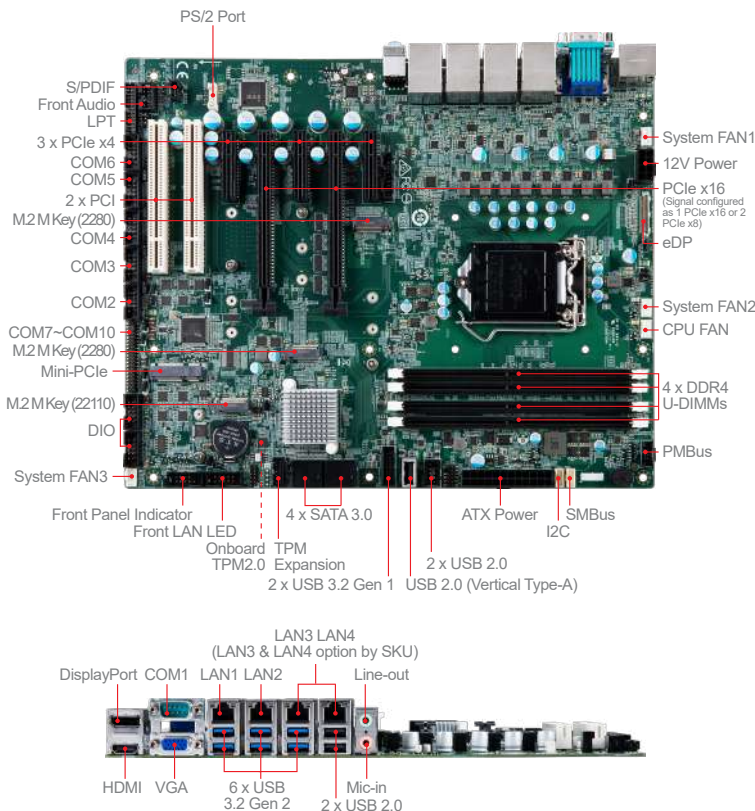
Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable, 500mm	2
E21-CF06010-C22	I/O SHIELDING	1

Specifications

Processor	CPU	12th Gen Intel® Alder Lake-S i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 65W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3/ Pentium®/Celeron® IOTG Series Processor, Max 65W 14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3/Pentium®/Celeron® IOTG Series Processor, Max 65W
	Frequency	P-Core 1.1GHz~5.0GHz (Depends on CPU) E-Core 0.9GHz~3.8GHz (Depends on CPU)
	L2 Cache	4MB~30MB (Depends on CPU)
	CPU Type	Socket (LGA1700)
Memory	Chipset	Intel® H610E Express
	BIOS	AMI UEFI
	Technology	Dual-channel DDR5 (non-ECC) 5600 MHz
	Max. Capacity	Up to 64GB
Display	Socket	2 x 288-pin UDIMMs
	Controller	Intel® UHD Graphics
	Graphic Memory	Depends on CPU
	LVDS	N/A
Ethernet	eDP	N/A
	VGA	1
	DVI	N/A
	HDMI	1
Audio	DisplayPort	N/A
	Multiple Display	2 independent displays
	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz
	Controller	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I225-V 2.5GbE LAN
Super I/O	Controller	Realtek® ALC897 Audio Codec (Co-lay ALC888S)
	Controller	FINTEK F81966D-I
	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
H/W Monitor	Controller	Infineon® SLB9672VU2.0
	USB	2 x USB 3.2 Gen 2 x1 (2 x rear) 2 x USB 3.2 Gen 1 x1 (2 x rear) 5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A)
	Serial	6 x COM ports (2 rear, 4 x internal) COM1: RS-232/422/485 0V/12V, Auto-flow Control COM2~6: RS-232, 0V/5V/12V
	Parallel	N/A
TPM	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	PCIe x16	1
	PCIe x4	1
Expansion Slot	PCIe x1	N/A
	PCI	5
	M.2	N/A
	Mini-PCIe	N/A
Storage	SATA	4 x SATA 3.0
	IDE	N/A
	eSATA	N/A
	CFast	N/A
Power Supply	mSATA	N/A
	CompactFlash	N/A
	DC	N/A
	ATX	ATX-Power 24P, 12V-8P
Environment	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	305 x 244 mm (ATX)
	Weight	0.728 Kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI, UKCA, CN
Software Platform	OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit) Windows 11 IoT Enterprise 22H2 (64-bit) Linux (Support by request) Noted : All driver base on Intel & chip vendor supported

MS-98N9

ATX with 10th Gen Intel® Comet Lake-S Xeon®, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor & Intel® W480E/Q470E for High-Performance Solution



Features

- Intel® 10th Gen Comet Lake-S Series with W480E/Q470E
- 4 DDR4 2933 MHz ECC/non-ECC UDIMMs up to 128GB
- Triple independent displays: VGA, DP, HDMI, eDP
- 4 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3) or 2 PCIe x8 (Gen 3), 3 PCIe x4 (Gen 3), 2 PCI, 1 Mini-PCIe (Full/Half-size) slots
- 3 M.2 M key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 2, 2 x USB 3.2 Gen 1, 5 USB 2.0, 10 COM, GPIO, LPT, PS/2, Audio, S/PDIF, 3 System FAN
- Onboard TPM 2.0
- SMBus, I2C, PMBus, iAMT 14.x, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98N9-001	MS-98N9(609-98N9-010)809-98N9-005 10 OPT:A Intel CML-S LGA1200, W480E, 4*DDR4, 1*VGA, 1*HD-MI, 1*DP, 1*eDP, 4*LAN, 6*USB 3.2 Gen 2, 2*USB 3.2 Gen 1, 5*USB2.0, 4*SATA3.0, 3*M.2, 10*COM, 2*PCIe x16, 4*PCIe x4, 2*PCI, TPM2.0, ATX, RoHS, SINGLE, For Channel
919-98N9-002	MS-98N9(609-98N9-020)809-98N9-006 10 OPT:B Intel CML-S LGA1200, Q470E, 4*DDR4, 1*VGA, 1*HD-MI, 1*DP, 1*eDP, 2*LAN, 6*USB 3.2 Gen 2, 2*USB 3.2 Gen 1, 5*USB2.0, 4*SATA3.0, 3*M.2, 6*COM, 2*PCIe x16, 4*PCIe x4, 2*PCI, TPM2.0, ATX, RoHS, SINGLE, For Channel

Packing List

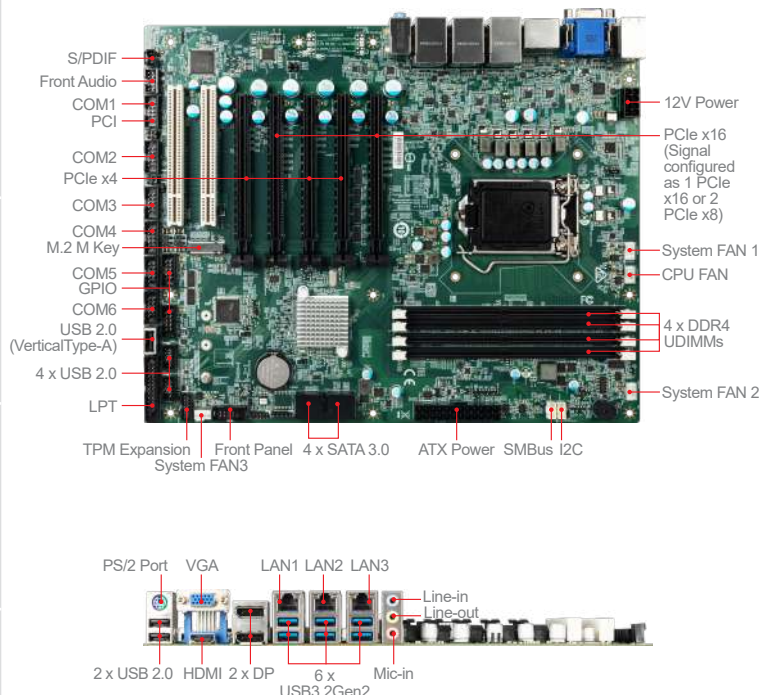
Part Number	Description	Quantity
K1B-3008012-E06	USB 2.0 CABLE, 330mm	1
K1D-1008261-V03	SATA CABLE, 500mm	2
E21-98N9010-C22	I/O SHIELDING (SKU1)	1
E21-98N9020-C22	I/O SHIELDING (SKU2)	1

Specifications

		SKU1	SKU2
		10th Gen Intel® Comet Lake-S Xeon®, Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor, Max 125W	10th Gen Intel® Comet Lake-S Core™ i9/i7/i5/i3, Pentium®, Celeron® Processor, Max 125W
Processor	CPU		
	Frequency	1.8GHz~4.8GHz (Depends on CPU)	
	L2 Cache	2MB~20MB (Depends on CPU)	
	CPU Type	Socket (LGA 1200)	
	Chipset	Intel® W480E Express	Intel® Q470E Express
	BIOS	AMI UEFI	
Memory	Technology	Dual-channel DDR4 (ECC/non-ECC)	Dual-channel DDR4 (non-ECC)
	Max. Capacity	2933 MHz	2933 MHz
	Up to	128GB	128GB
	Socket	4 x 288-pin UDIMMs	
	Controller	Intel® UHD Graphics	
	Graphic Memory	Depends on CPU	
Display	LVDS	N/A	
	eDP	1	
	VGA	1	
	DVI	N/A	
	HDMI	1	
	DisplayPort	1	
	Multiple Display	3 independent displays	
	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @30Hz DP up to 4096 x 2304 @60Hz eDP up to 4096 x 2304 @60Hz	
	Controller	1 x Intel® I219-LM GbE LAN PHY	1 x Intel® I219-LM GbE LAN PHY
	Controller	3 x Intel® I210-AT GbE LAN	1 x Intel® I210-AT GbE LAN
Ethernet	Controller	Realtek® ALC888S-VD2-GR Audio Codec	
Audio	Controller	Fintek F81966D-I	
Super I/O	Watchdog Timer	256-level Watchdog Timer	
H/W Monitor	Smart Fan	Yes	
TPM	Controller	Infineon SLB 9670VQ2.0	
I/O Interface	USB	6 x USB 3.2 Gen 2 (6 x rear) 2 x USB 3.2 Gen 1 (2 x internal) 5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A Connector)	
	Serial	10 x COM ports (1 x rear, 9 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232/422/485 with 0V/5V/12V Auto-flow Control COM7~10: RS-232, 0V/5V/12V	6 x COM ports (1 x rear, 5 x internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232/422/485 with 0V/5V/12V Auto-flow Control
	Parallel	Yes	
	PS/2	1 (wafer Connector)	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
	PCIe x16	1 (Signal configured as 1 PCIe x16 or 2 PCIe x8)	
	PCIe x4	3	
	PCIe x1	N/A	
	PCI	2	
	M.2	3 x M.2 M key (PCIe x4 NVMe, signal shared with PCIe Slot 1 & 3 & 5), two with 2242/2260/2280, one with 2242/2260/2280/22110	
Expansion Slot	Mini-PCIe	1 x Full-size/Half-size	
	SATA	4 x SATA 3.0 (RAID 0/1/5/10)	
	IDE	N/A	
	eSATA	N/A	
	CFast	N/A	
	mSATA	N/A	
Storage	CompactFlash	N/A	
	DC	N/A	
Power Supply	ATX	ATX-Power 24P, 12V-8P	
	Operating Temperature	-10 ~ 60°C	
Environment	Operating Humidity	Note: Thermal w/ Airflow:0.7m/s 10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions	305 x 244 mm (ATX)	
Form Factor	Weight	0.735 Kg	
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI Windows 10 IoT Enterprise 2019 SAC (64-bit, RS5)	
Software Platform	OS Support	Windows 10 Enterprise LTSC (64-bit, RS5) Windows 11 IoT Enterprise LTSC (64-bit) Linux (Support by request)	

MS-98K9 V2.1

ATX with 8th/9th Gen Intel® Coffee Lake-S & Coffee Lake Refresh-S Xeon®, Core™ i7/i5/i3, Pentium®, Celeron® Processor & Intel® C246/Q370 for High-Performance Solution



Features

- Intel® 9th/8th Gen Coffee Lake Refresh-S/Coffee Lake-S Series with C246/Q370
- 4 DDR4 2666 MHz ECC/non-ECC UDIMMs up to 128GB
- Triple independent displays: VGA, 2 DP, HDMI
- 3 GbE LAN with RJ-45
- 1 PCIe x16 (Gen3) or 2 PCIe x8 (Gen3), 3 PCIe x4 (Gen3), 2 PCI slots
- M.2 M key, 4 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 2, 7 USB 2.0, 6 COM (2 RS-485), GPIO, LPT, PS/2, Audio, S/PDIF, 3 System FAN
- Onboard TPM 2.0 (by option)
- SMBus, I2C, iAMT 12.x, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98K9-004	MS-98K9 VER 21, ATX, Intel Coffee Lake-S Refresh, Intel C246, 4*DDR4, 1*VGA, 1*HDMI, 2*DP, 3*LAN, 6*USB3.2, 7*USB2.0, 4*SATA3.0, 1*M.2, 6*COM, 5*PCIe x16, 2*PCI, TPM2.0, 2*SATA CABLE, 1*COM CABLE, 1*USB 2.0 CABLE, 1*I/O SHIELD, SINGLE, For Channel
919-98K9-005	MS-98K9 VER 21, ATX, Intel Coffee Lake-S Refresh, Intel Q370, 4*DDR4, 1*VGA, 1*HDMI, 2*DP, 3*LAN, 6*USB3.2, 7*USB2.0, 4*SATA3.0, 1*M.2, 6*COM, 5*PCIe x16, 2*PCI, TPM2.0, 2*SATA CABLE, 1*COM CABLE, 1*USB 2.0 CABLE, 1*I/O SHIELD, SINGLE, For Channel

Packing List

Part Number	Description	Quantity
K1B-3008012-E06	USB2.0 Cable, 330mm	1
K14-1018004-V03	COM Port Cable, 510mm	1
K1D-1008261-V03	SATA Cable, 550mm	2
E21-98K9010-C22	IO Shielding	1

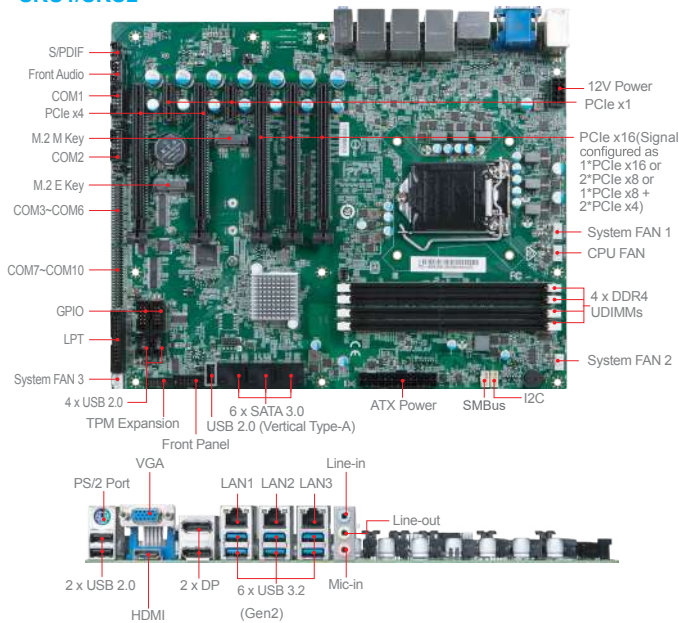
Specifications

System Processor	CPU	SKU1	SKU2
		9th/8th Gen Intel® Coffee Lake Refresh-S/Coffee Lake-S Xeon®, Core™ i7/i5/i3, Pentium®, Celeron® Processor, Max 95W	9th/8th Gen Intel® Coffee Lake Refresh-S/Coffee Lake-S, Core™ i7/i5/i3, Pentium®, Celeron® Processor, Max 95W
System Processor	Frequency	2.1GHz~4.7GHz (Depends on CPU)	
	L2 Cache	2MB~12MB (Depends on CPU)	
	CPU Type	Socket (LGA 1151)	
	Chipset	Intel® C246 Express	Intel® Q370 Express
	BIOS	AMI UEFI	
Memory	Technology	Dual-channel DDR4 (ECC/non-ECC) 2666 MHz	Dual-channel DDR4 (non-ECC) 2666 MHz
	Max. Capacity	Up to 128GB	
	Socket	4 x 288-pin UDIMMs	
Display	Controller	Intel® UHD Graphics	
	Graphic Memory	Depends on CPU	
	VGA	1	
	HDMI	1	
	DisplayPort	2	
	Multiple Display	3 independent displays	
Display	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz	
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 2 x Intel® I210-AT GbE LAN	
Audio	Controller	Realtek® ALC887-VD2-CG Audio Codec	
Super I/O	Controller	Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
TPM	Controller	Infineon SLB 9665TT2.0	
I/O Interfaces	USB	7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A) 6 x USB 3.2 Gen 2 (rear)	
	Serial	6 x COM ports (internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V	
	Parallel	Yes	
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
Expansion Slot	PCIe x16	2 (Signal configured as 1 PCIe x16 or 2 PCIe x8)	
	PCIe x4	3 (PCIe x16 Slot Type; 2*PCIe x4 NVMe)	
	PCIe x1	N/A	
	M.2	1 x M.2 M key (PCIe x4 NVMe, Intel® Optane™ Memory Support, SATA 3.0), 2242/2260/2280	
Storage	Mini-PCIe	N/A	
Storage	SATA	4 x SATA 3.0 (RAID 0/1/5/10, SATA port 4 share with M.2 M Key)	
Power Supply	ATX	ATX-Power 24P, 12V-8P	
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow: 0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	305 x 244 mm (ATX)	
	Weight	0.70 kg	
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI	
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)	

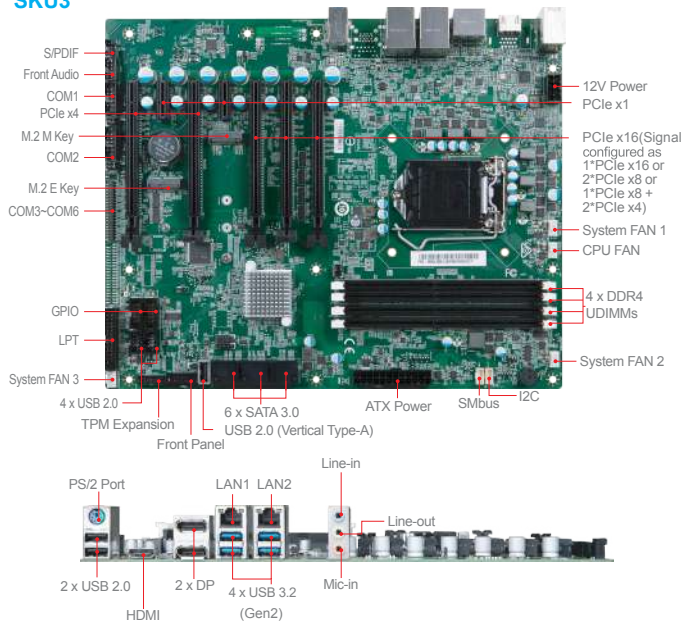
MS-98K9

ATX with 8th Gen Intel® Coffee Lake-S Xeon®, Core™ i7/i5/i3, Pentium®, Celeron® Processor & Intel® C246/Q370 for High-Performance Solution

SKU1/SKU2



SKU3



Features

- Intel® 8th Gen Coffee Lake-S Series with C246/Q370
- 4 DDR4 2666 MHz ECC/non-ECC UDIMM slots up to 64GB
- Triple independent displays: VGA, 2DP, HDMI
- 3 GbE LAN with RJ-45
- 1 PCIe x16 (Gen3) or 2 PCIe x8 (Gen3) or 1 PCIe x8 (Gen3) & 2 PCIe x4 (Gen3), 2 PCIe x4 (Gen3), 2 PCIe x1 (Gen3), 1 M.2 E key slots
- M.2 M key, 6 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 2, 7 USB 2.0, 10 COM (2 RS-485), GPIO, LPT, PS/2, Audio, S/PDIF, 3 System FAN
- Onboard TPM 2.0 (by option)
- SMBus, I2C, iAMT 12.x, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98K9-001	MS-98K9/609-98K9-010/809-98K9-005 VER10 Intel Coffee Lake-S C246, 4*DDR4 Long DIMM, 3*PCle16, 2*PCle4, 2*PCle1, HDMI, 2*DP, VGA, TPM2.0, 3*LAN, 6*USB3.1, 7*USB2.0, 6*SATA3.0, 2*M.2, 10*COM, ATX POWER, RoHS, SINGLE, For Channel
919-98K9-002	MS-98K9/609-98K9-020/809-98K9-006 VER10 OPT:A Intel Coffee Lake-S Q370 4*DDR4 Long DIMM, 3*PCle x16, 2*PCle x4, 2*PCle x1, HDMI, 2*DP, VGA, TPM2.0, 3*LAN, 6*USB3.1, 7*USB2.0, 6*SATA3.0, 2*M.2, 10*COM, ATX POWER, RoHS, SINGLE, For Channel
919-98K9-003	MS-98K9/609-98K9-030/809-98K9-007 VER10 OPT:B Intel Coffee Lake-S Q370 4*DDR4 Long DIMM, 3*PCle x16, 2*PCle x4, 2*PCle x1, HDMI, 2*DP, 2*LAN, 4*USB3.1, 7*USB2.0, 6*SATA3.0, 2*M.2, 6*COM, ATX POWER, RoHS, SINGLE, For Channel

Specifications

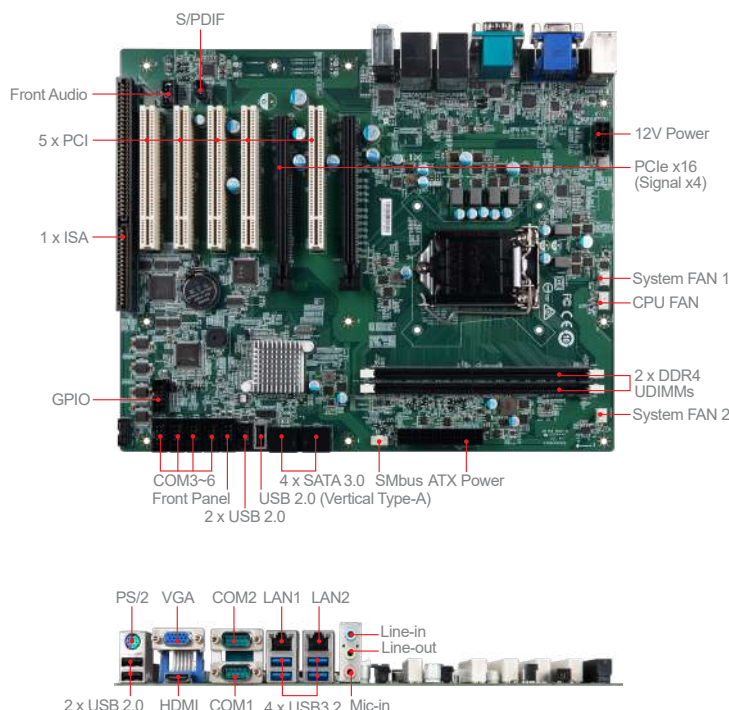
System Processor	CPU	SKU1		SKU2	SKU3	
		8th Gen Intel® Desktop Coffee Lake-S Xeon®/i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		8th Gen Intel® Desktop Coffee Lake-S i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W		
		Frequency		2.1GHz~4.7GHz (Depends on CPU)		
		L2 Cache		2MB~12MB (Depends on CPU)		
		CPU Type		Socket (LGA 1151)		
		Chipset	Intel® C246 Express	Intel® Q370 Express		
		BIOS		AMI UEFI		
Memory	Technology	Dual-channel DDR4 (ECC/ non-ECC) 2666 MHz		Dual-channel DDR4 (non-ECC) 2666 MHz		
	Max. Capacity	Up to 64GB				
	Socket	4 x 288-pin UDIMMs				
Display	Controller	Intel® UHD Graphics				
	Graphic Memory	Depends on CPU				
	LVDS	1 x Dual channel 18/24-bit				
	VGA	1			N/A	
	HDMI	1				
	DisplayPort	2				
	Multiple Display	3 independent displays				
	Multiple Display	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz			HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz	
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 2 x Intel® I210-AT GbE LAN			1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	
Audio	Controller	Realtek® ALC887-VD2-CG Audio Codec				
H/W Monitor	Watchdog Timer	256-level Watchdog Timer				
	Smart Fan	Yes				
I/O Interfaces	USB	7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A) 6 x USB 3.2 Gen 2 (rear)			7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 2 (rear)	
	Serial	10 x COM ports (internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~10: RS-232, 0V/5V/12V			6 x COM ports (internal) COM1~2: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V	
	Parallel	Yes				
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse				
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V				
	TPM	Controller	Infineon SLB 9665TT2.0			Box header (Default) Infineon SLB9665TT2.0 (by BOM option)
Expansion Slot	PCIe x16	3 (Signal configured as 1 PCIe x16 or 2 PCIe x8 or 1 PCIe x8 + 2 PCIe x4)				
	PCIe x4	2 (PCIe x16 Slot Type; 1*PCIe x4 NVMe)				
	PCIe x1	2				
	M.2	1 x M key (PCIe x4 NVMe, SATA 3.0), 2242/2260/2280 1 x E key (PCIe x1, USB 2.0), 2230				
Storage	Mini-PCIe	N/A				
	SATA	6 x SATA 3.0 (RAID 0/1/5/10, SATA port 6 share with M.2 M Key)				
Power Supply	DC Input	N/A				
	AC Input	ATX-Power 24P, 12V-8P				
Form Factor	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s				
	Operating Humidity	10 ~ 90%, non-condensing				
	Storage Temperature	-20 ~ 80°C				
	Storage Humidity	10 ~ 90%, non-condensing				
	Dimensions (W x D x H)	305 x 244 mm (ATX)				
	Weight	0.70 kg				
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI				
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Windows 11 IoT Enterprise (64-bit, 22H2, Pre-scan) Linux (Support by request)				

Packing List

Part Number	Description	Quantity
K1B-3008012-E06	IO SHIELD FOR MS-98D6	1
K14-1018004-V03	INT COM PORT CABLE, 510mm	1
K1D-1008261-V03	INT SATA CABLE, 500mm	2
E21-98K9010-C22	I/O Shielding	1

MS-98L9 V2.0

ATX with 7th/6th Gen Intel® Kaby Lake/Skylake Core™ i7/i5/ i3, Pentium®, Celeron® Processor & Intel® H110 for Mainstream with ISA Solution



Features

- Intel® 7th/6th Gen Kaby Lake-S/Skylake-S Series with H110
- 2 DDR4 2133/2400 MHz UDIMM slots up to 32GB
- Dual independent displays: VGA, HDMI
- 2 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3), 1 PCIe x4 (Gen 3), 5 PCI, 1 ISA slots
- 4 SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 5 USB 2.0, 6 COM ports (1 RS-485), GPIO, PS/2, Audio, S/PDIF, 2 System FAN
- SMBus, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98L9-002	MS-98L9/609-98L9-020/809-98L9-006 VER:20 ATX, Intel Kaby Lake-S/Skylake-S H110, 2*DDR4, 1*PCIe x16, 1*PCIe x4, 5*PCI, 1*ISA, HDMI, VGA, 2*LAN, 4*USB3.0, 5*USB2.0, Single, for channel.
919-98L9-101	MS-98L9/609-98L9-020/809-98L9-101 VER:20 ATX, Intel Kaby Lake-S/Skylake-S H110, 2*DDR4, 1*PCIe x16, 1*PCIe x4, 5*PCI, 1*ISA, HDMI, VGA, 2*LAN, 4*USB3.0, 5*USB2.0, Bulk, for channel.

Packing List

Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable ,500mm	2
E21-98L9010-C22	I/O Shielding	1

Optional Item

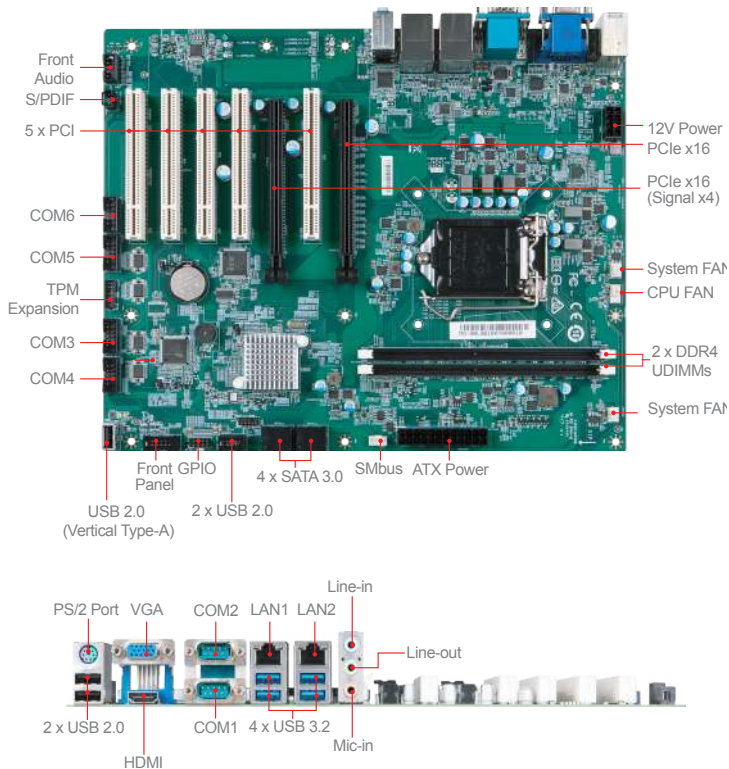
Part Number	Description
K1B-3008012-E06	USB3.0 Cable, 330mm
K14-1018004-V03	COM Port Cable, 510mm
K39-3002004-E06	PS/2 Y-Cable, 190mm

Specifications

System Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/ i5/i3/Pentium®/Celeron® Series Processor, Max 95W
	Frequency	2.3GHz~4.2GHz (Depends on CPU)
	L2 Cache	2MB~8MB (Depends on CPU)
	CPU Type	Socket (LGA 1151)
	Chipset	Intel® H110 Express
Memory	BIOS	AMI UEFI
	Technology	Dual-channel DDR4 2133/2400 MHz
	Max. Capacity	Up to 32GB
	Socket	2 x 288-pin UDIMMs
Display	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	N/A
	eDP	N/A
	VGA	1
	DVI	N/A
	HDMI	1
	DisplayPort	N/A
	Multiple Display	2 independent displays
	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Box header
I/O Interfaces	USB	5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (2 x rear, 4 x internal) COM1: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM2~6: RS-232, COM2: 0V/5V/12V
	Parallel	N/A
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	8-bits (4 x GPI; 4 x GPO by default), 5V 8-bits (8 x GPI or 8 x GPO by request), 5V
Expansion Slot	PCIe x16	1
	PCIe x4	1 (PCIe x16 Slot Type)
	PCIe x1	N/A
	PCI	5
	M.2	N/A
	Mini-PCIe	N/A
Storage	SATA	4 x SATA 3.0
Power Supply	ATX	ATX-Power 24P, 12V-8P
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	305 x 244 mm (ATX)
	Weight	0.70 kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only)
		Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

MS-98L9

ATX with 7th/6th Gen Intel® Kaby Lake/Skylake Core™ i7/i5/ i3, Pentium®, Celeron® Processor & Intel® H110 for Mainstream Solution



Features

- Intel® 7th/6th Gen Kaby Lake-S/Skylake-S Series with H110
- 2 DDR4 2133/2400 MHz UDIMM slots up to 32GB
- Dual independent displays: VGA, HDMI
- 2 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3), 1 PCIe x4 (Gen 3), 5 PCI slots
- 4 SATA 3.0 for storage
- 4 USB 3.2 Gen 1, 5 USB 2.0, 6 COM ports (1 RS-485), GPIO, PS/2, Audio, S/PDIF, 2 System FAN
- SMBus, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98L9-001	MS-98L9/609-98L9-010/809-98L9-005 VER11 Intel Kaby Lake-S/Skylake-S H110, 2*DDR4, 1*PCIe x16, 1*PCIe x4, 5*PCI, HDMI, VGA, 2*LAN, 4*USB3.0, 5*USB2.0, 4*SATA3.0, 6*COM, ATX POWER, RoHS, SINGLE, For Channel

Packing List

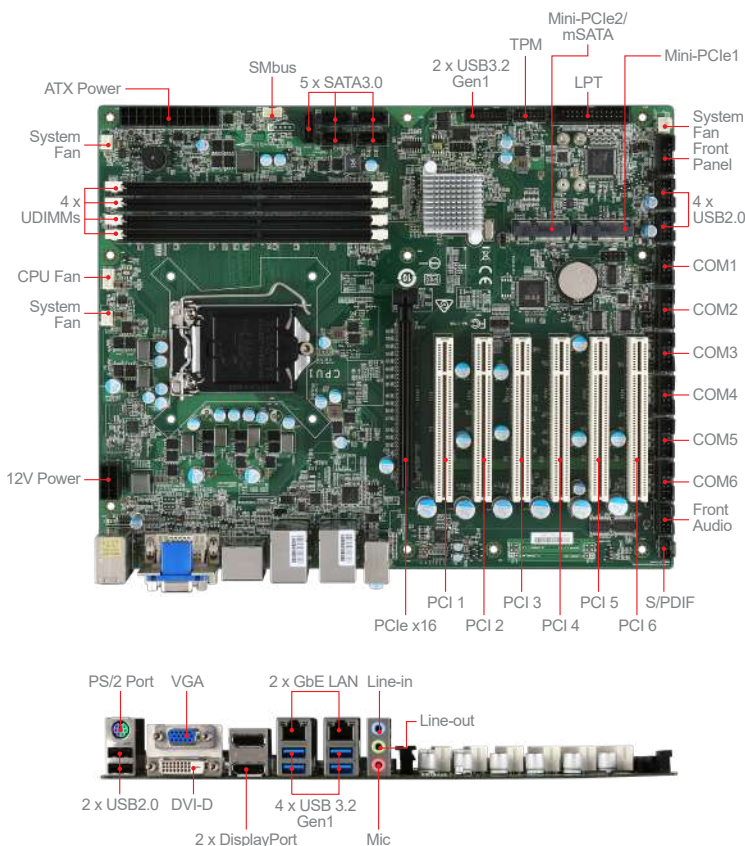
Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable, 500mm	2
E21-98L9010-C22	I/O SHIELDING	1

Specifications

Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 65W
	Frequency	2.3GHz~4.2GHz (Depends on CPU)
	L2 Cache	2MB~8MB (Depends on CPU)
	CPU Type	Socket (LGA 1151)
	Chipset	Intel® H110 Express
Memory	BIOS	AMI UEFI
	Technology	Dual-channel DDR4 2133/2400 MHz
	Max. Capacity	Up to 32GB
	Socket	2 x 288-pin UDIMMs
	Controller	Intel® HD Graphics
Display	Graphic Memory	Depends on CPU
	VGA	1
	DisplayPort	N/A
	Multiple Display	2 independent displays
	Display Interface	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz
Ethernet	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Box header
I/O Interface	USB	5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A) 4 x USB 3.2 Gen 1 (rear)
	Serial	6 x COM ports (2 x rear, 4 x internal) COM1: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM2~6: RS-232, COM2: 0V/5V/12V
	Parallel	N/A
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	GPIO 1: 8-bits (4 x GPI; 4 x GPO by default), 5V GPIO 2: 8-bits (8 x GPI or 8 x GPO by request), 5V
Expansion Slot	PCIe x16	1
	PCIe x4	1 (PCIe x16 Slot Type)
	PCI	5
	M.2	N/A
	Mini-PCIe	N/A
Storage	SATA	4 x SATA 3.0
	mSATA	N/A
Power Supply	DC	N/A
Environment	ATX	ATX-Power 24P, 12V-8P
	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow: 0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	305 x 244 mm (ATX)
	Weight	0.70 kg
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

MS-98H9 V2.0

ATX with 7th/6th Gen Intel® Kaby Lake/Skylake Core™ i7/i5/i3, Pentium®, Celeron® Processor & Intel® Q170 for High-Performance Solution



Features

- Intel® 7th/6th Gen Kaby Lake-S/Skylake-S Series with i7/i5/i3, Pentium®, Celeron®, and Intel® Q170
- 4 DDR4 2133 MHz UDIMM slots up to 64GB
- Triple independent displays: VGA, DVI-D, 2DP
- 2 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3), 6 PCI, 1 Mini-PCle (Full-size, with mSATA), 1 Mini-PCle (Full-size) slots
- mSATA, 5 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 1, 6 USB 2.0, 6 COM (2 RS-485), GPIO, LPT, PS/2, Audio, S/PDIF, 3 System FAN
- SMBus, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98H9-006	MS-98H9 VER:20 Intel Kaby Lake-S/Skylake-S, Intel Q170, 4*DDR4, 1*DVI-D+1*VGA+2*DP+ 6*USB3.2 Gen 1+6*USB 2.0+ 5*SATA 3.0+1*PCIe x16+6*PCI+2*Mini-PCle+1*mSATA+6*COM+2*LAN+ATX POWER

Packing List

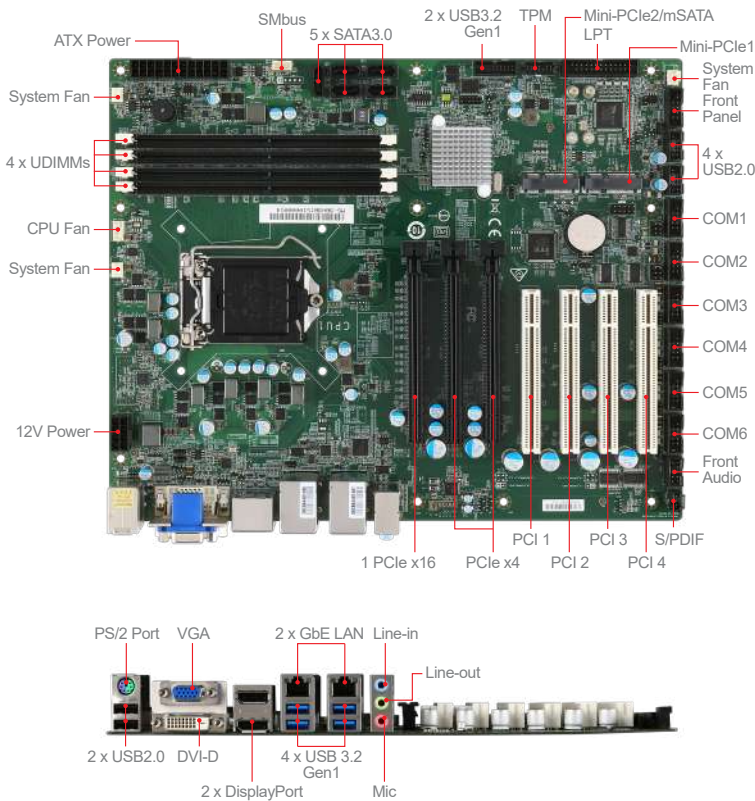
Part Number	Description	Quantity
K1B-3008012-E06	USB Cable, 330mm	1
K14-1018004-V03	COM Port Cable, 510mm	1
K39-3002004-E06	PS/2 Y-Cable, 190mm	1
K18-1025011-V03	LPT Cable, 300mm	1
K1D-1008261-V03	SATA Cable, 500mm	2
E21-98H9010-C22	I/O SHIELDING	1

Specifications

Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W
	Frequency	2.6GHz~4.5GHz(Depends on CPU)
	L2 Cache	2MB~8MB (Depends on CPU)
	CPU Type	Socket (LGA 1151)
	Chipset	Intel® Q170 Express
Memory	BIOS	AMI UEFI
	Technology	Dual-channel DDR4 (non-ECC) 2133 MHz
	Max. Capacity	Up to 64GB
Display	Socket	4 x 288-pin UDIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Depends on CPU
	LVDS	N/A
	eDP	N/A
	VGA	1 (Non Hot Plug)
	DVI	1 (DVI-D)
	HDMI	N/A
	DisplayPort	2
	Multiple Display	3 independent displays
Ethernet	Display Interface	VGA up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz DP up to 4096 x 2304 @60Hz
	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
Audio	Controller	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	Box header
I/O Interface	USB	6 x USB 2.0 (2 x rear, 4 x internal) 6 x USB 3.2 Gen 1 (4 x rear, 2 x internal)
	Serial	6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V
	Parallel	Yes
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	PCIe x16	1
Expansion Slot	PCIe x4	N/A
	PCIe x1	N/A
	PCI	6
	M.2	N/A
	Mini-PCle	2 x Full-size (one w/ mSATA)
Storage	SATA	5 x SATA 3.0 (RAID 0/1/5/10)
	IDE	N/A
	eSATA	N/A
	CFast	N/A
	mSATA	1
Power Supply	CompactFlash	N/A
	DC	N/A
	ATX	ATX-Power 24P, 12V-8P
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	305 x 244 mm (ATX)
	Weight	0.70 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI (Class B)
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)

MS-98H9

ATX with 7th/6th Gen Intel® Kaby Lake/Skylake Core™ Xeon®/i7/i5/i3, Pentium®, Celeron® Processor & Intel® C236/Q170/H110 for High-Performance Solution



Features

- Intel® 7th/6th Gen Intel® Kaby Lake-S/Skylake-S Series with i7/i5/i3, Pentium®, Celeron®, C236/Q170/H110
- 4 DDR4 2133 MHz ECC/non-ECC UDIMM slots up to 64GB
- Triple independent displays: VGA, DVI-D, 2DP
- 2 GbE LAN with RJ-45
- 1 PCIe x16 (Gen 3), 2 PCIe x4 (Gen 3), 4 PCI, 1 Mini-PCle (Full-size, with mSATA), 1 Mini-PCle (Full-size) slots
- mSATA, 5 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 1, 6 USB 2.0, 6 COM (2 RS-485), GPIO, LPT, PS/2, Audio, S/PDIF, 3 System FAN
- SMBus, Chassis Intrusion
- ATX Power

Ordering Information

Part Number	Description
919-98H9-001	MS-98H9 VER:10 Intel Kaby Lake-S/Skylake-S, Intel C236, 4*DDR4, 1*DVI-D+1*VGA+2*DP+6*USB3.2 Gen 1+6*USB 2.0+5*SATA 3.0+1*PCIe x16+2*PCIe x4+4*P-CI+2*Mini-PCle+1*mSATA+6*COM+2*LAN+ATX POWER
919-98H9-002	MS-98H9 VER:10 Intel Kaby Lake-S/Skylake-S, Intel Q170, 4*DDR4, 1*DVI-D+1*VGA+2*DP+6*USB3.2 Gen 1+6*USB 2.0+5*SATA 3.0+1*PCIe x16+2*PCIe x4+4*P-CI+2*Mini-PCle+1*mSATA+6*COM+2*LAN+ATX POWER
919-98H9-003	MS-98H9 VER:10 Intel Kaby Lake-S/Skylake-S, Intel H110, 2*DDR4, 1*DVI-D+1*VGA+2*DP+4*USB3.2 Gen 1+4*USB 2.0+4*SATA 3.0+1*PCIe x16+1*PCIe x4+4*P-CI+6*COM+2*LAN+ATX POWER

Packing List

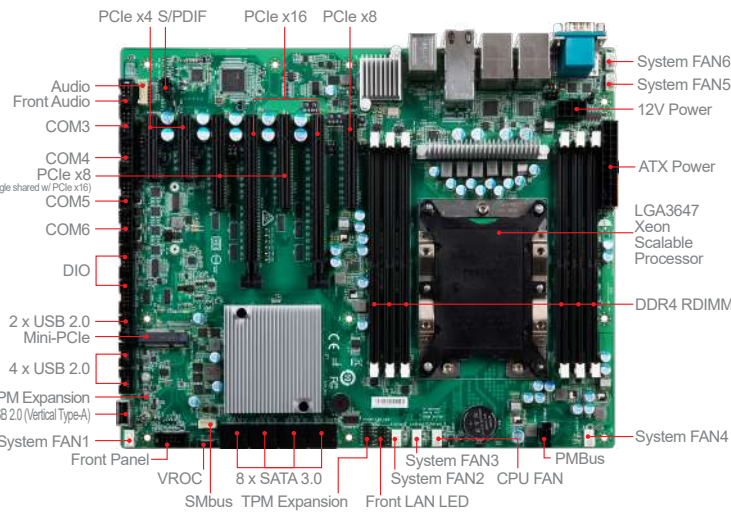
Part Number	Description	Quantity
K1B-3008012-E06	USB 2.0 Cable, 330mm	1
K14-1018004-V03	COM Port Cable, 510mm	1
K39-3002004-E06	PS/2 Y-Cable, 190mm	1
K18-1025011-V03	LPT Cable, 300mm	1
K1D-1008261-V03	GPIO Cable, 500mm	2
E21-98H9010-C22	I/O SHIELDING	1

Specifications

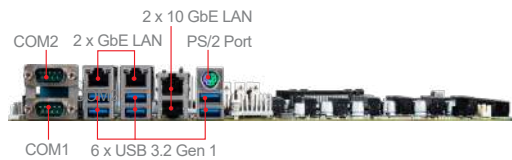
Processor	CPU	C236 SKU	Q170 SKU	H110 SKU	
		7th/6th Gen Intel® Desktop Kaby Lake/Skylake Xeon®/i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W			
		7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W			
		Frequency			2.6 GHz~4.5 GHz (Depends on CPU)
		L2 Cache			2MB~8MB (Depends on CPU)
	CPU Type			Socket (LGA 1151)	
Memory	Chipset	Intel® C236 Express	Intel® Q170 Express	Intel® H110 Express	
	BIOS	AMI UEFI			
Memory	Technology	Dual-channel DDR4 (ECC) 2133 MHz		Dual-channel DDR4 (non-ECC) 2133 MHz	
	Max. Capacity	Up to 64GB		Up to 32GB	
	Socket	4 x 288-pin UDIMMs		2 x 288-pin UDIMMs	
Display	Controller	Intel® HD Graphics			
	Graphic Memory	Depends on CPU			
	VGA	1 (Non Hot Plug)			
	DVI	1 (DVI-D)			
	DisplayPort	2			
	Multiple Display	3 independent displays		2 independent displays	
Ethernet	Display Interface	VGA up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz DP up to 4096 x 2304 @60Hz			
	Controller	1 x Intel® I219-LM GbE LAN PHY (Support Intel® AMT 11) 1 x Intel® I210-AT GbE LAN			
Audio	Controller	Realtek® ALC887 HD Audio Codec			
Super I/O	Controller	Fintek F81866AD-I			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer			
	Smart Fan	Yes			
TPM	Controller	Box header			
I/O Interface	USB	6 x USB 2.0 (2 x rear, 4 x internal) 6 x USB 3.2 Gen 1 (4 x rear, 2 x internal)		4 x USB 2.0 (2 x rear, 2 x internal) 4 x USB 3.2 Gen 1 (rear)	
	Serial	6 x COM ports (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V			
	Parallel	1			
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse			
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V			
Expansion Slot	PCIe x16	1			
	PCIe x4	2		1	
	PCI	4			
	M.2	N/A			
Storage	Mini-PCIe	2 x Full-size (one w/ mSATA)		N/A	
	SATA	5 x SATA 3.0 (RAID 0/1/5/10)		4 x SATA 3.0	
Power Supply	mSATA	1		N/A	
	DC	N/A			
Environment	ATX	ATX-Power 24P, 12V-8P			
	Operating Temperature	-10 ~ 60°C Note: Thermal w/ Airflow:0.7m/s			
	Operating Humidity	10 ~ 90%, non-condensing			
	Storage Temperature	-20 ~ 80°C			
Form Factor	Storage Humidity	10 ~ 90%, non-condensing			
	Dimensions	305 x 244 mm (ATX)			
Certification	Weight	0.70 kg			
	EMC	FCC, CE, RCM, VCCI, BSMI (Class B)			
Software Platform	OS Support	Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux (Support by request)			

MS-98M9

ATX with 2nd/1st Gen Intel® Cascade Lake/Skylake Xeon® Scalable Processors & Intel® C622/C621 Chipset for Ultra-High Performance Solution



SKU1



SKU2



Features

- Intel® 2nd/1st Gen Cascade Lake-SP/Skylake-SP Series with C622/C621
- 6 DDR4 2666 MHz ECC RDIMMs up to 192GB
- 2 GbE LAN, 2 10GbE LAN with RJ-45
- 2 PCIe x16 (Gen 3) or 4 PCIe x8 (Gen3), 1 PCIe x8 (Gen 3), 2 PCIe x4 (Gen 3), 1 Mini-PCle (Full/Half-size, with mSATA) slots
- mSATA, 8 SATA 3.0 for storage
- SATA RAID 0/1/5/10
- 6 USB 3.2 Gen 1, 7 USB 2.0, 6 COM (2 RS-485), GPIO, PS/2, Audio, 6 System FAN
- Onboard TPM 2.0
- Intel® VROC for RAID function with NVMe storage
- SMBus, Chassis Intrusion, PMBus
- ATX Power

Ordering Information

Part Number	Description
919-98M9-001	MS-98M9/609-98M9-010/809-98M9-003 Ver 1.0 Intel Xeon-SP C622, 4*DDR4 RDIMM, 2*PCIe x16, 3*PCIe x8, 2*PCIe x4, 1*Mini-PCle, TPM2.0, 4*LANs, 6*USB3.0, 7*USB2.0, 8*SATA-3.0, 6*COM, ATX POWER, RoHS, SINGLE
919-98M9-002	MS-98M9/609-98M9-020/809-98M9-004 Ver 1.0 Intel Xeon-SP C621, 4*DDR4 RDIMM, 2*PCIe x16, 3*PCIe x8, 2*PCIe x4, 1*Mini-PCle, TPM2.0, 2*LANs, 6*USB3.0, 7*USB2.0, 8*SATA-3.0, 6*COM, ATX POWER, RoHS, SINGLE

Packing List

Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable, 500mm	2
K1B-3008012-E06	USB 2.0 Cable, 330mm	1
E21-98M9020-C22	I/O SHIELDING (SKU1)	1
E21-98M9010-C22	I/O SHIELDING (SKU2)	1

Optional Item

Part Number	Description
K1A-1018004-V03	COM Port Cable, 510mm

Specifications

		SKU1	SKU2
		2nd/1st Gen Intel® Cascade Lake/Skylake Xeon® Scalable Processors, Max 205W	
System Processor	CPU	2nd/1st Gen Intel® Cascade Lake/Skylake Xeon® Scalable Processors, Max 205W	
	Frequency	1.9GHz~2.5GHz (Depends on CPU)	
	L2 Cache	11MB~27.5MB (Depends on CPU)	
	CPU Type	Socket (LGA 3647)	
	Chipset	Intel® C622 Express	Intel® C621 Express
Memory	BIOS	AMI UEFI	
	Technology	Six-channel DDR4 (ECC) 2666 MHz	
	Max. Capacity	Up to 192GB	
	Socket	6 x 288-pin RDIMMs	
	Controller	N/A	
Display	Graphic Memory	N/A	
	LVDS	N/A	
	eDP	N/A	
	VGA	N/A	
	DVI	N/A	
	HDMI	N/A	
	DisplayPort	N/A	
	Multiple Display	N/A	
Ethernet	Controller	1 x Intel® PHY X557-AT2 GbE LAN 2 x Intel® I210-AT GbE LAN	2 x Intel® I210-AT GbE LAN
	Audio	Realtek® ALC887-VD2-CG HD Audio Codec	
Super I/O	Controller	Fintek F81866AD-I	
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	
TPM	Smart Fan	Yes	
	Controller	Infineon SLB9665TT2.0	
I/O Interfaces	USB	7 x USB 2.0 (7 x internal with one Vertical Type-A) 6 x USB 3.2 Gen 1 (rear)	
	Serial	6 x COM ports (2 x rear, 4 x internal) COM1: RS-232/422/485, Ring/0V/5V/12V, Auto-flow Control COM2: RS-232/422/485, 0V/5V/12V, Auto-flow Control COM3~6: RS-232, 0V/5V/12V	
	Parallel	N/A	
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
	PCIe x16	2 (Signal configured as 2 PCIe x16 or 4 PCIe x8 or 1 PCIe x16 + 2 PCIe x8)	
	PCIe x8	3 (Slot3&5 single shared with PCIe x16)	
	PCIe x4	2	
Expansion Slot	PCIe x1	N/A	
	PCI	N/A	
	M.2	N/A	
	Mini-PCle	1 x Full-size/Half-size (mSATA)	
	SATA	8 x SATA 3.0 (RAID 0/1/5/10)	
Storage	mSATA	1 (shared w/ Mini-PCle)	
Power Supply	ATX	ATX-Power 24P, 12V-8P	
Environment	Operating Temperature	0 ~ 60°C Note: Thermal w/ Airflow:0.7m/s	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions (W x D x H)	305 x 244 mm (ATX)	
	Weight	0.90 kg	
Certification	EMC	CE, FCC Class B, BSMI, RCM, VCCI	
Software Platform	OS Support	Windows Server 2012 (64-bit) (Skylake-SP Series CPU Only) Windows Server 2016 (64-bit) (Skylake-SP & Cascade Lake Series CPU) Windows Server 2019 (64-bit) (Cascade Lake Series CPU) Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) (by request) Linux (Support by request)	

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