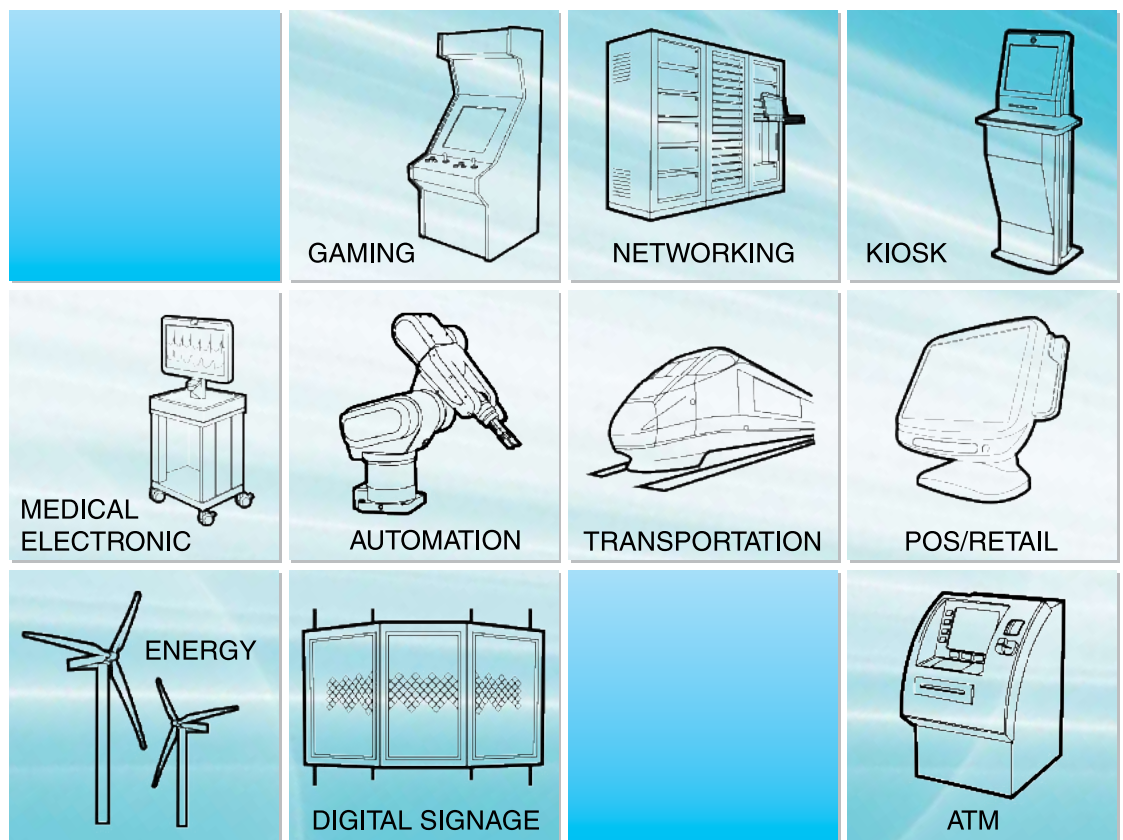


## Industrial Platform Solution

We Customize Your Business



Ready platforms for time  
to market integration in  
industrial applications

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## About MSI Industrial Platform Solution (IPC Business Unit in MSI group)

MSI has more than 30 years' of experience in motherboard design & manufacturing, ranked among the world's top 3 largest motherboard manufacturers, recognized internationally for high quality and stability by clients and individual users.

In Y2006, MSI entered Embedded and Industrial market development, and started providing reliable and expandable product with longevity support (5 to 7 Years).

We design & manufacture high-quality embedded boards and systems for various applications, such as **digital signage, medical electronics, ATM, POS, Kiosk, industrial automation, gaming, utility, and transportation.**

With solid R&D and manufacturing capability, we serves client with efficient DMS (Design, Manufacturing & Service) solution, and is poised to become the best partner for worldwide partner in Embedded and Industrial market.



## Our Strengths



### 1. Various Solutions:

Providing various systems based on x86 and RISC platforms.

### 2. Energy Saving:

Through experienced system design to reduce heat generation and increase operation reliability.

### 3. Strict Quality Control:

Through a 7-stage of QC system from design to mass production is able to assure the quality.

### 4. Multi Compliance\*:

FCC, CE, RCM, BSMI, VCC, WEEE, GOST, CCC and RoHS compliant.

### 5. High R&D Capability:

In IPS team, 55% with 5-10 years of experience and 35% with over 10 years of experience

### 6. Longevity support:

We manage to offer a comprehensive longevity services and work closely with you to help new and existing products.

\*Actual compliance is followed as shown on product specifications.

## MSI DMS



### DMS (Design Manufacture Service)

- Intel® member and commitment.
- Over 150 choices of board solutions for time-to-market.
- Speedy ODM process in 3 months.
- Experienced firmware, software, and hardware engineering.

### Design for System Integration SBC

- 2D/3D mechanical design team.
- Embedded OS porting.
- OS pre-installed test, function validation, system burn-in and testing.
- Private branding services.

### Manufacturing Capability

- PCBA production line, lead-free ready!
- System assembly line and dynamic burn-in rooms.
- Complete quality assurance systems.
- Certified by ISO 9001, ISO 14001, OHSAS 18001, ISO 13485, QC 080000, and ISO/TS 16949.

### Service

- Rich application know-how and act as your consultant.
- Always be customer-oriented and flexible to fulfill your needs globally.
- Long-term partnership and customer satisfaction.
- Act as your virtual design house and manufacturing site.

# SOFTWARE SERVICES PROVIDED

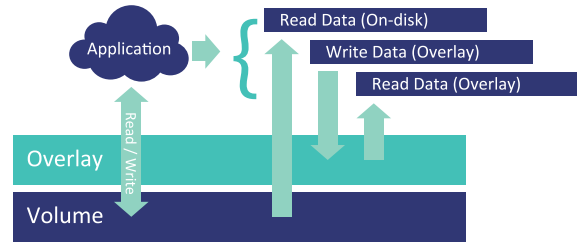
## 1. Embedded OS Customization

- POSReady 7
  - Industry 8.1
  - Windows 10 IoT LTSC\*/CBB#
  - WES7 E/P
  - WES 8
- \*: Long Term Service Branch  
#: Current Branch for Business

### UnBranded Boot / Custom Logon



### Write Filter



### Keyboard Filter



### OS Configuration Tool for Advanced build



### And other embedded Features:

- Toast Notification Blocking
- USB Filter
- Assigned Access
- Shell Launcher

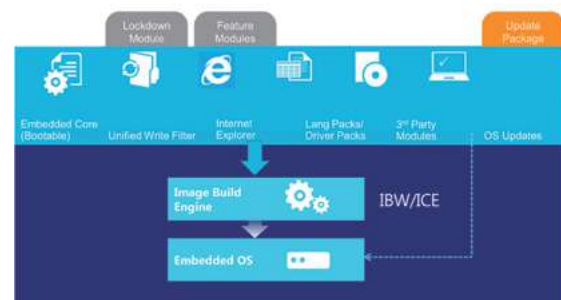
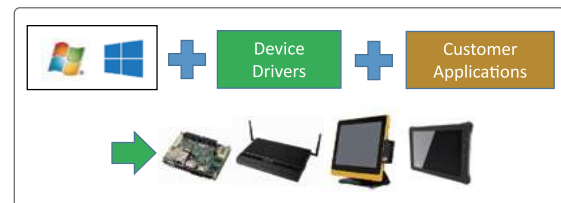
## 2. HIDAC Utility & API/Drivers

Hardware Information & Device Access Control

Hardware Management	Device Access Control
<p><b>Information of</b></p> <ul style="list-style-type: none"> <li>• System</li> <li>• Utility</li> <li>• Memory</li> <li>• Disk Drive Usager</li> </ul>	<p><b>LVDS/eDP Panel Brightness</b> Level from 1 to 5 (100%)</p>
<p><b>Hardware Monitor</b></p> <ul style="list-style-type: none"> <li>• Temperature</li> <li>• Voltage</li> <li>• FAN Speed</li> </ul>	<p><b>Cash Drawer Open &amp; Status</b> Supported on models with RJ11 Cash Drawer port</p>
<p><b>Alarm Logs</b></p> <ul style="list-style-type: none"> <li>• Real-time display of Hardware Monitor alarm logs</li> </ul>	<p><b>On Board GPIO Pin header</b></p> <ul style="list-style-type: none"> <li>• Real-time display of GPIO status</li> <li>• Selectable GPO status</li> </ul>
	<p><b>Watchdog Timer Operation</b> Real-time display and control of Watchdog Timer</p>

## 3. Embedded MS WES7/8 Integration

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



# Product Solution Guide

		Automation	Digital Signage	Gaming	Industrial
Industrial Computers ▶	MS-9B11	*		*	*
	MS-9A76	*	*	*	*
	MS-9A66	*	*	*	*
	MS-9A89	*	*		*
	MS-9A79	*	*		*
	MS-9A59	*	*		*
	MS-9A69	*	*		
	MS-9A78	*	*		
	MS-9A68	*	*		
	MS-9A84	*	*		*
	MS-9A95		*		
	MS-9A75		*		
	MS-9A65		*		*
	COM Express Board ▶	MS-98H7	*		*
MS-98F7		*		*	*
MS-9988		*		*	*
Qseven Board ▶	MS-98H2	*			*
	MS-99A1	*			*
Pico-ITX Board ▶	MS-98I6	*	*		*
	MS-98H6	*	*		*
3.5" Board ▶	MS-98L3	*	*		*
	MS-98J8	*	*		*
	MS-98H3	*	*		*
	MS-98E6	*	*		*
	MS-98I8	*	*		*
	MS-98G6	*	*		*
	MS-98F6	*	*		*
	MS-98F3	*	*		*
EPIC Board ▶	MS-98H5	*			*
PICMG Board ▶	MS-98G7	*			*

	IoT	Medical	Transportation	Retail	Energy	Kiosk
MS-9B11	*			*	*	
MS-9A76	*	*	*	*	*	
MS-9A66	*	*	*		*	
MS-9A89	*		*	*		*
MS-9A79	*		*			*
MS-9A59	*		*			*
MS-9A69	*	*	*			*
MS-9A78	*					*
MS-9A68	*					*
MS-9A84	*		*			*
MS-9A95	*		*	*	*	*
MS-9A75	*		*			*
MS-9A65	*		*			*
MS-98H7		*	*		*	*
MS-98F7		*	*		*	*
MS-9988		*	*		*	*
MS-98H2			*			
MS-99A1			*			
MS-98I6	*	*	*	*		*
MS-98H6	*		*	*		*
MS-98L3	*	*	*			*
MS-98J8	*	*	*			*
MS-98H3	*	*	*			*
MS-98E6	*	*	*			*
MS-98I8	*	*	*			*
MS-98G6	*	*	*			*
MS-98F6	*	*	*			*
MS-98F3	*	*	*			*
MS-98H5			*	*		
MS-98G7						

# Product Solution Guide

		Automation	Digital Signage	Gaming	Industrial
Mini-ITX Board ▶	MS-98L1	*		*	*
	MS-98K1				
	MS-98E1	*		*	
	MS-98H1	*			
	MS-98C7		*	*	
	MS-98B3		*	*	
	MS-98J4		*	*	
	MS-98H4		*		*
	MS-98G5		*	*	
	MS-98B1	*	*		*
	MS-98J0	*	*		*
	MS-9892	*			*
	MS-98F1	*	*	*	*
	MS-98I0	*	*		*
	MS-98F5	*	*		*
	MS-98E3	*	*	*	*
Micro-ATX Board ▶	MS-98L2	*		*	*
	MS-98E2	*		*	
	MS-98G3	*			
	MS-98D6	*		*	
ATX Board ▶	MS-98K9	*			*
	MS-98L9	*			*
	MS-98H9 V2.0	*			*
	MS-98H9	*			*
	MS-98B5	*			*
	MS-98A9	*			*
	MS-98I0	*			
Compact-Size DC/DC ▶	MS-99C9	*			
Full-Size Mini-PCIe ▶	MS-99C5				
Intel® SDM ▶	MS-98C5				

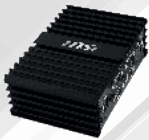


	IoT	Medical	Transportation	Retail	Energy	Kiosk
MS-98L1						
MS-98K1						
MS-98E1						
MS-98H1						
MS-98C7						*
MS-98B3	*	*	*			*
MS-98J4	*	*		*		*
MS-98H4	*		*	*		*
MS-98G5	*	*				*
MS-98B1		*		*		*
MS-98J0		*		*		*
MS-9892					*	
MS-98F1	*	*	*	*	*	*
MS-98I0	*	*	*	*		*
MS-98F5	*	*	*	*		*
MS-98E3	*	*	*	*	*	*
MS-98L2						
MS-98E2						
MS-98G3						*
MS-98D6			*			*
MS-98K9						
MS-98L9		*				
MS-98H9 V2.0						
MS-98H9						
MS-98B5						
MS-98A9						
MS-98I0						
MS-99C9			*	*		
MS-99C5						
MS-98C5						

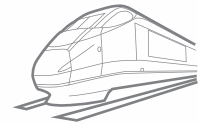
# Industrial Platform Solution

# We Customize Your Business

Embedded Systems Compact, Fanless, Reliable



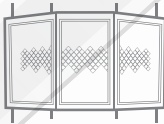
AUTOMATION



TRANSPORTATION



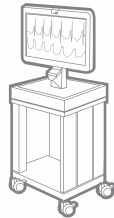
ENERGY



DIGITAL SIGNAGE



NETWORKING



MEDICAL ELECTRONIC



GAMING



POS/RETAIL



KIOSK



ATM

Embedded Boards Rich in Variety



PICMG



Qseven



COM Express



Pico-ITX



3.5"



EPIC



Mini-ITX



Micro-ATX



ATX



NEW



Model		MS-9B11		MS-9A76			MS-9A66			
		Industrial Computer								
System Processor	CPU	MS-9B11-S1 Intel® Desktop 7th Gen Kaby Lake-S & 6th Gen Skylake-S Core™ i7/i5/i3, Pentium®, Celeron® Processor, Max. 35W	MS-9B11-S2 Intel® Desktop 7th Gen Kaby Lake-S & 6th Gen Skylake-S Core™ i7/i5/i3, Pentium®, Celeron® Processor, Max. 65W	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Core™ i7/i5/i3/Celeron®/Pentium® Processor, Max. 65W			4th Gen Intel® Desktop Haswell Core™ i7/i5/i3/Celeron®/Pentium® Processor, Max. 35W			
	Frequency	2.3GHz~4.0GHz (Depends on CPU)		2.3GHz~3.9 GHz (Depends on CPU)			2M~4M (Depends on CPU)			
	L2 Cache	2M ~ 8M (Depends on CPU)		2M~8M (Depends on CPU)			Socket (LGA1150)			
	CPU Type	Socket (LGA1151)		Socket (LGA1151)			Intel® Q87 Express			
	Chipset	Intel® Q170 Express		Intel® Q170 Express / Intel® C236 Express			Intel® Q87 Express	Intel® C226 Express	Intel® Q87 Express	
	BIOS	AMI					AMI			
Memory	Technology	Dual-channel DDR4 2133MHz/2400MHz		Dual-channel DDR4(non-ECC) 2133/2400MHz for Q170 Dual-channel DDR4(ECC) 2133/2400MHz for C236			Dual-channel DDR3 1600/1333MHz			
	Max. Capacity	Up to 32GB		Up to 32GB			Up to 16GB			
	Socket	2 x 260-pin SO-DIMMs					2 x 204-pin SO-DIMMs			
Graphic	Controller	Intel® HD Graphics		Intel® HD Graphics			Intel® HD Graphics			
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM			Shared system memory up to 1.7 GB SDRAM			
	Multiple Display	3 independent displays		3 Independent Displays			3 independent displays			
	Display Interface	DVI-D up to 1920 x 1200 @60Hz DP up to 4096 x 2304 @60Hz HDMI up to 4096 x 2160 @24Hz					DP up to 3840 x 2160 @60Hz DVI-I up to 1920 x 1200 @60Hz			
Ethernet	Controller	4 x Intel® I210-AT GbE LAN		1 x Intel® I219GbE-PHY LAN (Support Intel AMT) 1 x Intel® I210-AT GbE LAN			1 x Intel® I217GbE-PHY LAN 1 x Intel® I210-AT GbE LAN			
Audio	Controller	Realtek® ALC887 HD Audio Codec		Realtek® ALC887 HD Audio Codec			Realtek® ALC887 HD Audio Codec			
H/W Monitor	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer			256-level Watchdog Timer			
	Smart Fan	N/A	Yes	Yes			N/A			
TPM	Controller	Infineon SLB9665TT 2.0		Yes			Infineon SLB9635TT1.2			
Expansion Slot	PCIe x16	1 (Maximum 75W, Low Profile Supported)		1	N/A	1	1	N/A	1	
	PCIe x8	N/A			2	N/A	N/A	2	N/A	
	PCI	Socket (LGA1151)		3	2	1	3	2	1	
	M.2	1 x M Key (PCIe x4 NVMe, SATA3.0), 2242/2280		N/A			N/A			
	Mini-PCIe	1 x Full-size (w/ SIM holder)					1 x Full-size (w/ mSATA)	1 x Full-size (w/ mSATA)		
Storage	SATA	2 x 2.5" HDD/SSD Bay (One w/ Removable)		2 x 2.5" HDD/SSD			2 x 2.5" HDD/SSD			
	mSATA	N/A		N/A	1	N/A	N/A	1		
	CFast	N/A		1				1		
I/O Interface	RJ-45	4					2			
	PoE	N/A		N/A			N/A			
	Audio	1 x Mic-in 1 x Line-out		1 x Mic-in 1 x Line-out 1 x Line-in			1 x Mic-in / 1 x Line-out / 1 x Line-in			
	USB	8 x USB 3.0 2 x USB 2.0		6 x USB 3.0 5 x USB 2.0 (one port w/ security key)			4 x USB 3.0 / 3 x USB 2.0 (one port w/ security key)			
	Serial	4 x COM ports COM1: RS-232/422/485, RI/5V/12V COM2~4: RS-232/422/485, 0V/5V/12V		5 x COM ports COM1~2: RS232/422/485, 0V/5V/12V COM3~5: RS-232, 0V			5 x COM ports COM1: RS232/422/485, 0V/5V/12V COM2: RS232/422/485, 0V COM3~5: RS-232, 0V			
	PS/2	N/A		1			1			
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V		8-bits (4 x GPI; 4 x GPO), 5~35V, Isolation 1.5KV			8-bits (4 x GPI; 4 x GPO), 5~24V, Isolation 1.5KV			
	CANbus	N/A		N/A			N/A			
	HDMI	1 (by BOM Optional)		N/A			N/A			
	LVDS	N/A		N/A			N/A			
	DVI	1		1 (DVI-I)			1 (DVI-I)			
	DisplayPort	Socket (LGA1151)		2			2			
	Antenna	2 openings reserved for antennas		N/A			N/A			
	Power Supply	DC Input	DC-In 12-24V Wide-Range Phoenix pluggable connectors with latch (V+, V-)		DC-In 9-36V Wide-Range pluggable connectors with latch (GND, V-, V+)			DC-In 9-36V Wide-Range pluggable connectors with latch (GND, V-, V+)		
IP Rating		N/A		Full IP20			Full IP20			
Environment	Operating Temperature	-10 ~ 45°C		-10 ~ 50°C w/ industrial DC power Up to 35W CPU -10 ~ 40°C w/ Fan module Up to 65W CPU			-10 ~ 50°C w/ industrial DC power			
	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: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)		Operating, IEC 60068-2-64: 1.5 Grms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD/SSD)			Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD) Operating, IEC 60068-2-64: 2 Gms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD)			
Physical characteristics	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)								
	Dimensions (W x D x H)	235 x 200 x 125mm	235 x 200 x 88mm	217 x 226 x 176mm		217 x 226 x 143mm	176 x 226 x 217mm		143 x 226 x 217mm	
	Weight	4.43 kg	2.50 kg	4.8 Kg		4.4 Kg	4.86 kg		4.4 kg	
	Mounting	Wall mount, DIN-rail mount (by BOM option)		Wall mount			Wall mount			
Certification	EMC	FCC Class A, CE, RCM, BSMI, VCCI		FCC Class A, CE, RCM, VCCI, BSMI			FCC, CE, RCM, VCCI, BSMI			
	Safety	BSMI		UL			N/A			
Software Platform	OS Support	Windows 10 (64-bit) Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Windows 10 (64-bit)			Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit)			

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PiCOMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

Industrial Computer  
COM Express Board  
Qseven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PIOMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCIe  
Intel® SDW



Model		MS-9A89				MS-9A79	
		Industrial Computer					
<b>System Processor</b>	CPU	MS-9A89-U1 2.2GHz~2.7 GHz (Depends on CPU)	MS-9A89-U2 Intel® SKL-U Core™ i5-6300U Processor, DC, 15W	MS-9A89-A1 Intel® KBL-U Core™ i3-7100U Processor, DC, 15W	MS-9A89-A2 Intel® Atom™ x5 Processor E3940, QC, 9.5W	MS-9A79-A1 Intel® Atom™ x5 Processor E3940, QC, 9.5W	MS-9A79-A2 Intel® Celeron® Processor N3350, DC, 6W
	Frequency	2.4GHz	2.4GHz	1.6GHz, up to 2.0GHz	1.6GHz, up to 1.8GHz	1.6 GHz up to 1.8 GHz	1.1 GHz up to 2.4 GHz
	L2 Cache	3MB		2MB		2MB	
	CPU Type	BGA		2MB		BGA	
	Chipset	Integrated in Process		Integrated in SoC Process		Integrated in SoC	
<b>Memory</b>	BIOS	AMI		AMI		AMI	
	Technology	Single channel for DDR3L 1866/1600 MHz		Single channel for DDR4 2133 MHz		Dual-channel LPDDR4-2133MHz	
	Max. Capacity	Up to 16GB		Up to 8GB		Onboard 4 GB	
<b>Graphic</b>	Socket	1 x 204-pin SO-DIMMs		1 x 260-pin SO-DIMMs		N/A	
	Controller	Intel® HD Graphics		Intel® HD Graphics		Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM				Shared system memory up to 1.7 GB SDRAM	
	Multiple Display	2 or 3 independent displays				2 or 3 independent displays	
<b>Display Interface</b>	Display Interface	HDMI1.4 up to 4096 x 2160 @24Hz DP up to 3840 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)		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)		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 (by BOM option) DVI-I up to 1920 x 1200 @60 Hz (by BOM option)	
	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I219LM GbE LAN PHY		2 x Intel® I210-IT GbE LAN		2 x Intel® I210-IT GbE LAN	
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec				Realtek® ALC887-VD2-CG HD Audio Codec	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer				256-level Watchdog Timer	
<b>TPM</b>	Smart Fan	N/A				N/A	
	Controller	N/A				Pin Header	
<b>Expansion Slot</b>	PCIe x16	N/A				N/A	
	PCIe x8	N/A				N/A	
	PCI	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)				N/A	
	M.2	N/A				N/A	
<b>Storage</b>	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)	
	SATA	1 x 2.5" HDD/SSD Bay				1 x 2.5" HDD/SSD Bay	
	mSATA	N/A				1 x Half-size (Shared w/ Mini-PCIe)	
<b>I/O Interface</b>	CFast	4 (Two by optional) LAN1/2: Standard LAN3/4: Optional (Supported standard LAN or PoE 802.3af)				N/A	
	RJ-45	4 (LAN1/2 Standard, LAN3/4 by Option)				2	
	PoE	2 x 802.11af (by request)				N/A	
	Audio	1 x Line-out / 1 x Mic-in				1 x Line-out / 1 x Mic-in	
	USB	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V				2 x USB 3.0 2 x USB 2.0	
	Serial	N/A				2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V	
	PS/2	1				N/A	
	GPIO	16-bit (8*GPI; 8*GPO), 5V				16-bit (8*GPI; 8*GPO), 5V	
	CANbus	2 x CAN 2.0B (optional)				CAN 2.0B (by BOM option)	
	HDMI	1 (by BOM option)				1	
<b>Power Supply</b>	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	
	DC Input	DC-in 12V~24V				DC-in 12V Jack (5.5mm/2.5mm) / Phoenix pluggable with latch (Support OCP/OVP Protection)	
<b>Environment</b>	IP Rating	N/A				N/A	
	Operating Temperature	-10~45°C (HDD) -10~60°C (w/WT SSD/mSATA)		-10~45°C (HDD) -20~70°C (w/WT SSD/mSATA)		-10 ~ 45°C (HDD) -20 ~ 70°C (w/ WT SSD/mSATA)	
	Operating Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C				-40 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing	
<b>Physical Characteristics</b>	Vibration	Operating: IEC61373, 0.101 Grms, Random, 5 ~ 150 Hz, 10 mins, Vertical axis (w/ HDD) IEC61373, 0.045 Grms, Random, 5 ~ 150 Hz, 10 mins, Transverse axis (w/ HDD) IEC61373, 0.07 Grms, Random, 5 ~ 150 Hz, 10 mins, Longitudinal axis (w/ HDD)				Operating, 0.5 Grms, 5-300Hz, 3axes (w/ HDD) Operating, 5 Grms, 5-300Hz, 3axes (w/ SSD/mSATA)	
	Shock	Non-operating: IEC61373, 3G, Half-sine, 30 ms, ±Vertical axis & ±Transverse axis (w/ HDD) IEC61373, 5G, Half-sine, 30 ms, ±Longitudinal axis (w/ HDD)				Operating, 3 G, half sine 11 ms duration (w/ HDD)	
	Dimensions(W x D x H)	215 x 155 x 55mm				155 x 110 x 55 mm	
<b>Certification</b>	Weight	1.50 kg				1.1 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)	
<b>Software Platform</b>	EMC	CE, FCC, VCCI, RCM, BSMI				FCC, CE, RCM, VCCI, BSMI	
	Safety	BSMI				BSMI	
<b>OS Support</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)				Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	



Model		MS-9A59		MS-9A69	
		Industrial Computer			
System Processor	CPU	Intel® Celeron® Processor N3160, QC, 6W		Intel® Celeron® Processor J1900, QC, 10W	Intel® BDW ULT Core™ i3-5010U Processor, DC, 15W
	Frequency	1.6GHz~2.24GHz		2GHz	2.1 GHz
	L2 Cache	2MB		2MB	3MB
	CPU Type	BGA		BGA	BGA
	Chipset	Integrated in SoC Process		Integrated in SoC Process	Integrated in Process
	BIOS	AMI		AMI	
Memory	Technology	Single-Channel DDR3L 1600MHz		Single-Channel DDR3L 1333 MHz	Single-Channel DDR3L 1600 MHz
	Max. Capacity	Onboard 2GB		Up to 8GB	
	Socket	N/A		1 x 204-pin SO-DIMM	
Graphic	Controller	Intel® HD Graphics		Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM	
	Multiple Display	2 or 3 independent displays		2 or 3 independent displays	
	Display Interface	HDMI up to 3840 x 2160 @30Hz DP1.1a up to 3840 x 2160 @30Hz LVDS up to 1920 x 1200 @60Hz (optional) DVI-I up to 1920 x 1200@60Hz (optional)		VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 @60Hz LVDS up to 1920 x 1200 @60Hz (optional)	VGA up to 1920 x 1200 @60Hz HDMI up to 1920 x 1080 @60Hz LVDS up to 1920 x 1200 @60Hz (optional)
Ethernet	Controller	1 x Intel® I211-AT GbE LAN		2 x Intel® I210-AT GbE LAN	1 x Intel® I210-AT GbE LAN 1 x Intel® I218-LM GbE LAN PHY
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	Controller	Pin Header		N/A	
Expansion Slot	PCIe x16	N/A		N/A	
	PCI	N/A		N/A	
	M.2	N/A		N/A	
	Mini-PCIe	1 x Half-size		2 x Full-size (one w/ mSATA)	1 x Full-size (w/ mSATA) 1 x Half-size
Storage	SATA	1 x 2.5" HDD/SSD Bay		1 x 2.5" HDD/SSD Bay	
	mSATA	1 x Full-size		1 x Full-size (Shared with Mini-PCIe)	
	CFast	N/A		N/A	
I/O Interface	RJ-45	2		4 (optional 2 x RJ-45 version available)	
	PoE	N/A		N/A	
	Audio	1 x Line-out / 1 x Mic-in		1 x Line-out / 1 x Mic-in	
	USB	2 x USB 3.0 2 x USB 2.0		1 x USB 3.0 5 x USB 2.0	2 x USB 3.0 4 x USB 2.0
	Serial	2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V		6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232, 0V/5V/12V	4 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-4: RS-232, 0V/5V/12V
	PS/2	1		N/A	
	GPIO	16-bit (8*GPI; 8*GPO), 5V		8-bit (4*GPI; 4*GPO), 5V	
	CANbus	N/A		2 x CAN 2.0B (by BOM option)	
	HDMI	1		1	
	LVDS	1 (optional)		1 (optional)	
	DVI	1 (DVI-I by option)		N/A	
	DisplayPort	1		N/A	
	VGA	3 openings reserved for antennas		1	
Antenna	2 openings reserved for antennas		2 openings reserved for antennas		
Power Supply	DC Input	DC-in 12V Jack (5.5mm/2.5mm) / Phoenix pluggable with latch (Support OCP/OVP Protection)		DC-in 12V/19V/24V	
	AC Input	N/A		N/A	
Environment	IP Rating	N/A		N/A	
	Operating Temperature	-10 ~ 45°C (HDD) -10 ~ 55°C (SSD or mSATA)		-10 ~ 45°C (HDD) -10 ~ 50°C (SSD or mSATA)	
	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	Operating: 0.5 Grms, 5-300Hz, 3axes (w/ HDD) Operating: 5 Grms, 5-300Hz, 3axes (w/ SSD)		Operating: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)	
	Shock	Operating, 3 G, half sine 11 ms duration (w/ HDD)		Operating: 3 G, half sine 11 ms duration (w/ HDD)	
Physical characteristics	Dimensions (WxDxH)	155 x 105 x 55mm		200 x 150 x 55mm	
	Weight	0.90 kg		1.38 kg	
	Mounting	Wall mount (STD)/VESA mount(by BOM option)/DIN-rail mount(by BOM option)		Wall mount (STD)/VESA mount(by BOM option)/DIN-rail mount(by BOM option)	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI	
	Safety	BSMI		BSMI	
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 21 (by request) Linux Ubuntu 14.04 (by request)		Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64 Bit) Linux Fedora 20 Linux Ubuntu 13.10	Windows 7 (64-bit) Windows 8.1 (32/64-bit) Windows 10 (64 Bit) Linux Fedora 19 Linux Ubuntu 13.04

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICOmG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM



Model		MS-9A78		MS-9A68		MS-9A84	
Industrial Computer							
<b>System Processor</b>	CPU	Intel® Celeron® Processor J1900/ N2930, QC, 10W/7.5W		4th Gen Intel® Desktop Haswell/Haswell Refresh Core™ i7/i5/i3/Celeron®/ Pentium® Processor, Max. 45W		3rd Gen Intel® Mobile Ivy bridge/Sandy bridge Core™ i7/i5/i3/Celeron®/Pentium® Processors, Max. 45W	
	Frequency	2GHz~2.42GHz (J1900) 1.83GHz~2.16GHz (N2930)		1.5GHz~2.3GHz (Depends on CPU)		1.0 GHz~3.8GHz (Depends on CPU)	
	L2 Cache	2MB		2M~8M (Depends on CPU)		2M~8M (Depends on CPU)	
	CPU Type	BGA		Socket (LGA 1150)		Socket G2 (rPGA 989)	
	Chipset	N/A		Intel® Q87 Express		Intel® QM77/HM76 Express	
	BIOS	AMI				AMI	
<b>Memory</b>	Technology	Dual-Channel DDR3L z066/1333MHz		Dual-Channel DDR3/DDR3L 1333/1600MHz		Dual-Channel DDR3 1066/1333/1600 MHz	
	Max. Capacity	Up to 8GB		Up to 16GB		Up to 16GB	
	Socket	2 x 204-pin SO-DIMMs				2 x 204-pin SO-DIMMs	
<b>Graphic</b>	Controller	Intel® HD Graphics		Intel® HD Graphics		Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM					
	Multiple Display	2 independent displays		3 independent displays		3 independent displays (SNB CPU only) 3 independent displays (IVB CPU only)	
<b>Ethernet</b>	Display Interface	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 @60Hz		VGA up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @60Hz		DP up to 2560 x 1600 @60Hz DVI-I up to 1920 x 1200 @60Hz	
	Controller	2 x Intel® i210-AT GbE LAN		1 x Intel® i217-LM GbE PHY (iAMT 9.0 supported) 1 x Intel® i210-AT PCIe GbE LAN		2 x Intel® i210-AT GbE LAN	
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec					
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer					
<b>TPM</b>	Controller	Pin header					
<b>Expansion Slot</b>	PCIe x16	N/A					
	PCI	N/A					
	M.2	N/A					
	Mini-PCIe	1 x Full-size (w/ mSATA)		1 x Full-size (w/ mSATA) 1 x Half-size		2 x Full-size (1 w/ SIM Holder)	
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD				1 x 2.5" HDD/SSD	
	mSATA	1				2 (shared with Mini-PCIe slots)	
	CFast	N/A				N/A	
<b>I/O Interface</b>	RJ-45	2				2	
	PoE	N/A				N/A	
	Audio	1 x Mic-in; 1 x Line-out; 1 x Line-in				1 x Mic-in; 1 x Line-out; 1 x Line-in	
	USB	6 x USB 2.0 1 x USB 3.0		4 x USB 2.0 4 x USB 3.0		2 x USB 3.0 6 x USB 2.0	
	Serial	5 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-5: RS-232, 0V/5V/12V		4 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-4: RS-232		4 x COM ports COM 1: RS-232/422/485, 0V/5V/12V COM 2-4: RS-232, 0V/5V/12V	
	PS/2	N/A		1		1	
	GPIO	N/A				N/A	
	CANbus	N/A				N/A	
	HDMI	1		N/A		N/A	
	LVDS	N/A				N/A	
	DVI	N/A				1 (DVI-I)	
	DisplayPort	N/A		2		2	
	VGA	1				N/A	
	Antenna	2 openings reserved for antennas				1	
<b>Power Supply</b>	DC Input	DC-in 12V				DC-in 12V/19V	
	AC Input	N/A				N/A	
<b>Environment</b>	IP Rating	N/A				Full IP30	
	Operating Temperature	-10 ~ 50°C (HDD) -10 ~ 60°C (SSD)		-10 ~ 50°C (TDP: 35W) -10 ~ 40°C (TDP: 45W)		0 ~ 50°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	Operating: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)				Operating: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)	
<b>Physical Characteristics</b>	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)				Operating: 3 G, half sine 11 ms duration (w/ HDD)	
	Dimensions (WxDxH)	180 x 183 x 49mm				180 x 180 x 44mm	
	Weight	1.80 kg				1.66Kg	
	Mounting	Wall mount				N/A	
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI				FCC, CE, RCM, VCCI, BSMI	
	Safety	BSMI, CB, UL				BSMI	
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)		Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit) Linux Fedora V19 (Kernel 3.8.2)		Windows 8 (32-bit) Windows 7 (32/64-bit) Windows XP (32/64-bit)	
						Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	



Model		MS-9A95	MS-9A75	MS-9A65	
Industrial Computer					
System Processor	CPU	Intel® Mobile Skylake/Kaby Lake ULT Core™ i3/i5/i7 Processor	Intel® BDW ULT Core™ i5-5200U Processor, Dual Core, 15W	Intel® Celeron® Processor J1900, QC, 10 W	
	Frequency	Depends on CPU	2.2GHz~2.7GHz	2GHz~2.42GHz	
	L2 Cache	Depends on CPU	3MB	2MB	
	CPU Type	BGA	BGA	BGA	
	Chipset	Integrated	N/A	N/A	
	BIOS	AMI	AMI	AMI	
Memory	Technology	Dual-Channel for DDR4 2133 MHz	Dual-Channel for DDR3L 1333/1600 MHz	Dual-Channel DDR3L 1333MHz	
	Max. Capacity	Up to 32GB	Up to 16GB	Up to 8GB	
	Socket	2 x 260-pin SO-DIMMs	2 x 204-pin SO-DIMMs	2 x 204-pin SO-DIMMs	
Graphic	Controller	Intel® HD Graphics 5500	Intel® HD Graphics 5500	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	
	Multiple Display	3 independent displays	3 independent displays	2 independent displays	
	Display Interface	HDMI up to 4096 x 2160 @60Hz DP up to 4096x 2304 @60Hz DVI-I up to 1920x 1200 @60Hz	DP up to 3840 x 2160 @60Hz DVI-D up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz	HDMI up to 1920 x 1080 @60Hz DVI-I up to 1920 x 1200 @60Hz	
Ethernet	Controller	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	2 x Intel® I210-AT GbE	
Audio	Controller	Realtek® ALC887/888S HD Audio Codec	Realtek® ALC887/888S HD Audio Codec	Realtek® ALC887 HD Audio Codec	
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	Infineon SLB9665TT2.0	Infineon SLB9635TT 1.2	N/A	
Expansion Slot	Mini-PCIe	1 x E Key (PCIe x2, USB 2.0), 2230	N/A	N/A	
	Mini-PCIe	1 x Full-size (one w/ SIM holder or mSATA) 1 x Half-size	2 x Full-size (one w/ SIM holder or mSATA)	1 x Full-size, mSATA (with SIM holder) 1 x Half-size	
Storage	SATA	1 x 2.5" HDD/SSD	1 x 2.5" HDD/SSD	1 x 2.5" HDD/SSD	
	mSATA	1 (shared with mini-PCIe)	1 (shared with mini-PCIe)	1	
I/O Interface	RJ-45	2	2	2	
	PoE	N/A	N/A	N/A	
	Audio	1 x SPDIF 1 x Line-out(Mic-in by AP driver)	1 x Mic-in 1 x Line-out	1 x Mic-in 1 x Line-out	
	USB	4 x USB 3.0; 2 x USB 2.0	SKU1: 4 x USB 3.0; 2 x USB 2.0 SKU2: 4 x USB 3.0	2 x USB 2.0 1 x USB 3.0	
	Serial	2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, 0V	SKU1: 1 x COM port, RS-232/422/485 SKU2: 2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, 0V	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	2 (colay with DP)	N/A	1	
	DVI	1 (DVI-I)	1 (DVI-I)	1 (DVI-I)	
	DisplayPort	2 (colay with HDMI)	2	N/A	
	VGA	1 (from DVI-I)	1 (from DVI-I)	N/A	
	Antenna	2	2	1 (opening reserved for 2nd antenna)	
	Power Supply	DC Input	DC-in 19V with Lockable DC Jack	DC-in 12V/19V/24V	DC-in 19V
		AC Input	N/A	N/A	N/A
Environment	IP Rating	Full IP40	Full IP40	N/A	
	Operating Temperature	-10 ~ 50°C (SSD) -10 ~40°C (HDD)	-10 ~ 50°C (SSD), -10 ~40°C (HDD)	0 ~ 40°C (HDD) -10 ~ 60°C (SSD)	
	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)	Operating: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)	Operating: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)	
	Shock	Operating: IEC 60068-2-27: 50G, half sine, 11ms (w/ SSD)	Operating: 3 G, half sine 11 ms duration (w/ HDD)	Operating: 3 G, half sine 11 ms duration (w/ HDD)	
Physical characteristics	Dimensions (W x D x H)	196 x 285 x 29mm	196 x 285 x 33mm	180 x 255 x 19mm	
	Weight	2.25 kg	2.60 kg	1.30 kg	
	Mounting	VESA/Wall mount, DIN Rail	VESA mount	VESA mount	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI	
	Safety	BSMI, CB	BSMI, CB, Energy Star	BSMI, CB, Energy Star	
Software Platform	OS Support	Windows 10 (32/64-bit)	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora Core 21 Linux Ubuntu 15.04	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit)	

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM



Model		MS-98H7		MS-98F7		MS-9988	
		COM Express Board					
Processor	CPU	8th Gen Intel® Embedded Mobile Coffee Lake-H Xeon™ E-2176M Processor, HC, 45W 8th Gen Intel® Embedded Mobile Coffee Lake-H Core™ i3-8100H Processor, QC, 45W		8th Gen Intel® Embedded Mobile Coffee Lake-H Core™ i7-8850H/i5-8400H Processor, HC/QC, 45W		7th/6th Gen Intel® Embedded Mobile Kaby Lake-ULT/Skylake-ULT Core™ i7/i5/i3/ Celeron Processor, DC, 15W	
	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	Intel® QM370	N/A		N/A	
Memory	BIOS	AMI		AMI		AMI	
	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	
Display	Controller	Intel® HD Graphics		Intel® HD Graphics		N/A	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM		N/A	
	LVDS	Dual channel 18/24-bit		Dual channel 24-bit		Dual channel 24-bit (depends on module board)	
	eDP	1 (by BOM option)		N/A		N/A	
	VGA	1		1 (Share with DDI1 Signal, by BOM option)		1	
	DVI					N/A	
	HDMI	3 DDI ports support HDMI/DP/DVI (DDI3 AUX shared with VGA)		2 DDI ports support HDMI/DP (DDI1 by BOM option, default is for VGA)		N/A	
	DisplayPort					3	
	Multiple Display	3 independent displays		3 independent displays		3 independent displays	
	Display Interface	LVDS Resolution up to 1920x1200 @60Hz VGA Resolution up to 1920 x 1080 @60Hz eDP Resolution up to 4096 x 2304 @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 3.1 (to carrier board)		8 x USB 2.0 (to carrier board) 4 x USB 3.0 (to carrier board)		4 x USB 3.0 (4 x rear) 4 x USB 2.0 (2 x rear; 2 x internal)	
	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	1 x PCI Express x16 GEN. 3.0 lanes (Configurable to 1 x16 or 2 x8 or 1 x8 + 2 x4)		N/A		1 (wafer connector)	
	GPIO	N/A		8-bits (4 x GPI; 4 x GPO), 5V		8-bits (4 x GPI; 4 x GPO), 5V	
Expansion Slot	PCIe x16	8 x PCI Express GEN. 3.0 lanes (Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4 )		N/A		1	
	PCIe x4	N/A		N/A		N/A	
	PCIe x1	N/A		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	
	Mini-PCIe	N/A		N/A		N/A	
Storage	SATA	4 x SATA 3.0		3 x SATA 3.0		N/A	
	mSATA	N/A		32GB eMMC 5.0 (by BOM option)		ATX-24P, 12V-4P	
Power Supply	DC	N/A		N/A		0 ~ 60°C	
	ATX	ATX +12 V and +5 VSB (standby power) AT: +12 V		ATX +12 V and +5 VSB (standby power) AT: +12 V		10 ~ 90%, non-condensing	
Environment	Operating Temperature	-10 ~ 60°C		-20 ~ 70°C		-20 ~ 80°C	
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C		-20 ~ 80°C		305 x 244mm (ATX)	
Form Factor	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing		0.60 kg	
	Dimensions (W x D x H)	125 x 95mm (COM Express Basic module)		95 x 95mm (COM Express compact module)		FCC, CE, RCM, VCCI, BSMI	
	Weight	0.113 kg		0.105 kg		Depends on CPU Module Board	
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 Kernel 4.x (by request)		Windows 7 (32/64-bit) (Skylake-ULT Only) Windows 8.1 (64-bit) (Skylake-ULT Only) Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)		Windows 10 (64-bit) Linux Kernel 4.x (by request)	





Model		MS-98H2	MS-99A1
		Qseven Board	
Processor	CPU	Intel® Pentium® processor N3710, QC, 6W Intel® Celeron® processor N3160, QC, 6W	N/A
	Frequency	N3710, 1.6 GHz up to 2.56 GHz N3160, 1.6 GHz up to 2.24GHz	N/A
	L2 Cache	N/A	N/A
	CPU Type	BGA	N/A
	Chipset	Integrated in SoC	N/A
	BIOS	AMI	AMI
Memory	Technology	Dual-channel DDR3L 1600MHz	N/A
	Max. Capacity	Up to 8GB	N/A
	Socket	Onboard	N/A
Display	Controller	Intel® HD Graphics	N/A
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	N/A
	LVDS	N/A	Dual channel 18/24-bit (depends on module board)
	eDP	1	N/A
	VGA	N/A	N/A
	DVI	N/A	N/A
	HDMI	N/A	1
	DisplayPort	3	1
	Multiple Display	3 independent displays	3 independent displays
Display Interface	Display Interface	eDP1.4 up to 2560 x 1600 @60Hz 2 x DDI: 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	Depends on module board
Ethernet	Controller	1 x Intel® I211-AT GbE LAN	5 x Intel® I211-AT GbE LAN (6 GLAN SKU) 1 x Intel® I211-AT GbE LAN (2 GLAN SKU)
Audio	Controller	Support HD audio interface to carrier board	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	N/A	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes	Yes
TPM	Controller	N/A	Pin header
I/O Interface	USB	4 x USB 2.0 (to carrier board) 2 x USB 3.0 (to carrier board)	3 x USB 2.0 (2 x rear; 1 x internal) 2 x USB 3.0 (2 x rear)
	Serial	1 x UART port (to carrier board)	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V COM3-6: RS-232, 0V/5V/12V 1 x UART Port (from Qseven module board)
	Parallel	N/A	N/A
	PS/2	N/A	1 (box header)
	GPIO	N/A	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x16	N/A	N/A
	PCIe x4	N/A	N/A
	PCIe x1	3 x PCI Express GEN. 2.0 lanes	1
	PCI	N/A	N/A
	M.2	N/A	N/A
	Mini-PCIe	N/A	2 x Full-size (one w/ mSATA)
Storage	SATA	2 x SATA 3.0	1 x SATA 3.0
	mSATA	N/A	1
Power Supply	DC	+5 V and +5 VSB (standby power)	DC-in 12V
	ATX	N/A	N/A
Environment	Operating Temperature	-10 ~ 60°C	-10 ~ 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 (W x D x H)	70 x 70mm (Qseven CPU module)	170 x 170mm (Mini-ITX)
	Weight	0.23 kg	0.242 Kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 22 (by request) Linux Ubuntu 15.04 (by request)	Depends on CPU Module Board



NEW



Model		MS-98I6		MS-98H6
		Pico-ITX Board		
Processor	CPU	Apollo Lake SKUs Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W	Apollo Lake-I SKU Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W	Intel® Pentium® processor N3710, QC, 6W Intel® Celeron® processor N3160, QC, 6W Intel® Celeron® processor N3010, DC, 4W
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz	E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz	N3710, 1.6 GHz up to 2.56 GHz N3160, 1.6 GHz up to 2.24 GHz N3010, 1.04 GHz up to 2.24 GHz
	L2 Cache	2MB		2MB
	CPU Type	BGA		BGA
	Chipset	Integrated in SoC		Integrated in SoC
	BIOS	AMI		AMI
Memory	Technology	Single-channel LPDDR4 2400MHz/2400MHz	Single-channel LPDDR4 2133MHz	Single-channel LPDDR4 2133MHz
	Max. Capacity	Up to 4GB		Up to 2GB
	Socket	Onboard		Onboard
Display	Controller	Intel® HD Graphics		Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 18/24-bit		Dual Channel 18/24-bit
	eDP	N/A		N/A
	VGA	N/A		N/A
	DVI	N/A		N/A
	HDMI	1		1
	DisplayPort	1 (Mini-DP)		1
	Multiple Display	3 independent displays		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		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 Intel® 211-AT GbE LAN	2 x Intel® I210-IT GbE LAN	1 x Intel® I211-AT GbE LAN
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec		Realtek® ALC887-VD2-CG 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	N/A		Yes
TPM	Controller	Pin header		N/A
I/O Interface	USB	2x USB 2.0 (2 x internal) 2 x USB 3.0 (2 x rear)		2 x USB 2.0 (2 x internal) 2 x USB 3.0 (2 x rear)
	Serial	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: 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	16-bits (8 x GPI; 8 x GPO), 5V		16-bits (8 x GPI; 8 x GPO), 5V
Expansion Slot	PCIe x16	N/A		N/A
	PCIe x4	N/A		N/A
	PCIe x1	3		N/A
	PCI	N/A		N/A
	M.2	N/A		N/A
	Mini-PCIe	1 x Full-size (Mini-PCIe Full-size Slot w/ NANO SIM-Holder) 1 x Half-size (Mini-PCIe Half-size Slot w/ mSATA)		1 x Half-size
Storage	SATA	1 x SATA 3.0		1 x SATA 3.0
	mSATA	1 (Shared with Mini-PCIe Half-size)		1
Power Supply	DC	DC-in 12V		DC-in 12V
	ATX	N/A		N/A
Environment	Operating Temperature	-10 ~ 60°C	-40 ~ 85°C	Heat-Spreader: 100(L) x 72.2(W) x 8(H) mm (standard packing) Heat-Sink: -10~60°C , 100(L) x 72.2(W) x 33(H) mm (by option)
	Operating Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing		10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	101 x 73mm (Pico-ITX)		100 x 72mm (Pico-ITX)
	Weight	0.27 kg		0.27 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)		Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 21 (by request) Linux Ubuntu14.04 (by request)



Model		MS-98L3	MS-98J8	MS-98H3
		3.5" Board		
Processor	CPU	8th Gen Intel® IOTG Mobile Whiskey Lake-U Core™ i7-8665UE/i5-8365UE, QC, 15W & i3-8145UE/Celeron® 4305UE, DC, 15W	Intel® Pentium™ N4200 Processor, QC, 6W Intel® Celeron™ N3350 Processor, DC, 6W Intel® Atom™ X5-E3940 Processor, QC, 9.5W Intel® Atom™ X5-E3930 Processor, DC, 6.5W	7th/6th Gen Intel® Embedded Mobile Kaby Lake-U/SkyLake-U Core™ i7/i5/i3/Celeron Processor, DC, 15W
	Frequency	1.8GHz~4.6GHz (Depends on CPU)	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz	2.0GHz~3.4GHz (Depends on CPU)
	L2 Cache	4MB~8MB (Depends on CPU)	2M	2MB~4MB (Depends on CPU)
	CPU Type	BGA	BGA	BGA
	Chipset	N/A	Integrated in SoC	N/A
	BIOS	AMI	AMI	AMI
Memory	Technology	Single-channel DDR4 2400MHz	Single Channel for DDR3L 1866/1600 MHz	Single-channel DDR4 2133MHz
	Max. Capacity	Up to 16GB	Up to 8GB	Up to 16GB
	Socket	1 x 260-pin SO-DIMM	1 x 204pin SO-DIMM	1 x 260-pin SO-DIMM
Display	Controller	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 18/24-Bit	Dual Channel 18/24-bit	Dual Channel 18/24-bit
	eDP	N/A	N/A	1 (Share with LVDS Singnal)
	VGA	N/A	N/A	N/A
	DVI	N/A	N/A	N/A
	HDMI	1	1	1 (HDMI1 Co-lay DP1 & HDMI2 Co-lay DP2 by option)
	DisplayPort	1 (Support DP++)	1	1 (DP1 Co-lay HDMI1 & DP2 Co-lay HDMI2 by option)
	Multiple Display	3 independent displays	3 independent displays	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	LVDS up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz	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® I219LM GbE-PHY LAN (AMT 12.0 supported by i7/i5 SKUs) 3 x Intel® I210-AT GbE LAN	2 x Realtek® RTL8111H GbE LAN	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	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	Pin header (Default)	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)	Pin header
I/O Interface	USB	4 x USB 3.1 Gen 2 (4 x rear) 4 x USB 2.0 (4 x internal)	4 x USB 3.0 (4 x rear) 2 x USB 2.0 (2 x internal)	4 x USB 3.0 (4 x Rear) 4 x USB 2.0 (4 x Internal)
	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: RS-232/422/485, 0V/5V/12V COM2~4: RS-232	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)
	PS/2	N/A	1 (wafer connector)	N/A
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	8-Bit (4 x GPI, 4 x GPO), 5V	16-bits (8 x GPI; 8 x GPO), 5V
Expansion Slot	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, CNV), 2230	1 x E Key (PCIe x1, USB2.0), 2230	N/A
	Mini-PCIe	N/A	1 x Full-size (w/ mSATA)	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)
Storage	SATA	2 x SATA 3.0	1 x SATA 3.0	2 x SATA 3.0
	mSATA	N/A	1 (Shared with Mini-PCIe)	1 (Shared with Mini-PCIe2)
Power Supply	DC	DC-in 12~24V (OCP & OVP Supported)	DC-in 9~36V	DC-in 12~24V
	ATX	N/A	N/A	N/A
Environment	Operating Temperature	-10 ~ 60°C	-10 ~ 60°C	-10 ~ 60°C Note: Thermal Test 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 102mm (3.5")	146 x 102mm (3.5")	146 x 102mm (3.5")
	Weight	0.64 kg	0.33 kg	0.59 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	CE, FCC Class B, BSMI, VCCI, RCM	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 10 (64-bit) Linux Fedora 29 (by request) Linux Ubuntu 18.04 (by request)	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	Windows 7 (32/64-bit) (Sky Lake-ULT Only) Windows 8.1 (64-bit) (Sky Lake-ULT Only) Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SOM

Industrial Computer  
COM Express Board  
Qseven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCIe  
Intel® SDM



Model		MS-98E6		MS-9818	MS-98G6	
		3.5" Board				
Processor	CPU	Apollo Lake SKUs Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W		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		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	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	
	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	4 x USB 3.0 (4 x Rear) 2 x USB 2.0 (2 x Internal)		2 x USB 2.0 (2 x internal) 4 x USB 3.0 (4 x rear)	7 x USB 2.0 (4 x internal; 3 x rear) 1 x USB 3.0 (1 x 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 (Mini-PCIe1 Slot 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-PCIe1)		1 (Shared with Mini-PCIe1)	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	-40 ~ 85°C	-10 ~ 60°C	-10 ~ 60°C	
	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 102mm (3.5")		146 x 102mm (3.5")	146 x 102mm (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 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)		Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 21 (by request) Linux Ubuntu 14.04.03 (by request)	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora 20 (by request) Linux Ubuntu 13.10 (by request)	



NEW

Model		MS-98F6	MS-98F3	MS-98H5
		3.5" Board		EPIC Board
Processor	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W	Intel® Core™ i5-4300U/i3-4010U Processors, DC, 15W Intel® Core™ i7-5650U/i5-5350U/i3-5010U/3765U Processors, DC, 15W	Intel® Atom™ x7 Processor E3950, QC, 12W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W
	Frequency	J1900, 2 GHz N2930, 1.83 GHz	i5-4300U, 1.9GHz, up to 2.9GHz i3-4010U, 1.7GHz i7-5650U, 2.2GHz, up to 3.1GHz i5-5350U, 1.8GHz, up to 2.9GHz i3-5010U, 2.1GHz 3765U, 1.9GHz	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	2MB	2MB~4MB (Depends on CPU)	2M
	CPU Type	BGA	BGA	BGA
	Chipset	N/A	N/A	Integrated in SoC
	BIOS	AMI	AMI	AMI
Memory	Technology	Single-channel DDR3L 1333 MHz	Single channel for DDR3L 1600 MHz	Single-channel LPDDR4 2133/2400MHz
	Max. Capacity	Up to 8GB	Up to 8GB	Up to 4 GB (8GB by option)
	Socket	1 x 204-pin SO-DIMM	1 x 204-pin SO-DIMM	Onboard
Display	Controller	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual channel 18/24-bit	Dual channel 18/24-bit	Dual Channel 18/24-bit
	VGA	1	1 (Optional)	N/A
	DVI	N/A	N/A	1 (DVI-D)
	HDMI	1	1	1 (by BOM option)
	DisplayPort	N/A	N/A	N/A
	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	VGA up to 1920 x 1200 @60Hz HDMI up to 2560 x 1600 @60Hz LVDS up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @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	
Ethernet	Controller	2 x Intel® I210-AT GbE LAN	1 x Intel® I210-AT GbE LAN 1 x Intel® I218-LM GbE LAN PHY	2 x Intel® I210-IT GbE LAN (W/ PoE IEEE 802.3af)
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I	Fintek F81866AD-I	Fintek F81867D-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A	N/A	Yes
I/O Interface	USB	7 x USB 2.0 (4 x internal; 3 x rear) 1 x USB 3.0 (1 x rear)	4 x USB 2.0 (2 x internal; 2 x rear) 2 x USB 3.0 (2 x rear with USB 2.0 signal)	4 x USB3.0 (Rear) 4 x USB2.0 (Internal)
	Serial	6 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, 0V/5V/12V	4 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~4: 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
	PS/2	1 (wafer connector)	1 (pin header)	N/A
	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	M.2	N/A	N/A	1 x M Key (SATA 3.0), 2242 1 x B Key (PCIe x1, USB2.0), 2242/3042
	Mini-PCIe	2 x Full-size (one w/ mSATA)	1 x Full-size (w/ mSATA) 1 x Half-size	1 x Full-size (w/ SIM holder)
Storage	SATA	1 x SATA 2.0	2 x SATA 3.0	1 x SATA 3.0
	mSATA	1	1	N/A
Power Supply	DC	DC-in 12V/19V/24V	DC-in 12V/19V/24V	DC-in 12V~48V
	ATX	N/A	N/A	N/A
Environment	Operating Temperature	-10 ~ 60°C	-10 ~ 60°C	-40 ~ 85°C
	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
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	146 x 102mm (3.5")	146 x 102mm (3.5")	165 x 115mm (EPIC)
	Weight	0.31 kg	0.56 kg	0.72g
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI	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 Fedora 20 (by request) Linux Ubuntu 13.10 (by request)	Windows 7 (64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 19 (by request) Linux Ubuntu 13.04 (by request)	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM



NEW

Model		MS-98G7	MS-98L1				MS-98K1		
		PICMG Board	Mini-ITX Board						
Processor	CPU	4th Gen Intel® Desktop Haswell/Haswell refresh Core™ i7/i5/i3/Pentium/Celeron Processor, Max. 95W	SKU1	SKU2	SKU3	SKU4	SKU1	SKU2	SKU3
	Frequency	2.4GHz~4.0GHz (Depends on CPU)	8th Gen Intel® Desktop Coffee Lake-S Xeon®/i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W				7th Gen Intel® Desktop Kaby Lake-S i7-7700/i7-7700T/i5-7500/i5-7500T/i3-7101E/i3-7101TE, Max 65W		
	L2 Cache	2M~8M (Depends on CPU)	9th Gen Intel® Desktop Embedded IOTG Coffee Lake-S Refresh Xeon®/i7/i5/i3 Series Processor, 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		
	CPU Type	Socket (LGA 1150)	Socket (LGA 1150)				Socket (LGA 1151)		
	Chipset	Intel® H81	Intel® C246 Express	Intel® Q370 Express	Intel® H310 Express		Intel® Q170 Express	Intel® H110 Express	
	BIOS	AMI	AMI UEFI				AMI		
Memory	Technology	Dual-channel DDR3/DDR3L 1333/1600MHz	Dual-channel DDR4 (ECC/non-ECC) 2666MHz		Dual-channel DDR4 (non-ECC) 2666MHz		Dual-channel DDR4 (non-ECC) 2133MHz/2400MHz		
	Max. Capacity	Up to 16GB	Up to 16GB				Up to 32 GB		
	Socket	2 x 240-pin UDIMMs	2 x 240-pin UDIMMs				2 x 260-pin SO-DIMMs		
Display	Controller	Intel® HD Graphics	Intel® HD Graphics				Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM				Shared system memory up to 1.7 GB SDRAM		
	LVDS	N/A	1 x Dual channel 18/24-bit		N/A		1 x Dual channel 18/24-bit		
	VGA	1	N/A				N/A		
	DVI	1 (DVI-D, pin-header)	N/A				2 (DVI-D)		
	HDMI	N/A	1 (Co-lay with DP by Optional)				1 (Co-lay with DP by Optional)		
	Multiple Display	2 independent displays	3 independent displays		2 independent displays		3 independent displays	2 independent displays	
	Display Interface	VGA up to 1920 x 1200 @60Hz DVI-D up to 1920 x 1200 @60Hz	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		
Ethernet	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I217-LM GbE 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® 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)
	Audio	Realtek® ALC887 HD Audio Codec	Realtek® ALC887 Audio Codec (Co-lay ALC888S)				Realtek® ALC887 HD Audio Codec		
Super I/O	Controller	Fintek F81866	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	Box header (Default) Infineon SLB9665TT2.0 (by BOM option)			Infineon SLB9665TT 2.0	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)		
I/O Interface	USB	2 x USB 3.0 (rear) 4 x USB 2.0 (internal)	4 x USB 3.1 Gen2 (4 x rear) 6 x USB 3.1 Gen1 (4 x rear, Signal Share with Internal Box Header, 2 x internal) 2 x USB 2.0 (2 x internal)		4 x USB 3.1 Gen1 (4 x rear) 4 x USB 2.0 (4 x rear)		8 x USB3.0 (rear) 3 x USB2.0 (internal)	4 x USB3.0 (rear) 5 x USB2.0 (4 x rear; 1 x internal)	
	Serial	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, 0V/5V/12V	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, 0V/5V/12V	
	Parallel	1	N/A				N/A		
	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				16-bits (8 x GPI; 8 x GPO), 5V		
	PCI	N/A	N/A				N/A		
Expansion Slot	M.2	N/A	1 x M Key (PCIe x4 NVMe, SATA), 2242/2280 1 x E Key (PCIe x1, USB 2.0, CNV), 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	
	Mini-PCIe	1 x Full-size (w/ mSATA)	1 x Full-size (w/SIM holder)		1 x Full-size		1 x Full-size (w/ SIM holder)		
Storage	SATA	2 x SATA 3.0 1 x SATA 2.0	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		
	mSATA	1	N/A				N/A		
Power Supply	DC	N/A	N/A				DC-in 12 ~24V		
	ATX	ATX/AT-Power 12V-4P, power from PICMG1.0 backplane	ATX-Power 24P, 12V-8P				N/A		
Environment	Operating Temperature	0 ~ 60°C	-10 ~ 60°C				-10 ~ 60°C		
	Operating Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing				10 ~ 90%, non-condensing		
	Storage Temperature	-10 ~ 60°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)	338 x 122mm (PICMG 1.0)	170 x 170mm (Mini-ITX)				170 x 170mm (Mini-ITX)		
	Weight	0.40 kg	0.405 kg	0.375 kg	0.39 kg	0.375 kg	0.42 kg	0.42 kg	0.39 kg
Certification	EMC	FCC, CE	CE, FCC Class B, BSMI, RCM, VCCI				FCC, CE, RCM, VCCI, BSMI (Class A)		
	OS Support	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit) Linux Fedora 19 (by request) Linux Ubuntu 10.04 (by request)	Windows 10 (64-bit) Linux Kernel 4.x (by request)				Windows 10 (64-bit) Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		



Model		MS-98E1		MS-98H1		MS-98C7		
		Mini-ITX Board		Mini-ITX Board		Mini-ITX Board		
Processor	CPU	C236 SKU	H110 SKU	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/Pentium® Processor, Max. 95W		4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/Pentium® Processor, 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)		2.4GHz~4.0 GHz (Depends on CPU)		2.2GHz~4.4GHz (Depends on CPU)		
	L2 Cache	2M ~ 8M (Depends on CPU)		2M~8M (Depends on CPU)		2M ~ 8M (Depends on CPU)		
	CPU Type	Socket (LGA 1151)		Socket (LGA 1150)		Socket (LGA 1150)		
	Chipset	Intel® C236 Express	Intel® H110 Express	Intel® Q87/H81 Express		Intel® H81/Q87 Express		
BIOS	AMI		AMI		AMI			
Memory	Technology	Dual-channel DDR4 (ECC) 2133MHz/ 2400MHz (7th Gen)	Dual-channel DDR4 (non-ECC) 2133MHz/ 2400MHz (7th Gen)	Dual-channel DDR3/DDR3L 1066/1333/1600MHz		Dual-channel DDR3/DDR3L 1066/1333/1600MHz		
	Max. Capacity	Up to 32GB		Up to 16GB		Up to 16GB		
	Socket	2 x 260-pin SO-DIMMs		2 x 204-pin SO-DIMMs		2 x 204-pin SO-DIMMs		
Display	Controller	Intel® HD Graphics		Intel® HD Graphics		Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM		
	LVDS	1		N/A		Dual channel 24-bit (add chrontel 7511B chipset)		
	eDP	N/A		N/A		N/A		
	VGA	1		2		1		
	DVI	1 (DVI-D)		1 (DVI-D)		N/A		
	HDMI	1		1		N/A		
	DisplayPort	N/A		N/A		2		
Multiple Display	3 independent displays		2 independent displays		3 independent displays (Q87 SKU)		2 independent displays (H81 SKU) 3 independent displays (Q87 SKU)	
	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		VGA1 up to 1920 x 1080 @60Hz VGA2 up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz HDMI up to 1920 x 1200 @60Hz		LVDS up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @60Hz	
Ethernet	Controller	1 x Intel® I219-LM GbE-PHY 1 x Intel® I211-AT PCIe GbE LAN(Co-lay I210-AT)		4 x Intel® I210-AT GbE LAN 2 x Intel® I211-AT GbE LAN (depends on SKU)		1 x Intel® I217-LM GbE PHY (iAMT 9.0 supported) 1 x Intel® I210-AT PCIe GbE LAN		
Audio	Controller	Realtek® ALC887 HD Audio Codec		Realtek® ALC887 HD Audio Codec		Realtek® ALC887 HD Audio Codec		
Super I/O	Controller	Fintek F81866AD-I		Fintek F81866D		Fintek F81866D		
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		Pin header		Pin header		
I/O Interface	USB	4 x USB 3.0 (4 x rear) 4 x USB 2.0 (2 x rear; 2 x internal) 1 x USB 2.0 (Vertical, internal)		2 x USB 3.0 (rear) 4 x USB 2.0 (2 x rear; 2 x internal)		Q87: 6 x USB 2.0 (4 x internal; 2 x rear); 4 x USB 3.0 (rear) H81: 6 x USB 2.0 (2 x internal; 4 x rear); 2 x USB 3.0 (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		10 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V COM7~10: RS-232, 0V/5V/12V (depends on SKU)		5 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, w/ WOR function COM3~5: RS-232, 0V/5V/12V		
	PS/2	1		1		1		
	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		1		1 (up to 75W)		
	PCIe x1	N/A		N/A		N/A		
	M.2	1 x M Key (PCIe x4, SATA3.0), 2242	N/A	N/A		N/A		
	Mini-PCIe	1 x Full-size, mSATA		1 x Full-size(W/ mSATA) 1 x Half-size		1 x Full-size(W/ mSATA) 1 x Half-size		
Storage	SATA	4 x SATA 3.0	3 x SATA 3.0	2 x SATA 3.0		Q87: 4 x SATA 3.0 H81: 2 x SATA 3.0; 1 x SATA 2.0		
	mSATA	1 (shared w/ Mini-PCIe)		1 (shared w/ Mini-PCIe)		1 (shared w/ Mini-PCIe)		
Power Supply	DC	N/A		N/A		DC-in 12V		
	ATX	ATX-Power 24P, 12V-4P		ATX-Power 24P, 12V-4P		N/A		
Environment	Operating Temperature	0 ~ 60°C		-10 ~ 60°C		0 ~ 60°C		
	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	170 x 170mm (Mini-ITX)		170 x 170mm (Mini-ITX)		170 x 170mm (Mini-ITX)		
	Weight	0.37 kg		0.37 kg		0.37 kg		
Certification	EMC	FCC, CE, RCM, VCCI, BSMI		FCC Class A, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI		
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8/8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 19 (by request) Linux Ubuntu 13.04 (by request)		Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit) Linux Fedora 19 (by request)		

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICOmG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM



NEW



Model		MS-98B3	MS-98J4	MS-98H4
Mini-ITX Board				
<b>Processor</b>	CPU	6th/7th Gen Intel® Mobile-H Kaby Lake/Skylake Core™ Xeon® / Core™ i7/i5/i3/Celeron® Processor, Max. 45W	7th/6th Gen Intel® Mobile Kaby Lake/Skylake-ULT Core™ i7/ i5/i3/Celeron® Processor,DC/QC, Max. 15W	5th Gen Intel® Mobile Broadwell ULT Core™ i3/i5/i7 Processor, Max. 15W
	Frequency	2.3GHz~3.9 GHz (Depends on CPU)	Depends on CPU	Depends on CPU
	L2 Cache	3M~8M (Depends on CPU)	Depends on CPU	Depends on CPU
	CPU Type	BGA	BGA	BGA
	Chipset	Intel® HM170/QM170/CM236 Express	Integrated	Integrated
	BIOS	AMI	AMI	AMI
<b>Memory</b>	Technology	Dual-channel DDR4 1866/2133 MHz	Dual-channel DDR4 2133 MHz SDRAM	Dual-channel DDR3L 1333 /1600 MHz SDRAM
	Max. Capacity	Up to 32GB	Up to 32GB	Up to 16 GB
	Socket	2 x 260-pin SO-DIMMs	2 x 260-pin SO-DIMMs	2 x 204-pin SO-DIMMs
<b>Display</b>	Controller	Intel® Iris™ Graphics/HD Graphics (depends on CPU)	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM
	LVDS	2 x Dual channel 24-bit ( LVDS1 co-design with eDP, LVDS2 co-design with DVI-D)	2 x Dual channel 24-bit (LVDS1 co-design with eDP, LVDS2 co-design with DP2/HDMI2.0)	1 x Dual channel 18/24-bit (Colay with DP)
	eDP	N/A	1 (Co-design with LVDS1)	N/A
	VGA	N/A	N/A	1 (shared w/ DVI-D)
	DVI	1 (DVI-I)	N/A	1 (DVI-D, shared w/ VGA)
	HDMI	2(1 x HDMI2.0, 1 x HDMI1.4 colay with DP)	2 (1 x HDMI1.4 colay with DP1, 1 x HDMI2.0 colay with DP2)	1 (shared w/ DP)
	DisplayPort	1(Colay with HDMI1.4)	2 (DP1 colay with HDMI1.4, DP2 colay with HDMI2.0)	2 (1 shared w/ HDMI, 1 shared w/ LVDS)
	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 2160 @60Hz DP up to 4096 x 2160 @60Hz HDMI up to 4096 x 2160 @60Hz DVI up to 1920 x 1200 @60Hz	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2160 @60Hz DP up to 4096 x 2160 @60Hz HDMI up to 4096 x 2160 @60Hz	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz DP up to 3840x 2160 @60Hz HDMI up to 4096 x 2160 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I217-LM LAN PHY 1 x Intel® I210 LAN	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I211-AT/I210-AT GbE LAN"	1 x Intel® I218LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
	Controller	Realtek® ALC887 HD Audio Codec	Realtek® ALC887/888S HD Audio Codec	Realtek® ALC887/888S HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I	Fintek F81866AD-I	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes	Yes	Yes
<b>TPM</b>	Controller	Pin header	Infineon SLB9665TT2.0(default) Pin header (By BOM option)	Infineon SLB9635TT1.2
<b>I/O Interface</b>	USB	4 x USB 3.0 (rear) 8 x USB 2.0 (6 x internal; 2 x rear)	4 x USB 3.0 (rear) 5 x USB 2.0 (4 x internal, 1 x vertical connector)	4 x USB 3.0 (rear) 2 x USB 2.0 (internal)
	Serial	2 x COM ports (rear) RS-232/422/485,0V/5V/12V	6 x COM Ports (Internal) COM1~2: RS-232/422/485, 0V/5V/12V, RI support (RS-232/422/485 by Optional , RS485 support 1000M+) COM3~6: RS-232, 0V/5V/12V (depends on SKU)	2 x COM Ports (Internal) COM3~4: RS-232, 0V/5V/12V
	Parallel	N/A	N/A	N/A
	PS/2	1	1 (pin header)	1 (pin header)
<b>Expansion Slot</b>	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
	PCIe x16	1 (up to 75W, w/ riser card to extend to x8+x8 or x8+x4+x4)	N/A	N/A
	PCIe x4	N/A	N/A	N/A
<b>Storage</b>	M.2	N/A	1 x E Key 2230 for Wi-Fi/ BT module 1 x M Key 2280 for SSD	1 x M Key (SATA 3.0), 2242 1 x E Key (PCIe x1, USB2.0), 2230
	Mini-PCIe	1 x Full-size colay mSATA 1 x Half-size QM87: 2 x SATA 3.0 HM86: 1 x SATA 3.0; 1 x SATA 2.0	1 x Full-size(w/mSATA) 1 x Full/Half-size(w/ SIM Holder)	N/A
	SATA	2 x Full-size (one w/ SIM holder or mSATA)	2 x SATA 3.0	2 x Full-size (one w/ SIM holder or mSATA)
<b>Power Supply</b>	mSATA	1 (Support by mini PCIe slot )	1 (shared w/ Mini-PCIe)	1 (shared w/ Mini-PCIe)
	DC	DC-in 12V/19V	DC-in 12V~24V	DC-in 12V/19V/24V
<b>Environment</b>	ATX	N/A	N/A	N/A
	Operating Temperature	0 ~ 60°C	-10 ~ 60°C	-10 ~ 60°C
	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
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)	170 x 170mm (Mini-ITX)	170 x 170mm (Mini-ITX)
	Weight	0.35 kg	0.34 kg	0.37 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Kernel 4.4	Windows 7 (32/64-bit) (For Skylake-U Only) Windows 8.1 (64-bit) (For Skylake-U Only) Windows 10/ Windows 10 IoT Enterprise (64-bit) Linux Kernel 4.x (Fedora 25 & Ubuntu 16.04 )	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora Core 21 Linux Ubuntu 15.04





Model		MS-98G5	MS-98B1	MS-98J0
		Mini-ITX Board		
Processor	CPU	4th Gen Intel® Mobile Haswell-H Core™ i7/i5/i3/ Celeron® Mobile Processor, Max. 47W	Intel® Celeron® Processor N3350, DC, 6W Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor N3350, DC, 6W Intel® Atom™ x5 Processor E3940, QC, 9.5W
	Frequency	2.2GHz~3.6 GHz (Depends on CPU)	2MB	2MB
	L2 Cache	3M~6M (Depends on CPU)	BGA	BGA
	CPU Type	BGA	Integrated in SoC	Integrated in SoC
	Chipset	Intel® HM86/QM87 Express	AMI	AMI
	BIOS	AMI	Dual-channel DDR3L 1333/1066 MHz	Dual-channel DDR3L 1333/1066 MHz
Memory	Technology	Dual-channel DDR3L 1333 /1600 MHz SDRAM	Dual-channel DDR3L 1866 MHz	Dual-channel DDR3L 1866 MHz
	Max. Capacity	Up to 16 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
Display	Controller	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual channel 24-bit	1 x Dual channel 18/24-bit (Signal shared w/ eDP)	1 x Dual channel 18/24-bit
	eDP	N/A	1 (by BOM option)	1 (by BOM option)
	VGA	N/A	N/A	1 (by BOM option)
	DVI	1 (DVI-I)	N/A	N/A
	HDMI	1	1 (Co-lay DP)	1 (Co-lay DP)
	DisplayPort	1	2 (One Signal shared w/ eDP)	1 (Co-lay VGA)
	Multiple Display	3 independent displays	3 independent displays	3 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz DVI up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @60Hz HDMI up to 3840 x 2160 @24Hz	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	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
Ethernet	Controller	1 x Intel® I217-LM LAN PHY 1 x Intel® I210 LAN	2 x Intel® I211-AT (colay I210-AT GbE LAN)	2 x Realtek® RTL8111H-CG
Audio	Controller	Realtek® ALC887 HD Audio Codec	Realtek® ALC887-VD2-CG HD Audio Codec	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I	Fintek F81867D-I	Fintek F81867D-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	Pin header (default) Infineon SLB9665TT 2.0 (by BOM option)	Pin header (default) Infineon SLB9665TT 2.0 (by BOM option)
I/O Interface	USB	4 x USB3.0 (rear) 8 x USB2.0 (6 x internal; 2 x rear)	4 x USB3.0 (rear) 5 x USB2.0 (internal)	4 x USB3.0 (rear) 3 x USB2.0 (internal)
	Serial	5 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~5: RS-232	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: RS-232/422/485, 0V/5V/12V COM2~6: RS-232, w/o Power
	PS/2	1	1 (pin header)	1 (pin header)
	GPIO	8-bits (4 x GPI; 4 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 (up to 75W, w/ riser card to extend to x8+x8 or x8+x4+x4)	N/A	N/A
	PCIe x1	1	1	1
	M.2	1 x M Key (SATA 3.0), 2242 1 x E Key (PCIe x1, USB2.0), 2230	1 x M Key (SATA 3.0), 2242 1 x E Key (PCIe x1, USB2.0), 2230	1 x M Key (SATA 3.0), 2242 1 x E Key (PCIe x1, USB2.0), 2230
	Mini-PCIe	N/A	N/A	N/A
Storage	SATA	QM87: 1 x Full-size, mSATA (w/ SIM Holder) 1 x Half-size HM86: 1 x Half-size	2 x SATA 3.0 (SATA2 share with M.2 M Key)	1 x SATA 3.0
	mSATA	1	N/A	N/A
Power Supply	DC	DC-in 12V/19V	DC-in 12/19/24V	DC-in 12V
	ATX	N/A	N/A	N/A
Environment	Operating Temperature	0 ~ 60°C	-10 ~ 60°C	-10 ~ 60°C
	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	170 x 170mm (Mini-ITX)	170 x 170mm (Mini-ITX)	170 x 170mm (Mini-ITX)
	Weight	0.35 kg	0.37 kg	0.37 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8 (32 bit)	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by Rrequest)	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-M Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM



Model		MS-9892		MS-98F1		MS-9810	
		Mini-ITX Board					
Processor	CPU	Apollo Lake SKUs N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz		Apollo Lake-I SKUs N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz		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	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz		E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 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	
	L2 Cache	1M~2M (Depends on CPU)				2MB	
	CPU Type	BGA				BGA	
	Chipset	Integrated in SoC				Integrated	
	BIOS	AMI				AMI	
Memory	Technology	Dual-channel DDR3L 1866 MHz		Dual-channel DDR3L 1333/1600 MHz		Dual-channel DDR3L 1333/1600 MHz	
	Max. Capacity	Up to 8GB		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	Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM		Shared system memory up to 1.7 GB SDRAM	
	LVDS	1 x Dual channel 18/24-bit		2*Dual channel 18/24-bit		Dual channel 24-bit	
	eDP	1 (colay with LVDS)		N/A		N/A	
	VGA	N/A		NA		N/A	
	DVI	N/A		N/A		1 (DVI-D)	
	HDMI	1 (colay with DP)		N/A		1 (colay with DP)	
	DisplayPort	1 (colay with HDMI)		N/A		N/A	
Ethernet	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		LVDS up to 1920 x 1200 @60 Hz DP up to 3840 x 2160 @30Hz eDP up to 2560 x 1600		LVDS up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @30Hz HDMI up to 1920 x 1200 DVI up to 1920 x 1200	
Audio	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT 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)	
Super I/O	Controller	Realtek® ALC887-VD2-CG HD Audio Codec		Realtek® ALC887 co-layer ALC888S		Realtek® ALC887 co-layer ALC888S	
H/W Monitor	Controller	Fintek F81867D-I		Fintek F81866AD-I		Fintek F81866AD-I	
	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer		256-level Watchdog Timer	
TPM	Smart Fan	Yes		Yes		Yes	
	Controller	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)	Pin header (Default) Infineon SLB9665XT 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	4 x USB3.0 (Rear) 6 x USB2.0 (Internal)		4 x USB3.0 (rear) 4 x USB2.0 (internal)		4 x USB3.0 (rear) 4 x USB2.0 (internal)	
	Serial	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 (COM1~2: rear, COM3~6: 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, COM3: internal) COM1: RS-232/422/485,0V/5V/12V COM5: RS-232,0V/5V/12V COM6: RS-232 w/o power	
	PS/2	1 (pin header)		1 (pin header)		1 (pin header)	
	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	PCIe x16	N/A		1		N/A	
	PCIe x1	1		N/A		1	
	M.2	N/A		N/A		N/A	
	Mini-PCIe	1 x Full-size (w/ SIM holder) 1 x Full-size (w/ mSATA)		2 x Full/Half-size (one w/ SIM holder)		1 x Full-size co-layer mSATA, support Half-size card	
Storage	SATA	2 x SATA3.0 (SATA2 share with M.2)		1 x SATA 3.0		1 x SATA 3.0	
	mSATA	1 (shared w/SATA2)		1 (support by mini PCIe slot )		1 (support by mini PCIe slot)	
Power Supply	DC	DC-in 12V~24V		DC-in 12/19/24V		DC-in 12V	
	ATX	N/A		ATX Power 20P		N/A	
Environment	Operating Temperature	-10 ~ 60°C	-40 ~ 85°C	0 ~ 60°C		0 ~ 60°C	
	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	170 x 170mm (Mini-ITX)		170 x 170mm (Mini-ITX)		170 x 170mm (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	
	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)		Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 23 Linux Ubuntu 15.10		Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Ubuntu 14.04.3 & Fedora 20	



Model		MS-98F5	MS-98E3	MS-98L2			
		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	SKU1	SKU2	SKU3	
	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	8th Gen Intel® Desktop Coffee Lake-S Xeon®/i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W			
	L2 Cache	2 MB	2 MB	2.1GHz~4.7GHz(Depends on CPU)			
	CPU Type	BGA	BGA	2MB~12MB (Depends on CPU)			
	Chipset	Integrated	Integrated	Intel® C246 Express	Intel® Q370 Express		
	BIOS	AMI	AMI	AMI UEFI			
Memory	Technology	Dual-channel DDR3L 1333/1066 MHz	Dual-channel DDR3L 1333/1066 MHz	Dual-channel DDR4 (ECC/non-ECC) 2666MHz	Dual-channel DDR4 (non-ECC) 2666MHz		
	Max. Capacity	Up to 8 GB	Up to 8 GB	Up to 64 GB			
	Socket	2 or 1 x 204-pin SO-DIMMs (depends on SKU)	2 x 204-pin SO-DIMMs	4 x 288-pin UDIMMs			
Display	Controller	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics			
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM			
	LVDS	Dual Channel 24-bit (add chrontel 7511B chipset)	Dual Channel 24-bit (add chrontel 7511B chipset)	N/A			
	VGA	1	1	N/A			
	DVI	N/A	N/A	1			
	HDMI	N/A	1	N/A			
	Multiple Display	2 independent displays	2 independent displays	3 independent displays			
Display Interface	VGA up to 2560 x 1600 @60Hz LVDS up to 1920 x 1200 @60Hz	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 LVDS up to 1920 x 1200	VGA up to 1920 x 1200 @60Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz				
Ethernet	Controller	2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)	2 x Intel® i210-AT GbE 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® ALC887 HD Audio Codec	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	Pin header	Pin header	Box header (Default) Infineon SLB9665TT2.0 (by BOM option)			
I/O Interface	USB	8 x USB 2.0 (4 x internal; 4 x rear)	8 x USB 2.0 (4 x internal; 4 x rear) 1 x USB 3.0 (internal)	4 x USB3.1 Gen2 Type-A (4 x Rear) 4 x USB3.1 Gen1 Type-A (4 x Rear) 5 x USB 2.0 (5 x internal with one Vertical Type-A)			
	Serial	6 x COM ports (COM1: rear, COM2~6: internal) COM1: RS-232, 0V/5V/12V COM2~6: RS-232, w/o power	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-232/422/485, 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 (Pin header)	N/A	1			
	PS/2	1 (Pin header)	1 (Pin header)	1 x PS/2 port by Y-cable for keyboard and mouse			
	GPIO	8-bits (4 x GPI, 4 x GPO), 3.3V	8-bits (4 x GPI, 4 x GPO), 5V	16-bits (8 x GPI; 8 x GPO), 5V			
	Expansion Slot	PCIe x16	N/A	1 x SATA 2.0	1		
Storage	PCI	N/A	N/A	N/A			
	M.2	N/A	N/A	1 x M Key (PCIe x4 NVMe, SATA 3.0), 2242/2260/2280			
	Mini-PCIe	1 x Full-size, mSATA	1 x Full-size, mSATA	1 x Full-size/Half-size			
	SATA	1 x SATA 2.0	1 x SATA 2.0	4 x SATA 3.0			
Power Supply	CFast	N/A	N/A	N/A			
	mSATA	1	1	N/A			
	DC	DC-in 12V	DC-in 12V/19V/24V	N/A			
Environment	ATX	N/A	ATX-Power 20P	ATX-Power 24P, 12V-8P			
	Operating Temperature	0 ~ 60°C	0 ~ 60°C	-10 ~ 60°C			
	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	170 x 170mm (Mini-ITX)	170 x 170mm (Mini-ITX)	244 x 244mm (uATX)			
	Weight	0.37 kg	0.37 kg	0.625 kg	0.600 kg		
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI	CE, FCC Class B, BSMI, RCM, VCCI			
Software Platform	OS Support	Windows 8 (32/64-bit) Windows 10 (64-bit)	Windows 8 (64-bit)	Windows 10 (64-bit) Linux Kernel 4.x (by request)			

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO-M Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

Industrial Computer  
COM Express Board  
Qseven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PQMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCIe  
Intel® SDM



Model		MS-98E2		MS-98G3	MS-98D6	
		Micro-ATX Board				
<b>Processor</b>	CPU	C236 SKU 1.1GHz~3.7 GHz (Depends on CPU)	H110 SKU 7th/6th Gen Intel® Desktop Kaby Lake/SkyLake Core™ i7/ i5/i3/Pentium®/Celeron® Series Processor, Max 95W	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/ Celeron®/Pentium® Processors, Max. 95W	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/ Celeron®/Pentium® Processor, Max. 95W	
	Frequency	2.3GHz~4.0GHz (Depends on CPU)		2.2GHz~4.4GHz (Depends on CPU)	2M ~ 8M (Depends on CPU)	
	L2 Cache	2M ~ 8M (Depends on CPU)		2M ~ 8M (Depends on CPU)	Socket (LGA 1150)	
	CPU Type	Socket (LGA 1151)		Socket (LGA 1150)	Intel® Q87 Express	
	Chipset	Intel® C236 Express	Intel® H110 Express		Intel® Q87 Express	
	BIOS	AMI		AMI	AMI	
<b>Memory</b>	Technology	Dual-channel DDR4 (ECC) 2133MHz/2400MHz (7th Gen)	Dual-channel DDR4 (non-ECC) 2133MHz/2400MHz (7th Gen)	Dual-channel DDR3 1066/1333/1600MHz	Dual-channel DDR3 1066/1333/1600MHz	
	Max. Capacity	Up to 64 GB	Up to 32 GB	Up to 32GB	Up to 32 GB	
	Socket	4 x 288-pin Long-DIMMs	2 x 288-pin Long-DIMMs	4 x 240-pin Long-DIMMs	4 x 240-pin Long-DIMMs	
<b>Display</b>	Controller	Intel® HD Graphics		Intel® HD Graphics	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM				
	LVDS	1	N/A	N/A	N/A	
	eDP	N/A		N/A	N/A	
	VGA	1		1	N/A	
	DVI	1 (DVI-D)		1 (DVI-D)	1 (DVI-I)	
	DisplayPort	1		N/A	2	
	Multiple Display	3 independent displays	2 independent displays	2 independent displays	3 independent displays	
<b>Display Interface</b>	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	VGA up to 1920 x 1080 @60Hz DVI up to 2560 x 1600 @60Hz	DP up to 3840 x 2160 @ 60Hz DVI up to 1920 x 1200 @ 60Hz	
	Controller	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	1 x Intel® I217-LM GbE-PHY 3 x Intel® I210-AT PCIe GbE LAN	1 x Intel® I217-LM GbE-PHY 1 x Intel® I210-AT PCIe GbE LAN	
<b>Ethernet</b>	Controller	Realtek® ALC887 HD Audio Codec		Realtek® ALC887 HD Audio Codec	Realtek® ALC887 HD Audio Codec	
<b>Audio</b>	Controller	Fintek F81866AD-I + F81216H	Fintek F81866AD-I	Fintek F81866AD-I + F81216AD	Fintek F81866AD-I + F81216AD	
<b>Super I/O</b>	Watchdog Timer	256-level Watchdog Timer		256-level Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes		Yes	Yes	
<b>H/W Monitor</b>	Controller	Pin header		Pin header	Pin header	
<b>TPM</b>	USB	6 x USB 3.0 (4 x rear; 2 x internal) 6 x USB 2.0 (2 x rear; 4 x internal)	4 x USB 3.0 (4 x rear) 6 x USB 2.0 (2 x rear; 4 x internal)	8 x USB 2.0 (4 x rear; 4 x internal) 4 x USB 3.0 (4 x rear)	8 x USB 2.0 (6 x rear; 2 x internal) 4 x USB 3.0 (4 x rear)	
	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	10 x COM ports (internal) COM1~4: RS-232, 0V/5V/12V COM5: RS-232/422/485, 0V/5V/12V COM6: RS-232/422/485, without power COM7~10: RS-232, 0V/5V/12V COM1 & COM2 support WOR)	10 x COM ports (internal) COM1~4: RS-232, 0V/5V/12V COM5: RS-232/422/485, 0V/5V/12V COM6: RS-232/422/485, without power COM7~10: RS-232, 0V/5V/12V COM1 & COM2 support WOR)	
		Parallel	N/A		1	1
	PS/2	1		1	1	
	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	
	<b>I/O Interface</b>	PCIe x16	1		1	1
		PCIe x8	1*PCIe x8 (x4 signal)	1*PCIe x8 (x1 signal)	N/A	N/A
PCIe x4		N/A		1*PCIe x8 (x4 signal)	1*PCIe x8 (x4 signal)	
PCIe x1		1		N/A	N/A	
PCI		1		2	2	
M.2		1 x M Key (PCIe x4, SATA3.0), 2242/2260/2280	N/A		N/A	
<b>Expansion Slot</b>	Mini-PCIe	1 x Full-size, mSATA		1 x Full-size, mSATA	1 x Full-size, mSATA	
	SATA	6 x SATA 3.0	3 x SATA 3.0	4 x SATA 3.0	4 x SATA 3.0	
<b>Storage</b>	mSATA	N/A		1	1	
	DC	N/A		N/A	N/A	
<b>Power Supply</b>	ATX	ATX-Power 24P, 12V-8P		ATX-Power 24P, 12V-4P	ATX-Power 24P, 12V-4P	
	<b>Environment</b>	Operating Temperature	0 ~ 60°C		0 ~ 60°C	0 ~ 60°C
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	
<b>Form Factor</b>	Dimensions	244 x 244 mm (uATX)		244 x 244mm (uATX)	244 x 244mm (uATX)	
	Weight	0.73 kg		0.6 kg	0.73 kg	
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI		FCC, CE, RCM, VCCI, BSMI	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit)	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit)	



Model		MS-98K9			MS-98L9	
		ATX Board				
Processor	CPU	8th Gen Intel® Desktop Coffee Lake-S 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 65W	
	Frequency	2.1GHz~4.7GHz (Depends on CPU)			2.3GHz~4.2GHz (Depends on CPU)	
	L2 Cache	2MB~12MB (Depends on CPU)			2MB~8MB (Depends on CPU)	
	CPU Type	Socket (LGA 1151)			Socket (LGA 1151)	
	Chipset	Intel® C246 Express	Intel® Q370 Express	Intel® Q370 Express	Intel® H110 Express	
	BIOS	AMI UEFI			AMI UEFI	
Memory	Technology	Dual-channel DDR4 (ECC) 2666MHz	Dual-channel DDR4 (non-ECC) 2666MHz	Dual-channel DDR4 (non-ECC) 2666MHz	Dual-channel DDR4 2133/2400MHz	
	Max. Capacity	Up to 64GB			Up to 32GB	
	Socket	4 x 288-pin UDIMMs			2 x 288-pin UDIMMs	
Display	Controller	Intel® HD Graphics			Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM			Shared system memory up to 1.7 GB SDRAM	
	LVDS	N/A			N/A	
	eDP	N/A			N/A	
	VGA	1			1	
	DVI	1		N/A	N/A	
	HDMI	1			1	
	DisplayPort	2			1	
	Multiple Display	3 independent displays			2 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		HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @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 2 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 1 x Intel® I211-AT GbE LAN	
	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	Infineon SLB 9665TT2.0 TPM 2.0		Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)	Box header	
	USB	6 x USB 3.1 Gen2 Type-A (6 x rear) 7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A)		4 x USB 3.1 Gen2 Type-A (4 x rear) 7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A)	*4 x USB 3.0 (4 x rear) 5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A)	
I/O Interface	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	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	Yes			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	16-bits (8 x GPI; 8 x GPO), 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	3 (Signal configed as 1 PCIe x16 or 2 PCIe x8 or 1 PCIe x8 + 2 PCIe x4)			1	
	PCIe x8	N/A			N/A	
	PCIe x4	2 (PCIe x16 Slot Type)			1	
	PCIe x1	2			N/A	
	PCI	N/A			5	
	M.2	1 x M Key (PCIe x4, SATA 3.0), 2242/2260/2280 1 x E Key (PCIe x1, USB 2.0), 2230			N/A	
Storage	SATA	6 x SATA 3.0 (Support RAID 0/1/5/10, SATA Port 6 share with M.2 M Key)			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			-10 ~ 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 244mm (ATX)			305 x 244mm (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 10 (64-bit) Linux Kernel 4.x (by request)			Windows 10 (64-bit) Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)	

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO-M Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM



Model		MS-98H9 V2.0	MS-98H9				
		ATX Board					
Processor	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W	C236 SKU	Q170 SKU	H110 SKU		
			Frequency	2.6GHz~4.5GHz(Depends on CPU)	2.6 GHz~4.5 GHz (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® Q170 Express	Intel® C236 Express	Intel® Q170 Express	Intel® H110 Express
			BIOS	AMI UEFI	AMI UEFI		
Memory	Technology	Dual-channel DDR4 (non-ECC) 2133MHz	Dual-channel DDR4 (ECC) 2133MHz				
	Max. Capacity	Up to 64 GB	Up to 64 GB		Up to 32 GB		
	Socket	4 x 288-pin UDIMMs	4 x 288-pin UDIMMs		2 x 288-pin UDIMMs		
Display	Controller	Intel® HD Graphics	Intel® HD Graphics				
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM				
	VGA	1 (Non PnP)	1 (Non PnP)				
	DVI	1 (DVI-D)	1 (DVI-D)				
	DisplayPort	2	2				
	Multiple Display	3 independent displays	3 independent displays				
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				
	Audio	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	Box header	Box header				
I/O Interface	USB	6 x USB 2.0 (2 x rear; 4 x internal) 6 x USB 3.0 (4 x rear; 2 x internal)	6 x USB 2.0 (2 x rear; 4 x internal) 6 x USB 3.0 (4 x rear; 2 x internal)		4 x USB 2.0 (2 x rear; 2x internal) 4 x USB 3.0 (4 x 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 (internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V				
	Parallel	Yes	1				
	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				
Expansion Slot	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	8-bits (4 x GPI; 4 x GPO), 5V				
	PCIe x16	1	1		1		
	PCIe x4	N/A	2				
	PCIe x1	N/A	N/A				
	PCI	6	4				
	M.2	N/A	N/A				
Storage	Mini-PCIe	2 x Full-size (one w/ mSATA)	2 x Full-size (one w/ mSATA)		N/A		
	SATA	5 x SATA 3.0 (Support RAID 0/1/5/10)	5 x SATA 3.0 (Support RAID 0/1/5/10)		4 x SATA 3.0		
Power Supply	mSATA	1	1		N/A		
	DC	N/A	N/A				
ATX	ATX	ATX-Power 24P, 12V-8P	ATX-Power 24P, 12V-8P				
	Operating Temperature	-10 ~ 60°C	-10 ~ 60°C				
Environment	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				
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing				
Form Factor	Dimensions	305 x 244mm (ATX)	305 x 244mm (ATX)				
	Weight	0.70 kg	0.70 kg				
Certification	EMC	FCC, CE, RCM, VCCI, BSMI (Class B)	FCC, CE, RCM, VCCI, BSMI (Class B)				
Software Platform	OS Support	Windows 10 (64-bit) Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)	Windows 10 (64-bit) Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)				



Model		MS-98B5	MS-98A9
		ATX Board	
Processor	CPU	4th Gen Intel® Core™ i7/i5/i3/Pentium®/Celeron® Processor, Max. 95W	3rd Gen Intel® Core™ i7/i5/i3/Pentium®/Celeron® Processor, Max.95W
	Frequency	2.4GHz~4.0 GHz (Depends on CPU)	2.8GHz~3.9 GHz (Depends on CPU)
	L2 Cache	2M~8M (Depends on CPU)	3M~8M (Depends on CPU)
	CPU Type	Socket (LGA 1150)	Socket (LGA 1155)
	Chipset	Intel® H81/Q87 Express	Intel® Q77 Express
	BIOS	AMI	AMI
Memory	Technology	Dual-channel DDR3/DDR3L 1333/1600MHz	Dual-channel DDR3 1333/1600MHz
	Max. Capacity	Up to 32GB	Up to 32GB
	Socket	4 x 240-pin DIMMs	4 x 240-pin DIMMs
Display	Controller	Intel® HD Graphics	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	Shared system memory up to 1.7 GB SDRAM
	VGA	N/A	1
	DVI	1 (DVI-I)	1 (DVI-D)
	DisplayPort	1	1
	Multiple Display	2 independent displays (H81 SKU) 3 independent displays (Q87 SKU)	2 independent displays (SNB CPU only) 3 independent displays (IVB CPU only)
Display Interface	VGA up to 1920 x 1080 @60Hz DVI-D up to 2560 x 1600 @60Hz DP up to 2560 x 1600 @60Hz	VGA up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz DP up to 2560 x 1600 @60Hz HDMI up to 1920 x 1200 @60Hz	
Ethernet	Controller	1 x Intel® I217-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN	1 x Intel® 82579LM GbE LAN PHY 1 x Intel® 82583V GbE LAN
Audio	Controller	Realtek® ALC887 HD Audio Codec	Realtek® ALC887 HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I	Fintek F81866
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(Q87: 2 x rear; 6 x internal; H81: 4 x rear; 4 x internal) 4 x USB 3.0(Q87: 4 x rear; H81: 2 x rear)	4 x USB 3.0 (rear) 8 x USB 2.0 (2 x rear; 6 x internal)
	Serial	6 x COM ports (COM1~2: rear, COM3~6: internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V	6 x COM ports (COM1: rear, COM2~6: internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V
	Parallel	1	1
	PS/2	1 x PS/2 port by Y-cable for keyboard and mouse	1
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	PCIe x16	1	1
	PCIe x4	N/A	1
	PCIe x1	3	N/A
	PCI	3	5
	M.2	N/A	N/A
	Mini-PCIe	2 x Full-size (Q87 only)	1 x Full-size
Storage	SATA	6 x SATA 3.0 (H81 SKU: 2 x SATA 2.0, 2 x SATA 3.0) (Q87 SKU: RAID 0/1/5/10)	2 x SATA 3.0; 3 x SATA 2.0 (support RAID 0, 1, 5, 10)
	mSATA	N/A	1
Power Supply	DC	N/A	N/A
	ATX	ATX-Power 24P, 12V-4P	ATX-Power 24P, 12V-4P
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 244mm (ATX)	305 x 244mm (ATX)
	Weight	0.70 kg	0.75 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI (Class A)	FCC Class A, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM



Model		MS-99C5	MS-99C9	MS-98C5	
		Full-Size Mini-PCIe	Compact-Size DC/DC	Intel® SDM	
Processor	CPU	N/A	N/A	8th Gen Intel® Whiskey Lake ULT Core™ i7/i5/i3/Celeron® Processor, QC/DC, 15W	
	Frequency	N/A	N/A	1.6GHz~2.2GHz(Depends on CPU)	
	L2 Cache	N/A	N/A	4M~8M (Depends on CPU)	
	CPU Type	N/A	N/A	BGA	
	Chipset	N/A	N/A	N/A	
Memory	BIOS	N/A	N/A	AMI	
	Technology	N/A	N/A	Dual-channel DDR4 2400 MHz	
	Max. Capacity	N/A	N/A	Up to 32 GB	
Display	Socket	N/A	N/A	2 x 260-pin SO-DIMM	
	Controller	N/A	N/A	Intel® UHD Graphics	
	Graphic Memory	N/A	N/A	Shared system memory up to 1.7 GB SDRAM	
	VGA	N/A	N/A	N/A	
	DVI	N/A	N/A	N/A	
	HDMI	N/A	N/A	2 (1*HDMI1.4 rear, 1*HDMI2.0 through PCIe x8 gold finger)	
	DisplayPort	N/A	N/A	1 (through PCIe x8 gold finger)	
Ethernet	Multiple Display	N/A	N/A	2 independent displays	
	Display Interface	N/A	N/A	HDMI1.4 up to 4096 x 2160 @24Hz HDMI2.0 up to 4096 x 2160 @60Hz DP up to 4096 x 2340 @60Hz	
Audio	Controller	N/A	N/A	1 x Intel® I219LM GbE LAN PHY	
Super I/O	Controller	N/A	N/A	Realtek® ALC887 HD Audio Codec	
H/W Monitor	Controller	N/A	N/A	Fintek F81866AD-I	
	Watchdog Timer	N/A	N/A	256-level Watchdog Timer	
I/O Interface	Smart Fan	N/A	N/A	Yes	
	TPM	Controller	N/A	Infineon SLB9665TT2.0 (default) Pin header (by BOM option)	
	USB	USB	1 x 24V Power USB (by cable) 2 x 12V Power USB (by cable)	N/A	3 x USB 3.0 Gen1/USB3.1 Gen2 (depends on CPU) (2x rear, 1 x internal through PCIe x8) 2 x USB 3.0 (2x rear)
		Serial	N/A	N/A	2 x COM ports (internal) COM1-2: RS-232 , 0V
		Parallel	N/A	N/A	N/A
PS/2		N/A	N/A	N/A	
Expansion Slot	GPIO	N/A	N/A	N/A	
	PCIe	PCIe x16	N/A	N/A	N/A
		PCIe x4	N/A	N/A	1 (gold finger, the pin define follows Intel® SDM specifications) (1x DP1.2, 1x HDMI 2.0, 1x USB 3.1, 1x PCIe, 1x UART, 2x I2C)
		PCIe x1	N/A	N/A	N/A
		PCI	N/A	N/A	N/A
		M.2	N/A	N/A	N/A
Mini-PCIe	N/A	N/A	1 x E Key (PCIe x1/ USB 2.0), 2230 1 x M Key (PCIe x4/ SATA 3.0), 2242		
Storage	SATA	N/A	N/A	N/A	
	mSATA	N/A	N/A	N/A	
Power Supply	DC	DC-in 12V	DC-in 9~36V, DC-out 12V	DC-in 12V (via gold finger, power from SDM Host monitor)	
	ATX	N/A	N/A	N/A	
Environment	Operating Temperature	0 ~ 60°C	-40 ~ 85°C	-10 ~ 60°C	
	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	
	Storage Humidity	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	10 ~ 90%, non-condensing	
Form Factor	Dimensions	47.75 x 30mm (Full-Size Mini-PCIe)	122 x 23 mm (DC to DC Converter Module)	175 x 100mm (Intel® SDM-L)	
	Weight	0.01 kg	0.046 kg	0.23 kg	
Certification	EMC	CE, FCC Class A, BSMI, VCCI, RCM	CE, FCC Class A, BSMI, VCCI, RCM	FCC, CE, VCCI, RCM	
Software Platform	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Fedora 25 Ubuntu 16.04	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux	Windows 10 (64-bit) Windows 10 IoT Enterprise RS5 (64-bit) Linux Ubuntu & Fedora (kernel 4.19)	



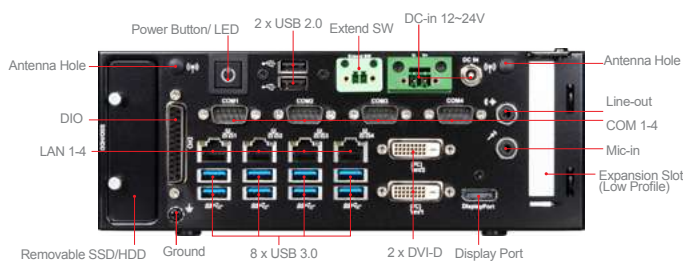
# MS-9B11

Outperform Fanless Box PC with 7th/6th Gen Intel® Kaby Lake/Skylake Processor for One Site I/O & Simplified Installation Solution

## MS-9B11-S1



## MS-9B11-S2



### Features

- 7th/6th Gen Intel® Kaby Lake-S/Skylake-S Core™ i7/i5/i3, Pentium®, Celeron® Processors
- Fanless design to support Intel® 7th/6th Gen CPU (up to 35W)
- Activate thermal design to support Intel® 7th/6th Gen CPU (up to 65W)
- 3 independent displays: Dual DVI-D and DP/HDMI (Optional)
- Wide range 12~24V DC power input
- Supports 2.5" removable HDD/SSD Drive Bay & M.2 M Key 2242/2280 for Storage with RAID 0, 1, 5
- Supports Mini-PCIe with SIM Holder & PCIe x16 for ExpansionSlot (Low Profile)
- Supports 4 Intel® GbE LAN, 8 USB 3.0 ports, 4 COM ports & 16Bit DIO
- One site I/O for simplified installation and maintenance

### Ordering Information

Part Number	Description
939-9B11-002	MS-9B11-S1/MS-9B11/709-9B11-010/829-9B11-005/STD VER1.1 FANLESS, Q170, BLACK, 1*SATA CABLE, 2*WALL MOUNT, 2*TERMINAL BLOCK, 2*THERMAL PAD, 1*DRIVER CD, SINGLE
939-9B11-003	MS-9B11-S2/MS-9B11/709-9B11-020/829-9B11-006/OPT:A VER1.1 FAN COOLER, Q170, BLACK, 1*SATA CABLE, 2*WALL MOUNT, 2*TERMINAL BLOCK, 2*THERMAL PAD, 1*DRIVER CD, SINGLE

### Packing List

Part Number	Description
S93-0404420-S14	Adaptor 19V/180W
OE2-9A7001-000	DIN Rail (2pcs for 1set)
E43-1306044-P65	Screw for DIN Rail Mounting (4pcs for 1set)
K33-3001020-I45	Power Cord, US, 1800mm
K33-3001021-I45	Power Cord, EU, 1800mm

### Specifications

		MS-9B11-S1	MS-9B11-S2	
<b>System Processor</b>	CPU	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor N3350, DC, 6W	
	Frequency	2.3GHz~4.0GHz (Depends on CPU)		
	L2 Cache	2M ~ 8M (Depends on CPU)		
	CPU Type	Socket (LGA1151)		
	Chipset	Intel® Q170 Express		
	BIOS	AMI		
<b>Memory</b>	Technology	Dual-channel DDR4 2133MHz/2400MHz		
	Max. Capacity	Up to 32GB		
	Socket	2 x 260-pin SO-DIMMs		
<b>Graphic</b>	Controller	Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	Multiple Display	3 independent displays		
<b>Display Interface</b>	DVI-D up to 1920 x 1200 @60Hz	DP up to 4096 x 2304 @60Hz		
	HDMI up to 4096 x 2160 @24Hz			
<b>Ethernet</b>	Controller	4 x Intel® I210-AT GbE LAN		
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer		
	Watchdog Timer	N/A	Yes	
<b>TPM</b>	Controller	Infineon SLB9665TT 2.0		
<b>Expansion Slot</b>	M.2	1 x M Key (PCIe x4 NVMe, SATA3.0), 2242/2280		
	Mini-PCIe	1 x Full-size (w/ SIM holder)		
<b>Storage</b>	SATA	2 x 2.5" HDD/SSD Bay (One w/ Removable)		
	RJ-45	4		
<b>I/O Interface</b>	Audio	1 x Mic-in 1 x Line-out		
	USB	8 x USB 3.0 2 x USB 2.0		
	Serial	4 x COM ports COM1: RS-232/422/485, RI/5V/12V COM2~4: RS-232/422/485, 0V/5V/12V		
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V		
	HDMI	11 (by BOM Optional)		
	DVI	2 (DVI-D)		
	Antenna	2 openings reserved for antennas		
	<b>Power Supply</b>	DC Input	DC-In 12-24V Wide-Range Phoenix pluggable connectors with latch (V+, V-)	
		Operating Temperature	-10 ~ 45°C	
		Operating Humidity	10 ~ 90%, non-condensing	
<b>Environment</b>	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)		
<b>Physical characteristics</b>	Dimensions (WxDxH)	235 x 200 x 125mm / 235 x 200 x 88mm		
	Weight	4.43 kg	2.50 kg	
	Mounting	Wall mount, DIN-rail mount (by BOM option)		
<b>Certification</b>	EMC	FCC Class A, CE, RCM, BSMI, VCCI		
	Safety	BSMI		
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) / Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only)		
		Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		

### Optional Item

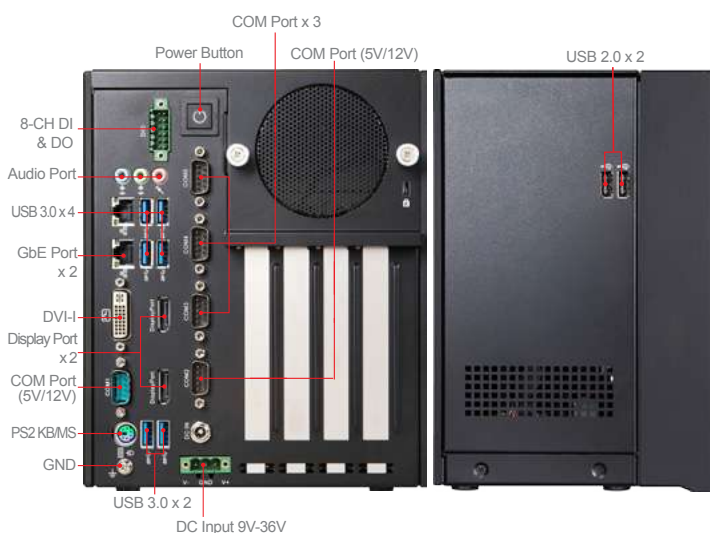
Part Number	Description	939-9B11-001	939-9B11-002
E22-9B11130-LA2	Wall Mounting Bracket	2	2
E49-1304011-P65	Screw for Wall Mounting	6	6
E25-9B01030-K23	Rubber for Wall Mountin	6	6
E43-1304037-P65	Screw for 2.5" Drive Bay	8	8
E25-9B11070-K23	Rubber for 2.5" Drive Bay	8	8
E31-0806300-K08	FANLESS Thermal Module	1	1
E32-0802420-K08	FAN Cooler	0	1
K1D-3012023-V03	SATA Cable with Power, 230mm	1	0
E26-9B11010-Z36	HDD Thermal Pad	2	2
NA1-1020051-PC1	Phoenix Terminal Plugged for Extend SW	1	1
NA1-1020073-SR2	Phoenix Terminal Plugged for DC-in	1	1

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-Pcie  
Intel® SDM

# MS-9A76

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

NEW



## Specifications

<b>Processor</b>	CPU	7th/6th Gen Intel® Desktop Kaby Lake/Skylake Core™ i7/ i5/i3/Celeron®/Pentium® Processor, Max. 65W		
	Frequency	2.3GHz~3.9 GHz (Depends on CPU)		
	L2 Cache	2M~8M (Depends on CPU)		
	CPU Type	Socket (LGA1151)		
	Chipset	Intel® Q170 Express / Intel® C236 Express		
<b>Memory</b>	BIOS	AMI		
	Technology	Dual-channel DDR4(non-ECC) 2133/2400MHz for Q170 Dual-channel DDR4(ECC) 2133/2400MHz for C236		
	Max. Capacity	Up to 32GB		
<b>Display</b>	Socket	2 x 260-pin SO-DIMMs		
	Controller	Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	Multiple Display	3 Independent Displays		
<b>Ethernet</b>	Display Interface	DP up to 3840 x 2160 @60Hz DVI-I up to 1920 x 1200 @60Hz		
	Controller	1 x Intel® I219GbE-PHY LAN (Support Intel AMT) 1 x Intel® I210-AT GbE LAN		
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	N/A		
<b>TPM</b>	Controller	Infineon SLB9665TT2.0		
	<b>TPM</b>	PCIe x16	1	N/A
PCIe x8		N/A	2	N/A
PCIe x4		N/A		
PCIe x1		N/A		
PCI		3	2	1
<b>Storage</b>	M.2	N/A		
	Mini-PCIe	N/A		1 x Full-size (w/ mSATA)
	SATA	2 x 2.5" HDD/SSD		
	mSATA	N/A		
	CFast	1		
<b>I/O Interface</b>	CompactFlash	N/A		
	RJ-45	2		
	PoE	N/A		
	Audio	1 x Mic-in 1 x Line-out 1 x Line-in		
	USB	6 x USB 3.0 5 x USB 2.0 (one port w/ security key)		
	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		
	<b>Power Supply</b>	DC Input	DC-In 9-36V Wide-Range pluggable connectors with latch (GND, V-, V+)	
IP Rating		Full IP20		
<b>Environment</b>	Operating Temperature	-10 ~ 50°C w/ industrial DC power Up to 35W CPU -10 ~ 40°C w/ Fan module Up to 65W CPU		
	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)		
<b>Form Factor</b>	Shock	Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD/SSD)		
	Dimensions (Wx DxH)	217 x 226 x 176mm	217 x 226 x 143mm	
	Weight	4.8 Kg	4.4 Kg	
<b>Certification</b>	Mounting	Wall mount		
	EMC	FCC Class A, CE, RCM, VCCI, BSMI		
<b>Software Platform</b>	Safety	UL		
	OS Support	Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Windows 10 (64-bit)		

## Features

- 7th/6th Gen Intel® Core i7/i5/i3/Pentium®/Celeron® processor
- Fanless design to support Intel® 7th/6th Gen CPU (up to 35W)
- 3 independent displays: DP and DVI-I
- Wide range 9~36V DC power input
- Supports AT power mode
- Optional system fan module (Up to 65W)
- Supports 2 expansion slots: 1\*PCIe x16; 1\*PCI and 4 expansion slots: 1\*PCIe x16; 3\*PCI, 2\*PCIe x8; 2\*PCI
- GPIO supports 5~35V for automation
- Removable cover for easy maintenance (CPU, HDD, memory, CFast, expansion slots)
- Supports DAQ, video capture and Embedded VGA card for PCI express slot
- Anti-Vibration & Shockproof Design to Compliance IEC 60068-2

## Ordering Information

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

## Packing List

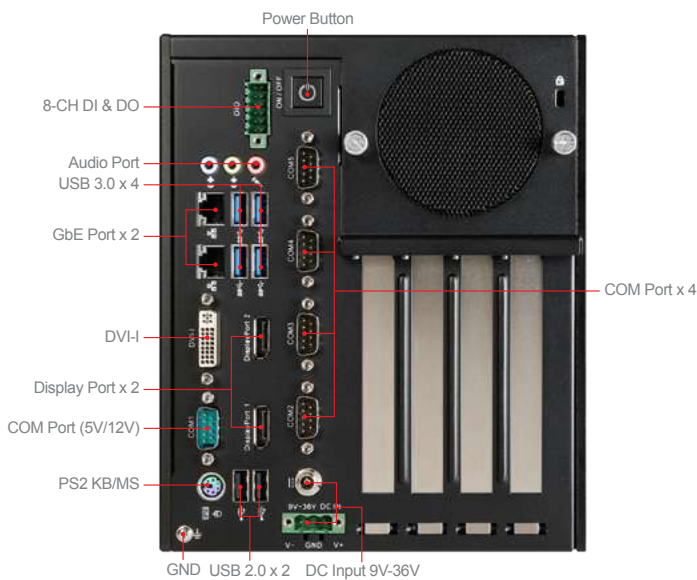
Part Number	Description
Please check MSI IPC website at <a href="http://ipc.msi.com">http://ipc.msi.com</a> for details.	

## Optional Item

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

# MS-9A66

Outperform Fanless Box PC with 4th Gen Intel® Core™ i Processor for Rugged, Scalable & Versatile Solution



## Features

- 4th Gen Intel® Core i7/i5/i3/Pentium®/Celeron® processor
- Fanless design to support Intel® 4th Gen CPU (up to 35W)
- 3 independent display: DP and DVI-I
- Wide range 9~36V DC power input
- Supports AT power mode
- Optional system fan module
- Supports 2 expansion slots: 1\*PCIe x16, 1\*PCI for Q87 & 4 expansion slots: 1\*PCIe x16, 3\*PCI for Q87; 2\*PCIe x8, 2\*PCI for C226
- GPIO supports 5~24V for automation
- Removable cover for easy maintenance (HDD, memory, CFast, expansion slots)
- Supports DAQ, video capture and embedded VGA card for PCI express slot
- Anti-Vibration & Shockproof Design to Compliance IEC 60068-2

## Ordering Information

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

## Packing List

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

## Specifications

<b>System Processor</b>	CPU	4th Gen Intel® Desktop Haswell Core™ i7/i5/i3/ Celeron®/Pentium® Processor, Max. 35W		
	Frequency	2.2GHz~2.7 GHz (Depends on CPU)		
	L2 Cache	2M~4M (Depends on CPU)		
	CPU Type	Socket (LGA1150)		
	Chipset	Intel® Q87 Express	Intel® C226 Express	Intel® Q87 Express
<b>Memory</b>	BIOS	AMI		
	Technology	Dual-channel DDR3 1600/1333MHz		
	Max. Capacity	Up to 16GB		
<b>Graphic</b>	Socket	2 x 204-pin SO-DIMMs		
	Controller	Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	Multiple Display	3 independent displays		
<b>Ethernet</b>	Display Interface	DP up to 3840 x 2160 @60Hz DVI-I up to 1920 x 1200 @60Hz		
	Controller	1 x Intel® I217GbE-PHY LAN 1 x Intel® I210-AT GbE LAN		
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	N/A		
<b>TPM</b>	Controller	Infineon SLB9635TT1.2		
<b>Expansion Slot</b>	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)
<b>Storage</b>	SATA	2 x 2.5" HDD/SSD		
	mSATA	N/A		1
	CFast	1		
<b>I/O Interface</b>	RJ-45	2		
	PoE	N/A		
	Audio	1 x Mic-in, 1 x Line-out, 1 x Line-in		
	USB	4 x USB 3.0 3 x USB 2.0 (one port w/ security key)		
	Serial	5 x COM ports COM1: RS232/422/485, 0V/5V/12V COM2: RS232/422/485, 0V COM3-5: RS-232, 0V		
	Parallel	N/A		
	PS/2	1		
	GPIO	8-bits (4 x GPI; 4 x GPO), 5~24V, Isolation 1.5KV		
	CANbus	N/A		
	DVI	1 (DVI-I)		
<b>Power Supply</b>	DisplayPort	2		
	DC Input	DC-In 9-36V Wide-Range pluggable connectors with latch (GND, V-, V+)		
<b>Environment</b>	AC Input	N/A		
	IP Rating	Full IP20		
	Operating Temperature	-10 ~ 50°C w/ industrial DC power		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		
	Vibration	Operating, IEC 60068-2-27: 50G, half sine, 11ms (w/ HDD)		
<b>Physical characteristics</b>	Shock	Operating, IEC 60068-2-64: 2 Grms, random, 5 ~ 500 Hz, 1hr/axis (w/ HDD)		
	Dimensions (W x D x H)	176 x 226 x 217mm	143 x 226 x 217mm	
	Weight	4.86 kg	4.4 kg	
<b>Certification</b>	Mounting	Wall mount		
	EMC	FCC, CE, RCM, VCCI, BSMI		
<b>Software Platform</b>	Safety	N/A		
	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit)		

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM

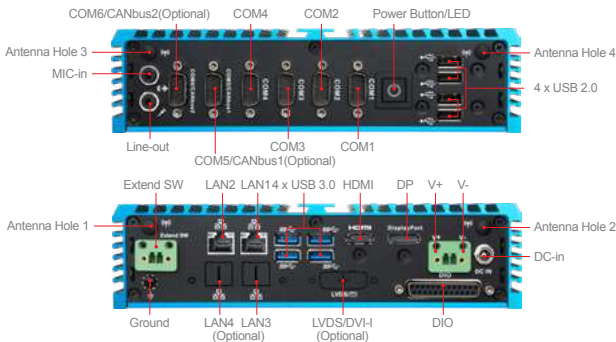
# MS-9A89

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

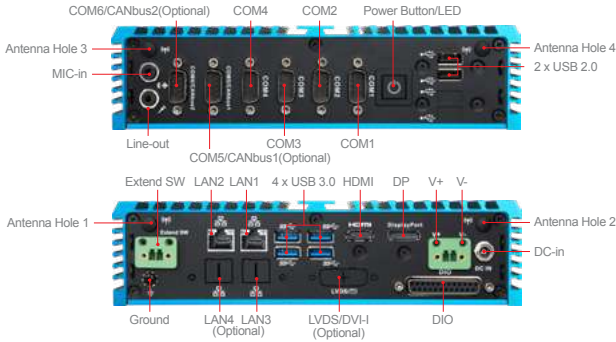
**NEW**



## MS-9A89-U1 / MS-9A89-U2



## MS-9A89-A1 / MS-9A89-A2



### Features

- Ultra low power with fanless design
- Support DDR4 2133MHz SO-DIMM Memory up to 16GB(For KBL-U Series)
- Support DDR3L 1866/1600MHz SO-DIMM Memory up to 8GB(For APL-I Series)
- Support operating temperature: -20~70°C (w/ WT SSD or mSATA For MS-9A89A1 SKU)
- 3 independent displays: HDMI, DP and LVDS/DVI-I(Optional)
- Supports 16-bit GPIO (8\*GPI; 8\*GPO)
- Dual GbE LAN and 4\*USB 3.0 and 4\*USB2.0(APL-I Series support 2\*USB2.0) and 6\*COM
- Dual Mini-PCIe for expansion
- Support DC in 12V~24V
- 4 openings reserved for antennas
- Anti-Vibration & Shockproof Design
- EN50155 Compliance

### Ordering Information

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

### Packing List

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

### Specifications

	MS-9A8-U1	MS-9A89-U2	MS-9A89-A1	MS-9A89-A2	
<b>Processor</b>	CPU	Intel® KBL-U Core™ i3-7100U Processor, DC, 15W	Intel® SKL-U Core™ i5-6300U Processor, DC, 15W	Intel® Atom™ x7 Processor E3940, QC, 12W	Intel® Atom™ x5 Processor E3940, QC, 9.5W
	Frequency	2.4GHz	2.4GHz	1.6GHz, up to 2.0GHz	1.6GHz, up to 1.8GHz
	L2 Cache	3MB		2MB	
	CPU Type	BGA			
	Chipset	Integrated in Process		Integrated in SoC Process	
<b>Memory</b>	BIOS	AMI			
	Technology	Single channel for DDR4 2133 MHz		Single channel for DDR3L 1866/1600 MHz	
	Max. Capacity	Up to 16GB		Up to 8GB	
	Socket	1 x 260-pin SO-DIMMs		1 x 204-pin SO-DIMMs	
<b>Display</b>	Controller	Intel® HD Graphics			
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM			
	Multiple Display	2 or 3 independent displays			
<b>Ethernet</b>	Controller	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® I210-AT GbE LAN	
	Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer			
<b>TPM</b>	Controller	N/A			
<b>Expansion Slot</b>	Mini-PCIe	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)			
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD Bay			
	mSATA	1			
	RJ-45	4 (LAN1/2 Standard, LAN3/4 by Option)			
	PoE	2 x 802.11af (by request)			
<b>I/O Interface</b>	Audio	1 x Line-out / 1 x Mic-in			
	USB	4 x USB 3.0, 4 x USB 2.0		4 x USB 3.0, 2 x USB 2.0	
	Serial	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232, 0V/5V/12V			
	GPIO	16-bit (8*GPI; 8*GPO), 5V			
	CANbus	2 x CAN 2.0B (optional)			
	HDMI	1			
	LVDS	1 (optional)			
	DVI	1 (DVI-I by option)			
	DisplayPort	1			
	Antenna	4 openings reserved for antennas			
<b>Power Supply</b>	DC Input	DC-in 12V~24V			
	Operating Temperature	-10~45°C (HDD)	-10~45°C (HDD)	-10~45°C (HDD)	-10~45°C (HDD)
		-10~60°C (w/ WT SSD/mSATA)	-20~70°C (w/ WT SSD/mSATA)	-10~60°C (w/ WT SSD/mSATA)	-10~60°C (w/ WT SSD/mSATA)
	Operating Humidity	10 ~ 90%, non-condensing			
Storage Temperature	-20 ~ 80°C				
	Storage Humidity	10 ~ 90%, non-condensing			
<b>Environment</b>	Vibration	Operating: IEC61373, 0.101 Grms, Random, 5 ~ 150 Hz, 10 mins, Vertical axis (w/ HDD) IEC61373, 0.045 Gms, Random, 5 ~ 150 Hz, 10 mins, Transverse axis (w/ HDD) IEC61373, 0.07 Grms, Random, 5 ~ 150 Hz, 10 mins, Longitudinal axis (w/ HDD)			
		Non-operating: IEC61373, 3G, Half-sine, 30 ms, ±Vertical axis & ±Transverse axis (w/ HDD) IEC61373, 5G, Half-sine, 30 ms, ±Longitudinal axis (w/ HDD)			
	Shock	Non-operating: IEC61373, 3G, Half-sine, 30 ms, ±Vertical axis & ±Transverse axis (w/ HDD) IEC61373, 5G, Half-sine, 30 ms, ±Longitudinal axis (w/ HDD)			
<b>Form Factor</b>	Dimensions (Wx DxH)	215 x 155 x 55mm			
	Weight	1.55 kg			
	Mounting	Wall mount(STD)/DIN-rail mount(STD)/ VESA mount(by BOM option)			
<b>Certification</b>	EMC	CE, FCC, VCCI, RCM, BSMI			
	Safety	BSMI			
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)			

### Optional Item

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

# MS-9A79

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



## Features

- Ultra low power with fanless design
- Supports operating temperature: -20~70°C (w/ WT SSD/mSATA)
- Supports Onboard 4GB LPDDR4-2133/2400MHz memory
- Support 2 or 3 independent displays with HDMI, Mini-DP, and LVDS/DVI-I(Optional)
- Supports 16-bit GPIO (8\*GPI; 8\*GPO), 5V
- Multi GbE LAN and 2 USB 3.0, 2 USB2.0 and 2 COM Ports
- Supports Flexible DC-in 12V input
- 4 openings reserved for antennas
- Compliance IEC 61373 body mount class A
- EN60068-2-1, EN60068-2-2, EN60068-2-30 Compliance
- 4 openings reserved for antennas

## Ordering Information

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

## Packing List

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

## Optional Item

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

## Specifications

		MS-9A79-A1	MS-9A79-A2
<b>System Processor</b>	CPU	Intel® Atom™ x5 Processor E3940, QC, 9.5W	Intel® Celeron® Processor N3350, DC, 6W
	Frequency	1.6 GHz up to 1.8 GHz	1.1 GHz up to 2.4 GHz
	L2 Cache	2MB	
	CPU Type	BGA	
	Chipset	Integrated in SoC Process	
<b>Memory</b>	BIOS	AMI	
	Technology	Single-Channel LPDDR4-2133MHz	Single-Channel LPDDR4-2400MHz
	Max. Capacity	Onboard 4 GB	
<b>Graphic</b>	Socket	N/A	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	Multiple Display	2 or 3 independent displays	
<b>Display Interface</b>	HDMI up to 3840 x 2160 @30Hz		
	Mini-DP up to 4096 x 2160 @30Hz LVDS up to 1920 x 1200 @60Hz (optional by cable) DVI-I up to 1920 x 1200 @60Hz (optional by MS-99C0)		
<b>Ethernet</b>	Controller	2 x Intel® I210-IT GbE LAN	2 x Intel® I211-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
<b>TPM</b>	Controller	N/A	
<b>Expansion Slot</b>	M.2	N/A	
	Mini-PCIe	1 x Full-size (w/ NANO SIM-Holder) 1 x Half-size (Shared w/ mSATA)	
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD Bay	
	mSATA	1 x Half-size (Shared w/ Mini-PCIe)	
<b>I/O Interface</b>	RJ-45	2	
	PoE	N/A	
	Audio	1 x Line-out 1 x Mic-in	
	USB	2 x USB 3.0 2 x USB 2.0	
	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)	
	Antenna	4 openings reserved for antennas	
<b>Power Supply</b>	DC Input	DC-in 12V Jack (5.5mm/2.5mm) / Phoenix pluggable with latch (Support OCP/ OVP Protection)	
	AC Input	N/A	
<b>Environment</b>	IP Rating	N/A	
	Operating Temperature	-10 ~ 45°C (HDD) -20 ~ 70°C (w/ WT SSD/mSATA)	-10 ~ 45°C (HDD) -10 ~ 55°C (SSD/mSATA)
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-40 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Vibration	IEC61373 Category 1, Class A	
<b>Physical characteristics</b>	Shock	IEC61373 Category 1, Class A	
	Dimensions (WxDxH)	155 x 110 x 55 mm	
	Weight	1.1 kg	
<b>Certification</b>	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)	
	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	Safety	BSMI	
	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	

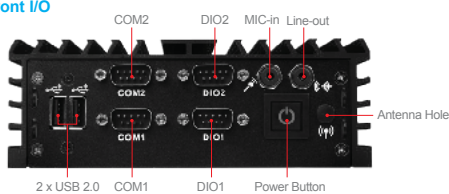
Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PIOMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-9A59

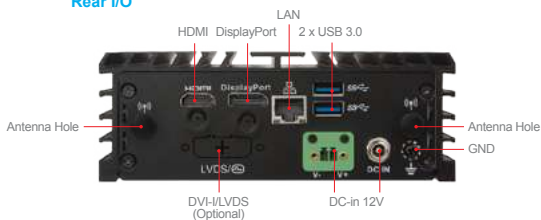
Palm-Size Box PC with Intel® Braswell N3160 SoC Platform for Ultra Low-Power Fanless Solution



### Front I/O



### Rear I/O



## Features

- Ultra low power with fanless design
- Supports Onboard 2GB DDR3L memory
- 2 or 3 independent displays:HDMI, DP and DVI-I/LVDS(Optional)
- Supports 16-bit GPIO (8\*GPI; 8\*GPO)
- Supports 1 Intel® GbE LAN, 2 USB 3.0, 2 USB 2.0 and 2 COM ports
- Supports Flexible DC-in 12V input
- Anti-Vibration & Shockproof Design
- Compliance IEC 61373 body mount class A
- 3 openings reserved for antennassupport 2\*USB2.0) and 6\*COM
- Dual Mini-PCIe for expansion

## Ordering Information

Part Number	Description
939-9A59-001	MS-9A59\MS-9A59\709-9A59-010\829-9A59-004\STD MS-9A59 VER 1.1 HEATSINK, 1*SATA CABLE, 2*WALL MOUNT, CD 12V/36W ADAPTER, POWER CORD USA SINGLE
939-9A59-002	MS-9A59\MS-9A59\709-9A59-010\829-9A59-005\STD MS-9A59 VER 1.1 HEATSINK, 1*SATA CABLE, 2*WALL MOUNT, CD 12V/36W ADAPTER, POWER CORD EU SINGLE

## Ordering Information

Part Number	Description
K33-3001020-I45/ K33-3001021-I45	Power Cord, USA, 1800mm/ Power Cord, EU, 1800mm
K1D-3010018-V03	SATA Cable with power, 120mm
NA1-1020051-PC1	Phoenix Terminal Plugged
S93-0408870-S14	Adapter 12V/36W
G71-SEDC165-N56	Driver DVD
E22-9A59010-LA2	Wall Mounting Bracket
E25-9B01030-K23	Rubber for Wall Mounting
E49-1068001-P65	Screw for Wall Mounting

## Specifications

<b>System Processor</b>	CPU	Intel® Celeron® Processor N3160, QC, 6W
	Frequency	1.6GHz~2.24GHz
	L2 Cache	2MB
	CPU Type	BGA
<b>Memory</b>	Chipset	Integrated in SoC Process
	BIOS	AMI
	Technology	Single-Channel DDR3L 1600MHz
<b>Memory</b>	Max. Capacity	Onboard 2GB
	Socket	N/A
	Controller	Intel® HD Graphics
<b>Graphic</b>	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	Multiple Display	2 or 3 independent displays
	Display Interface	HDMI up to 3840 x 2160 @30Hz DP 1.1a up to 3840 x 2160 @30Hz LVDS up to 1920 x 1200 @60 Hz (optional by cable) DVI-I up to 1920 x 1200 @60 Hz (optional by MS-99C0)
<b>Ethernet</b>	Controller	1 x Intel® I211-AT GbE LAN
<b>Audio</b>	Controller	Realtek®ALC887-VD2-CG HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
<b>TPM</b>	Controller	N/A
<b>Expansion Slot</b>	M.2	N/A
<b>Storage</b>	Mini-PCIe	1 x Half-size
	SATA	1 x 2.5" HDD/SSD Bay
	mSATA	1 x Full-size
<b>I/O Interface</b>	RJ-45	1
	PoE	N/A
	Audio	1 x Line-out 1 x Mic-in
	USB	2 x USB 3.0 2 x USB 2.0
	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	N/A
	HDMI	1
	LVDS	1 (optional)
	DVI	1 (DVI-I by option)
DisplayPort	N/A	
Antenna	3 openings reserved for antennas	
<b>Power Supply</b>	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
<b>Environment</b>	Operating Temperature	-10 ~ 45°C (HDD) -10 ~ 55°C (SSD or mSATA)
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	IEC61373 Category 1, Class A
<b>Physical characteristics</b>	Shock	IEC61373 Category 1, Class A
	Dimensions (W x D x H)	155 x 105 x 55mm
	Weight	0.90 kg
<b>Certification</b>	Mounting	Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)
	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	Safety	BSMI
	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 21 (by request) Linux Ubuntu14.04 (by request)

## Optional Item

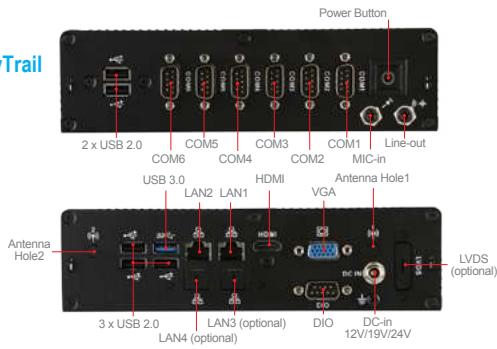
Part Number	Description
E22-9A25031-C22	VESA Mount
E24-9B02010-P09	DIN Rail
E41-1356002-P65	Screw for DIN Rail

# MS-9A69

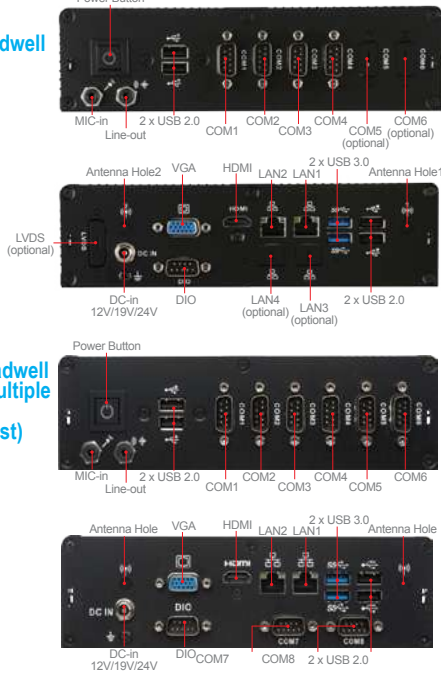
Compact-Size Box PC with Intel® BDW ULT or Bay Trail-D Series Processor for Ultra Low-Power Fanless Solution



MS-9A69 with BayTrail



MS-9A69 with Broadwell



MS-9A69 with Broadwell  
8 COM ports for multiple connection  
(Support by Request)

## Features

- Ultra low power with fanless design
- Supports DDR3L 1333/1600 MHz SO-DIMM memory up to 8GB
- 2 or 3 independent displays: HDMI, VGA and LVDS (BDW only)
- Dual GbE LAN, rich USB and COM ports
- Dual Mini-PCIe for expansion
- Supports DC-in 12V/19V/24V
- 2 openings reserved for antennas

## Ordering Information

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

## Ordering Information

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

## Specifications

<b>System Processor</b>	CPU	Intel® Celeron® Processor J1900, QC, 10W	Intel® BDW ULT Core™ i3-5010U Processor, DC, 15W
	Frequency	2GHz	2.1 GHz
	L2 Cache	2MB	3MB
	CPU Type	BGA	BGA
	Chipset	Integrated in SoC Process	Integrated in Process
<b>Memory</b>	BIOS	AMI	
	Technology	Single-Channel DDR3L 1333 MHz	Single-Channel DDR3L 1600 MHz
	Max. Capacity	Up to 8GB	
<b>Graphic</b>	Socket	1 x 204-pin SO-DIMM	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	Multiple Display	2 or 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 (optional)	VGA up to 1920 x 1200 @60Hz HDMI up to 1920 x 1080 @60Hz LVDS up to 1920 x 1200 @60Hz (optional)
<b>Ethernet</b>	Controller	2 x Intel® I210-AT GbE LAN	1 x Intel® I210-AT GbE LAN 1 x Intel® I218-LM GbE LAN PHY
	Audio	Realtek® ALC887-VD2-CG HD Audio Codec	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
<b>TPM</b>	Controller	N/A	
<b>Expansion Slot</b>	M.2	N/A	
	Mini-PCIe	2 x Full-size (one w/ mSATA)	1 x Full-size (w/ mSATA) 1 x Half-size
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD Bay	
	mSATA	1 x Full-size (Shared with Mini-PCIe)	
<b>I/O Interface</b>	RJ-45	4 (optional 2 x RJ-45 version available)	
	PoE	N/A	
	Audio	1 x Line-out 1 x Mic-in	
	USB	1 x USB 3.0 5 x USB 2.0	2 x USB 3.0 4 x USB 2.0
	Serial	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2-6: RS-232, 0V/5V/12V	4 x COM ports COM1: RS-32/422/485, 0V/5V/12V COM2-4: RS-232, 0V/5V/12V
	GPIO	8-bit (4*GPI; 4*GPO), 5V	
	CANbus	2 x CAN 2.0B (by BOM option)	
	HDMI	1	
	LVDS	1 (optional)	
	VGA	1	
<b>Power Supply</b>	Antenna	2 openings reserved for antennas	
	DC Input	DC-in 12V/19V/24V	
	AC Input	N/A	
<b>Environment</b>	IP Rating	N/A	
	Operating Temperature	-10 ~ 45°C (HDD) -10 ~ 50°C (SSD or mSATA)	
	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)	
<b>Physical characteristics</b>	Dimensions (WxDxH)	200 x 150 x 55mm	
	Weight	1.38 kg	
<b>Certification</b>	Mounting	Wall mount (STD)/VESA mount(by BOM option)/ DIN-rail mount(by BOM option)	
	EMC Safety	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora 20 (by request) Linux Ubuntu 13.10 (by request)	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 19 (by request) Linux Ubuntu 13.04 (by request)

## Optional Item

Part Number	Description
E22-9A25031-C22	VESA Mount
E24-9B02010-P09	DIN Rail
E41-1356002-P65	Screw for DIN Rail

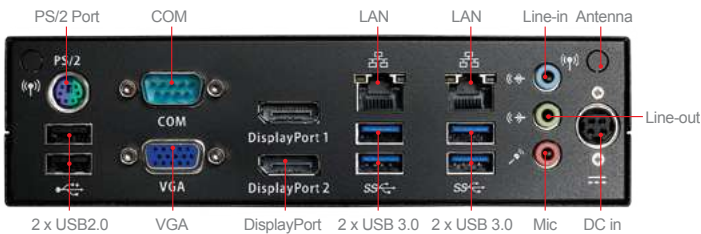
Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM

# MS-9A78

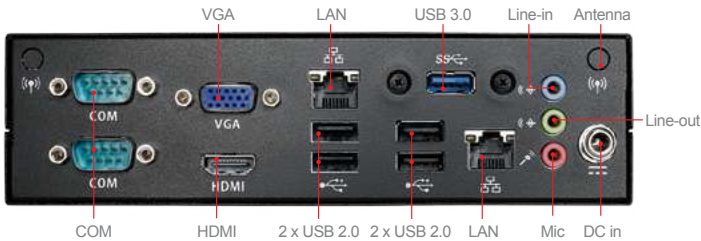
Swappable Box PC with Intel® BayTrail/Haswell Platform for Low-Power & High-Performance Solution



## MS-9A78 with Haswell



## MS-9A78 with Bay Trail



## Features

- Mini-ITX motherboard is swappable for standard BOX
- Supports Intel® 4th Generation Haswell platform and BayTrail platform
- Supports up to TDP 45W high performance
- Haswell (98C7) SKU operation temperature:
  - (1) 35W CPU: -10 ~ 50°C
  - (2) 45W CPU: -10 ~ 40°C
- BayTrail (98E3) SKU operation temperature: -10 ~ 60°C
- 2 openings reserved for antennas

## Ordering Information

Part Number	Description
939-9A78-001	J1900, 12V 84W DC-in DOE VI Adaptor, EU Power Cord
939-9A78-002	J1900, 12V 84W DC-in DOE VI Adaptor, USA Power Cord
939-9A78-003	Q87, DC12V 150W Adapter, EU Power Cord
939-9A78-004	Q87, DC12V 150W Adapter, USA Power Cord
939-9A78-005	Q87, 12V 130W DC-in DOE V Adaptor, USA Power Cord, White Brand
939-9A78-008	Q87, 12V 130W DC-in DOE VI Adaptor, USA Power Cord

## Packing List

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

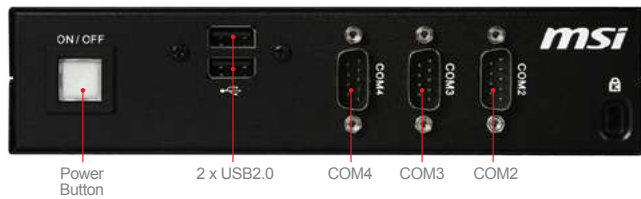
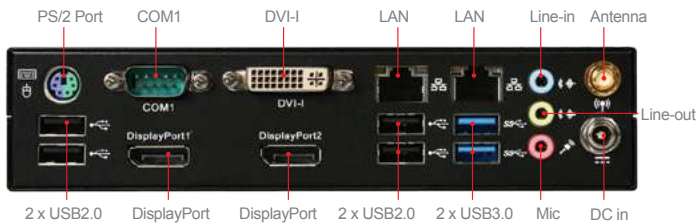
## Specifications

<b>System Processor</b>	CPU	Intel® Celeron® Processor J1900/ N2930, QC, 10W/7.5W	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/Pentium® Processor, Max. 45W
	Frequency	"2GHz~2.42GHz (J1900) 1.83GHz~2.16GHz (N2930)"	1.5GHz~2.3GHz (Depends on CPU)
	L2 Cache	2MB	2M~8M (Depends on CPU)
	CPU Type	BGA	Socket (LGA 1150)
	Chipset	N/A	Intel® Q87 Express
	BIOS	AMI	
<b>Memory</b>	Technology	Dual-Channel DDR3L 1066/1333MHz	Dual-Channel DDR3/DDR3L 1333/1600MHz
	Max. Capacity	Up to 8GB	Up to 16GB
	Socket	2 x 204-pin SO-DIMMs	
<b>Graphic</b>	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	Multiple Display	2 independent displays	3 independent displays
	Display Interface	VGA up to 2560 x 1600 @60Hz HDMI up to 1920 x 1080 @60Hz	VGA up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @60Hz
<b>Ethernet</b>	Controller	2 x Intel® I210-AT GbE LAN	1 x Intel® I217-LM GbE PHY (IAMT 9.0 supported) 1 x Intel® I210-AT PCIe GbE LAN
	Audio	Controller	Realtek® ALC887 HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>TPM</b>	Controller	Pin header	
<b>Expansion Slot</b>	M.2	N/A	
	Mini-PCIe	1 x Full-size (w/ mSATA)	"1 x Full-size (w/ mSATA) 1 x Half-size"
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD	
	mSATA	1	1
<b>I/O Interface</b>	RJ-45	2	2
	PoE	N/A	
	Audio	1 x Mic-in; 1 x Line-out; 1 x Line-in	
	USB	6 x USB 2.0 1 x USB 3.0	4 x USB 2.0 4 x USB 3.0
	Serial	5 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2~5: RS-232, 0V/5V/12V	4 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2~4: RS-232
	PS/2	N/A	
	GPIO	N/A	
	CANbus	N/A	
	HDMI	1	N/A
	DVI	N/A	
	DisplayPort	N/A	2
	VGA	1	
Antenna	2 openings reserved for antennas		
<b>Power Supply</b>	DC Input	DC-in 12V	
	AC Input	N/A	
<b>Environment</b>	IP Rating	N/A	
	Operating Temperature	-10 ~ 50°C (HDD) -10 ~ 60°C (SSD)	-10 ~ 50°C (TDP: 35W) -10 ~ 40°C (TDP: 45W)
	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)	
<b>Physical characteristics</b>	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)	
	Dimensions (W x D x H)	180 x 183 x 49mm	
<b>Certification</b>	Weight	1.80 kg	
	Mounting	Wall mount	
<b>Software Platform</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
	Safety	BSMI, CB, UL	
<b>OS Support</b>	OS Support	Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)	Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit) Linux Fedora V19 (Kernel 3.8.2)



# MS-9A68

Industrial Box PC with Intel® Ivy Bridge Platform for Rich I/O Ports & Fanless Solution



## Features

- Support Intel® Ivy Bridge mobile series CPU
- Great 3D graphic performance with high definition up to 1080P
- Support standard and low-voltage DDR3 SO-DIMM up to 16GB
- 3 independent displays: DP, DP and DVI-I
- Support DirectX11 Shader Model 4.0
- Support 2 Intel® GbE LAN (one with iAMT 8.0) and 2 USB 3.0 ports
- Support SATA 3.0 and mSATA storage (optional)
- 4 powered COM ports

## Ordering Information

Part Number	Description
939-9A68-003	QM77, 19V 90W ADAPTER, USA POWER CORD
939-9A68-004	HM76, 19V 90W ADAPTER, EU POWER CORD
939-9A68-005	HM76, 19V 90W ADAPTER, USA POWER CORD
939-9A68-006	QM77, 19V 90W ADAPTER, EU POWER CORD

## Packing List

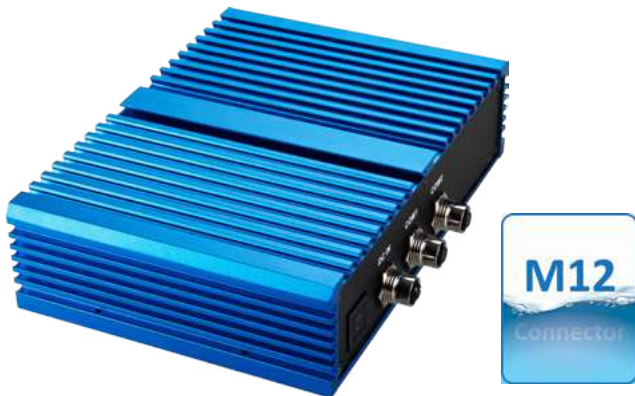
Part Number	Description
S93-0406480-S14	ADAPTOR
E43-1064014-P65	HDD Screw
E31-0804100-AM1	HEATSINK
K33-3001020-I45/ K33-3001021-I45	Power Cord, USA, 1800mm/ Power Cord, EU, 1800mm
S79-0000360-V03	ANTENNA
E25-9A58020-K23	HDD RUBBER
E22-9A68050-LA2	Wall mounting bracket
G71-SEDC093-J24	Driver CD

## Specifications

<b>System Processor</b>	CPU	3rd Gen Intel® Mobile Ivy bridge/ Sandy bridge Core™ i7/i5/i3/Celeron®/ Pentium® Processors, Max. 45W
	Frequency	1.0 GHz~3.8GHz (Depends on CPU)
	L2 Cache	2M~8M (Depends on CPU)
	CPU Type	Socket G2 (rPGA 989)
	Chipset	Intel® QM77/HM76 Express
	BIOS	AMI
<b>Memory</b>	Technology	Dual-Channel DDR3 1066/1333/1600 MHz
	Max. Capacity	Up to 16GB
	Socket	2 x 204-pin SO-DIMMs
<b>Graphic</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	Multiple Display	2 independent displays (SNB CPU only) 3 independent displays (IVB CPU only)
	Display Interface	DP up to 2560 x 1600 @60Hz DVI-I up to 1920 x 1200 @60Hz
<b>Ethernet</b>	Controller	2 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	2 x Full-size (1 w/ SIM Holder)
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD
	mSATA	2 (shared with Mini-PCIe slots)
	RJ-45	2
<b>I/O Interface</b>	PoE	N/A
	Audio	1 x Mic-in 1 x Line-out 1 x Line-in
	USB	2 x USB 3.0 6 x USB 2.0
	Serial	4 x COM ports COM 1: RS-232/422/485, 0V/5V/12V COM 2~4: RS-232, 0V/5V/12V
	PS/2	1
	GPIO	N/A
	CANbus	N/A
	DVI	1 (DVI-I)
	DisplayPort	2
	Antenna	1 opening reserved for antenna
<b>Power Supply</b>	DC Input	DC-in 12/19V
	AC Input	N/A
<b>Environment</b>	IP Rating	Full IP30
	Operating Temperature	0 ~ 50°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Physical characteristics</b>	Vibration	Operating: 0.25 Grms, 5-300Hz, 3axes (w/ HDD)
	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)
	Dimensions (W x D x H)	180 x 180 x 44mm
<b>Certification</b>	Weight	1.80 kg
	Mounting	Wall mount
<b>Software Platform</b>	EMC	FCC, CE, RCM, VCCI, BSMI
	Safety	CB, UL
	OS Support	Windows 8 (32-bit) Windows 7 (32/64-bit) Windows XP (32/64-bit)

# MS-9A84

M12 I/O Box PC with Intel® Kaby Lake-U Series Processor for Ultra Low-Power Fanless Solution



Power Button DC IN COM1 COM2



LAN2 LAN1 2x USB3.0 HDMI

## Features

- Ultra low power with fanless design
- 1 independent display: HDMI support up to 1920x1080@60Hz
- M12 type I/O connector design : 1\*HDMI, 2\*GbE LAN, 2\*USB 3.0, 2\*COM & 1\*DC-in
- Dual Mini-PCIe for expansion
- Support DC in 12V~24V

## Ordering Information

Part Number	Description
939-9A84-002	MS-9A84\709-9A84-020 \829-9A84-005\ BAREBONE, STD VER 11, W/CPU CORE i3-7100U, 1*SATA CABLE, W/O LOGO, for Channel

## Packing List

Part Number	Description	Quantity
K1D-1012064-V03	SATA CABLE, 200mm	1

## Optional Item

Part Number	Description
K39-3001183-V03	External M12 DC Cable,1000mm
K3C-3001033-V03	External M12 HDMI Cable,2100mm
K37-3001058-V03	External M12 USB 3.0 Cable,1000mm
K3B-3001017-V03	External M12 RJ45 Cable,1800mm
K3B-3001018-V03	External M12 RJ45 Cable,500mm
K3A-3001015-V03	External M12 RS232 Cable,1800mm

## Specifications

<b>System Processor</b>	CPU	Intel® Kaby Lake-U Core™ i3-7100U Processor, DC, 15W
	Frequency	2.4GHz
	L2 Cache	3MB
	CPU Type	BGA
	Chipset	Integrated in Process
	BIOS	AMI
<b>Memory</b>	Technology	Single-Channel for DDR4 2133 MHz
	Max. Capacity	Up to 16GB
	Socket	1 x 260-pin SO-DIMMs
<b>Graphic</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	Multiple Display	1 independent display
	Display Interface	HDMI1.4 up to 1920 x 1080 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I219-LM GbE LAN PHY
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
<b>TPM</b>	Controller	N/A
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder) (Mini-PCIe2 Slot w/ mSATA)
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD Bay
	mSATA	1 x Full-size
<b>I/O Interface</b>	RJ-45	2
	PoE	N/A
	Audio	N/A
	USB	2 x USB 3.0
	Serial	2 x COM ports COM1:RS-232/422/485 (without power) COM2:RS-232 (without power)
	GPIO	N/A
	CANbus	N/A
	HDMI	1
	LVDS	N/A
	VGA	N/A
	Antenna	N/A
	<b>Power Supply</b>	DC Input
AC Input		N/A
IP Rating		N/A
<b>Environment</b>	Operating Temperature	-10~45°C (HDD) -10~60°C (w/ WT Memory, SSD/mSATA)
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Vibration	Operating: 0.5 Grms, 5-500Hz, 3axes (w/ HDD)
	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)
<b>Physical characteristics</b>	Dimensions (WxDxH)	215 x 155 x 55 mm
	Weight	1.66 Kg
	Mounting	N/A
<b>Certification</b>	EMC	FCC Class A, CE, RCM, VCCI, BSMI
	Safety	BSMI
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

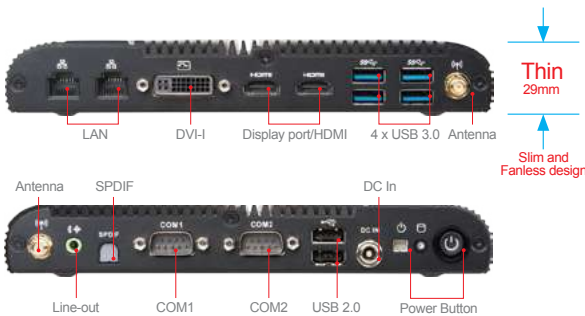
# MS-9A95

Slim Fanless Box PC with Intel® Skylake/Kaby Lake ULT, High Performance & Low-Power for 4K2K Digital Signage, KIOSK & Automation

WindBOX IV Advanced



NEW



## Features

- Slim and fanless system design with 29mm thinness
- Intel® Skylake/Kaby Lake Mobile U series, low power solution, TDP 15W
- Supports 2 x DDR4 SO-DIMM up to 32GB memory
- 3 independent display: 2 x DP/HDMI, 1 x DVI-I
- TPM 2.0 on board
- Cableless design with proprietary board
- 2 x GbE LAN, 4 x USB 3.0 and 2 x USB2.0, 2 x COM, audio, and lockable DC jack
- Mini-PCIe slots for mSATA Cards, 3G/4G ; M.2 slot for WiFi
- Storage: 1 x mSATA and 2.5" SDD/HDD for flexible use
- Easy maintain for 2x Memory, 2 x Mini-PCIe, SIM Card Slot, 2.5"HDD (all on bottom side)

## Ordering Information

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

## Packing List

Part Number	Description	Quantity
S93-0401690-S14	Adaptor 19V/65W	1
K33-3001020-I45/ K33-3001021-I45	Power Cord, USA, 1800mm/ Power Cord, EA, 1800mm	1
E22-9A95080-C22	VESA Mounting Bracket	1
E41-1406003-P65	VESA Mounting Screw	4
E24-9B02010-P09	DIN Rail	2
E41-1356002-P65	DIN Rail Screw	4

## Optional Item

Part Number	Description
S79-0000360-V03	RF Antenna

## Specifications

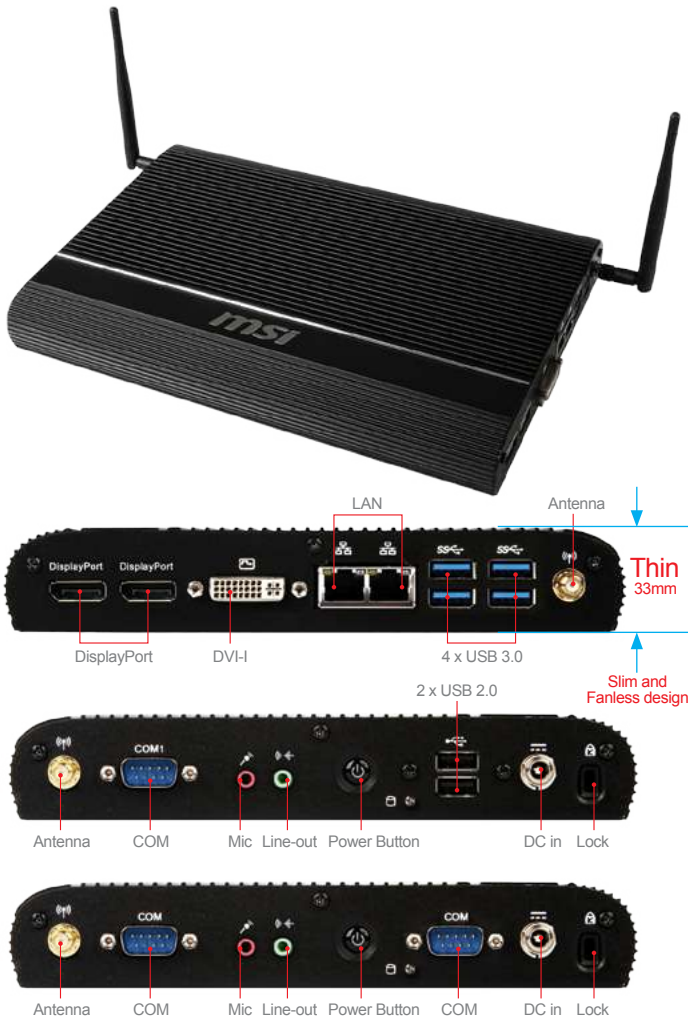
<b>System Processor</b>	CPU	7th/6th Gen Intel® Mobile Kaby Lake-U/ Skylake-U Core™ i7/i5/i3/ Celeron® Processor, DC, 15W
	Frequency	2.0GHz~3.9GHz (Depends on CPU)
	L2 Cache	2MB~4MB (Depends on CPU)
	CPU Type	BGA
	Chipset	Integrated
	BIOS	AMI
<b>Memory</b>	Technology	Dual-Channel for DDR4 2133 MHz
	Max. Capacity	Up to 32GB
	Socket	2 x 260-pin SO-DIMMs
<b>Graphic</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	Multiple Display	3 independent displays
	Display Interface	HDMI 2.0 up to 4096 x 2160 @60Hz DP up to 4096 x 2304 @60Hz DVI-I up to 1920 x 1200 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	N/A
<b>TPM</b>	Controller	Infineon SLB9665TT2.0
<b>Expansion Slot</b>	M.2	1 x E Key (PCIe x2, USB 2.0), 2230
	Mini-PCIe	1 x Full-size (one w/ SIM holder or mSATA) 1 x Half-size
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD
	mSATA	1 (shared with mini-PCIe)
<b>I/O Interface</b>	RJ-45	2
	PoE	N/A
	Audio	1 x SPDIF-out 1 x Line-out (Mic-in by AP driver)
	USB	4 x USB 3.0 2 x USB 2.0
	Serial	2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, 0V
	GPIO	N/A
	CANbus	N/A
	HDMI	2 (Co-lay with DP)
	DVI	1 (DVI-I)
	DisplayPort	2 (Colay with HDMI)
VGA	1 (DVI-I to VGA dongle)	
Antenna	2 openings reserved for antennas	
<b>Power Supply</b>	DC Input	DC-in 19V with Lockable DC Jack
	AC Input	N/A
<b>Environment</b>	IP Rating	Full IP40
	Operating Temperature	-10 ~ 50°C (SSD), -10 ~ 40°C (HDD)
	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, 5 ~ 500 Hz, 1hr/axis (w/ SSD)
	Shock	Operating: IEC 60068-2-27: 50G, half sine, 11ms (w/ SSD)
<b>Physical characteristics</b>	Dimensions (W x D x H)	196 x 285 x 29mm
	Weight	2.25 kg
	Mounting	VESA/Wall mount, DIN Rail
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
	Safety	BSMI, CB, Energy Star
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 25 Linux Ubuntu 17.04

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO/MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-9A75

Slim Industrial Fanless Box PC with Intel® BDW ULT, High Performance & Low-Power for 4K2K Digital Signage

## WindBOX III Advanced



### Features

- Slim and fanless system design with 33mm thickness
- 5th Gen Intel® Broadwell ULT Core i7/i5/i3, Celeron Processor
- Support DDR3L SO-DIMM up to 16GB memory
- 3 independent displays: 2 DP and 1 DVI-I (support DVI-D and VGA via Y cable)
- 2 x GbE LAN, 4 x USB 3.0 and 2 x USB2.0, 1 x COM, audio, and lockable DC jack
- Mini-PCIe slots for WiFi, 3G, or mSATA cards
- Flexible design for easy maintenance on 2.5" HDD/SSD, memory & 2 full size mini-PCIe
- DC-in 19V/65W adaptor

### Ordering Information

Part Number	Description
9S9-9A75-001	I5-5200U, 1*COM, MEMORY 2GB, HDD 500GB, WIRELESS LAN, 19V/65W ADAPTER, POWER CORD EU
9S9-9A75-003	I5-5200U, 1*COM, MEMORY 2GB, HDD 500GB, WIRELESS LAN, 19V/65W ADAPTER, POWER CORD USA
9S9-9A75-004	I5-5200U, 2*COM, MEMORY 4GB, HDD 500GB, WIRELESS LAN, 19V/65W ADAPTER, POWER CORD USA
939-9A75-001	I5-5200U, 1*COM, WIRELESS LAN, 19V/65W ADAPTER, POWER CORD EU
939-9A75-002	I5-5200U, 1*COM, WIRELESS LAN, 19V/65W ADAPTER, POWER CORD USA

### Specifications

<b>System Processor</b>	CPU	Intel® BDW ULT Core™ i5-5200U Processor, Dual Core, 15W
	Frequency	2.2GHz~2.7GHz
	L2 Cache	3MB
	CPU Type	BGA
	Chipset	N/A
<b>Memory</b>	BIOS	AMI
	Technology	Dual-Channel for DDR3L 1333/1600 MHz
	Max. Capacity	Up to 16GB
<b>Graphic</b>	Socket	2 x 204-pin SO-DIMMs
	Controller	Intel® HD Graphics 5500
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
<b>Multiple Display</b>	Multiple Display	3 independent displays
	Display Interface	DP up to 3840 x 2160 @60Hz DVI-D up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I218LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887/888S HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Infineon SLB9635TT 1.2
<b>Expansion Slot</b>	M.2	N/A
<b>Storage</b>	Mini-PCIe	2 x Full-size (one w/ SIM holder or mSATA)
	SATA	1 x 2.5" HDD/SSD
	mSATA	1 (shared with mini-PCIe)
<b>I/O Interface</b>	RJ-45	2
	PoE	N/A
	Audio	1 x Mic-in, 1 x Line-out
	USB	SKU1: 4 x USB 3.0; 2 x USB 2.0 SKU2: 4 x USB 3.0
	Serial	SKU1: 1 x COM port, RS-232/422/485 SKU2: 2 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, 0V
	GPIO	N/A
	CANbus	N/A
	HDMI	N/A
	DVI	1 (DVI-I)
	DisplayPort	2
VGA	1 (from DVI-I)	
Antenna	2 openings reserved for antennas	
<b>Power Supply</b>	DC Input	DC-in 12V/19V/24V
	AC Input	N/A
<b>Environment</b>	IP Rating	Full IP40
	Operating Temperature	-10 ~ 50°C (SSD), -10 ~ 40°C (HDD)
	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)
<b>Physical characteristics</b>	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)
	Dimensions (W x D x H)	196 x 285 x 33mm
	Weight	2.60 kg
<b>Certification</b>	Mounting	VESA mount
	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	Safety	BSMI, CB, Energy Star
	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora Core 21 Linux Ubuntu 15.04

### Packing List

Part Number	Description
E22-9A25031-C22	VESA Mounting Bracket
K33-3001020-I45/ K33-3001021-I45	Power Cord, USA, 1800mm/ Power Cord, EA, 1800mm
S79-0000360-V03	RF Antenna
S93-0401690-S14	Adaptor
G71-SEDC141-X03	Driver CD

# MS-9A65

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

## WindBOX II Advanced



### Features

- Ultra-slim and low power fanless design with 19mm thinness
- Support Intel® BayTrail platform
- Mini-PCIe slots for WiFi, 3G, or mSATA cards
- Easy maintenance on 2.5" drive & mini-PCIe with removable bottom cover
- Smart power button design to avoid mistaken action
- Cable clip for better cabling and avoid cable loose

### Ordering Information

Part Number	Description
9S9-9A65-001	MS-9A65\709-9A65-010\829-9A65-001 STD VER 1.0, WindBOX II, FANLESS, BAYTRAIL J1900, MEMORY 2GB, HDD 500GB, WIRELESS LAN, MSI LOGO, BLACK, 1*ANTENNA, CD, ADAPTER 19V/65W, POWER CORD USA, SINGLE
9S9-9A65-002	MS-9A65\709-9A65-010\829-9A65-002 OPTA VER 1.0, WindBOX II, FANLESS, BAYTRAIL J1900, MEMORY 2GB, HDD 500GB, WIRELESS LAN, MSI LOGO, BLACK, 1*ANTENNA, CD, ADAPTER 19V/65W, POWER CORD EU, SINGLE

### Packing List

Part Number	Description	Quantity
G71-SEDC136-X03	Driver CD	1
K33-3001020-I45/ K33-3001021-I45	Power Cord, USA, 1800mm/ Power Cord, EU, 1800mm	1
S93-0401680-S14	19V/65W DOE VI Adaptor	1
S79-0000360-V03	Antenna	1
E24-9A14090-K23	Cable Tie	2
E22-9A95080-C22	VESA Mounting Bracket	1

### Specifications

<b>System Processor</b>	CPU	Intel® Celeron® Processor J1900, QC, 10 W
	Frequency	2GHz~2.42GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	N/A
<b>Memory</b>	BIOS	AMI
	Technology	Dual-Channel DDR3L 1333MHz
	Max. Capacity	Up to 8GB
<b>Graphic</b>	Socket	2 x 204-pin SO-DIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	Multiple Display	2 independent displays
<b>Ethernet</b>	Display Interface	HDMI up to 1920 x 1080 @60Hz DVI-I up to 1920 x 1200 @60Hz
	Controller	2 x Intel® I210-AT GbE
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	N/A
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	1 x Full-size (w/ mSATA or SIM holder) 1 x Half-size
<b>Storage</b>	SATA	1 x 2.5" HDD/SSD
	mSATA	1
<b>I/O Interface</b>	RJ-45	2
	PoE	N/A
	Audio	1 x Mic-in 1 x Line-out
	USB	2 x USB 2.0 1 x USB 3.0
	Serial	1 x COM port COM1: RS-232/422/485, 0V/5V/12V
	GPIO	N/A
	CANbus	N/A
	HDMI	1
	DVI	1 (DVI-I)
	Antenna	1 (opening reserved for 2nd antenna)
<b>Power Supply</b>	DC Input	DC-in 19V
	AC Input	N/A
<b>Environment</b>	Operating Temperature	0 ~ 40°C (HDD) -10 ~ 60°C (SSD)
	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)
<b>Physical characteristics</b>	Shock	Operating: 3 G, half sine 11 ms duration (w/ HDD)
	Dimensions (W x D x H)	180 x 255 x 19mm
<b>Certification</b>	Weight	1.30 kg
	Mounting	VESA mount
	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	Safety	BSMI, CB, Energy Star
	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICOVME Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98H7

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



## Features

- Supports 8th Gen Intel® Embedded Coffee Lake-H Xeon™ & Core™ i7/i5/i3 Mobile Processor
- Supports 2 x DDR4 2666MHz SO-DIMMs up to 32GB (ECC supported by CM246)
- Supports 3 independent displays with 4K/2K HD resolution
- Supports Intel® I219LM GbE-PHY LAN w/ iAMT 12.x
- Supports 4 SATA 3.0 with RAID 0/1/5/10, 2 COM, 4 USB 3.1 Gen1, and 8 USB 2.0 ports
- Supports 8 PCIe x1 Gne3 for multiple expansion (Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4)
- Supports PEG Gne3 configurable to 1 x16 or 2 x8 or 1 x8 + 2 x4
- Supports TPM 2.0 Onboard

## 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

<b>Processor</b>	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
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR4 (ECC) 2666MHz	Dual-channel DDR4 (Non-ECC) 2666MHz
	Max. Capacity	Up to 32GB	
<b>Display</b>	Socket	2 x 260-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	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 HDMI1.4 up to 4096 x 2160 @24Hz DP up to 4096 x 2304 @60Hz	
<b>Ethernet</b>	Controller	1 x Intel® I219LM GbE-PHY LAN (AMT 12.x supported)	
<b>Audio</b>	Controller	Support HD audio interface to carrier board	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>TPM</b>	Controller	Infineon SLB9665TT 2.0	
<b>I/O Interface</b>	USB	8 x USB 2.0 (to carrier board) 4 x USB 3.1 (to carrier board)	
	Serial	2 x COM ports (to carrier board)	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	
<b>Expansion Slot</b>	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	
<b>Storage</b>	SATA	4 x SATA 3.0	
	DC	N/A	
<b>Power Supply</b>	ATX	ATX +12 V and +5 VSB (standby power) AT: +12 V	
	Operating Temperature	-10 ~ 60°C	
<b>Environment</b>	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions (W x D x H)	125 x 95mm (COM Express Type 6 Basic module)	
<b>Form Factor</b>	Weight	0.113 kg	
	Certification	EMC	
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Kernel 4.x (by request)	

# MS-98F7

COM Express SBC with 7th/6th Gen Intel® Kaby Lake-U/ Skylake-U Platform for Type6-Compact Solution

NEW



## Features

- Supports 7th/6th Gen Intel® Embedded Mobile Kaby Lake-ULT/ Skylake-ULT Core™ i7/i5/i3/Celeron Processor
- Supports 2 x DDR4 1866/2133 SO-DIMM up to 32GB
- Supports 3 independent displays with 4K/2K HD resolution
- Supports Intel® GbE LAN w/ iAMT 11.x
- Supports 3 SATA 3.0, 2 COM, 4 USB 3.0, and 8 USB 2.0 ports
- Supports 8 PCIe x1 Gne3 for multiple expansion  
(Configurable to 5 x PCIe x1 or 4 x PCIe x1 & 1 x PCIe x4 )
- Supports TPM 2.0 and 32GB eMMC 5.0

## 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

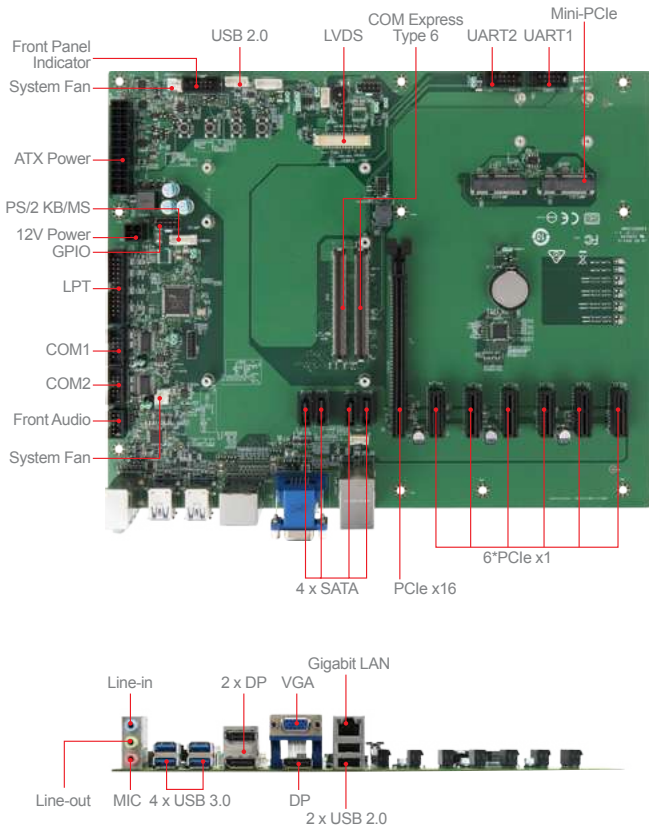
## Specifications

<b>Processor</b>	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	
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR4 2133MHz	
<b>Display</b>	Max. Capacity	Up to 32GB	
	Socket	2 x 260-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
<b>Display</b>	LVDS	Dual channel 24-bit	
	eDP	N/A	
	VGA	1 (Share with DDI1 Signal, by BOM option)	
	DVI		
	HDMI	2 DDI ports support HDMI/DP (DDI1 by BOM option, default is for VGA)	
	DisplayPort		
	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
	<b>Ethernet</b>	Controller	1 x Intel® I219LM GbE-PHY LAN (AMT 11.x supported)
<b>Audio</b>	Controller	Support HD audio interface to carrier board	
<b>Super I/O</b>	Controller	N/A	
	Watchdog Timer	256-level Watchdog Timer	
<b>H/W Monitor</b>	Smart Fan	Yes	
<b>TPM</b>	Controller	Yes (TPM2.0, by BOM option)	
<b>I/O Interface</b>	USB	8 x USB 2.0 (to carrier board) 4 x USB 3.0 (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	
	<b>Expansion Slot</b>	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	
<b>Storage</b>	Mini-PCIe	N/A	
	SATA	3 x SATA 3.0	
	mSATA	32GB eMMC 5.0 (by BOM option)	
<b>Power Supply</b>	DC	N/A	
	ATX	ATX +12 V and +5 VSB (standby power) AT: +12 V	
<b>Environment</b>	Operating Temperature	-20 ~ 70°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions (W x D x H)	95 x 95mm (COM Express compact module)	
	Weight	0.105 kg	
<b>Certification</b>	EMC	FCC, CE,RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) (Skylake-ULT Only) Windows 8.1 (64-bit) (Skylake-ULT Only) Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-9988

## COM Express Type 6 Carrier Board



### Features

- Supports VGA, LVDS, and 3 DP ports
- 1 RJ45 for COM Express module board
- 4 USB 3.0, 4 USB 2.0, 2 COM ports and 2 UART
- Supports 4 SATA ports, 6 PCIe x1, 2 Mini-PCle, and PCIe x16

### Ordering Information

Part Number	Description
919-9988-002	MS-9988 20 COM Express Carrier M/B, 1*PCIe x16, 6*PCIe 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

<b>Processor</b>	CPU	N/A
	BIOS	AMI
<b>Display</b>	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
<b>Ethernet</b>	Controller	1 x RJ45 for COM Express module board
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	4 x USB 3.0 (4 x rear) 4 x USB 2.0 (2 x rear; 2 x internal)
	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)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	PCIe x16	1
	PCIe x1	6
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCle	2 x Full-size
	SATA	4 x SATA
<b>Storage</b>	DC	N/A
	ATX	ATX-24P, 12V-4P
<b>Power Supply</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Environment</b>	Dimensions (W x D x H)	305 x 244mm (ATX)
	Weight	0.60 kg
	<b>Certification</b>	EMC
<b>Software Platform</b>	OS Support	Depends on CPU Module Board



# MS-98H2

Qseven R2.0 CPU Module with Intel® Braswell N3000 Series SoC Platform for Low-Power Solution



## Features

- Intel® Pentium®/Celeron® Processor N3000 Series SoC
- Onboard DDR3L 1600 up to 8GB
- Support Intel® GbE LAN
- 3 DDI ports for eDP, DP, and HDMI
- 4 USB 2.0, 2 USB 3.0, and 3 PCIe x1
- Compliant with Qseven specifications revision 2.0

## Ordering Information

Part Number	Description
919-98H2-004	MS-98H2 12 Qseven module board Intel Braswell N3710 SoC, Onboard 4GB DDR3L-1600MHz, 1*GbE LAN, 3*PCIe x1, 2*SATA, 2*USB 3.0, 4*USB 2.0, 1*SD, 1*UART, 1*SMBus, 1*12C
919-98H2-005	MS-98H2 12 Qseven module board Intel Braswell N3160 SoC, Onboard 4GB DDR3L-1600MHz, 1*GbE LAN, 3*PCIe x1, 2*SATA, 2*USB 3.0, 4*USB 2.0, 1*SD, 1*UART, 1*SMBus, 1*12C

## Packing List

Part Number	Description	Quantity
E31-0804880-K08	Standard heatspreader for Qseven module	1
G71-SEDC154-X03/N56	DRIVER CD	1

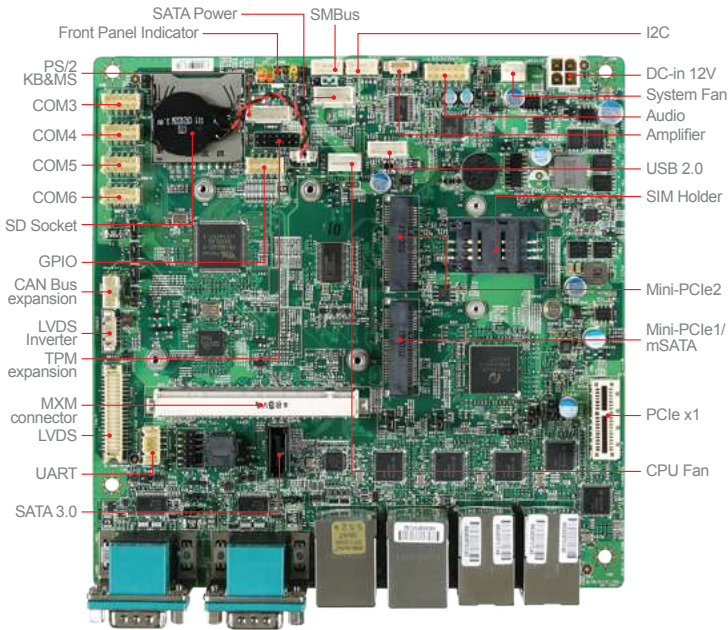
## Specifications

<b>Processor</b>	CPU	Intel® Pentium® processor N3710, QC, 6W Intel® Celeron® processor N3160, QC, 6W
	Frequency	N3710, 1.6 GHz up to 2.56 GHz N3160, 1.6 GHz up to 2.24GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated in SoC
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3L 1600MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	Onboard
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	eDP	1
	HDMI	1
	DisplayPort	1
	Multiple Display	3 independent displays
	Display Interface	eDP1.4 up to 2560 x 1600 @60Hz 2 x DDI: 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*
<b>Ethernet</b>	Controller	1 x Intel® I211-AT GbE LAN
<b>Audio</b>	Controller	Support HD audio interface to carrier board
<b>Super I/O</b>	Controller	N/A
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	N/A
<b>I/O Interface</b>	USB	4 x USB 2.0 (to carrier board) 2 x USB 3.0 (to carrier board)
	Serial	1 x UART port (to carrier board)
<b>Expansion Slot</b>	PCIe x1	3 x PCI Express GEN. 2.0 lanes
	M.2	N/A
<b>Storage</b>	SATA	2 x SATA 3.0
	CompactFlash	N/A
<b>Power Supply</b>	DC	+5 V and +5 VSB (standby power)
	ATX	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions (W x D x H)	70 x 70mm (Qseven CPU module)
	Weight	0.23 Kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 22 (by request) Linux Ubuntu 15.04 (by request)

Industrial Computer  
COM Express Board  
Qseven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM

# MS-99A1

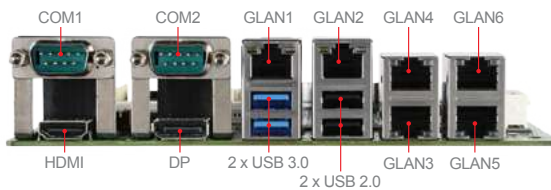
Qseven R2.0 Compliant Carrier Board in Mini-ITX for 6 GLAN & 7 COM Solution



## 2 LAN SKU



## 6 LAN SKU



## Features

- Supports LVDS, HDMI, and DP ports
- 6 RJ45 (one for Qseven module board)
- 2 USB 3.0, 5 USB 2.0, and 7 COM ports (one for Qseven module board)
- 1 SATA 3.0, 1 SD socket, Dual Mini-PCle, and 1 mSATA
- 1 SMBus, 1 I2C, and 1 CAN Bus expansion
- Compliant with Qseven specifications revision 2.0

## Ordering Information

Part Number	Description
919-99A1-002	MS-99A1 VER 12 STD QSEVEN CARRIER BOARD, MXM CONNECTOR, DP, HDMI, LVDS, 6GLAN, 5USB, 6COM, UART, PCIe x1, Mini-PCle, mSATA, SIM Holder, SMBus, I2C, DC-IN 12V, SATA CABLE, SATA POWER CABLE, DC-IN CABLE, CD, SINGLE

## Specifications

<b>Processor</b>	CPU	N/A
	BIOS	AMI
<b>Memory</b>	Technology	N/A
	Display	LVDS
<b>Display</b>	HDMI	1
	DisplayPort	1
	Multiple Display	3 independent displays
	Display Interface	Depends on module board
<b>Ethernet</b>	Controller	5 x Intel® I211-AT GbE LAN (6 GLAN SKU) 1 x Intel® I211-AT GbE LAN (2 GLAN SKU)
	Audio	Controller
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
	USB	3 x USB 2.0 (2 x rear; 1 x internal) 2 x USB 3.0 (2 x rear)
<b>I/O Interface</b>	Serial	6 x COM ports COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V COM3-6: RS-232, 0V/5V/12V 1 x UART Port (from Qseven module board)
	Parallel	N/A
	PS/2	1 (box header)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
<b>Expansion Slot</b>	PCIe x1	1
	M.2	N/A
	Mini-PCle	2 x Full-size (one w/ mSATA)
<b>Storage</b>	SATA	1 x SATA 3.0
	mSATA	1
<b>Power Supply</b>	DC	DC-in 12V
	ATX	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions (W x D x H)	170 x 170mm (Mini-ITX)
	Weight	0.242 Kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Depends on CPU Module Board

## Packing List

Part Number	Description	Quantity
K1D-3008006-V03	SATA Power Cable, 300mm	1
K1D-1008261-V03	SATA Cable, 500mm	1
K10-3004215-V03	DC-IN Cable, 160mm	1

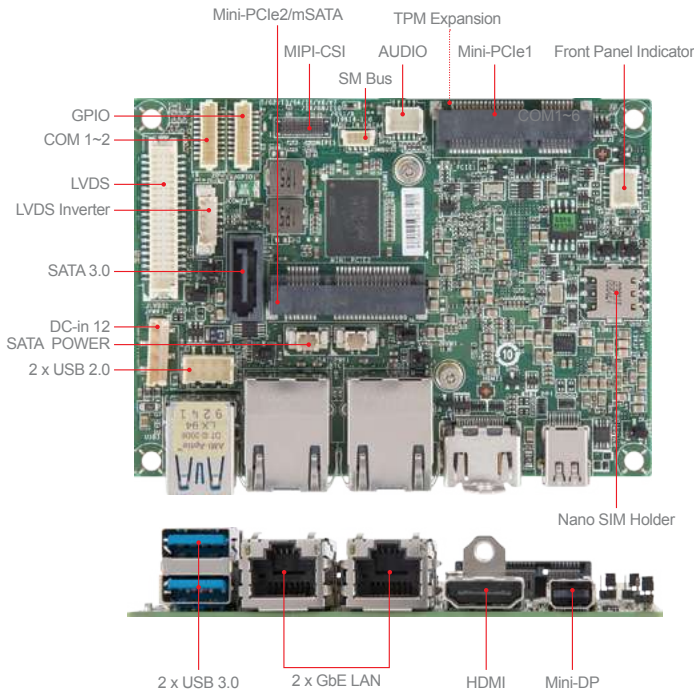
## Optional Item

Part Number	Description
K14-1018003-V03	COM Port Cable, 300mm

# MS-9816

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

NEW



## Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- Supports LPDDR4 2133/2400 MHz onboard memory up to 4GB
- 3 independent displays: HDMI, Mini-DP and LVDS
- 2 USB 3.0, 2 USB 2.0, and 2 COM ports
- Dual Mini-PCIe, SATA3.0, mSATA, NANO SIM-Holder
- Apollo Lake-I Series support wide operating temperature : -40 ~ 85°C
- Supports Dual GbE LAN
- Supports MIPI-CSI2.0 interface for Camera
- Compact design for size-sensitive & anti-vibration devices in harsh environments
- 1 x MIPI-CSI 2.0 (by request)

## Ordering Information

Part Number	Description
919-9816-001	MS-9816 10, Apollo Lake N4200, 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
919-9816-002	MS-9816 10, Apollo Lake N3350, 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
919-9816-003	MS-9816 10, Apollo Lake-I E3940, 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
919-9816-004	MS-9816 10, Apollo Lake-I E3930, 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-3008034-V03	USB Cable, 150mm	1
K1D-3010008-V03	SATA Cable with Power, 150mm	1
K1G-3004057-V03	DC Power Cable, 150mm	1
G71-SEDC177-X03	Driver DVD	1

## Specifications

		Apollo Lake SKUs	Apollo Lake-I SKUs
			Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W
<b>Processor</b>	CPU		
	Frequency	N4200, 1.5 GHz, up to 2.5 GHz N3350, 1.1 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	
<b>Memory</b>	BIOS	AMI	
	Technology	Single-channel LPDDR4 2400MHz	Single-channel LPDDR4 2133MHz
	Max. Capacity	Up to 4GB	
<b>Display</b>	Socket	Onboard	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	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	
<b>Display Interface</b>	LVDS	up to 1920 x 1200 @60Hz	
	HDMI	up to 3840 x 2160 @30Hz	
<b>Ethernet</b>	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	
<b>Audio</b>	Controller	Fintek F81866AD-I	
<b>Super I/O</b>	Watchdog Timer	256-level Watchdog Timer	
<b>H/W Monitor</b>	Smart Fan	N/A	
<b>TPM</b>	Controller	Pin header	
<b>I/O Interface</b>	USB	2 x USB 2.0 (2 x internal) 2 x USB 3.0 (2 x 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	
<b>Expansion Slot</b>	Mini-PCIe	1 x Full-size 1 x Half-size (Mini-PCIe Full-size Slot w/ NANO SIM-Holder) (Mini-PCIe Half-size Slot w/ mSATA)	
	SATA	1 x SATA 3.0	
<b>Storage</b>	mSATA	1 (Shared with Mini-PCIe Half-size)	
	DC	DC-in 12V	
<b>Power Supply</b>	ATX	N/A	
	Operating Temperature	-10 ~ 60°C	-40 ~ 85°C
<b>Environment</b>	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions	101 x 73mm (Pico-ITX)	
	Weight	0.27 kg	
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	

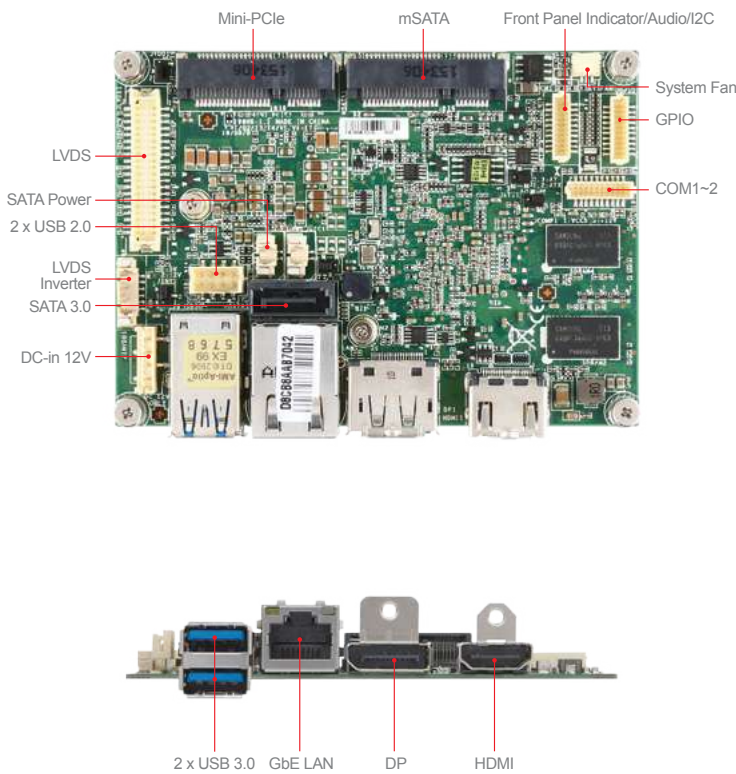
## Optional Item

Part Number	Description	Quantity
E31-0805810-K08	Heartspreader for Apollo Lake-I	1
E31-0805820-K08	Heartspreader for Apollo Lak	1

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO/MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98H6

Pico-ITX SBC with Intel® Braswell N3000 Series SoC Platform for Low-Power and Fanless Solution



## Features

- Intel® Braswell N3000 Series SoC
- Onboard 2GB DDR3L memory
- 3 independent displays: HDMI, DP, and LVDS
- SATA 3.0, mSATA (Full-size), Mini-PCIe (Half-size), and Intel® GbE LAN
- 2 USB 3.0, 2 USB 2.0 ports, and 2 COM ports
- 16-bit GPIO (8\*GPI; 8\*GPO)

## Ordering Information

Part Number	Description
919-98H6-004	Intel Braswell N3710 SoC, Onboard 2GB DDR3L, HDMI, DP, GbE LAN, 2*USB3.0, 2*COM, Mini-PCIe, mSATA, I2C, DC-IN 12V, SATA CABLE WITH POWER, USB CABLE, COM PORT CALBE, DC-IN CABLE, CD, SINGLE
919-98H6-005	Intel Braswell N3160 SoC, Onboard 2GB DDR3L, HDMI, DP, GbE LAN, 2*USB3.0, 2*COM, Mini-PCIe, mSATA, I2C, DC-IN 12V, SATA CABLE WITH POWER, USB CABLE, COM PORT CALBE, DC-IN CABLE, CD, SINGLE
919-98H6-006	Intel Braswell N3010 SoC, Onboard 2GB DDR3L, HDMI, DP, GbE LAN, 2*USB3.0, 2*COM, Mini-PCIe, mSATA, I2C, DC-IN 12V, SATA CABLE WITH POWER, USB CABLE, COM PORT CALBE, DC-IN CABLE, CD, SINGLE

## Packing List

Part Number	Description	Quantity
K14-3018001-V03	COM PORT Cable, 150mm	1
K1B-3008034-V03	USB Cable, 150mm	1
K1D-3010008-V03	SATA Cable with Power, 150mm	1
K1G-3004057-V03	DC Power Cable, 150mm	1
G71-SEDC149-X03	Driver DVD	1

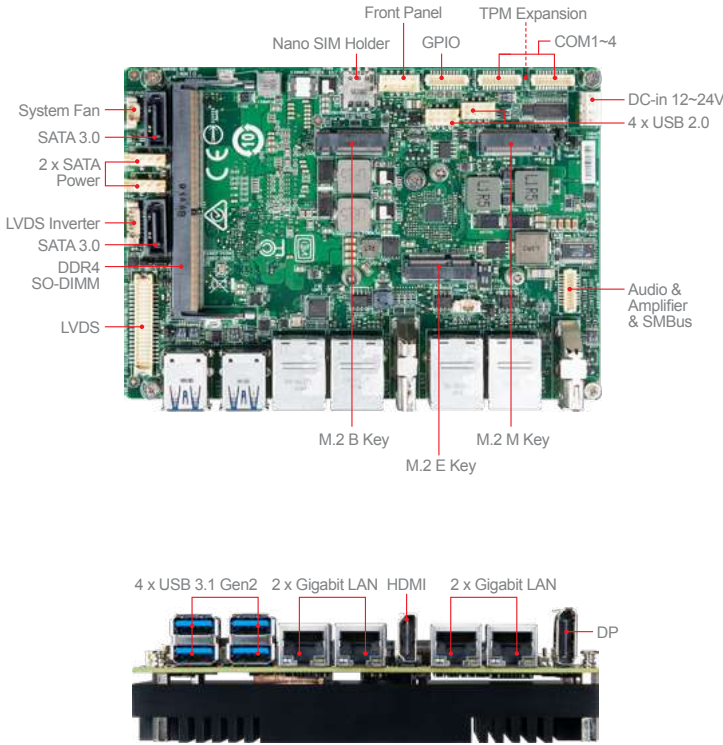
## Specifications

<b>Processor</b>	CPU	Intel® Pentium® processor N3710, QC, 6W Intel® Celeron® processor N3160, QC, 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 N3010, 1.04 GHz up to 2.24 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated in SoC
<b>Memory</b>	BIOS	AMI
	Technology	Single-channel DDR3L 1600MHz
	Max. Capacity	Up to 2GB
	Socket	Onboard
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 18/24-bit
	HDMI	1
	DisplayPort	1
	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
Audio	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
Super I/O	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
TPM	Controller	N/A
<b>I/O Interface</b>	USB	2 x USB 2.0 (2 x internal) 2 x USB 3.0 (2 x 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
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	1 x Half-size
<b>Storage</b>	SATA	1 x SATA 3.0
	mSATA	1
<b>Power Supply</b>	DC	DC-in 12V
	ATX	N/A
<b>Environment</b>	Operating Temperature	Heat-Spreader: 100(L) x 72.2(W) x 8(H) mm (standard packing) Heat-Sink: -10~60°C, 100(L) x 72.2(W) x 33(H) mm (by option)
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	100 x 72mm (Pico-ITX)
	Weight	0.27 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 21 (by request) Linux Ubuntu14.04 (by request)

# MS-98L3

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

NEW



## Features

- Intel® Whiskey Lake-U Series SoC up to TDP-15W
- Supports DDR4 2400 MHz SO-DIMM memory up to 16GB
- Supports 3 or 2 independent displays: HDMI, DP & LVDS
- Supports maximum 4 Intel® GbE LAN with AMT 12.x
- Supports 2 SATA 3.0, 1 micro SD, 1 M.2 M key 2242 & RAID 0/1/5 (RAID 5 configured with M.2 M Key) for storage
- Supports maximum 4 USB 3.1 Gen2 & 4 USB 2.0
- Supports 4 COM ports (all with RS-232/422/485), 16-bit DIO, SMBus & Amplifier-6W for flexible applications
- Supports 1 M.2 E key 2230 with CNVi & 1 M.2 B key 2242/3042 with SIM holder
- Supports wide voltage DC-in 12~24V with OCP & OVP

## Ordering Information

Part Number	Description
Coming soon	

## Packing List

Part Number	Description	Quantity
Coming soon		

## Optional Item

Part Number	Description
Coming soon	

## Specifications

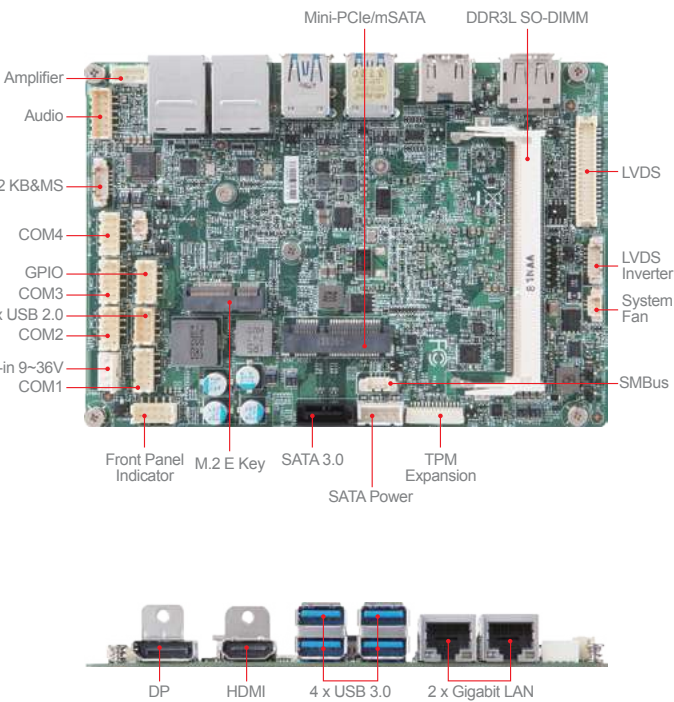
<b>System Processor</b>	CPU	8th Gen Intel® IOTG Mobile Whiskey Lake-U Core™ i7-8665UE/i5-8365UE, QC, 15W & i3-8145UE/Celeron® 4305UE, DC, 15W
	Frequency	1.8GHz~4.6GHz (Depends on CPU)
	L2 Cache	4MB~8MB (Depends on CPU)
	CPU Type	BGA
	Chipset	N/A
<b>Memory</b>	BIOS	AMI
	Technology	Single-channel DDR4 2400MHz
	Max. Capacity	Up to 16GB
<b>Display</b>	Socket	1 x 260-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 18/24-Bit
	HDMI	1
	DisplayPort	1 (Support DP++)
	Multiple Display	3 independent displays
<b>Ethernet</b>	Display Interface	LVDS up to 1920 x 1200 @60 Hz HDMI up to 4096 x 2160 @24Hz DP up to 4096 x 2160 @60Hz
	Controller	1 x Intel® I219LM GbE-PHY LAN (AMT 12.0 supported by i7/i5 SKUs) 3 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header (Default)
<b>I/O Interfaces</b>	USB	4 x USB 3.1 Gen 2 (4 x rear) 4 x USB 2.0 (4 x internal)
	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 x16	N/A
	PCIe x4	N/A
<b>Expansion Slot</b>	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, CNVi), 2230
	Mini-PCIe	N/A
	Storage	SATA 2 x SATA 3.0
<b>Power Supply</b>	DC Input	DC-in 12~24V (OCP & OVP Supported)
	AC Input	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions (W x D x H)	146 x 102mm (3.5")
	Weight	0.64 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 29 (by request) Linux Ubuntu 18.04 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM

# MS-98J8

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

NEW



## Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- Supports DDR3L 1866/1600 MHz SO-DIMM memory up to 8GB
- 3 independent displays: HDMI, DP, and LVDS outputs
- Supports 4 USB 3.0, 2 USB 2.0, and 4 COM ports
- Supports Dual GbE LAN, Mini-PCIe, SATA, mSATA, and M.2 E Key 2230
- Supports Wide-Range DC-in 9~36V

## Ordering Information

Part Number	Description
919-98J8-001	MS-98J8 10 OPT:A Intel Apollo Lake N3350,DDR3L,DP+HDMI+LVDS, 1*SATA3.0+2*GbE LAN+1*M.2+1*Mini-PCIe+2*USB2.0+4*USB3.0+4*COM,DC-in 9V~36V, SINGLE
919-98J8-002	MS-98J8 10 OPT:B Intel Apollo Lake-I E3940,DDR3L,DP+HDMI+LVDS, 1*SATA3.0+2*GbE LAN+1*M.2+1*Mini-PCIe+2*USB2.0+4*USB3.0+4*COM,DC-in 9V~36V, SINGLE

## Packing List

Part Number	Description	Quantity
K14-1009062-V03	COM PORT Cable, 250mm	1
K1B-3008034-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1
K1G-3004069-V03	DC Power Cable, 150mm	1
G71-SEDC182-X03/N56	Driver DVD	1

## Optional Item

Part Number	Description	Quantity
E31-0805810-K08	Heatspreader for Apollo Lake	1
E31-0805820-K08	Heatspreader for Apollo Lake-I	1

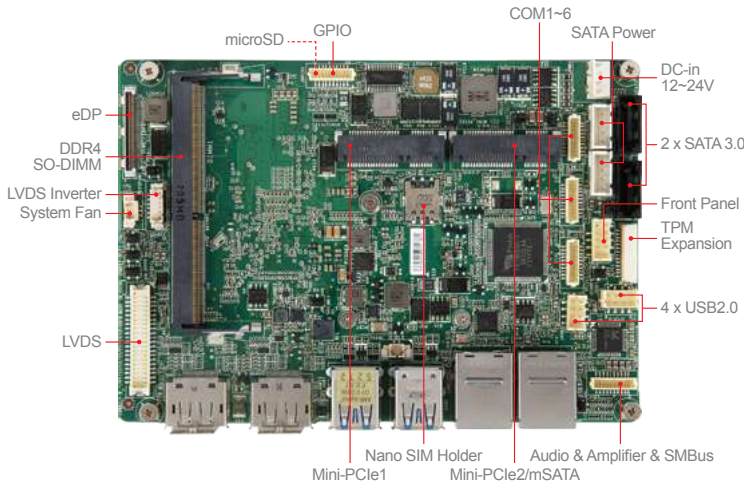
## Specifications

<b>Processor</b>	CPU	Intel® Pentium™ N4200 Processor, QC, 6W Intel® Celeron™ N3350 Processor, DC, 6W 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 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
<b>Memory</b>	BIOS	AMI
	Technology	Single Channel for DDR3L 1866/1600 MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	1 x 204pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	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	
<b>Ethernet</b>	Controller	2 x Realtek® RTL8111H GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81867AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)
<b>I/O Interface</b>	USB	4 x USB 3.0 (4 x rear) 2 x USB 2.0 (2 x internal)
	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
	<b>Expansion Slot</b>	PCIe x 16
PCIe x 4		N/A
PCIe x 1		N/A
PCI		N/A
M.2		1 x E Key ( PCIe x1, USB2.0), 2230
Mini-PCIe		1 x Full-size (w/ mSATA)
<b>Storage</b>	SATA	1 x SATA 3.0
	IDE	N/A
	eSATA	N/A
	CFast	N/A
	mSATA	1 (Shared with Mini-PCIe)
	CompactFlash	N/A
<b>Power Supply</b>	DC	DC-in 9~36V
	ATX	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	146 x 102mm (3.5")
	Weight	0.33 kg
<b>Certification</b>	EMC	CE, FCC Class B, BSMI, VCCI, RCM
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

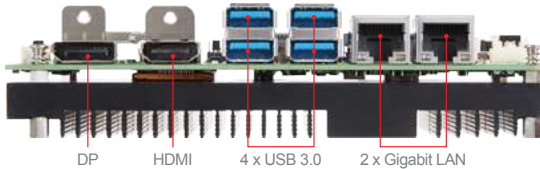
# MS-98H3

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

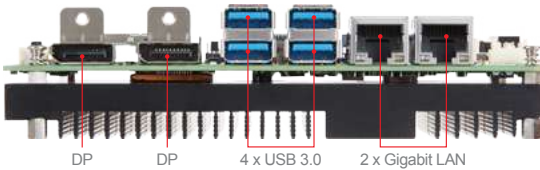
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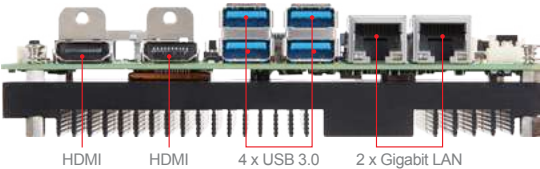
## Standard : DP+HDMI



## Optional : 2 DP



## Optional : 2 HDMI



## Features

- Intel® Kaby Lake-U/Skylake-U Series SoC
- Supports DDR4 2133 MHz SO-DIMM memory up to 16GB
- 3 independent displays: HDMI, DP, eDP & LVDS outputs
- 4 USB 3.0, 4 USB 2.0 & 6 COM ports
- Dual Mini-PCle, 2 SATA3.0, mSATA, NANO SIM-Holder, Dual GbE LAN & Micro SD slot
- Supports DC-in 12~24V

## 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 OPTA 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 OPTB 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 OPTC 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 OPTD 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 OPTE 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 OPTF 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 OPTG 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

## Specifications

<b>Processor</b>	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
<b>Memory</b>	Technology	Single-channel DDR4 2133MHz
	Max. Capacity	Up to 16GB
	Socket	1 x 260-pin SO-DIMM
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 18/24-bit
	eDP	1 (Share with LVDS Signal)
	HDMI	1(HDMI1 Co-layer DP1 & HDMI2 Co-layer DP2 by option)
	DisplayPort	1 (Support DP+, DP1 Co-layer HDMI1 & DP2 Co-layer HDMI2 by option)
	Multiple Display	3 independent displays
<b>Display Interface</b>	LVDS	up to 1920 x 1200 @60Hz
	eDP	up to 4096 x 2304 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I219LM GbE-PHY LAN (AMT 11.x supported)
	Audio	Controller
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
<b>TPM</b>	Smart Fan	Yes
<b>I/O Interface</b>	Controller	Pin header
	USB	4 x USB 3.0 (4 x Rear) 4 x USB 2.0 (4 x Internal)
	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)
<b>Expansion Slot</b>	GPIO	16-bits (8 x GPI; 8 x GPO), 5V
	Mini-PCle	2 x Full-size (Mini-PCle1 Slot w/ NANO SIM-Holder) (Mini-PCle2 Slot w/ mSATA)
<b>Storage</b>	SATA	2 x SATA 3.0
	mSATA	1 (Shared with Mini-PCle2)
<b>Power Supply</b>	DC	DC-in 12~24V
	Environment	Operating Temperature
<b>Form Factor</b>	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Certification</b>	Dimensions	146 x 102mm (3.5")
	Weight	0.59 kg
<b>Software Platform</b>	EMC	FCC, CE, RCM, VCCI, BSMI
	OS Support	Windows 7 (32/64-bit) (Sky Lake-ULT Only) Windows 8.1 (64-bit) (Sky Lake-ULT Only) Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

## Packing List

Part Number	Description	Quantity
G71-SEDC173-N56 / G71-SEDC173-X03	Driver CD	1
K1G-3004069-V03	DC Power Cable, 150mm	1
K14-3018001-V03	COM Port Cable, 150mm	1
K1B-3008034-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1

## Optional Item

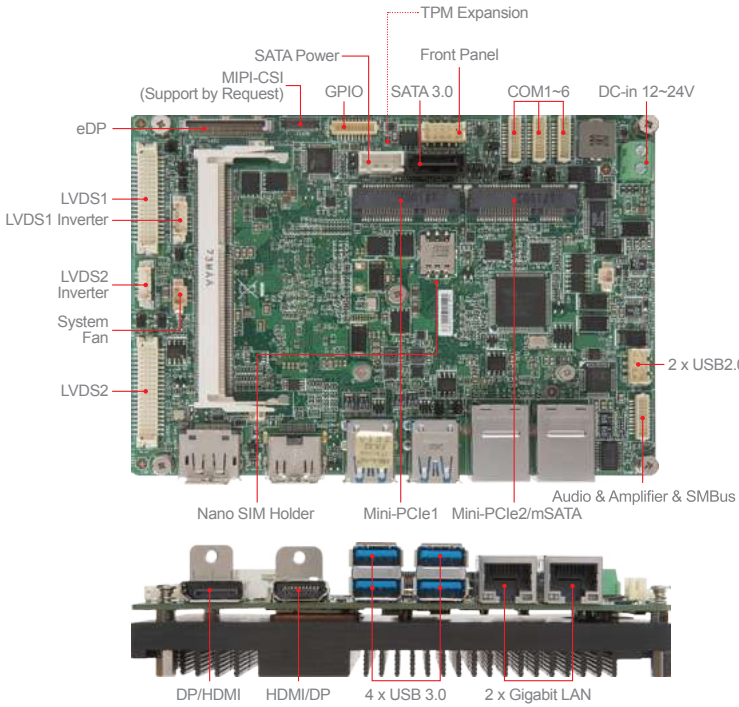
Part Number	Description	Quantity
E31-2100150-K08	Heatspreader	1

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO-M Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SoM

# MS-98E6

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

NEW



## Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- Supports DDR3L 1866/1600 MHz SO-DIMM memory up to 8GB
- 3 independent displays: HDMI, DP, eDP and LVDS
- 4 USB 3.0, 2 USB 2.0, and 6 COM ports
- Dual Mini-PCle, SATA3.0, mSATA, NANO SIM-Holder, Dual GbE LAN and Micro SD slot
- Supports MIPI-CSI2.0 interface for Camera
- Apollo Lake-I Series support operating temperature : -40 ~ 85°C
- Supports DC-in 12~24V

## Ordering Information

Part Number	Description
919-98E6-001	MS-98E6 11 Intel Apollo Lake N4200,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, SINGLE
919-98E6-002	MS-98E6 11 OPTA Intel Apollo Lake N3350,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, SINGLE
919-98E6-003	MS-98E6 11 OPTB Intel Apollo Lake-I E3940,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, SINGLE
919-98E6-004	MS-98E6 11 OPTC Intel Apollo Lake-I E3950,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, SINGLE
919-98E6-005	MS-98E6 11 OPTD Intel Apollo Lake-I E3940,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, SINGLE
919-98E6-006	MS-98E6 11 OPT E Intel Apollo Lake-I E3930,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, SINGLE

## Packing List

Part Number	Description	Quantity
K1B-3008034-V03	USB Cable, 150mm	1
K1D-1012064-V03	DC Power Cable, 150mm	1
K14-3018001-V03	COM PORT Cable, 150mm	1
K1B-3008034-V03	DC Power Cable, 150mm (For 919-98E6-001/002/003)	1
K1G-3002031-V03	DC Power Cable, 150mm (For 919-98E6-004/005/006)	1
G71-SEDC172-X03	Driver DVD	1

## Optional Item

Part Number	Description	Quantity
E31-0805810-K08	Heatspreader For Apollo Lake	1
E31-0805820-K08	Heatspreader For Apollo Lake-I	1

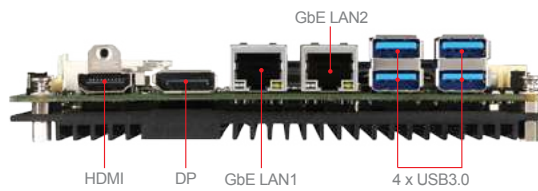
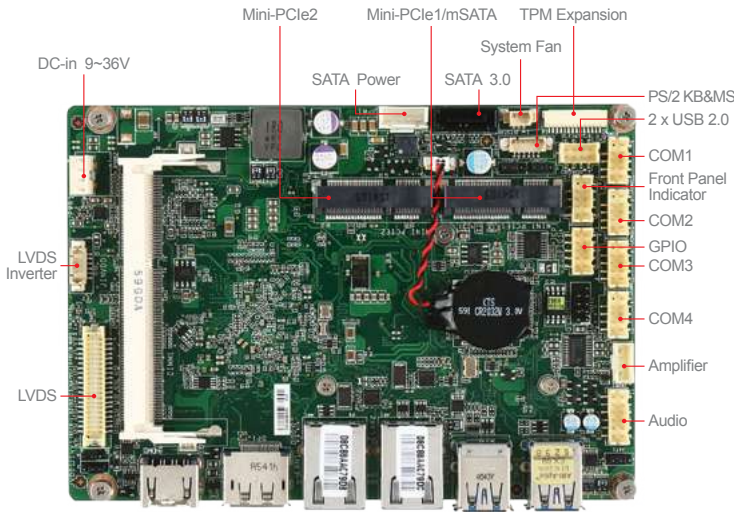
## Specifications

		Apollo Lake SKUs	Apollo Lake-I SKUs
			Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W
<b>Processor</b>	CPU		
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 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	
	BIOS	AMI	
<b>Memory</b>	Technology	Single-channel DDR3L 1866/1600 MHz	
	Max. Capacity	Up to 8GB	
	Socket	1 x 204-pin SO-DIMM	
	Controller	Intel® HD Graphics	
<b>Display</b>	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	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)	
<b>Ethernet</b>	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	
	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
	Controller	Realtek® ALC887-V/D2-CG HD Audio Codec	
<b>Audio</b>	Controller	Realtek® ALC887-V/D2-CG HD Audio Codec	
<b>Super I/O</b>	Controller	Fintek F81867AD-I	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>TPM</b>	Controller	Pin header	
	USB	4 x USB 3.0 (4 x Rear) 2 x USB 2.0 (2 x Internal)	
	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
<b>I/O Interface</b>	PS/2	N/A	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
	PCIe x16	N/A	
	PCI	N/A	
	M.2	N/A	
	Mini-PCle	2 x Full-size (Mini-PCle1 Slot w/ NANO SIM-Holder) (Mini-PCle2 Slot w/ mSATA)	
<b>Storage</b>	SATA	1 x SATA 3.0	
	mSATA	1 (Shared with Mini-PCle2)	
<b>Power Supply</b>	DC	DC-in 12~24V (Box header with 4pin)	DC-in 12~24V (Phoenix connector with 2pin)
	ATX	N/A	
<b>Environment</b>	Operating Temperature	-10 ~ 60°C	-40 ~ 85°C
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions	146 x 102mm (3.5")	
	Weight	0.34 kg	0.59 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	
		*1 x MIPI-CSI 2.0 (by request) *1 x microSD slot	



# MS-9818

3.5" SBC with Intel® Celeron® Processor N3010/N3160 for High-Performance, Low-Power & Fanless Solution



## Features

- Intel® Braswell N3000 Series SoC
- Supports DDR3L 1333/1600 MHz SO-DIMM memory up to 8GB
- 3 independent displays: HDMI, DP and LVDS
- 4 USB 3.0, 2 USB 2.0, and 4 COM ports
- Dual Mini-PCIe, SATA, mSATA, and Dual GbE LAN
- Supports DC-in 9~36V

## Ordering Information

Part Number	Description
919-9818-003	MS-9818 10 OPTB, 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-3008034-V03	USB2.0 CABLE, 150mm	1
K14-1009062-V03	INT COM PORT CABLE, 250mm	1
K1D-1012064-V03	SATA Power CABLE, 200mm	1
G71-SEDC152-N56 / X03	DRIVER CD	1
E31-0806020-K08	Heatsink	1

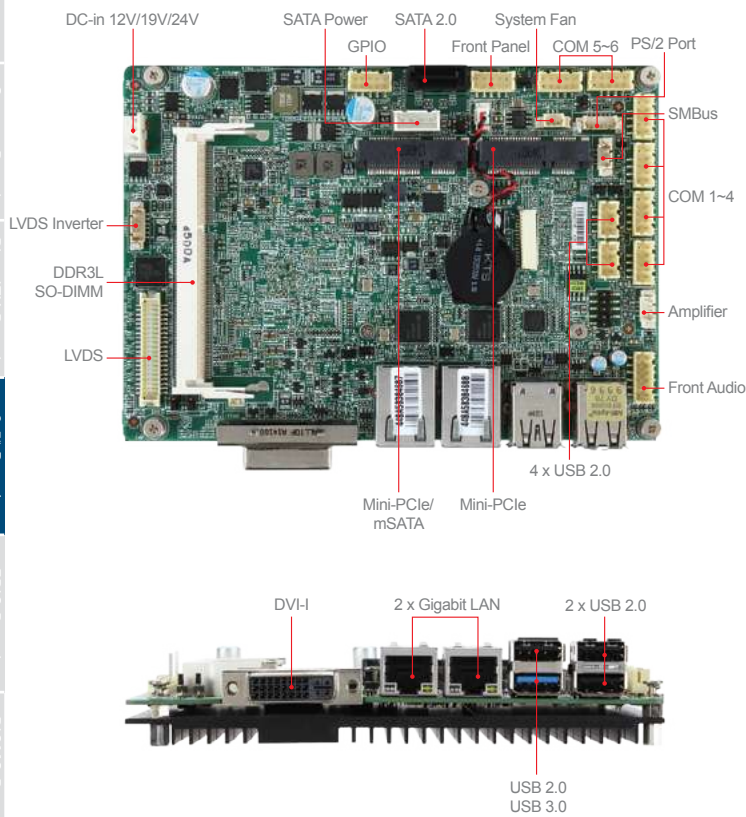
## Specifications

<b>Processor</b>	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
<b>Memory</b>	Chipset	Integrated in SoC
	BIOS	AMI
	Technology	Single-channel DDR3L 1600MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	1 x 204-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 18/24-bit
	HDMI	1
	DisplayPort	1
	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	
<b>Ethernet</b>	Controller	2 x Realtek® RTL8111G GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	2 x USB 2.0 (2 x internal) 4 x USB 3.0 (4 x 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
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	2 x Full-size (Mini-PCIe1 Slot w/ mSATA)
<b>Storage</b>	SATA	1 x SATA 3.0
	mSATA	1 (Shared with Mini-PCIe1)
<b>Power Supply</b>	DC	DC-in 9~36V
	ATX	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	146 x 102mm (3.5")
	Weight	0.33 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 21 (by request) Linux Ubuntu 14.04.03 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# 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 Processors
- Supports DDR3L 1333 MHz SO-DIMM memory up to 8 GB
- DVI-I and LVDS displays
- Dual GbE LAN, USB 3.0, and 6 COM
- Supports dual Mini-PCIe, SATA and mSATA

## Ordering Information

Part Number	Description
919-98G6-001	MS-98G6 10 Intel Bay Trail D-J1900, DDR3L SO DIMM+DVI-I+LVDS+2*Mini-PCIe+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-PCIe+2*LAN+ 1*SA-TA2.0+1*USB3.0+7*USB 2.0+6*COM, DC 12V/19V/24V

## Packing List

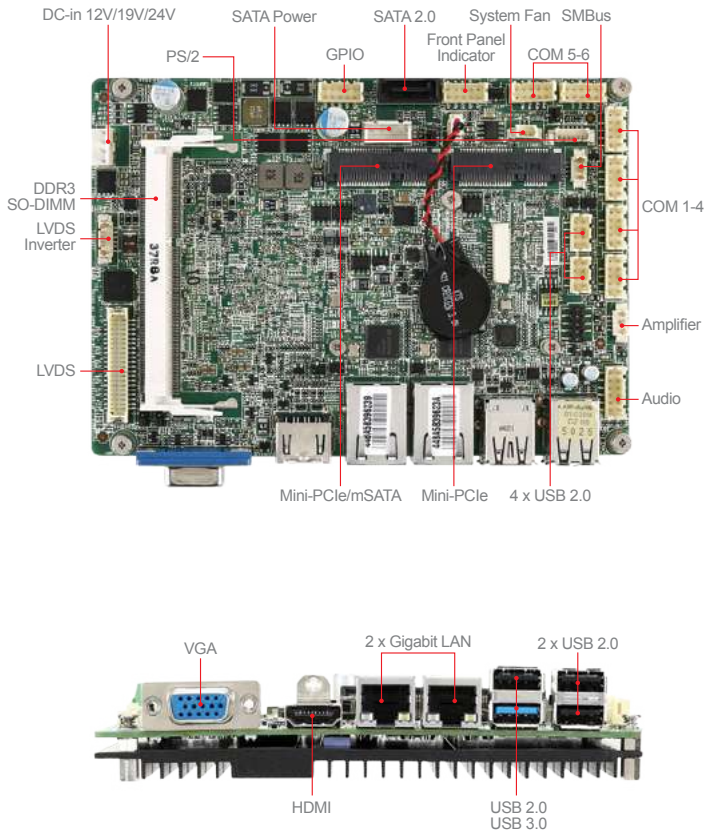
Part Number	Description	Quantity
G71-SEDC164-N56	Driver DVD	1
K10-3002145-V03	DC Power Cable, 120mm	1
K14-1009062-V03	COM Port Cable, 250mm	1
K1B-3008034-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1

## Specifications

<b>Processor</b>	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
<b>Memory</b>	Chipset	N/A
	BIOS	AMI
	Technology	Single-channel DDR3L 1333 MHz
<b>Display</b>	Max. Capacity	Up to 8GB
	Socket	1 x 204-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
<b>Ethernet</b>	LVDS	Dual channel 18/24-bit
	DVI	1 (DVI-I)
	Multiple Display	2 independent displays
	Display Interface	LVDS up to 1920 x 1200 @60Hz DVI-I up to 1920 x 1200 @60Hz
<b>Ethernet</b>	Controller	2 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	N/A
<b>I/O Interface</b>	USB	7 x USB 2.0 (4 x internal; 3 x rear) 1 x USB 3.0 (1 x 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)
<b>Expansion Slot</b>	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	M.2	N/A
<b>Storage</b>	Mini-PCIe	2 x Full-size (one w/ mSATA)
	SATA	1 x SATA 2.0
<b>Power Supply</b>	mSATA	1
	DC	DC-in 12V/19V/24V
<b>Environment</b>	ATX	N/A
	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	146 x 102mm (3.5")
	Weight	0.31 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora 20 (by request) Linux Ubuntu 13.10 (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 Processor
- DDR3L 1333 MHz SO-DIMM Memory up to 8GB
- HDMI, VGA and LVDS Displays
- Dual GbE LAN, USB 3.0 and 6 COM
- Supports dual Mini-PCIe and SATA and mSATA

## Ordering Information

Part Number	Description
919-98F6-003	MS-98F6 11 Intel Bay Trail D-J1900,DDR3L SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+ 1*SATA2.0+1*USB3.0+7*USB 2.0+6*COM,DC 12V/19V/24V
919-98F6-004	MS-98F6 11 OPT:A Intel Bay Trail M-N2930,DDR3L SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+ 1*SATA2.0+1*USB3.0+7*USB 2.0+6*COM,DC 12V/19V/24V

## Packing List

Part Number	Description	Quantity
G71-SEDC163-N56	Driver DVD	1
K10-3002145-V03	DC Power Cable, 120mm	1
K14-1009062-V03	COM Port Cable, 250mm	1
K1B-3008034-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1

## Specifications

<b>Processor</b>	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
<b>Memory</b>	BIOS	AMI
	Technology	Single-channel DDR3L 1333 MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	1 x 204-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual channel 18/24-bit
	VGA	1
	HDMI	1
<b>Ethernet</b>	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
<b>Ethernet</b>	Controller	2 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
<b>TPM</b>	Controller	N/A
<b>I/O Interface</b>	USB	7 x USB 2.0 (4 x internal; 3 x rear) 1 x USB 3.0 (1 x 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
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	2 x Full-size (one w/ mSATA)
<b>Storage</b>	SATA	1 x SATA 2.0
	mSATA	1
<b>Power Supply</b>	DC	DC-in 12V/19V/24V
	ATX	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	146 x 102mm (3.5")
	Weight	0.31 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora 20 (by request) Linux Ubuntu 13.10 (by request)

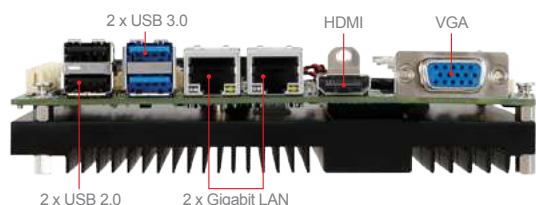
Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-M Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98F3

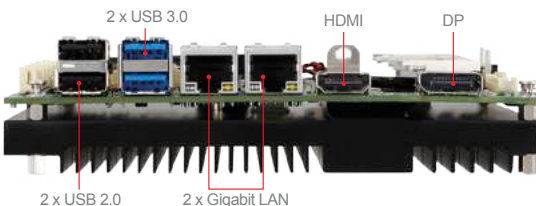
3.5" SBC with Intel® HSW/BDW ULT Series Platform for High-Performance, Low-Power & Fanless Solution



919-98F3-009/919-98F3-011/919-98F3-013  
919-98F3-014/919-98F3-016/919-98F3-017



919-98F3-015/919-98F3-018



## Features

- Intel® HSW/BDW ULT Series Processors
- Supports DDR3L 1600 MHz SO-DIMM memory up to 8GB
- HDMI and VGA/DP and LVDS display interfaces
- Dual GbE LAN, USB 3.0, and 4 COM
- Dual Mini-PCIe, dual SATA 3.0, and mSATA

## Ordering Information

Part Number	Description
919-98F3-009	MS-98F31609-98F3-110\809-98F3-008 VER11 STD Intel HSW ULT i3-4010U, DDR3 SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V
919-98F3-011	MS-98F31609-98F3-130\809-98F3-008 VER11 OPT:B Intel HSW ULT i5-4300U, DDR3 SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V
919-98F3-013	MS-98F31609-98F3-150\809-98F3-010 VER11 OPT:D Intel BDW ULT i3-5010U, DDR3 SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V
919-98F3-014	MS-98F31609-98F3-160\809-98F3-010 VER11 OPT:E Intel BDW ULT i7-5650U, DDR3 SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V
919-98F3-015	MS-98F31609-98F3-170\809-98F3-010 VER11 OPT:F Intel BDW ULT i3-5010U, DDR3 SO DIMM+DP+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V
919-98F3-016	MS-98F31609-98F3-180\809-98F3-010 VER11 OPT:G Intel BDW ULT i5-5350U, DDR3 SO DIMM+VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V
919-98F3-017	MS-98F31609-98F3-210\809-98F3-010 VER11 OPT:J Intel BDW ULT 3765U 3.5" DDR3L SO-DIMM, VGA+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB2.0+4*COM+DC-IN 12V/19V/24V, SATA CABLE+SATA POWER CABLE+USB CABLE+COM CALBE+DC POWER CABLE, CD, SINGLE
919-98F3-018	MS-98F31609-98F3-220\809-98F3-010 VER11 OPT:K Intel BDW ULT i7-5650U, DDR3 SO DIMM+DP+HDMI+LVDS+2*Mini-PCIe+2*LAN+2*SATA3.0+2*USB3.0+4*USB 2.0+4*COM,DC 12V/19V/24V

## Specifications

Processor	CPU	Intel® Core™ i5-4300U/i3-4010U Processors, DC, 15W Intel® Core™ i7-5650U/i5-5350U/i3-5010U/3765U Processors, DC, 15W
Processor	Frequency	i5-4300U, 1.9GHz, up to 2.9GHz i3-4010U, 1.7GHz i7-5650U, 2.2GHz, up to 3.1GHz i5-5350U, 1.8GHz, up to 2.9GHz i3-5010U, 2.1GHz 3765U, 1.9GHz
	L2 Cache	2MB~4MB (Depends on CPU)
	CPU Type	BGA
	Chipset	N/A
	BIOS	AMI
Memory	Technology	Single-channel for DDR3L 1600 MHz
	Max. Capacity	Up to 8GB
	Socket	1 x 204-pin SO-DIMM
Display	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual channel 18/24-bit
	VGA	1 (optional)
	HDMI	1
	DisplayPort	1 (optional)
	Multiple Display	3 independent displays
Display Interface	VGA	up to 1920 x 1200 @60Hz
	HDMI	up to 2560 x 1600 @60Hz
Ethernet	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I218-LM GbE LAN PHY
	Audio	Controller
Super I/O	Controller	Fintek F81866AD-I
H/W Monitor	Watchdog Timer	256-level Watchdog Timer
I/O Interface	USB	4 x USB 2.0 (2 x internal; 2 x rear) 2 x USB 3.0 (2 x rear with USB 2.0 signal)
	Serial	4 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2~4: RS-232, 0V/5V/12V
	PS/2	1 (pin header)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
Expansion Slot	M.2	N/A
	Mini-PCIe	1 x Full-size (w/ mSATA) 1 x Half-size
Storage	SATA	2 x SATA 3.0
	mSATA	1
Power Supply	DC	DC-in 12V/19V/24V
Environment	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	146 x 102mm (3.5")
	Weight	0.56 kg
Certification	EMC	FCC, CE, RCM, VCCI, BSMI
Software Platform	OS Support	Windows 7 (64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 19 (by request) Linux Ubuntu 13.04 (by request)

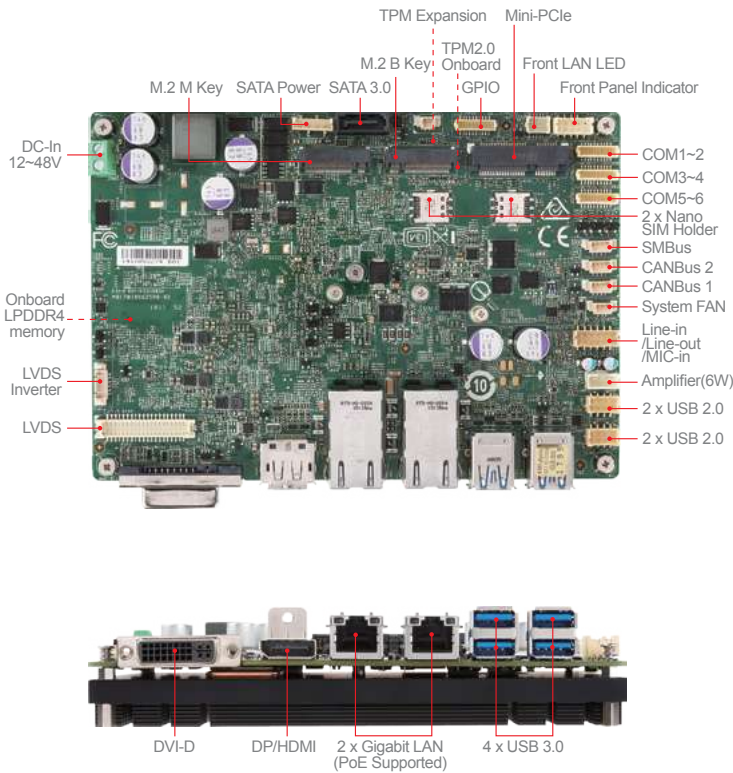
## Packing List

Part Number	Description	Quantity
G71-SEDC161-N56 (HSW ULT SKU) G71-SEDC162-N56 (BDW ULT SKU)	Driver DVD	1
K10-3002145-V03	DC Power Cable, 120mm	1
K14-1009062-V03	COM Port Cable, 250mm	1
K1B-3008034-V03	USB Cable, 150mm	1
K1D-1012064-V03	SATA Cable with Power, 200mm	1
K1D-3008006-V03	SATA Cable, 300mm	1

# MS-98H5

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

NEW



## Features

- Supports Dual GbE LAN with IEEE PoE 802.3af & 2 channel CANBus 2.0B
- Supports 3 independent displays : DVI-D, HDMI (Co-Lay DP) & LVDS
- Supports LPDDR4 2133/2400 MHz onboard memory up to 4GB(8GB by option)
- Supports 4 USB 3.0, 4 USB 2.0 & 6 COM ports (all with power)
- Mini-PCle & M.2 B Key 2242/3042 with NANO SIM-Holder , SATA 3.0, M.2 M Key 2242 for storage
- Apollo Lake-I Series support wide operating temperature : -40 ~ 85°C
- Supports wide voltage 12~48V for in-vehicle application
- Compact design for anti-vibration devices in harsh environments

## Ordering Information

Part Number	Description
919-98H5-002	MS-98H5/609-98H5-020/809-98H5-005 VER:11 OPT B,4 Inches, Intel Apollo Lake-I E3940, 4GB LPDDR4,4*USB3.0 +46*UCS0BM2+.0HDMI+DVI+2* I210 LAN with POE+1*LVDS+1*mini-PCle +1*SATA,2*M.2,2*CANBUS DC12~48V,WT for channel

## Packing List

Part Number	Description	Quantity
K1B-3008034-V03	USB Cable, 150mm	1
K14-3018001-V03	COM Cable, 150mm	1
K1G-3002031-V03	DC Power Cable, 150mm	1
K1D-3012023-V03	SATA Cable with Power, 230mm	1
G71-SEDC195-N56	Driver CD	1

## Specifications

<b>Processor</b>	CPU	Intel® Atom™ x7 Processor E3950, QC, 12W Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5W	
	Frequency	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	
<b>Memory</b>	Chipset	Integrated in SoC	
	BIOS	AMI	
	Technology	Single-channel LPDDR4 2133/2400MHz	
	Max. Capacity	Up to 4 GB (8GB by option)	
<b>Display</b>	Socket	Onboard	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	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	
<b>Display Interface</b>	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		
	2 x Intel® I210-IT GbE LAN (W/ PoE IEEE 802.3af)		
<b>Ethernet</b>	Controller	(W/ PoE IEEE 802.3af)	
<b>Audio</b>	Controller	Fintek F81867D-I	
<b>Super I/O</b>	Controller	Watchdog Timer	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>TPM</b>	Controller	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)	Infineon SLB9665XT 2.0 (Default)
	USB	4 x USB 3.0 (rear) 4 x USB 2.0 (internal)	
<b>I/O Interface</b>	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	
	PCIe x 16	N/A	
	PCIe x 4	N/A	
<b>Expansion Slot</b>	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	
	Mini-PCle	1 x Full-size (w/ SIM holder)	
<b>Storage</b>	SATA	1 x SATA 3.0	
	IDE	N/A	
	eSATA	N/A	
	CFast	N/A	
	mSATA	N/A	
	CompactFlash	N/A	
<b>Power Supply</b>	DC	DC-in 12V~48V	
	ATX	N/A	
<b>Environment</b>	Operating Temperature	-40 ~ 85°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-40 ~ 85°C	
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions	165 x 115mm (EPIC)	
	Weight	0.42 kg	0.67 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	

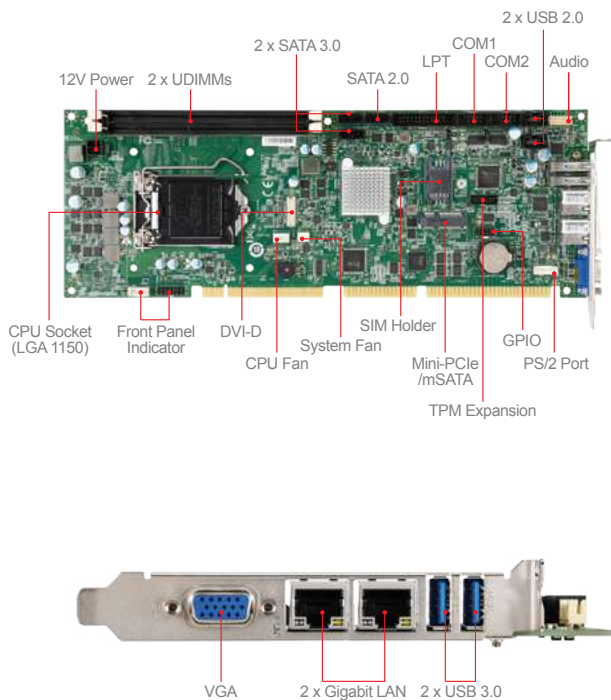
## Optional Item

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

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98G7

PICMG 1.0 SBC with 4th Gen Intel® Desktop Haswell/Haswell Refresh Platform for High-Performance Solution



## Features

- Intel® Desktop Haswell & Haswell Refresh Core™ i7/i5/i3/ Pentium®/Celeron® Processor
- Dual-channel DDR3/DDR3L 1333/1600MHz
- 2 independent displays: VGA and DVI-D
- 2 Intel® GbE LAN, 2 COM with power, 2 USB 3.0, 4 USB 2.0
- 2 SATA 3.0, SATA 2.0, mSATA

## Ordering Information

Part Number	Description
919-98G7-106	MS-98G7 11 OPT:C Intel Haswell Processor+Intel H81, 2*DDR3 UDIMM, VGA, DVI-D, 3*SATA, 2*LAN, 6*USB, 2*COM, m-SATA, 1 x Mini-PCIe, 1*SIM Holder, ATX power

## Packing List

Part Number	Description
Bulk Packing	N/A

## Optional Item

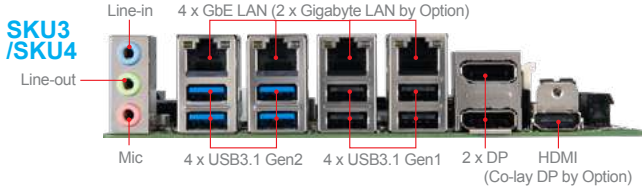
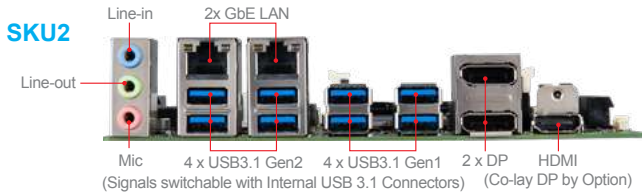
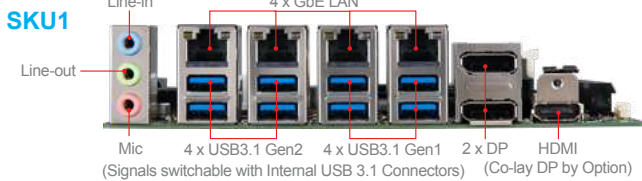
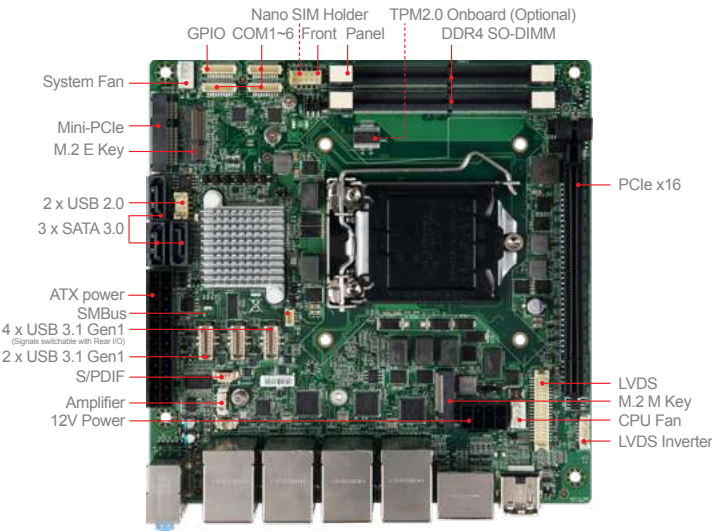
Part Number	Description	Quantity
K1D-1008261-V03	SATA 3.0 Cable, 500mm	1
K18-1025011-V03	Parallel Cable, 300mm	1
K1B-3008034-V03	USB 2.0 Cable, 150mm	1

## Specifications

<b>Processor</b>	CPU	4th Gen Intel® Desktop Haswell/Haswell refresh Core™ i7/i5/i3/Pentium/Celeron Processor, Max. 95W
	Frequency	2.4GHz~4.0GHz (Depends on CPU)
	L2 Cache	2M~8M (Depends on CPU)
	CPU Type	Socket (LGA 1150)
	Chipset	Intel® H81
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3/DDR3L 1333/1600MHz
	Max. Capacity	Up to 16GB
<b>Display</b>	Socket	2 x 240-pin UDIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	VGA	1
	DVI	1 (DVI-D, pin-header)
<b>Ethernet</b>	Multiple Display	2 independent displays
	Display Interface	VGA up to 1920 x 1200 @60Hz DVI-D up to 1920 x 1200 @60Hz
	Controller	1 x Intel® I210-AT GbE LAN 1 x Intel® I217-LM GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	2 x USB 3.0 (rear) 4 x USB 2.0 (internal)
	Serial	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, 0V/5V/12V
	Parallel	1
	PS/2	1 (wafer connector)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	1 x Full-size (w/ mSATA)
<b>Storage</b>	SATA	2 x SATA 3.0 1 x SATA 2.0
	mSATA	1
<b>Power Supply</b>	ATX	ATX/AT-Power 12V-4P, power from PICMG1.0 backplane
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	338 x 122mm (PICMG 1.0)
	Weight	0.40 kg
<b>Certification</b>	EMC	FCC, CE
<b>Software Platform</b>	OS Support	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit) Linux Fedora 19 (by request) Linux Ubuntu 10.04 (by request)

# MS-98L1

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



## Features

- Intel® Coffee Lake-S & Coffee Lake Refresh-S Series CPU to maximize performance
- Support 3 or 2 independent displays with Dual DP, HDMI (DP by option) & LVDS
- Support maximum 4 Intel® GbE LAN & AMT 12.x
- Support 3 SATA-3.0 ports, M.2 M key 2242/2280 for storage & RAID 0/1/5/10 (RAID 10 Configured with M.2 M Key)
- Support maximum 4 USB 3.1 Gen2, 6 USB3.1 Gen1 (4 rear, Signal Share with Internal Box Header; 2 internal) & 2 USB 2.0 ports
- Support 6 COM ports (2 RS-232/422/485 or 6 RS-232/422/485 by option), SMBus & 16Bit DIO for flexible applications
- Support 1 PCIe x16 Slot, M.2 M key 2230 with CNVi & Mini-PCle slot with SIM Holder

## Ordering Information

Part Number	Description
919-98L1-005	MS-98L1 10 Intel® CLF-S & CFLR-S C246 2*DDR4 SO-DIMM, 4*LAN, 2*DP, 1*HDMI, 1*LVDS, 3*SATA-3.0, 2*M.2, 1*PCIe x16, 1*Mini PCIe, 6*COM, 12*USB (4*USB 3.1 Gen2), ATX Power
919-98L1-006	MS-98L1 10 OPT.A Intel® CLF-S & CFLR-S Q370 2*DDR4 SO-DIMM, 2*LAN, 2*DP, 1*HDMI, 1*LVDS, 3*SATA-3.0, 2*M.2, 1*PCIe x16, 1*Mini PCIe, 6*COM, 12*USB (4*USB 3.1 Gen2), ATX Power

## Specifications

		SKU1	SKU2	SKU3	SKU4	
<b>System Processor</b>	CPU	8th Gen Intel® Desktop Coffee Lake-S Xeon®/i7/i5/i3/Pentium®/Celeron® Series Processor, Max 95W 9th Gen Intel® Desktop Embedded IOTG Coffee Lake-S Refresh Xeon®/i7/i5/i3 Series 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		
	BIOS	AMI UEFI				
<b>Memory</b>	Technology	Dual-channel DDR4 (ECC/ non-ECC) 2666MHz				
	Max. Capacity	Up to 32 GB				
	Socket	2 x 260-pin DDR4 SO-DIMMs				
	Controller	Intel® HD Graphics				
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM				
	LVDS	1 x Dual channel 18/24-bit	N/A			
<b>Display</b>	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		
	<b>Ethernet</b>	Controller	1 x Intel® I219-LM GbE LAN PHY	1 x Intel® I219-LM GbE LAN PHY	1 x Intel® I219-LM GbE LAN PHY	1 x Intel® I219-LM GbE LAN PHY
			3 x Intel® I210-AT GbE LAN	1 x Intel® I210-AT GbE LAN	3 x Intel® I211-AT GbE LAN	1 x Intel® I211-AT GbE LAN
<b>Audio</b>						
Controller						
<b>Super I/O</b>		Controller				
Controller		Fintek F81866AD-1				
<b>H/W Monitor</b>		Watchdog Timer				
Smart Fan		Yes				
<b>TPM</b>		Controller				
		Box header (Default) Infineon SLB9665TT2.0 (by BOM option)				
<b>I/O Interfaces</b>	USB	4 x USB 3.1 Gen2 (4 x rear) 6 x USB 3.1 Gen1 (4 x rear, Signal Share with Internal Box Header; 2 x internal) 2 x USB 2.0 (2 x internal)		4 x USB 3.1 Gen1 (4 x rear) 4 x USB 2.0 (4 x rear)		
		6 x COM ports COM1: RS-232/422/485, R1/5V/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, R1/5V/12V, Auto-flow Control COM2: RS-232, 0V/5V/12V (RS-232/422/485 by option)		
	Serial	2 x COM ports COM1: RS-232/422/485, R1/5V/12V, Auto-flow Control COM2: RS-232, 0V/5V/12V (RS-232/422/485 by option)		2 x COM ports COM1: RS-232/422/485, R1/5V/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				
<b>Expansion Slot</b>	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-PCle	1 x Full-size (w/SIM holder)		1 x Full-size		
<b>Storage</b>		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)		
<b>Power Supply</b>		AC Input				
		ATX-Power 24P, 12V-8P				
<b>Environment</b>	Operating Temperature	-10 ~ 60°C				
	Operating Humidity	10 ~ 90%, non-condensing				
	Storage Temperature	-20 ~ 80°C				
	Storage Humidity	10 ~ 90%, non-condensing				
<b>Form Factor</b>		Dimensions (W x D x H)				
		170 x 170mm (Mini-ITX)				
		Weight	0.405 kg	0.375 kg	0.39 kg	0.375 kg
<b>Certification</b>		EMC				
		CE, FCC Class B, BSMI, RCM, VCCI				
<b>Software Platform</b>		OS Support				
		Windows 10 (64-bit) Linux Kernel 4.x (by request)				

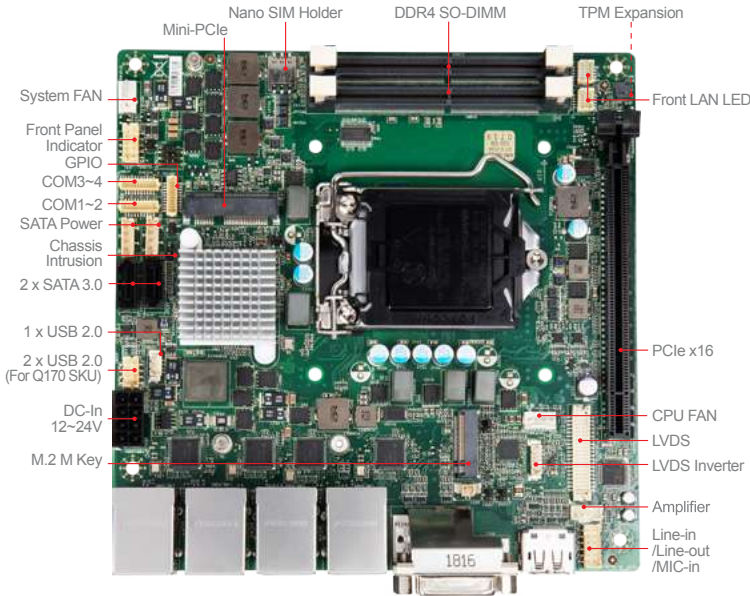
## Optional Item

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

# MS-98K1

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

NEW



## Specifications

<b>System Processor</b>	CPU	SKU1 7th Gen Intel® Desktop Kaby Lake-S i7-7700/i7-7700T/i5-7500/i5-7500T/i3-7101E/i3-7101TE, Max 65W SKU2 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	
<b>Memory</b>	BIOS	AMI		
	Technology	Dual-channel DDR4 (non-ECC) 2133MHz/2400MHz		
	Max. Capacity	Up to 32 GB		
<b>Display</b>	Socket	2 x 280-pin SO-DIMMs		
	Controller	Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	LVDS	1 x Dual channel 18/24-bit		
	DVI	2 (DVI-D)		
<b>Ethernet</b>	HDMI	1 (Co-lay with DP by Optional)		
	DisplayPort	1		
	Multiple Display	3 independent displays	2 independent displays	
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec		
	Watchdog Timer	256-level Watchdog Timer		
<b>H/W Monitor</b>	Smart Fan	Yes		
	USB	8 x USB3.0 (rear) 3 x USB2.0 (internal)	4 x USB3.0 (rear) 5 x USB2.0 (4 x rear; 1 x internal)	
<b>I/O Interfaces</b>	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)	
<b>Expansion Slot</b>	PCIe x16	1 (Maximum 75W Supported)		
	M.2	1 x M Key (PCIe x4 NVMe, SATA3.0), 2242/2280	1 x M Key (SATA3.0), 2242/2280	
	Mini-PCle	1 x Full-size (w/ SIM holder)		
<b>Storage</b>	SATA	2 x SATA 3.0		
	DC Input	DC-in 12 ~24V		
<b>Power Supply</b>	AC Input	N/A		
	Operating Temperature	-10 ~ 60°C		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing		
	Dimensions (W x D x H)	170 x 170mm (Mini-ITX)		
	Weight	0.42 kg	0.42 kg	0.39 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI (Class A)		
	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) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		

## Features

- 3 or 2 independent displays with multiple video outputs(2 DVI-D, DP/HDMI, LVDS)
- Supports maximum 4 Intel® GbE LAN
- Supports DDR4-2400MHz SO-DIMM memory up to 32GB
- Supports 2 SATA 3.0 ports, M.2 M Key 2242/2280 for storage
- Supports PCIe x16, and Mini-PCle slot with SIM Holder
- Supports maximum 8 USB 3.0 ports, 4 COM ports & 16Bit GPIO
- Supports wide voltage DC-in 12~24V

## Ordering Information

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

## Packing List

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

## Optional Item

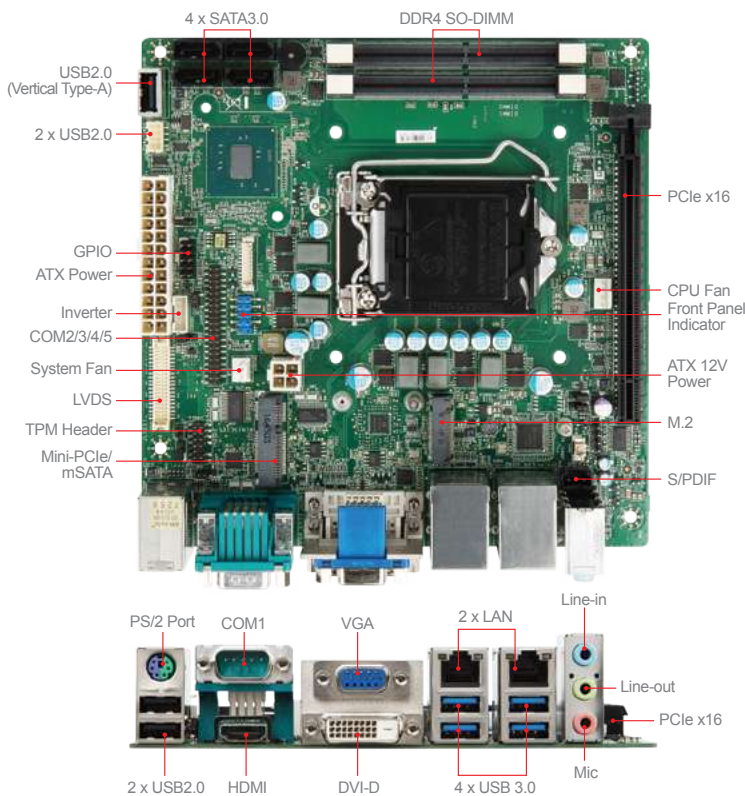
Part Number	Description
Please check MSI IPC website at <a href="http://ipc.msi.com">http://ipc.msi.com</a> for details.	



# MS-98E1

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

NEW



## Features

- 3 independent displays with multiple video outputs (LVDS, HDMI, DVI-D, VGA)
- Supports DirectX 11.1 and Intel® Clear Video Technology (up to 1080P)
- 4 SATA 3.0 ports for RAID
- Supports m-SATA function by Mini-PCle slot
- Plenty USB ports for more peripherals(USB3.0\*4, USB2.0\*4, Vertical Type USB2.0\*1)
- 2 independent displays with multiple video outputs (LVDS, HDMI, DVI-D, VGA)
- Supports DirectX 11.1 and Intel® Clear Video Technology (up to 1080P)
- 3 SATA 3.0 ports for faster and high-capacity storage
- Supports m-SATA function by Mini-PCle slot
- Plenty USB ports for more peripherals(USB3.0\*4, USB2.0\*4, Vertical Type USB2.0\*1)

## 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

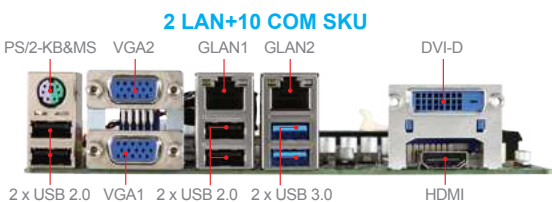
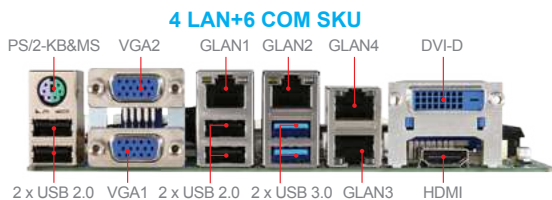
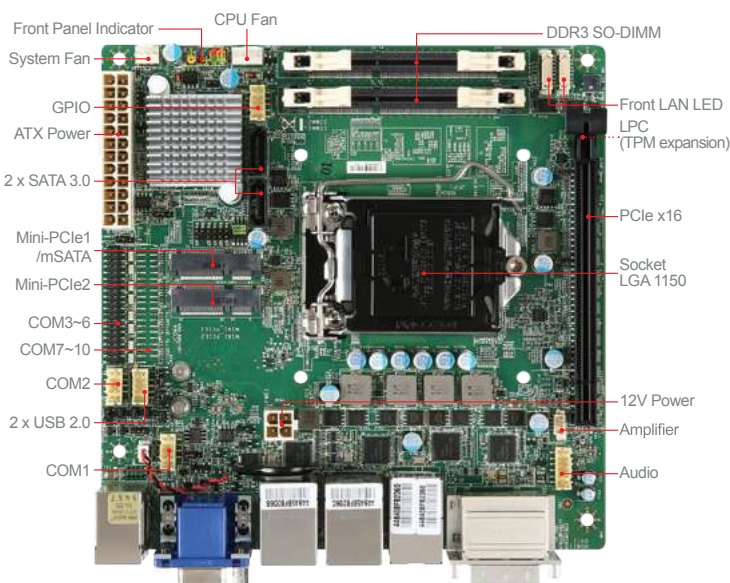
## Specifications

		C236 SKU	H110 SKU
		<b>Processor</b>	
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
BIOS		AMI	
<b>Memory</b>		Technology Dual-channel DDR4 (ECC) 2133MHz/2400MHz (7th Gen)	Dual-channel DDR4 (non-ECC) 2133MHz/2400MHz (7th Gen)
Max. Capacity		Up to 32GB	
Socket		2 x 260-pin SO-DIMMs	
Controller		Intel® HD Graphics	
Graphic Memory		Shared system memory up to 1.7 GB SDRAM	
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	
<b>Ethernet</b>		Controller 1 x Intel® I219-LM GbE-PHY 1 x Intel® I211-AT PCIe GbE LAN(Co-layer I210-AT)	
<b>Audio</b>		Controller Realtek® ALC887 HD Audio Codec	
<b>Super I/O</b>		Controller Fintek F81866AD-I	
<b>H/W Monitor</b>		Watchdog Timer Smart Fan 256-level Watchdog Timer Yes	
<b>TPM</b>		Controller Pin header	
<b>I/O Interface</b>		USB 4 x USB 3.0 (4 x rear) 4 x USB 2.0 (2 x rear; 2 x internal) 1 x USB 2.0 (Vertical, internal)	
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	
<b>Expansion Slot</b>		PCIe x 16 1	
M.2		1 x M Key ( PCIe x4, SATA3.0), 2242	N/A
Mini-PCle		1 x Full-size, mSATA	
<b>Storage</b>		SATA 4 x SATA 3.0	3 x SATA 3.0
mSATA		1 (shared w/ Mini-PCle)	
<b>Power Supply</b>		DC N/A	
ATX		ATX-Power 24P, 12V-4P	
<b>Environment</b>		Operating Temperature 0 ~ 60°C	
Operating Humidity		10 ~ 90%, non-condensing	
Storage Temperature		-20 ~ 80°C	
Storage Humidity		10 ~ 90%, non-condensing	
<b>Form Factor</b>		Dimensions 170 x 170mm (Mini-ITX)	
Weight		0.37 kg	
<b>Certification</b>		EMC FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>		OS Support Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)	

Industrial Computer  
COM Express Board  
Open Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98H1

Mini-ITX with 4th Gen Intel® Desktop Haswell/Haswell Refresh Platform for 4 GLAN, 10 COM & 3 Independent Displays



## Features

- Intel® Desktop Haswell & Haswell Refresh Core™ i7/i5/i3/ Pentium®/Celeron® Processor
- Supports 4 Intel® GbE LAN
- 3 or 2 independent displays with dual VGA, DVI-D, and HDMI outputs
- Support 10 COM ports (all with power)
- 2 SATA 3.0, 8 USB ports, 1 PCIe x16 and 2 Mini-PCle

## Ordering Information

Part Number	Description
919-98H1-101	MS-98H1 V1.0 Mini-ITX, Intel Haswell Processor+Intel H81,2*DDR3/DDR3L SO-DIMM+1*DVI-D+1*HDMI+2*VGA+4*GbE LAN+6*COM+8*USB Port ,ATX power
919-98H1-102	MS-98H1 V1.0 Mini-ITX, Intel Haswell Processor+Intel H81,2* DDR3/DDR3L SO-DIMM+1*DVI-D+1*HDMI+2*VGA+2*GbE LAN+10*COM+8*USB Port ,ATX power
919-98H1-103	MS-98H1 V1.0 Mini-ITX, Intel Haswell Processor+Intel Q87,2* DDR3/DDR3L SO-DIMM+1*DVI-D+1*HDMI+2*VGA+2*GbE LAN+10*COM+8x USB Port ,ATX power

## Packing List

Part Number	Description	Quantity
E21-98H10X0-C22	I/O SHEILDING	1

## Specifications

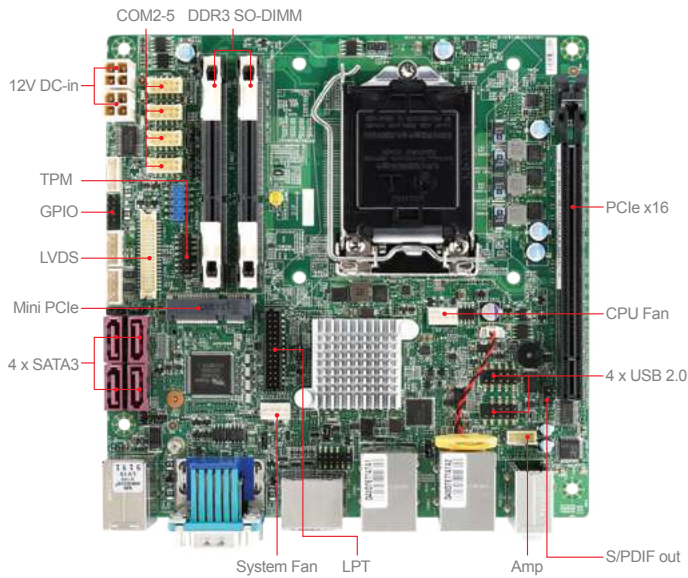
<b>Processor</b>	CPU	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/ Pentium® Processor, Max. 95W	
	Frequency	2.4GHz~4.0 GHz (Depends on CPU)	
	L2 Cache	2M~8M (Depends on CPU)	
	CPU Type	Socket (LGA 1150)	
	Chipset	Intel® Q87/H81 Express	
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR3/DDR3L 1066/1333/1600MHz	
	Max. Capacity	Up to 16GB	
<b>Display</b>	Socket	2 x 204-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	VGA	2	
	DVI	1 (DVI-D)	
	HDMI	1	
	Multiple Display	3 independent displays (Q87 SKU) 2 independent displays (H81 SKU)	
	Display Interface	VGA1 up to 1920 x 1080 @60Hz VGA2 up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz HDMI up to 1920 x 1200 @60Hz	
	<b>Ethernet</b>	Controller	4 x Intel® I210-AT GbE LAN 2 x Intel® I211-AT GbE LAN (depends on SKU)
		Audio	Controller: Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866D	
	Watchdog Timer	256-level Watchdog Timer	
<b>H/W Monitor</b>	Smart Fan	Yes	
	TPM	Controller: Pin header	
<b>I/O Interface</b>	USB	2 x USB 3.0 (rear) 4 x USB 2.0 (2 x rear; 2 x internal)	
	Serial	10 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V COM3-6: RS-232, 0V/5V/12V COM7-10: RS-232, 0V/5V/12V (depends on SKU)	
	Parallel	N/A	
	PS/2	1	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	
	<b>Expansion Slot</b>	PCIe x16	1
		M.2	N/A
Mini-PCle		1 x Full-size(W/ mSATA) 1 x Half-size	
<b>Storage</b>	SATA	2 x SATA 3.0	
	mSATA	1 (shared w/ Mini-PCle)	
<b>Power Supply</b>	DC	N/A	
	ATX	ATX-Power 24P, 12V-4P	
<b>Environment</b>	Operating Temperature	-10 ~ 60°C	
	Operating Humidity	10~90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10~90%, non-condensing	
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)	
	Weight	0.37 kg	
<b>Certification</b>	EMC	FCC Class A, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8/8.1 (32/64-bit) Windows 10 (64-bit) Linux Fedora 19 (by request) Linux Ubuntu 13.04 (by request)	

## Optional Item

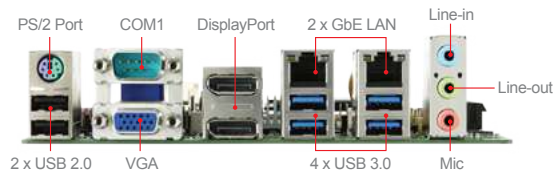
Part Number	Description
K14-1036004-V03	COM Port Cable, 200mm

# MS-98C7

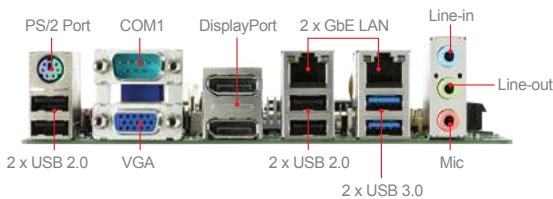
Mini-ITX with 4th Gen Intel® Haswell/Haswell Refresh Platform for Multi-Displays & High-Performance Solution



## MS-98C7 with Q87



## MS-98C7 with H81



## Features

- 4th Gen Intel® Core™ i7/i5/i3/Celeron®/Pentium® processors (formerly Haswell) w/ Intel® H81/Q87 chipset
- 3 independent displays: VGA, LVDS and dual DisplayPorts
- Supports DDR3\DDR3L memory up to 16GB
- Supports dual Intel® GbE LAN

## Ordering Information

Part Number	Description
919-98C7-005	MS-98C7 10 Mini-ITX, Q87, Haswell Mbl, 2x DDR3 SO-DIMM, LVDSx1/VGAx1/DPx2, 4x SATA III, 2x GbE LAN, 10x USB, 5x COM DC Power (ROHS)
919-98C7-006	MS-98C7 10 OPT A Mini-ITX, H81, Haswell Mbl, 2x DDR3 SO-DIMM, LVDSx1/VGAx1/DPx2, 2x SATA III, 1x SATA II, 2x GbE LAN, 8x USB, 5x COM DC Power (ROHS)

## Packing List

Part Number	Description
E21-98C7010-C22	I/O shield
K14-1018003-V03	INT COM PORT CABLE, 300mm
K1D-1008261-V03	INT SATA CABLE, 500mm
K1D-3008006-V03	INT SATA CABLE, POWER, 200/300mm
K39-3002004-E06	EXT OTHER CABLE, PS2 Y-CABLE/2/190mm

## Specifications

<b>Processor</b>	CPU	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/ Pentium® Processor, Max. 65W
	Frequency	2.2GHz~4.4GHz (Depends on CPU)
	L2 Cache	2M ~ 8M (Depends on CPU)
	CPU Type	Socket (LGA 1150)
	Chipset	Intel® H81/Q87 Express
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3/DDR3L 1333/1600MHz
<b>Memory</b>	Max. Capacity	Up to 16GB
	Socket	2 x 204-pin SO-DIMMs
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual channel 24-bit (add chrontel 7511B chipset)
	VGA	1
	DisplayPort	2
	Multiple Display	2 independent displays (H81 SKU) 3 independent displays (Q87 SKU)
	Display Interface	LVDS up to 1920 x 1200 @60Hz VGA up to 1920 x 1200 @60Hz DP up to 3840 x 2160 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I217-LM GbE PHY (iAMT 9.0 supported) 1 x Intel® I210-AT PCIe GbE LAN
	Controller	Realtek® ALC887 HD Audio Codec
<b>Audio Super I/O</b>	Controller	Fintek F81866D
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	Q87: 6 x USB 2.0 (4 x internal; 2 x rear); 4 x USB 3.0 (rear) H81: 6 x USB 2.0 (2 x internal; 4 x rear); 2 x USB 3.0 (rear)
	Serial	5 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232, w/ WOR function COM3~5: RS-232, 0V/5V/12V
	Parallel	1 (Pin header)
	PS/2	1
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
<b>Expansion Slot</b>	PCIe x16	1 (up to 75W)
	M.2	N/A
	Mini-PCIe	1 x Full-size(W/ mSATA) 1 x Half-size
<b>Storage</b>	SATA	Q87: 4 x SATA 3.0 H81: 2 x SATA 3.0; 1 x SATA 2.0
	mSATA	1 (shared w/ Mini-PCIe)
<b>Power Supply</b>	DC	DC-in 12V
	ATX	N/A
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)
	Weight	0.37 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit) Linux Fedora 19 (by request)

## Optional Item

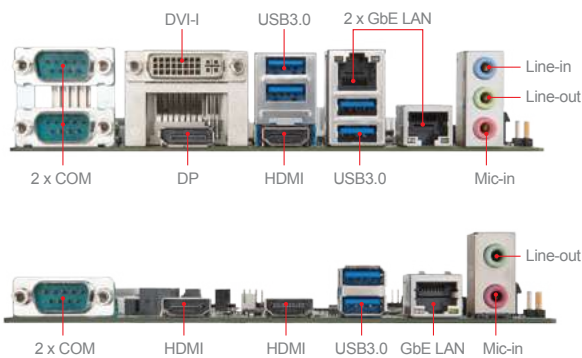
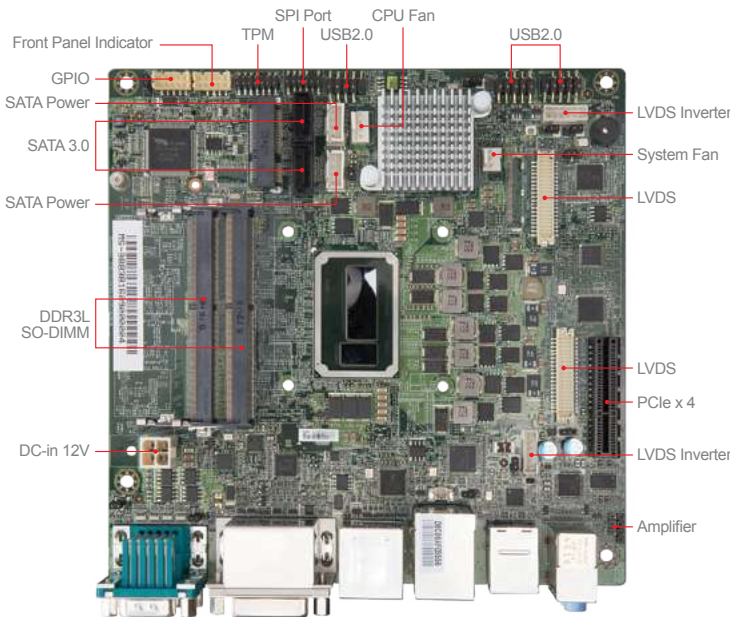
Part Number	Description
K10-3004215-V03	DC-In Cable, 160mm
K1B-3008012-E06	USB 2.0 Cable, 330mm

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM

# MS-98B3

Mini-ITX SBC with Intel® Skylake/Kaby Lake for Multi Displays and High Graphic Performance Solutions

NEW



## Features

- Embedded Motherboard for high graphic performance application, medical, gaming or high-end digital signage
- Supports Intel® Skylake/Kaby Lake Mobile H Core™ i series & equip Intel® GT4e graphic engine by CPU SKU, up to 45 W
- Full HW decode & encode HEVC H.265 high-efficient video media
- Supports 2 x DDR4, 1866/2133 MHz memory up to 32GB, ECC by SKU with CM236 PCH
- Multi displays support up to 4K/2K HD resolution, 60Hz
- Supports dual GbE LAN, iAMT 11.0 (Intel IOTG Core i5/i7 CPU + QM170/CM236)
- Supports 1xPCIe(x4), 6xUSB2.0, 4xUSB3.0, 2xRS-232/422/485, 2xSATA3.0, 2xmini-PCIe

## Ordering Information

Part Number	Description
Coming soon	

## Packing List

Part Number	Description	Quantity
Coming soon		

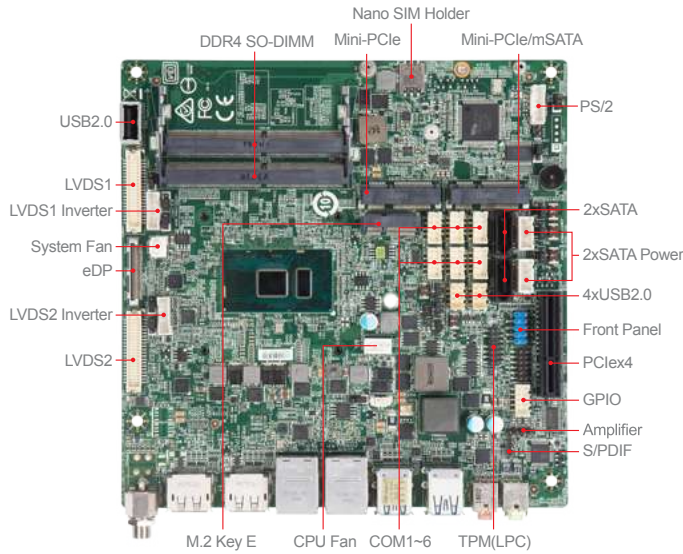
## Specifications

<b>Processor</b>	CPU	6th/7th Gen Intel® Mobile-H Kaby Lake/Skylake Core™ Xeon® / Core™ i7/i5/i3/Celeron® Processor, Max. 45W	
	Frequency	2.3GHz~3.9 GHz (Depends on CPU)	
	L2 Cache	3M~8M (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Intel® HM170/QM170/CM236 Express	
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR4 1866/2133 MHz	
	Max. Capacity	Up to 32GB	
<b>Display</b>	Socket	2 x 260-pin SO-DIMMs	
	Controller	Intel® IrisTM Graphics/HD Graphics (depends on CPU)	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	LVDS	2 x Dual channel 24-bit ( LVDS1 co-design with eDP, LVDS2 co-design with DVI-D)	
	eDP	1	
	DVI	1 (DVI-I)	N/A
	HDMI	2(1 x HDMI2.0, 1 x HDMI1.4 colay with DP)	
	DisplayPort	1(Colay with HDMI1.4)	
	Multiple Display	3 independent displays	
	<b>Display Interface</b>	Controller	LVDS up to 1920 x 1200 @60Hz
eDP up to 4096 x 2160 @60Hz			eDP up to 4096 x 2160 @60Hz
<b>Ethernet</b>	Controller	DP up to 4096 x 2160 @60Hz	DP up to 4096 x 2160 @60Hz
		HDMI up to 4096 x 2160 @60Hz	HDMI up to 4096 x 2160 @60Hz
<b>Ethernet</b>	Controller	DVI up to 1920 x 1200 @60Hz	DVI up to 1920 x 1200 @60Hz
		Intel® I219-LM LAN PHY	Intel® I219-LM LAN PHY
<b>Ethernet</b>	Controller	Intel® I210 colay	Intel® I210 colay
		I211 LAN	I211 LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio (co-lay ALC888)	
<b>Super I/O</b>	Controller	Fintek F81866AD-I	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>TPM</b>	Controller	Pin header(default)	
		TPM2.0 infineon SLB 9665( By BOM option)	
<b>I/O Interface</b>	USB	4 x USB3.0 (rear)	2 x USB3.0 (rear)
		6 x USB2.0 (internal)	6 x USB2.0 (internal)
	Serial	2 x COM ports (rear)	1 x COM port (rear)
		RS-232/422/485, 0V/5V/12V	RS-232/422/485, 0V/5V/12V
		PS/2	N/A
<b>Expansion Slot</b>	GPIO	8-bits (4 x GPI; 4 x GPO),5V	
	PCIe x4	1	
	PCI	N/A	
	M.2	N/A	
<b>Storage</b>	Mini-PCIe	1 x Full-size colay mSATA	
		1 x Half-size	
<b>Storage</b>	SATA	2 x SATA3.0	
	mSATA	1 (Support by mini PCIe slot )	
<b>Power Supply</b>	DC	DC-in 12V	
	ATX	N/A	
<b>Environment</b>	Operating Temperature	0 ~ 60°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions	170 x 170mm (Mini-ITX)	
<b>Certification</b>	Weight	0.37 kg	
	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit)	
		Windows 8.1 (64-bit)	
		Windows 10 (64-bit)	
		Linux Kernel 4.4	

# MS-98J4

Mini-ITX with Intel® Kaby Lake/Skylake ULT Platform for Low Power, Low Profile, Multi-Displays and High Performance Solutions

NEW



## SKU1: 2HDMI



## SKU2: 2DP



## SKU3: 1DP



## Features

- Intel® Kaby Lake-U & Skylake-U (TDP-15W), Dual Core/Quad Core
- Support 2\*DDR4 SO-DIMM up to 32GB 2133MHz Memory
- 3 independent displays with 2 x LVDS available (DP/HDMI, LVDS/DP/HDMI2.0, eDP/LVDS)
- Support 2 x Intel GbE LAN, 4 x USB 3.0, 5 x USB 2.0, 6 x COM (w/ Power)
- Support 2\*SATA3.0, 1\*M.2 (M key), 1\*M.2 (E key), 2\*Mini-PCIe Full-size Slots (one shared mSATA; one w/SIM holder)
- Support DC-In 12V~24V (OVP & OCP)
- Support TPM2.0
- Low profile design, optional support low profile thermal solution

## Ordering Information

Part Number	Description
919-98J4-101	MS-98J4\609-98J4-030\809-98J4-105 VER:1.0 OPT:C, Mini-ITX, KabyLake Core i5-8250U, 2*DDR4, 1*PCIE4, 2*HDMI, 2*LVDS, 1*eDP, 5*USB2, 4*USB3, 4*COM, 2*Mini-PCIe, 1*M.2 E Key, 1*M.2 M Key, 2*LAN, 2*SATA, DC Jack, 1*SATA CABLE, I/O SHIELD, DRIVER CD, BULK, For Channel
919-98J4-102	MS-98J4\609-98J4-010\809-98J4-106 VER:1.0 OPT:A, Mini-ITX, KabyLake Core i5-7300U, 2*DDR4, 1*PCIE4, 2*DP, 2*LVDS, 1*eDP, 5*USB2, 4*USB3, 4*COM, 2*Mini-PCIe, 1*M.2 E Key, 1*M.2 M Key, 2*LAN, 2*SATA, DC Jack, 1*SATA CABLE, I/O SHIELD, DRIVER CD, BULK, For Channel
919-98J4-103	MS-98J4\609-98J4-020\809-98J4-107 VER:1.0 OPT:B, Mini-ITX, Skylake Core i3-6100U, 2*DDR4, 1*DP, 2*LVDS, 4*USB2, 4*USB3, 2*COM, 2*Mini-PCIe, 1*M.2 E Key, 1*LAN, 2*SATA, DC CONN, 1*SATA CABLE, 1*POWER CABLE, I/O SHIELD, DRIVER CD, BULK, For Channel

## Packing List

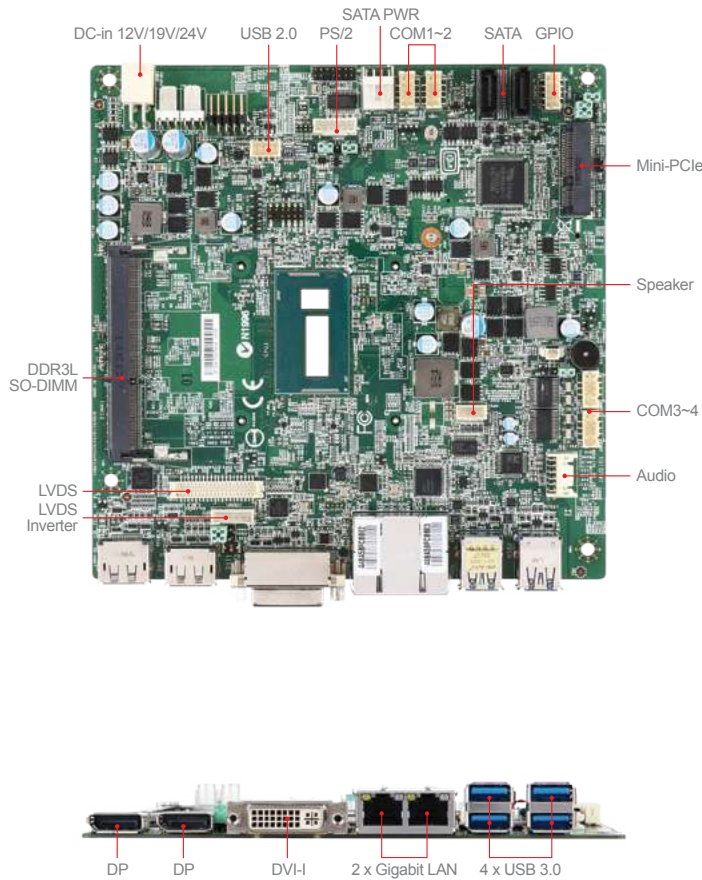
Part Number	Description
K1D-1012064-V03	SATA Cable ,200mm
K10-3004215-V03	DC Power Cable, 160mm
E21-98J4010-C22	I/O Shield(SKU1, 2xHDMI)
E21-98J4020-C22	I/O Shield(SKU2, 2xDP)
E21-98J4030-C22	I/O Shield(SKU3, 1xDP)
G71-SEDC188-N56/X03	Driver CD

## Specifications

<b>Processor</b>	CPU	7th/6th Gen Intel® Mobile Kaby Lake/Skylake-ULT Core™ i7/i5/i3/Celeron® Processor,DC/ QC, Max. 15W	
	Frequency	Depends on CPU	
	L2 Cache	Depends on CPU	
	CPU Type	BGA	
	Chipset	Integrated	
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR4 2133 MHz SDRAM	
	Max. Capacity	Up to 32GB	
	Socket	2 x 260-pin SO-DIMMs	
<b>Display</b>	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	LVDS	2 x Dual channel 24-bit (LVDS1 co-design with eDP, LVDS2 co-design with DP2/HDMI2.0)	
	eDP	1 (Co-design with LVDS1)	
	VGA	N/A	
	DVI	N/A	
	HDMI	2 (1 x HDMI1.4 colay with DP1, 1 x HDMI2.0 colay with DP2)	
	DisplayPort	2 (DP1 colay with HDMI1.4, DP2 colay with HDMI2.0)	
	Multiple Display	3 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60Hz eDP up to 4096 x 2304 @60Hz DP up to 4096 x 2304 @60Hz HDMI up to 4096 x 2160 @60Hz	
<b>Ethernet</b>	Controller	1 x Intel® I219LM GbE LAN PHY 1 x Intel® I211-AT/ I210-AT GbE LAN	1 x Intel® I211-AT GbE LAN
	Controller	Realtek® ALC887/888S HD Audio Codec	
<b>Audio</b>	Controller	Fintek F81866AD-I	
<b>Super I/O</b>	Watchdog Timer	256-level Watchdog Timer	
<b>H/W Monitor</b>	Smart Fan	Yes	
<b>TPM</b>	Controller	Infineon SLB9665TT2.0(default) Pin header (By BOM option)	
<b>I/O Interface</b>	USB	4 x USB 3.0 (rear) 5 x USB 2.0 (4 x internal, 1 x vertical connector)	4 x USB 3.0 (rear) 4 x USB 2.0 (4 x internal)
	Serial	6 x COM Ports (Internal) COM1~2: RS-232/422/485, 0V/5V/12V, RI support (RS-232/422/485 by Optional, RS485 support 1000M+) COM3~6: RS-232, 0V/5V/12V (depends on SKU)	2 x COM Ports (Internal) COM3~4: RS-232, 0V/5V/12V
	Parallel	N/A	
	PS/2	1 (pin header)	
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V	
	PCIe x16	N/A	
	PCIe x4	N/A	
	PCIe x1	N/A	
	PCI	N/A	
	<b>Expansion Slot</b>	M.2	1 x E Key 2230 for Wi-Fi/BT module 1 x M Key 2280 for SSD
Mini-PCIe		1 x Full-size(w/mSATA) 1 x Full/Half-size(w/ SIM Holder)	
<b>Storage</b>	SATA	2 x SATA 3.0	
	mSATA	1 (shared w/ Mini-PCIe)	
<b>Power Supply</b>	DC	DC-in 12V~24V	
	ATX	N/A	
<b>Environment</b>	Operating Temperature	-10 ~ 60°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)	
	Weight	0.34 kg	
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) (For Skylake-U Only) Windows 8.1 (64-bit) (For Skylake-U Only) Windows 10/ Windows 10 IoT Enterprise (64-bit) Linux Kernel 4.x (Fedora 25 & Ubuntu 16.04 )	

# MS-98H4

Mini-ITX with 5th Gen Intel® Broadwell ULT Platform for Multi-Displays



## Features

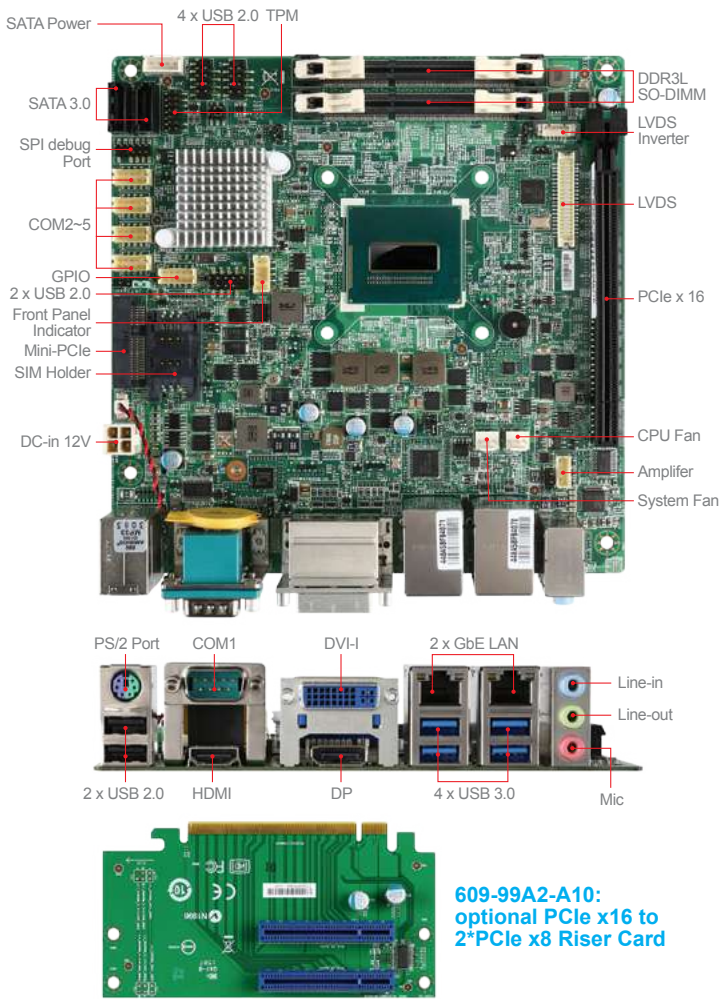
- 5th Gen Intel® Broadwell ULT SoC processors
- Embedded Mini-ITX Motherboard for Fanless computer in Digital Signage, touch panel PC, tablet application
- Supports DDR3L 1600MHz SO-DIMM memory up to 16GB
- 3 independent displays: LVDS, HDMI, DP, VGA, DVI-D
- 2 x GbE LAN, 4 x USB 3.0, 4 x COM (w/ Power)
- 2xSATA 3.0, 2xfull-size Mini-PCle (one shared mSATA or SIM holder)
- Supports wide voltage DC-in 12V/19V/24V

## Specifications

<b>Processor</b>	CPU	5th Gen Intel® Mobile Broadwell ULT Core™ i3/i5/i7 processor
	Frequency	Depends on CPU
	L2 Cache	Depends on CPU
	CPU Type	BGA
	Chipset	Integrated
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1600 MHz
	Max. Capacity	Up to 16GB
<b>Display</b>	Socket	2 x 204-pin SO-DIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	1 x DUAL channel 18/24-bit (Colay with DP)
	eDP	N/A
	VGA	1 (shared w/ DVI-D)
	DVI	1 (DVI-D, shared w/ VGA)
	HDMI	N/A
	DisplayPort	2
	Multiple Display	3 independent displays
<b>Ethernet</b>	Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 4096 x 2304 @30Hz DP up to 3840x 2160 @60Hz DVI-I up to 1920x 1200 @60Hz
	Controller	1 x Intel® I218LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887/888S HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Infineon SLB9635TT 1.2 (by BOM option)
<b>I/O Interface</b>	USB	4 x USB 3.0 (rear) 2 x USB 2.0 (internal)
	Serial	4 x COM ports (by SKU) COM1: RS-232/422/485, 0V/5V/12V COM2-4: RS-232, 0V/5V/12V
	Parallel	N/A
	PS/2	1 (pin header)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	PCIe x16	N/A
	PCIe x4	N/A
<b>Expansion Slot</b>	PCIe x1	N/A
	PCI	N/A
	M.2	N/A
	Mini-PCle	2 x Full-size (one w/ SIM holder or mSATA)
	SATA	2 x SATA 3.0
	IDE	N/A
<b>Storage</b>	eSATA	N/A
	CFast	N/A
	mSATA	1 (shared w/ Mini-PCle)
	CompactFlash	N/A
	DC	DC-in 12V/19V/24V
<b>Power Supply</b>	ATX	N/A
	<b>Environment</b>	Operating Temperature
Operating Humidity		10~ 90%, non-condensing
Storage Temperature		-20 ~ 80°C
Storage Humidity		10~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)
	Weight	0.37 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Linux Fedora Core 21 Linux Ubuntu 15.04

# MS-98G5

Mini-ITX SBC with 4th Gen Intel® Core™, Intel® HM86/QM87, Multi-Displays & High-Performance for Digital Signage & Gaming Solution



609-99A2-A10: optional PCIe x16 to 2\*PCIe x8 Riser Card

## Features

- Embedded Motherboard for high graphic performance application, medical, gaming or high-end digital signage
- Intel Haswell/Broadwell Mobile Core i7/i5/i3/Celeron Processor
- 3 independent displays with HDMI, DP, DVI-I, and LVDS
- Dual GbE LAN with iAMT (EIA+QM87)
- 2 x DDR3L 1333/1600 MHz memory up to 16GB
- 1 x PCIe(x16) with riser card extends to x8+x8 or x8+x4+x4
- 8 x USB 2.0; 4 x USB 3.0; 5 x COM; SATA 3.0 supported
- 2 x full-size Mini-PCle (one shared mSATA or SIM holder)
- Auto-switch DC power 12V/19V

## Ordering Information

Part Number	Description
919-98G5-001	MS-98G5609-98G5-010/809-98G5-003 STD VER 1.0, OPT A, Intel i5-4210H, HM86, 2*DDR3L, 1*COOLER, 1*COM CABEL, 1*I/O SHIELD, 1*SATA CABLE, 1*PS2 Y CABLE
919-98G5-002	MS-98G5609-98G5-020/809-98G5-003 STD VER 1.0, OPT E, Intel i5-4410E, QM87, 2*DDR3L, 1*COOLER, 1*COM CABEL, 1*I/O SHIELD, 1*SATA CABLE, 1*PS2 Y CABLE
919-98G5-003	MS-98G5609-98G5-030/809-98G5-003 STD VER 1.0, OPT F, Intel i7-4700EQ, QM87, 2*DDR3L, 1*COOLER, 1*COM CABEL, 1*I/O SHIELD, 1*SATA CABLE, 1*PS2 Y CABLE

## Packing List

Part Number	Description
E32-2100030-K08	Cooler
E21-98G5010-C22	I/O Shielding
K39-3002004-E06	PS2 Y-cable, 190mm
K14-1018003-V03	COM Port Cable, 300mm
K1D-1012064-V03	SATA Cable, 200mm
G71-SEDC140-X03	CD

## Specifications

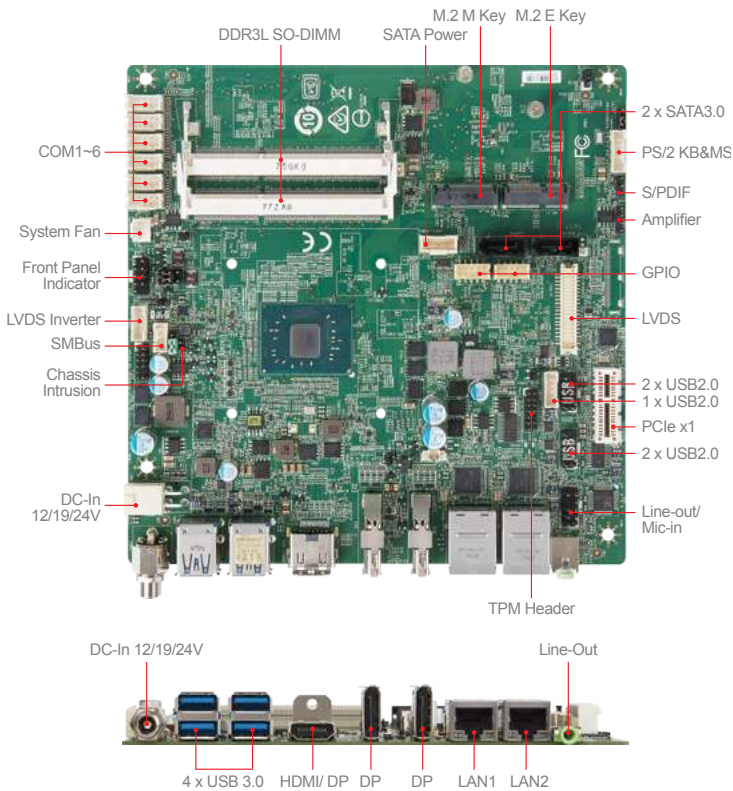
<b>Processor</b>	CPU	4th Gen Intel® Mobile Haswell-H Core™ i7/i5/i3/Celeron® Mobile Processor, Max. 47W	
	Frequency	2.2GHz~3.6 GHz (Depends on CPU)	
	L2 Cache	3M~6M (Depends on CPU)	
	CPU Type	BGA	
	Chipset	Intel® HM86/QM87 Express	
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR3L 1333/1600 MHz SDRAM	
	Max. Capacity	Up to 16GB	
<b>Display</b>	Socket	2 x 204-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	LVDS	Dual channel 24-bit	
	DVI	1 (DVI-I)	
	HDMI	1	
	DisplayPort	1	
	Multiple Display	3 independent displays	
	Display Interface	LVDS	up to 1920 x 1200 @60Hz
		DVI	up to 1920 x 1200 @60Hz
DP		up to 3840 x 2160 @60Hz	
Ethernet	HDMI	up to 3840 x 2160 @24Hz	
	Controller	1 x Intel® I217-LM LAN PHY 1 x Intel® I210 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	Pin header	
<b>I/O Interface</b>	USB	4 x USB3.0 (rear) 8 x USB2.0 (6 x internal; 2 x rear)	
	Serial	COM1	5 x COM ports (COM1: rear, COM2~5: internal) COM1: RS-232/422/485, 0V/5V/12V COM2~5: RS-232
		PS/2	1
		GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	<b>Expansion Slot</b>	PCIe x16	1 (up to 75W, w/ riser card to extend to x8+x8 or x8+x4+x4)
PCI		N/A	
M.2		N/A	
Mini-PCle		QM87: 1 x Full-size, mSATA (w/ SIM Holder) 1 x Half-size HM86: 1 x Half-size	
<b>Storage</b>	SATA	QM87: 2 x SATA 3.0 HM86: 1 x SATA 3.0; 1 x SATA 2.0	
	mSATA	1	
<b>Power Supply</b>	DC	DC-in 12V/19V	
	ATX	N/A	
<b>Environment</b>	Operating Temperature	0 ~ 60°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)	
	Weight	0.35 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 7 (32/64-bit) Windows 8 (32-bit)	

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98B1

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

NEW



## Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- 3 independent displays : 1 x LVDS/eDP, 2 x DP, 1 x HDMI (Co-lay DP) for flexible display applications
- Supports Dual DDR3L 1866MHz SO-DIMM memory up to 8GB
- Supports Dual SATA 3.0 ports, M.2 M Key 2242 for storage
- Supports Dual Intel® GbE LAN, PCIe x1 and M.2 E Key 2230
- Supports 6 COM ports, 9 USB ports & 16Bit GPIO
- TPM supported with onboard chip or pin header
- Supports DC-in 12/19/24V

## Ordering Information

Part Number	Description
919-98B1-101	MS-98B1 10 OPT:A Intel E3940, DP+DP+HDMI+LVDS, 2*DDR3L SO-DIMMs, 2*LAN, 2*SATA 3.0, Audio, 2*M.2 Slot, 4*USB 3.0, 5*USB 2.0, PCIe x1, DC-in 12V/19V/24V, BULK
919-98B1-102	MS-98B1 10 OPT:C Intel N3350, DP+DP+HDMI+LVDS, 2*DDR3L SO-DIMMs, 2*LAN, 2*SATA-3.0, Audio, 2*M.2 Slot, 4*USB 3.0, 5*USB 2.0, PCIe x1, DC-in12V/19V/24V, BULK

## 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

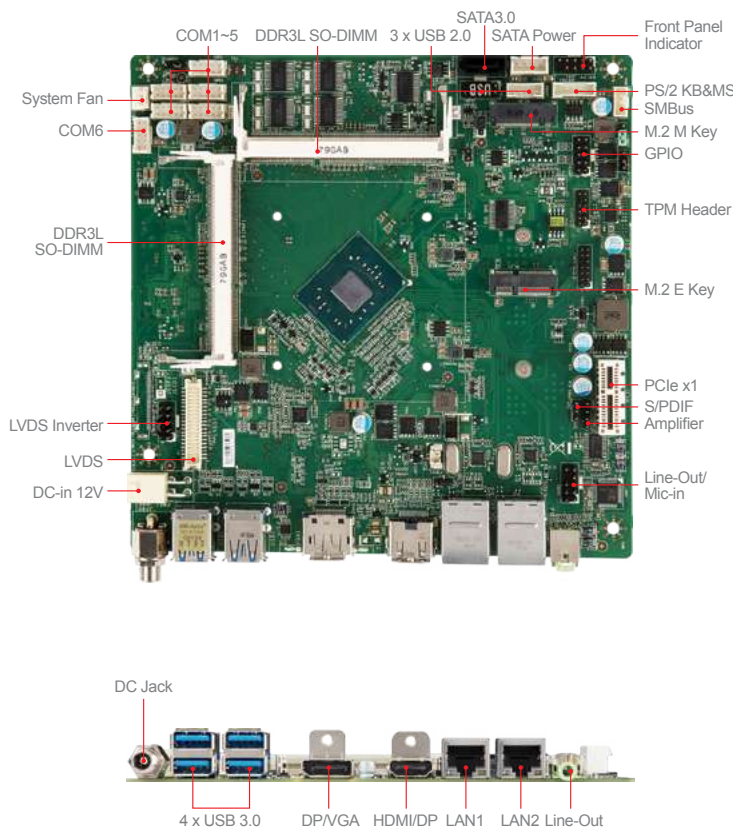
<b>Processor</b>	CPU	Intel® Celeron® Processor N3350, DC, 6W Intel® Atom™ x5 Processor E3940, QC, 9.5 W	
	Frequency	N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz	
	L2 Cache	2MB	
	CPU Type	BGA	
	Chipset	Integrated in SoC	
<b>Memory</b>	BIOS	AMI	
	Technology	Dual-channel DDR3L 1866 MHz	
<b>Memory</b>	Max. Capacity	Up to 8GB	
	Socket	2 x 204-pin SO-DIMMs	
	Controller	Intel® HD Graphics	
<b>Display</b>	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	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		
<b>Ethernet</b>	Controller	2 x Intel® I211-AT (colay I210-AT GbE LAN)	
	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	
	Controller	Fintek F81867AD-I	
<b>Super I/O</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>H/W Monitor</b>	Controller	Pin header (default) Infineon SLB9665TT 2.0 (by BOM option)	
	Controller	Infineon SLB9665TT 2.0 (by BOM option)	
<b>TPM</b>	USB	4 x USB3.0 (rear) 5 x USB2.0 (internal)	
	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	
<b>Expansion Slot</b>	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, USB2.0), 2230	
<b>Storage</b>	Mini-PCIe	N/A	
	SATA	2 x SATA 3.0 (SATA2 share with M.2 M Key)	
<b>Power Supply</b>	mSATA	N/A	
	DC	DC-in 12/19/24V	
<b>Environment</b>	ATX	N/A	
	Operating Temperature	-10 ~ 60°C	
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing	
	Dimensions	170 x 170mm (Mini-ITX)	
	Weight	0.37 kg	
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	



# MS-98J0

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

NEW



## Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- 3 independent displays : 1 x LVDS/eDP, 1 x DP (Co-lay VGA), 1 x HDMI (Co-lay DP) for flexible display applications
- Supports DDR3L 1866MHz SO-DIMM memory up to 8GB
- Supports SATA 3.0 port, M.2 M Key 2242 for storage
- Supports Dual GbE LAN, PCIe x1 and M.2 E Key 2230
- Supports 6 COM ports & 7 USB ports
- TPM supported with onboard chip or pin header
- Supports DC-in 12V

## Ordering Information

Part Number	Description
919-98J0-101	MS-98J0 10 OPT:A Intel E3940, DP+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, PCIe x1, DC-in12V, BULK
919-98J0-102	MS-98J0 10 OPT:B Intel N3350, DP+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, PCIe x1, DC-in12V, BULK

## Packing List

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

## 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

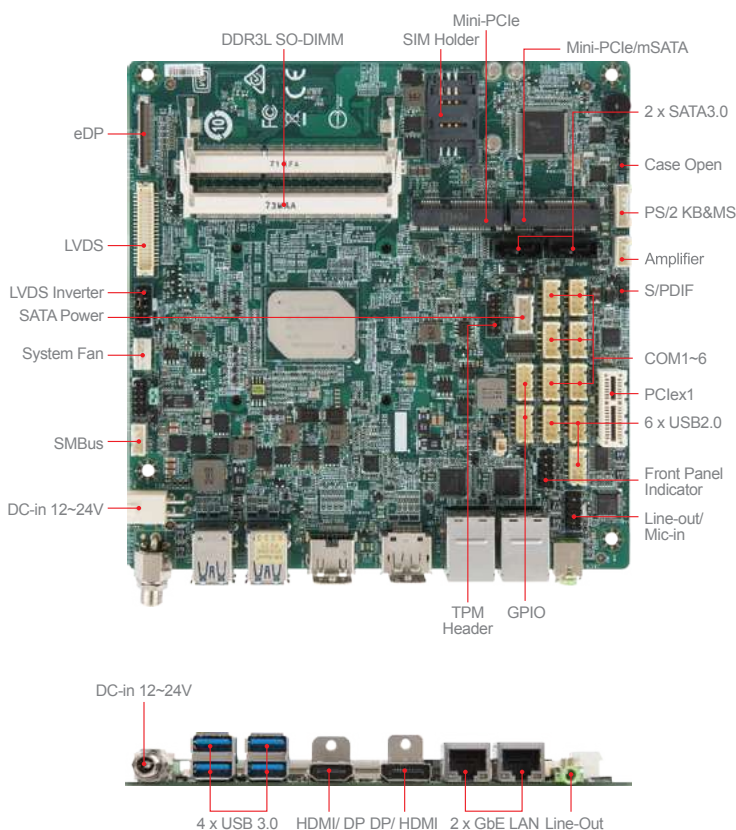
<b>Processor</b>	CPU	Intel® Celeron® Processor N3350, DC, 6W Intel® Atom™ x5 Processor E3940, QC, 9.5W
	Frequency	N3350, 1.1 GHz, up to 2.4 GHz E3940, 1.6 GHz, up to 1.8 GHz
	L2 Cache	2MB
	CPU Type	BGA
	Chipset	Integrated in SoC
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3L 1866 MHz
	Max. Capacity	Up to 8GB
	Socket	2 x 204-pin SO-DIMMs
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	1 x Dual channel 18/24-bit
	eDP	1 (by BOM option)
	VGA	1 (by BOM option)
	DVI	N/A
	HDMI	1 (Co-lay DP)
	DisplayPort	1 (Co-lay VGA)
	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 VGA up to 1920 x 1080 @60Hz
<b>Ethernet</b>	Controller	2 x Realtek® RTL8111H-CG
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81867D-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header (default) Infineon SLB9665TT 2.0 (by BOM option)
<b>I/O Interface</b>	USB	4 x USB3.0 (rear) 3 x USB2.0 (internal)
	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
	<b>Expansion Slot</b>	PCIe x 16
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
Mini-PCIe		N/A
<b>Storage</b>		SATA
	IDE	N/A
	eSATA	N/A
	CFast	N/A
	mSATA	N/A
<b>Power Supply</b>	CompactFlash	N/A
	DC	DC-in 12V
<b>Environment</b>	ATX	N/A
	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	170 x 170mm (Mini-ITX)
<b>Certification</b>	Weight	0.37 kg
	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PC  
Intel® SDM

# MS-9892

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

NEW



## Features

- Intel® Apollo Lake/Apollo Lake-I Series SoC
- 3 independent displays : 1 x LVDS/eDP, 1 x DP, 1 x HDMI
- Supports Dual DDR3L 1866MHz SO-DIMM memory up to 8GB
- Supports Dual SATA 3.0 ports, mSATA for storage
- Supports Dual Intel® GbE LAN, PCIe x1 and Mini-PCIe slot
- Supports 6 COM ports & 10 USB ports for flexible applications
- TPM supported with onboard chip or pin header
- Apollo Lake-I Series support wide operating temperature : -40 ~ 85°C
- Supports DC-in 12~24V

## Ordering Information

Part Number	Description
919-9892-001	MS-9892 10 Intel Apollo Lake-I E3940, 2*DDR3L, 4*USB3.0, 6*USB2.0, 6*COM, 1*HDMI, 1*DP, 1*eDP, 1*LVDS, 2*LAN, 1*MiniPCIe, 1*PClex1, 2*SATA, 1*mSATA, DC12~24V, WT
919-9892-002	MS-9892 10 OPT: A Intel Apollo Lake-I E3930, 2*DDR3L, 4*USB3.0, 6*USB2.0, 6*COM, 1*HDMI, 1*DP, 1*eDP, 1*LVDS, 2*LAN, 1*MiniPCIe, 1*PClex1, 2*SATA, 1*mSATA, DC12~24V, WT
919-9892-003	MS-9892 1.0 OPT: B Intel Apollo Lake N4200, 2*DDR3L, 4*USB3.0, 6*USB2.0, 6*COM, 1*HDMI, 1*DP, 1*eDP, 1*LVDS, 2*LAN, 1*MiniPCIe, 1*PClex1, 2*SATA, 1*mSATA, DC12~24V
919-9892-004	MS-9892 1.0 OPT: C Intel Apollo Lake E3940, 2*DDR3L, 4*USB3.0, 6*USB2.0, 6*COM, 1*HDMI, 1*DP, 1*eDP, 1*LVDS, 2*LAN, 1*MiniPCIe, 1*PClex1, 2*SATA, 1*mSATA, DC12~24V
919-9892-005	MS-9892 1.0 OPT: D Intel Apollo Lake N3350, 2*DDR3L, 4*USB3.0, 6*USB2.0, 6*COM, 1*HDMI, 1*DP, 1*eDP, 1*LVDS, 2*LAN, 1*MiniPCIe, 1*PClex1, 2*SATA, 1*mSATA, DC12~24V

## Packing List

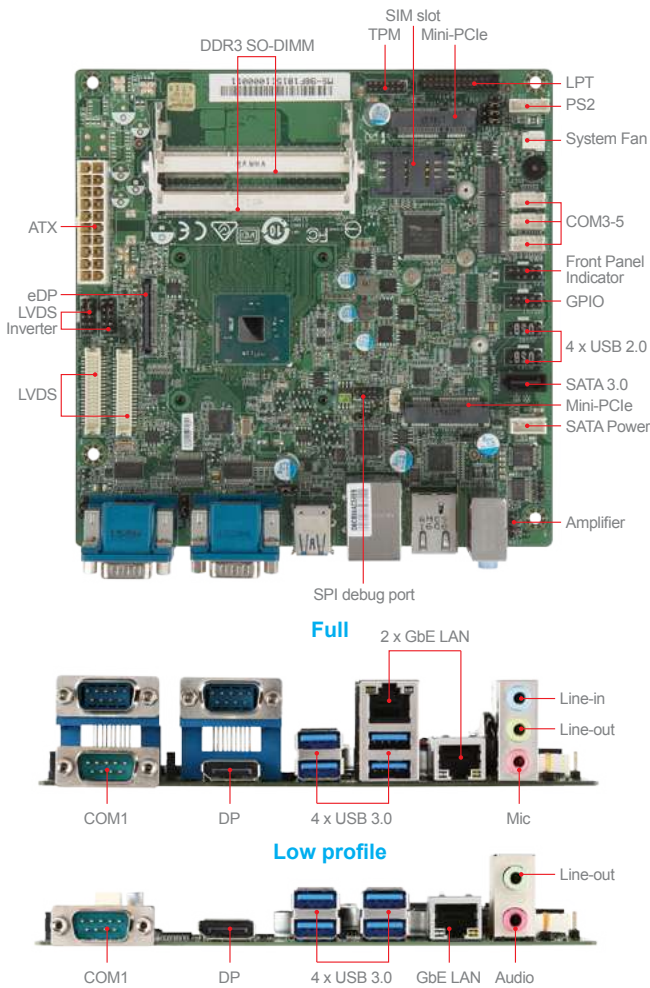
Part Number	Description
K14-1018003-V03	COM Port Cable, 300mm
K1D-1012115-V03	SATA Cable with Power, 230mm

## Specifications

		Apollo Lake SKUs	Apollo Lake-I SKUs
			Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W
<b>Processor</b>	CPU		
	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 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	
	BIOS	AMI	
<b>Memory</b>	Technology	Dual-channel DDR3L 1866 MHz	
	Max. Capacity	Up to 8GB	
	Socket	2 x 204-pin SO-DIMMs	
<b>Display</b>	Controller	Intel® HD Graphics	
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM	
	LVDS	1 x Dual channel 18/24-bit	
	eDP	1 (colay with LVDS)	
	HDMI	1 (colay with DP)	
	DisplayPort	1 (colay with HDMI)	
	Multiple Display	3 independent displays	
<b>Display Interface</b>	LVDS	up to 1920 x 1200 @60 Hz	
	eDP	up to 4096 x 2160 @60Hz	
<b>Ethernet</b>	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	
<b>Super I/O</b>	Controller	Fintek F81867D-I	
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer	
	Smart Fan	Yes	
<b>TPM</b>	Controller	Pin header (Default) Infineon SLB9665TT 2.0 (by BOM option)	Pin header (Default) Infineon SLB9665XT 2.0 (by BOM option)
	USB	4 x USB3.0 (Rear) 6 x USB2.0 (Internal)	
<b>I/O Interface</b>	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 x 1	1	
<b>Expansion Slot</b>	M.2	N/A	
	Mini-PCIe	1 x Full-size (w/ SIM holder) 1 x Full-size (w/ mSATA)	
<b>Storage</b>	SATA	2 x SATA3.0 (SATA2 share with mSATA)	
	mSATA	1 (shared w/SATA2)	
<b>Power Supply</b>	DC	DC-in 12V~24V	
	ATX	N/A	
<b>Environment</b>	Operating Temperature	-10 ~ 60°C	-40 ~ 85°C
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)	
	Weight	0.37 kg	
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI	
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	

# MS-98F1

Mini-ITX with Intel® Atom™ Braswell Platform for Multi-Displays, Low-Power and DC/ATX Solution



## Features

- Intel® Atom™ Braswell Series SoC processor
- Embedded Mini-ITX Motherboard with Rich I/O ports, Low power and fanless design
- 3 independent displays with optional inputs: 1 DP, 1 LVDS & 1 x eDP or 1 DP & 2 LVDS
- 4 USB 2.0, 4 USB 3.0, Optional SKU with 4 or 6 COM; SATA3.0 supported
- Dual Intel® LAN and dual mini-PCIe slots
- TPM supported with onboard chip or pin header
- Dual full-size Mini-PCIe (one shared mSATA or SIM holder)
- Power input: DC 12V/19/24V or ATX (depends on SKU)

## 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 eDP,6*COM,4*USB3.0, 4*USB2.0, 2*Gbe LAN,1*SATA3.0, 2*Mini-PCIe, ATX Power, 1*SATA cable, 1*CD, 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-PCIe, DC Power, 1*SATA cable, 1*Power cable, 1*CD, 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
G71-SEDC153-N56/X03	DRIVER CD

## Specifications

<b>Processor</b>	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
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1600 MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	2 x 204-pin SO-DIMM
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	2 x dual channel 18/24-bit
	eDP	1 (colay with LVDS)
<b>Ethernet</b>	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
<b>Audio</b>	Controller	2 x Intel® i210-AT GbE LAN
<b>Super I/O</b>	Controller	1 x Intel® i210-AT GbE LAN
<b>H/W Monitor</b>	Controller	Realtek® ALC887 co-lay ALC888S
	Watchdog Timer	Fintek F81866AD-I
<b>TPM</b>	Smart Fan	256-level Watchdog Timer
	Controller	Yes
<b>I/O Interface</b>	Pin header (default)	Pin header (default)
	Infineon SLB9635TT 1.2 (by BOM option)	Infineon SLB9635TT 1.2 (by BOM option)
	USB	4 x USB3.0 (rear) 4 x USB2.0 (internal)
	Serial	4 x USB3.0 (rear) 4 x USB2.0 (internal)
	Parallel	1
	PS/2	1 (pin header)
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	Expansion Slot	M.2 Mini-PCIe
	Storage	1 x SATA 3.0 mSATA CompactFlash
	Power Supply	DC ATX
<b>Environment</b>	DC-in 12V/19V/24V	DC-in 12V/19V/24V
	ATX Power 20P	ATX Power 20P
	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	170 x 170mm (Mini-ITX)
<b>Certification</b>	Weight	0.37 kg
	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 23 Linux Ubuntu 15.10

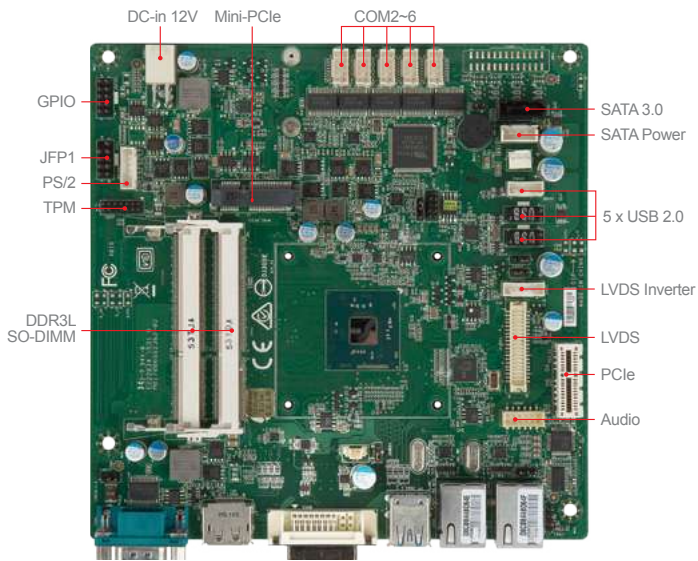
## Optional Item

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

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO/MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-9810

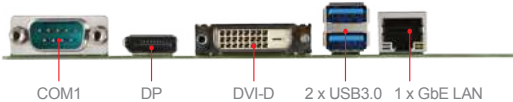
Mini-ITX with Intel® Atom™ Braswell Platform for Low-Power, Low profile and Fanless Solution



## 919-9810-103



## 919-9810-104



## Features

- Intel® Atom™ Braswell Series SoC processor
- Embedded Mini-ITX Motherboard with low power, slim and fanless design
- 3 independent displays : DP/HDMI , DVI-D and LVDS
- 5 x USB 2.0, 2 x USB 3.0, 6 x COM, and SATA3.0 supported
- TPM supported with onboard chip or pin header
- Supports DC 12V power
- Entry level with best-value for choice

## 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)
G71-SEDC146-N56	Driver CD
K1D-1012064-V03	SATA Cable, 200mm
K10-3004215-V03	DC power cable, 160mm

## Specifications

<b>Processor</b>	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
<b>Memory</b>	Technology	Dual-channel DDR3L 1333/1600 MHz
	Max. Capacity	Up to 8GB
	Socket	2 x 204-pin SO-DIMMs (1 slot for opt SKU)
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	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
<b>Ethernet</b>	Controller	2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)
<b>Audio</b>	Controller	Realtek® ALC887 co-lay ALC888S
<b>Super I/O</b>	Controller	Fintek F81866AD-I
	Watchdog Timer	256-level Watchdog Timer
<b>H/W Monitor</b>	Smart Fan	Yes
	TPM	Controller
<b>I/O Interface</b>	USB	2 x USB 3.0 (rear) 5 x USB 2.0 (internal)
	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
	PCIe x 1	1
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCIe	1 x Full-size co-lay mSATA, support Half-size card
<b>Storage</b>	SATA	1 x SATA 3.0
	mSATA	1 (support by mini PCIe slot)
<b>Power Supply</b>	DC	DC-in 12V
	ATX	N/A
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)
	Weight	0.37 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 20 Linux Ubuntu 14.04.3

## Optional Item

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

# MS-98F5

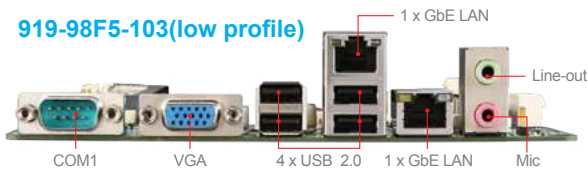
Mini-ITX with Intel® Atom™ Bay Trail for Low-Power and Low-Profile Solution



919-98F5-101(low profile)



919-98F5-103(low profile)



## Features

- Intel® Celeron® Processor J1900/N2930 Quad Core 1.86/2GHz processor (formerly BayTrail)
- Embedded Mini-ITX Motherboard with low power, slim and fanless design
- 2 independent displays: LVDS and VGA
- Supports 6xCOMs and 8xUSB 2.0
- Entry level with best-value for choice

## Ordering Information

Part Number	Description
919-98F5-101	MS-98F5MS-98F51609-98F5-010/809-98F5-102MS-98F5 VER 10 OPT A FOR MS-98F5 STD SKU, 1 LAN, 1 SO-DIMM BULK
919-98F5-103	MS-98F5MS-98F51609-98F5-020/809-98F5-101MS-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)
G71-SEDC117-X03	Driver CD
K10-3004215-V03	DC power cable, 160mm
K1D-1012064-V03	SATA cable, 200mm

## Specifications

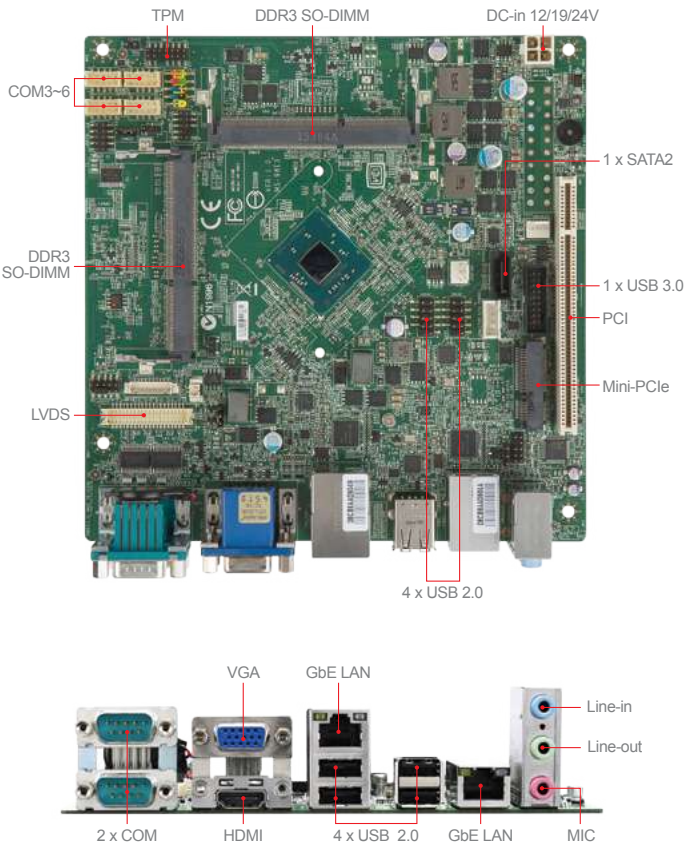
<b>Processor</b>	CPU	Intel® Celeron® Processor J1900, QC, 10W Intel® Celeron® Processor N2930, QC, 7.5W
	Frequency	J1900, 2.0 GHz, up to 2.42 GHz N2930, 1.83 GHz, up to 2.16 GHz
	L2 Cache	2 MB
	CPU Type	BGA
	Chipset	Integrated
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1066 MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	2 or 1 x 204-pin SO-DIMMs (depends on SKU)
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 24-bit (add chrontel 7511B chipset)
	VGA	1
<b>Ethernet</b>	Multiple Display	2 independent displays
	Display Interface	VGA up to 2560 x 1600 @60Hz LVDS up to 1920 x 1200 @60Hz
<b>Audio</b>	Controller	2 or 1 x Realtek® RTL8111G-CG GbE LAN (depends on SKU)
<b>Super I/O</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>H/W Monitor</b>	Controller	Fintek F81866AD-I
	Watchdog Timer	256-level Watchdog Timer
<b>TPM</b>	Smart Fan	Yes
<b>I/O Interface</b>	Controller	Pin header
	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
	PCle x1	1
<b>Expansion Slot</b>	M.2	N/A
	Mini-PCle	1 x Full-size (w/ mSATA)
<b>Storage</b>	SATA	1 x SATA 2.0
	mSATA	1
<b>Power Supply</b>	DC	DC-in 12V
	ATX	N/A
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	170 x 170mm (Mini-ITX)
	Weight	0.37 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	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-98E3

Mini-ITX with Intel® Atom™ Bay Trail for Multi-Displays and DC/ATX Solution



## Specifications

<b>Processor</b>	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
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3L 1333/1066 MHz
	Max. Capacity	Up to 8GB
<b>Display</b>	Socket	2 x 204-pin SO-DIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	Dual Channel 24-bit (add chrontel 7511B chipset)
	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	
<b>Ethernet</b>	Controller	2 x Intel® i210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	8 x USB 2.0 (4 x internal; 4 x rear) 1 x USB 3.0 (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
	PCI	1
	M.2	N/A
<b>Expansion Slot</b>	Mini-PCle	1 x Full-size (w/ mSATA)
	SATA	1 x SATA 2.0
<b>Storage</b>	mSATA	1
	DC	DC-in 12V/19V/24V
<b>Power Supply</b>	ATX	ATX-Power 20P
	Operating Temperature	0 ~ 60°C
<b>Environment</b>	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	170 x 170mm (Mini-ITX)
<b>Form Factor</b>	Weight	0.37 kg
	<b>Certification</b>	EMC
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8 (64-bit)

## Features

- Intel® Celeron® Processor J1900/N2930 Quad Core 1.86/2GHz processor (formerly BayTrail)
- Embedded Mini-ITX Motherboard with low power and fanless design
- 2 independent displays: HDMI, VGA, and LVDS
- Supports 6xCOMs, 8xUSB 2.0, 1xUSB 3.0
- Low power and fanless design
- Power input: DC 12V/19/24V or ATX (by BOM)

## 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
G71-SEDC113-X03	Driver CD	1

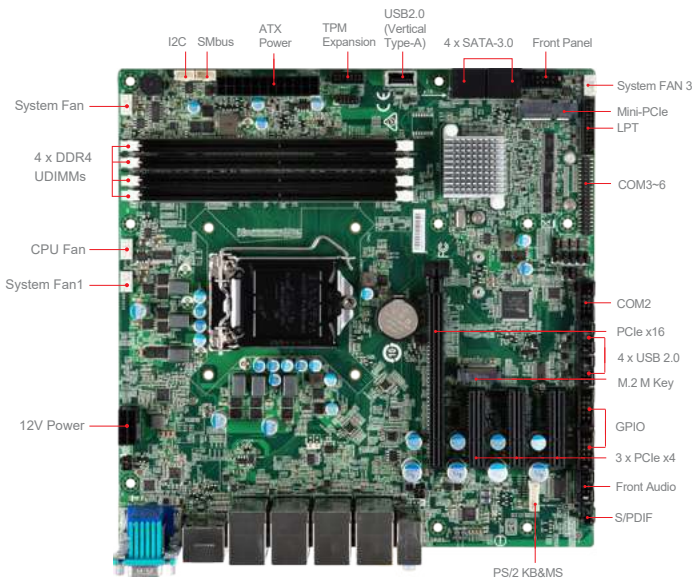
## Optional Item

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

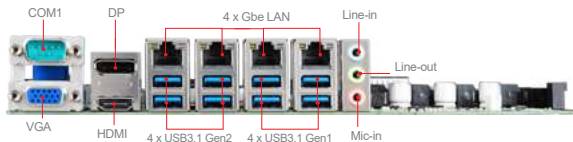
# MS-98L2

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

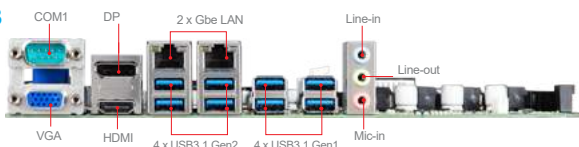
NEW



## SKU1/SKU2



## SKU3



## Features

- Intel® Coffee Lake-S Series CPU to maximize performance
- 4 DDR4 2666MHz UDIMMs slots up to 64 GB memory
- Supports 3 independent displays with multiple video outputs (DP, HDMI & VGA)
- Supports 2/4 Intel® GbE LAN & AMT 12.x
- Supports 4 SATA-3.0 & 6 COM ports for flexible applications
- Supports 1 PCIe x16, 3 PCIe x4 Slots, full-size & half-size mini-PCIe for multiple expansion slots
- M.2 supports high speed PCIe NVMe SSD storage
- 8 USB 3.1 & 5 USB 2.0 ports for more peripherals

## Ordering Information

Part Number	Description
919-98L2-001	MS-98L2 VER 10 Intel Coffee Lake-S LGA1151,Q370,4*DDR4 UDIMM,1*PCIe x16,3*PCIe x4, HDMI, DP, VGA, 4*LAN, 8*USB 3.1, 5*USB 2.0, 6*COM, ATX POWER, RoHS,SINGLE, For Channel

## Packing List

Part Number	Description	Quantity
K1D-1008261-V03	SATA Cable, 500mm	2
E21-98L2020-C22	I/O SHIELDING	1
G71-SEDC194-N56/X03	Driver CD	1

## Optional Item

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

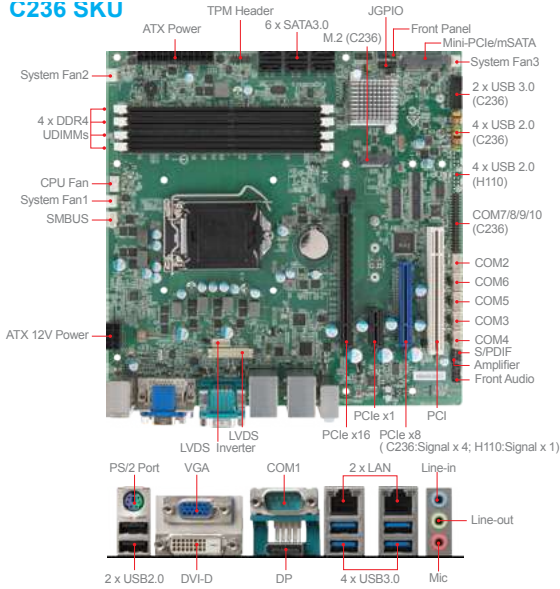
## Specifications

		SKU1	SKU2	SKU3
<b>System Processor</b>	CPU	8th Gen Intel® Desktop Coffee Lake-S Xeon®/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	
<b>Memory</b>	BIOS	AMI UEFI		
	Technology	Dual-channel DDR4 (ECC/ non-ECC) 2666MHz	Dual-channel DDR4 (non-ECC) 2666MHz	
	Max. Capacity	Up to 64 GB		
	Socket	4 x 288-pin UDIMMs		
	Controller	Intel® HD Graphics		
<b>Display</b>	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	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		
<b>Ethernet</b>	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	
		<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	Yes		
<b>TPM</b>	Controller	Box header (Default) Infineon SLB9665TT2.0 (by BOM option)		
<b>I/O Interfaces</b>	USB	4 x USB3.1 Gen2 Type-A (4 x Rear) 4 x USB3.1 Gen1 Type-A (4 x Rear) 5 x USB 2.0 (5 x internal with one Vertical Type-A)		
		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		
	<b>Expansion Slot</b>	PCIe x16	1	
PCIe x4		3 (Slot2 signal shared with M.2; 2*PCIe x4 NVMe)		
M.2		1 x M Key (PCIe x4 NVMe, SATA 3.0), 2242/2260/2280		
Mini-PCIe		1 x Full-size/Half-size		
<b>Storage</b>	SATA	4 x SATA 3.0		
<b>Power Supply</b>	DC Input	N/A		
	AC Input	ATX-Power 24P, 1 2V-8P		
<b>Environment</b>	Operating Temperature	-10 ~ 60°C		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		
<b>Form Factor</b>	Dimensions (W x D x H)	244 x 244mm (uATX)		
	Weight	0.625 kg	0.39 kg	
<b>Certification</b>	EMC	CE, FCC Class B, BSMI, RCM, VCCI		
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Linux Kernel 4.x (by request)		

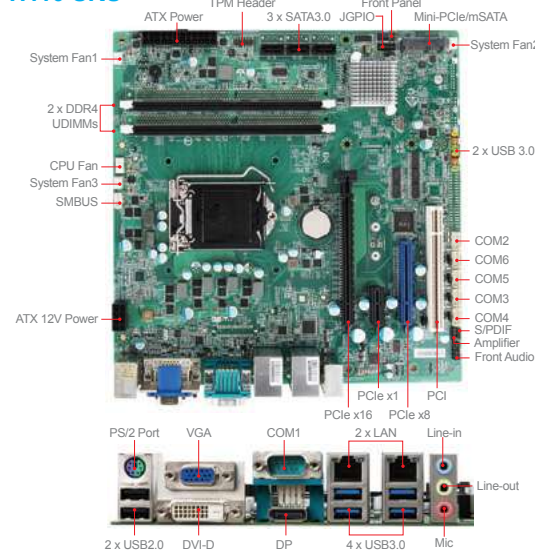
# MS-98E2

Micro-ATX with 7th/6th Gen Intel® Kaby Lake/Skylake, Superior I/O & Expansion Capability for High-Performance Solution

## C236 SKU



## H110 SKU



## Features

- 10 COM ports for flexible applications
  - Supports 3 System FANS
  - 3 independent displays: LVDS, DP, DVI-D and VGA
  - Supports DirectX 11.1 and Intel® Clear Video Technology (up to 1080P)
  - Multiple expansion slots: PCIe x16, PCIe x8 (x4 signal), PCIe x1, and PCI
  - 6 SATA 3.0 ports for RAID
  - M.2 supports high speed PCIe NVMe SSD storage
  - Supports m-SATA function by Mini-PCIe slot
  - Plenty USB ports for more peripherals (6 USB 2.0, 6 USB 3.0)
- 
- 6 COM ports for flexible applications
  - Supports 3 System FANS
  - 2 independent displays: DP, DVI-D and VGA
  - Supports DirectX 11.1 and Intel® Clear Video Technology (up to 1080P)
  - Multiple expansion slots: PCIe x16, PCIe x1, PCIe x8 (x1 signal), and PCI
  - 3 SATA 3.0 ports for faster and high-capacity storage
  - Supports m-SATA function by Mini-PCIe slot
  - Plenty USB ports for more peripherals (6 USB 2.0, 4 USB 3.0)

## Ordering Information

Part Number	Description
919-98E2-001	VER 1.1 OPTB,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	
<b>Processor</b>	CPU	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)		
	L2 Cache	2M ~ 8M (Depends on CPU)		
	CPU Type	Socket (LGA 1151)		
	Chipset	Intel® C236 Express	Intel® H110 Express	
<b>Memory</b>	BIOS	AMI		
	Technology	Dual-channel DDR4 (ECC) 2133MHz/2400MHz (7th Gen)	Dual-channel DDR4 (non-ECC) 2133MHz/2400MHz (7th Gen)	
	Max. Capacity	Up to 64 GB	Up to 32 GB	
<b>Display</b>	Socket	4 x 288-pin Long-DIMMs	2 x 288-pin Long-DIMMs	
	Controller	Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	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	
<b>Ethernet</b>	Controller	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		
<b>Super I/O</b>	Controller	Fintek F81866AD-I + F81216H		
	H/W Monitor	Watchdog Timer Smart Fan Yes		
<b>TPM</b>	Controller	Pin header		
	USB	6 x USB 3.0 (4 x rear; 2 x internal) 6 x USB 2.0 (2 x rear; 4 x internal)		
		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		
	PCIe x8	1*PCIe x8 (x4 signal)	1*PCIe x8 (x1 signal)	
	PCIe x4	N/A		
	PCIe x1	1		
PCI	1			
<b>Expansion Slot</b>	M.2	1 x M Key (PCIe x4, SATA3.0), 2242/2260/2280	N/A	
	Mini-PCIe	1 x Full-size, mSATA		
	SATA	6 x SATA 3.0	3 x SATA 3.0	
<b>Storage</b>	mSATA	1		
	DC	N/A		
<b>Power Supply</b>	ATX	ATX-Power 24P, 12V-8P		
	Operating Temperature	0 ~ 60°C		
<b>Environment</b>	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		
<b>Form Factor</b>	Dimensions	244 x 244 mm (uATX)		
	Weight	0.73 kg		
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI		
<b>Software Platform</b>	OS Support	Windows 7 (32/64-bit) Windows 8.1 (64-bit) Windows 10 (64-bit) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (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

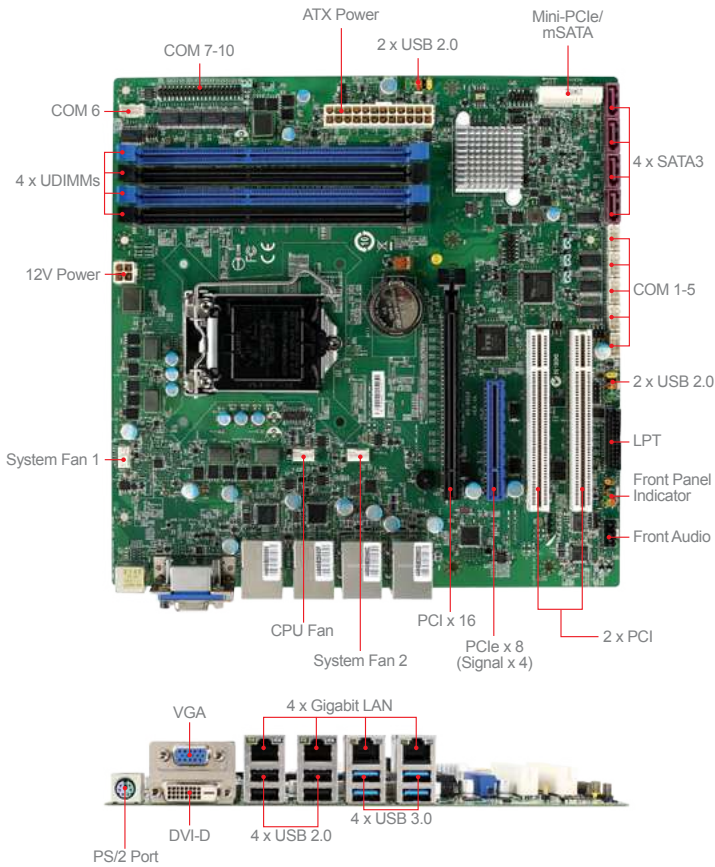
## Optional Item

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



# MS-98G3

Micro-ATX with 4th Gen Intel® Haswell/Haswell Refresh Platform for Q87, 4 LAN, 10 COM & USB 3.0 for Vision Applications



## Specifications

<b>Processor</b>	CPU	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/ Pentium® Processors, Max. 95W
	Frequency	2.2GHz~4.4GHz (Depends on CPU)
	L2 Cache	2M ~ 8M (Depends on CPU)
	CPU Type	Socket (LGA 1150)
	Chipset	Intel® Q87 Express
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3 1066/1333/1600MHz
	Max. Capacity	Up to 32GB
	Socket	4 x 240-pin Long-DIMMs
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	VGA	1
	DVI	1 (DVI-D)
	Multiple Display	2 independent displays
<b>Ethernet</b>	Display Interface	VGA up to 1920 x 1080 @60Hz DVI up to 2560 x 1600 @60Hz
	Controller	1 x Intel® I217-LM GbE-PHY 3 x Intel® I210-AT PCIe GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I + F81216AD
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	8 x USB 2.0 (4 x rear; 4 x internal) 4 x USB 3.0 (4 x rear)
	Serial	10 x COM ports (internal) COM1~4: RS-232, 0V/5V/12V COM5: RS-232/422/485, 0V/5V/12V COM6: RS-232/422/485, without power COM7~10: RS-232, 0V/5V/12V
	Parallel	1
	PS/2	1
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V
	PCIe x16	1
	PCIe x4	1*PCIe x8 (x4 signal)
<b>Expansion Slot</b>	PCI	2
	M.2	N/A
	Mini-PCIe	1 x Full-size, mSATA
	Storage	SATA 4 x SATA 3.0 mSATA 1
<b>Power Supply</b>	DC	N/A
	ATX	ATX-Power 24P, 12V-4P
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	244 x 244mm (uATX)
	Weight	0.6 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit)

## Features

- Supports Intel® Haswell Desktop CPU
- Max Support 32GB DDR3 1600MHz Memory
- 2 independent displays: VGA and DVI
- 4 GbE LAN, 10 COM, and 4 USB 3.0
- Supports Mini-PCIe/mSATA Slot

## Ordering Information

Part Number	Description
919-98G3-001	MS-98G3, Q87 Haswell / Haswell Re-Flash Desktop CPU, 4 x DDR3 Long DIMM, VGA/DVI-D, 4 x SATA3.0, 4 x GbE LAN, 10 x COM, 4 x USB3.0, 8 x USB2.0

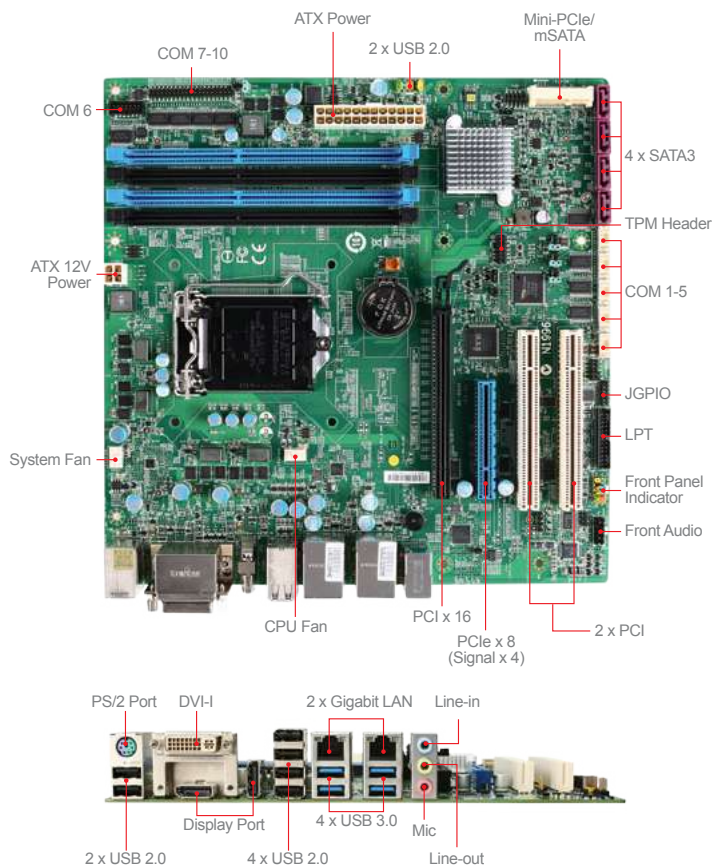
## Packing List

Part Number	Description	Quantity
K14-1018003-V03	COM PORT Cable, 300mm	1
K1D-1008261-V03	SATA CABLE,SIGNAL, 500mm	2
E21-98G3010-C22	IO Shielding	1
G71-SEDC125-X03	Driver CD	1

Industrial Computer  
COM Express Board  
Qseven Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98D6

Micro-ATX with 4th Gen Intel® Haswell/Haswell Refresh Platform for Superior I/O & Expansion Capability for High-Performance Solution



## Specifications

<b>Processor</b>	CPU	4th Gen Intel® Desktop Haswell/ Haswell Refresh Core™ i7/i5/i3/Celeron®/ Pentium® Processors, Max. 95W
	Frequency	2.2GHz~4.4GHz (Depends on CPU)
	L2 Cache	2M ~ 8M (Depends on CPU)
	CPU Type	Socket (LGA 1150)
	Chipset	Intel® Q87 Express
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3 1066/1333/1600MHz
	Max. Capacity	Up to 32GB
<b>Display</b>	Socket	4 x 240-pin Long-DIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	DVI	1 (DVI-I)
	DisplayPort	2
	Multiple Display	3 independent displays
<b>Ethernet</b>	Display Interface	DP up to 3840 x 2160 @60Hz DVI up to 1920 x 1200 @60Hz
	Controller	1 x Intel® I217-LM GbE-PHY 1 x Intel® I210-AT PCIe GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I + F81216AD
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	8 x USB 2.0 (6 x rear; 2 x internal) 4 x USB 3.0 (4 x rear)
	Serial	10 x COM ports (internal) COM1~4: RS-232, 0V/5V/12V COM5: RS-232/422/485, 0V/5V/12V COM6: RS-232/422/485, without power COM7~10: RS-232, 0V/5V/12V (COM1 & COM2 support WOR)
	Parallel	1
	PS/2	1
	GPIO	8-bits (4 x GPI, 4 x GPO), 5V
	<b>Expansion Slot</b>	PCIe x16
PCIe x8		1*PCIe x8 (x4 signal)
PCI		2
M.2		N/A
Mini-PCIe		1 x Full-size, mSATA
<b>Storage</b>	SATA	4 x SATA 3.0
	mSATA	1
<b>Power Supply</b>	DC	N/A
	ATX	ATX-Power 24P, 12V-4P
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	244 x 244mm (uATX)
	Weight	0.73 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit)

## Features

- 10 COM ports for flexible applications
- 3 independent displays: DVI-I and DP
- Supports DirectX 11.1 and Intel® Clear Video Technology (up to 1080P)
- Multiple expansion slots: PCIe x16, PCI x8 (x4 signal) and 2\*PCI
- 4 SATA 3.0 ports for faster and high-capacity storage
- Supports m-SATA function by Mini-PCIe slot
- Plenty USB ports for more peripherals (USB 2.0\*8 USB 3.0\*4)

## Ordering Information

Part Number	Description
919-98D6-001	MS-98D6 10 OPT: A Q87+2*PCIe+1*Mini-Pcie+2*P-CI+4*SATA3.0+1*mSATA+4*DDR3+2*DP+1*DVI+8*USB 2.0+4*USB3.0+10*COM+2*Gbe LAN+ATX Power

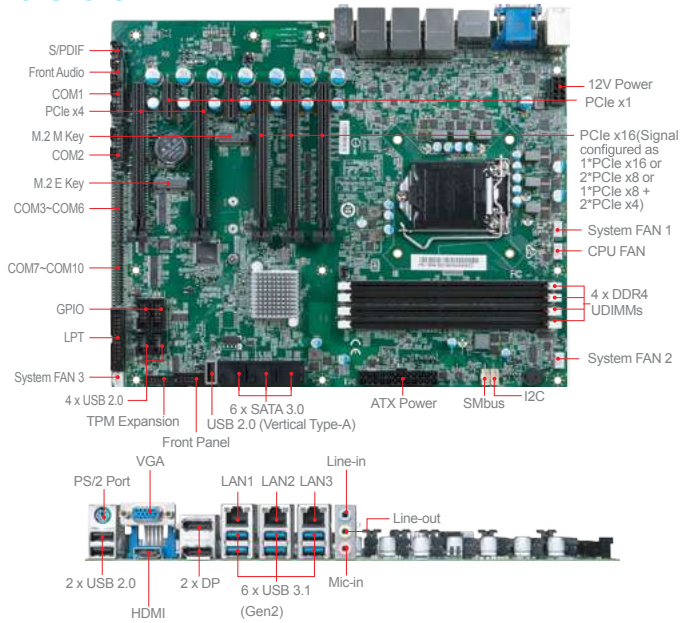
## Packing List

809-98D6-002		
Part Number	Description	Quantity
E21-98D6010-C22	IO SHIELD FOR MS-98D6	1
K14-1018003-V03	INT COM PORT CABLE,300mm	1
K1D-1008261-V03	INT SATA CABLE,500mm	2

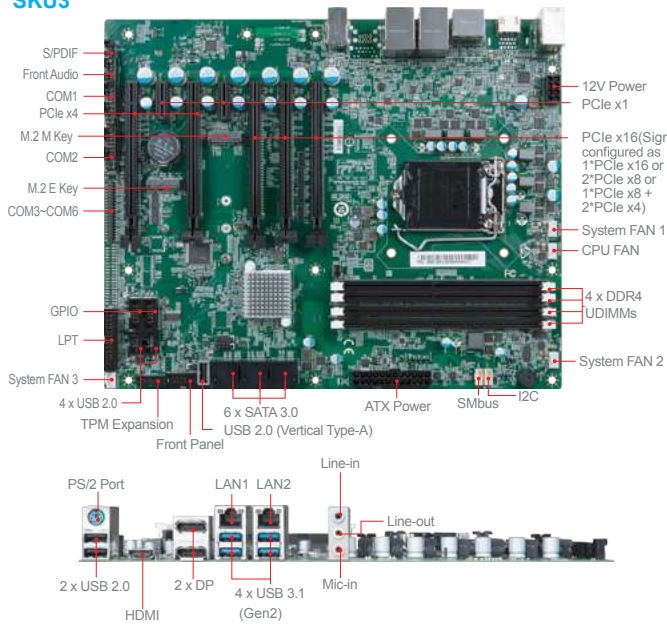
# MS-98K9

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® Coffee Lake-S Series CPU to maximize performance
- 4 DDR4 2666MHz UDIMMs slots up to 64GB memory
- Supports dual DP, VGA, HDMI, 3 Intel® GbE LAN and AMT 12.x
- Supports 6 SATA 3.0, 6 USB 3.1(Gen2), 7 USB 2.0 and 10 COM ports for flexible applications
- Supports 3 PCIe x16 (Signal configured as 1 PCIe x16 or 2 PCIe x8 or 1 PCIe x8 + 2 PCIe x4), 2 PCIe x4 (PCIe x16 Slot Type) and 2 PCIe x1 Slots

## 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*PCIe x16, 2*PCIe x4, 2*PCIe 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
919-98K9-002	MS-98K9\609-98K9-020\809-98K9-006 VER10 OPT:A Intel Coffee Lake-S Q370, 4*DDR4 Long DIMM, 3*PCIe x16, 2*PCIe x4, 2*PCIe 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*PCIe x16, 2*PCIe x4, 2*PCIe 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

	SKU1	SKU2	SKU3	
<b>System Processor</b>	CPU	8th Gen Intel® Desktop Coffee Lake-S Xeon® 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	
<b>Memory</b>	BIOS	AMI UEFI		
	Technology	Dual-channel DDR4 (ECC/ non-ECC) 2666MHz	Dual-channel DDR4 (non-ECC) 2666MHz	
	Max. Capacity	Up to 64GB		
	Socket	4 x 288-pin UDIMMs		
	Controller	Intel® HD Graphics		
<b>Display</b>	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	LVDS	1 x Dual channel 18/24-bit		
	VGA	1	N/A	
	HDMI	1		
	DisplayPort	2		
<b>Ethernet</b>	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	
	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	Realtek® ALC887-VD2-CG Audio Codec		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer		
	Smart Fan	Yes		
<b>I/O Interfaces</b>	USB	6 x USB 3.1 Gen2 (6 x rear) 7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A)	4 x USB 3.1 Gen2 (4 x rear) 7 x USB 2.0 (2 x rear, 5 x internal with one Vertical Type-A)	
	Serial	10 x COM ports (internal) COM1-2: RS-232/422/485, Ring/OV/5V/12V, Auto-flow Control COM3-10: RS-232, 0V/5V/12V	6 x COM ports (Internal) COM1-2: RS-232/422/485, Ring/OV/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		
<b>TPM</b>	Controller	Infineon SLB 9665TT2.0	Box header (Default) Infineon SLB9665TT2.0 (by BOM option)	
	<b>Expansion Slot</b>	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		
<b>Storage</b>	Mini-PCIe	N/A		
	SATA	6 x SATA 3.0 (Support RAID 0/1/5/10, SATA Port 6 share with M.2 M Key)		
<b>Power Supply</b>	DC Input	N/A		
	AC Input	ATX-Power 24P, 12V-8P		
<b>Form Factor</b>	Operating Temperature	-10 ~ 60°C		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
	Storage Humidity	10 ~ 90%, non-condensing		
<b>Certification</b>	Dimensions (W x D x H)	305 x 244mm (ATX)		
	Weight	0.70 kg		
<b>Software Platform</b>	EMC	CE, FCC Class B, BSMI, RCM, VCCI		
	OS Support	Windows 10 (64-bit) Linux Kernel 4.x (by request)		

## Packing List

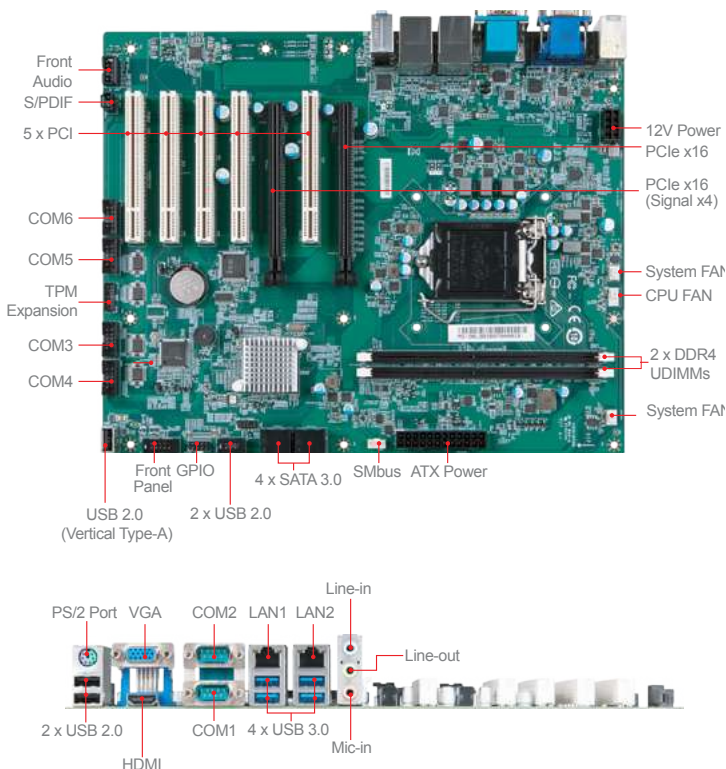
Part Number	Description	Quantity
K1B-3008012-E06	IO SHIELD FOR MS-98D6	1
K14-1018004-V03	INT COM PORT CABLE, 510mm	1
K1D-1008261-V03	INT SATA CABLE, 500mm	2
E21-98K9010-C22	I/O Shielding	1
G71-SEDC192-N56	Driver CD	1

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98L9

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

NEW



## Features

- Intel® Kaby Lake-S/Skylake-S Series CPU to maximize performance
- 2 DDR4 2133/2400MHz UDIMMs slots up to 32GB memory
- Supports VGA, HDMI and dual Intel® GbE LAN
- Supports 4 SATA 3.0, 4 USB 3.0, 5 USB 2.0 and 6 COM ports for flexible applications
- Supports 1 PCIe x16, 1 PCIe x4 and 5 PCI Slots

## 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
G71-SEDC193-N56	Driver CD	1

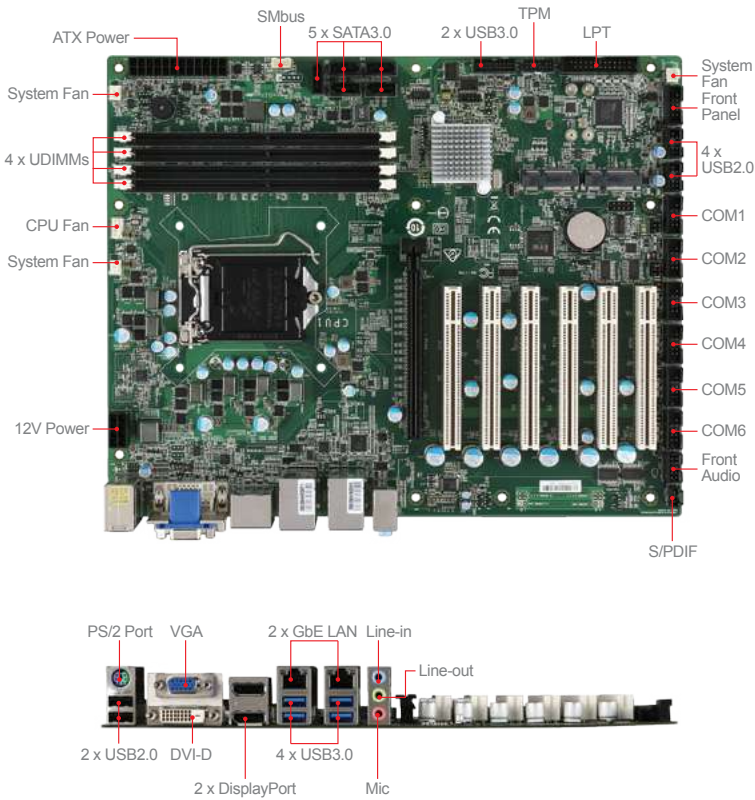
## Specifications

<b>Processor</b>	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
<b>Memory</b>	BIOS	AMI UEFI
	Technology	Dual-channel DDR4 2133/2400MHz
	Max. Capacity	Up to 32GB
<b>Display</b>	Socket	2 x 288-pin UDIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	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
<b>Ethernet</b>	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I211-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887-VD2-CG Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Box header
<b>I/O Interface</b>	USB	4 x USB 3.0 (4 x rear) 5 x USB 2.0 (2 x rear, 3 x internal with one Vertical Type-A)
	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
<b>Expansion Slot</b>	PCIe x16	1
	PCIe x4	1 (PCIe x16 Slot Type)
	PCI	5
	M.2	N/A
<b>Storage</b>	Mini-PCIe	N/A
	SATA	4 x SATA 3.0
	mSATA	N/A
<b>Power Supply</b>	DC	N/A
	ATX	ATX-Power 24P, 12V-8P
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	305 x 244mm (ATX)
	Weight	0.70 kg
<b>Certification</b>	EMC	CE, FCC Class B, BSMI, RCM, VCCI
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Windows 7 (32/64-bit) (Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)

# MS-98H9 V2.0

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

NEW



## Features

- Intel® Kaby Lake-S/Skylake-S Series CPU to maximize performance
- 4 DDR4 2133MHz UDIMMs slots up to 64 GB memory
- Supports DisplayPort, DVI-D, dual Intel® GbE LAN and AMT 11.0
- Supports 6 COM ports, 5 SATA 3.0, 1 mSATA, 6 USB 3.0 and 6 USB 2.0 for flexible applications
- Supports 1 PCIe x 16 and 6 PCI Slots

## Ordering Information

Part Number	Description
919-98H9-006	MS-98H9 20 OPT:A LGA1151,Q170,4*D-DR4,1*DVI-D+1*VGA+2*DisplayPort 1.2a+6*USB3.0+6*USB2.0+5*SATA3.0+1*mSATA+6*COM+1*PCIe+6*PCI+2*GBE 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
G71-SEDC148-N56/X03	Driver CD	1

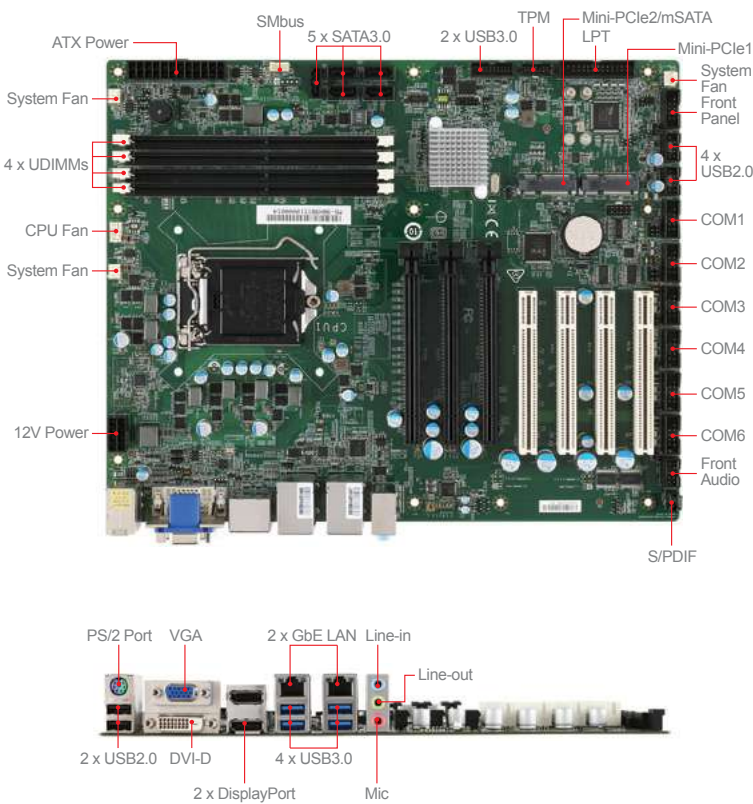
## Specifications

<b>Processor</b>	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
<b>Memory</b>	BIOS	AMI UEFI
	Technology	Dual-channel DDR4 (non-ECC)
	Max. Capacity	Up to 64GB
	Socket	4 x 288-pin UDIMMs
<b>Display</b>	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	LVDS	N/A
	eDP	N/A
	VGA	1 (Non Hot Plug)
	DVI	1 (DVI-D)
	HDMI	N/A
	DisplayPort	2
<b>Ethernet</b>	Controller	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
	Watchdog Timer	256-level Watchdog Timer
<b>H/W Monitor</b>	Smart Fan	Yes
	TPM	Controller
<b>I/O Interface</b>	USB	6 x USB 2.0 (2 x rear; 4 x internal) 6 x USB 3.0(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
	<b>Expansion Slot</b>	PCIe x16
PCIe x4		N/A
PCIe x1		N/A
PCI		6
M.2		N/A
Mini-PCIe		2 x Full-size (one w/ mSATA)
<b>Storage</b>	SATA	5 x SATA 3.0 (Support RAID 0/1/5/10)
	IDE	N/A
	eSATA	N/A
	CFast	N/A
	mSATA	1
	CompactFlash	N/A
<b>Power Supply</b>	DC	N/A
	ATX	ATX-Power 24P, 12V-8P
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	305 x 244mm (ATX)
	Weight	0.70 kg
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI (Class B)
	OS Support	Windows 10 (64-bit) Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICMG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98H9

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



## Features

- Intel® Kaby Lake-S/Skylake-S Series CPU to maximize performance
- 4 DDR4 2133MHz UDIMMs slots up to 64GB memory
- Supports DisplayPort, DVI-D, dual Intel® GbE LAN and AMT 11.0
- 5 SATA 3.0, 1 mSATA, 6 COM, 6 USB 3.0, 6 USB 2.0
- 1 PCIe x 16, dual PCIe x 4 and 4 PCI Slots

## Ordering Information

Part Number	Description
919-98H9-001	LGA1151, C236, 4*DDR4, 1*DVI-D+1*VGA+2*Display-Port 1.2a+6*USB3.0+6*USB2.0+5*SATA3.0+1*mSATA+6*COM+2*GBE LAN+ATX POWER
919-98H9-002	OPT: A LGA1151, Q170, 4*DDR4, 1*DVI-D+1*VGA+2*DisplayPort 1.2a+6*USB3.0+6*USB2.0+5*SATA3.0+1*mSATA+6*COM+2*GBE LAN+ATX POWER
919-98H9-003	OPT: B LGA1151, H110, 2*DDR4, 1*DVI-D+1*VGA+2*DisplayPort 1.2a+4*USB3.0+4*USB2.0+4*SATA3.0+6*COM+2*GBE LAN+ATX POWER

## Packing List

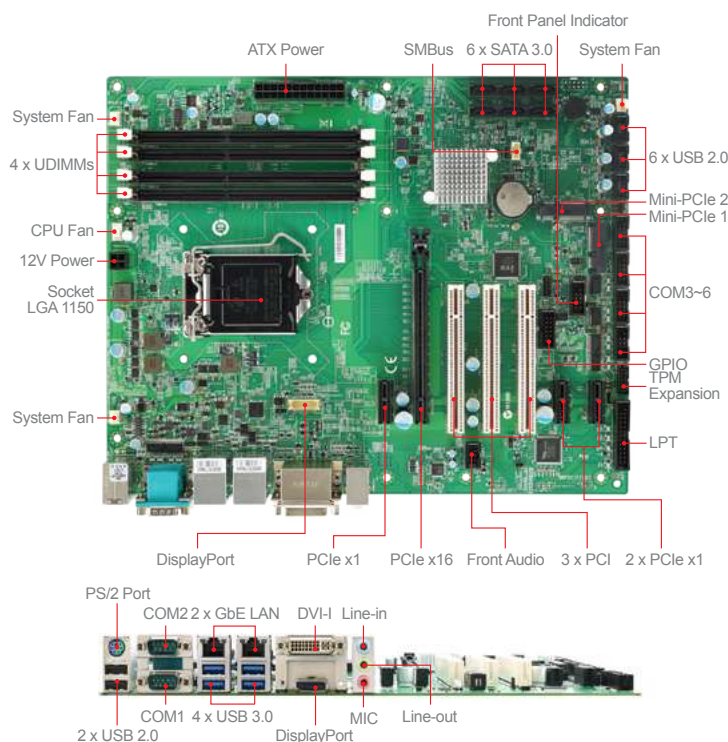
Part Number	Description	Quantity
K1B-3008012-E06	USB 2.0 Cable, 330mm	1
K14-1018004-V03	COM Port Cable, 510mm	1
K39-3002004-E06	PS/2 Y-Cable, 190mm	1
K18-1025011-V03	LPT Cable, 300mm	1
K1D-1008261-V03	SATA Cable, 500mm	2
E21-98H9010-C22	I/O SHIELDING	1
G71-SEDC148-N56/X03	DRIVER DVD	1

## Specifications

		C236 SKU	Q170 SKU	H110 SKU
<b>Processor</b>	CPU	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)		
	Chipset	Intel® C236 Express	Intel® Q170 Express	Intel® H110 Express
	BIOS	AMI UEFI		
<b>Memory</b>	Technology	Dual-channel DDR4 (ECC) 2133MHz		
	Max. Capacity	Up to 64GB		Up to 32GB
	Socket	4 x 288-pin UDIMMs		2 x 288-pin UDIMMs
<b>Display</b>	Controller	Intel® HD Graphics		
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM		
	VGA	1 (Non Hot Plug)		
	DVI	1 (DVI-D)		
	DisplayPort	2		
<b>Ethernet</b>	Multiple Display	3 independent displays		
	Display Interface	VGA up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz DP up to 4096 x 2304 @60Hz		
<b>Ethernet</b>	Controller	1 x Intel® I219-LM GbE LAN PHY (Support Intel® AMT 11) 1 x Intel® I210-AT GbE LAN		
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec		
<b>Super I/O</b>	Controller	Fintek F81866AD-I		
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer		
<b>TPM</b>	Smart Fan	Yes		
<b>I/O Interface</b>	Controller	Box header		
	USB	6 x USB3.0 (4 x rear, 2 x internal) 6 x USB2.0 (2 x rear, 4 x internal)	4 x USB3.0 (4 x rear) 4 x USB2.0 (2 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	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		
<b>Expansion Slot</b>	PCIe x16	1		
	PCIe x4	2		1
	PCI	4		
	M.2	N/A		
<b>Storage</b>	Mini-PCIe	2 x Full-size (one w/ mSATA)		N/A
	SATA	5 x SATA 3.0 (Support RAID 0/1/5/10)		4 x SATA 3.0
<b>Power Supply</b>	mSATA	1		N/A
	DC	N/A		
<b>Environment</b>	ATX	ATX-Power 24P, 12V-8P		
	Operating Temperature	-10 ~ 60°C		
	Operating Humidity	10 ~ 90%, non-condensing		
	Storage Temperature	-20 ~ 80°C		
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing		
	Dimensions	305 x 244mm (ATX)		
	Weight	0.70 kg		
<b>Certification</b>	EMC	FCC, CE, RCM, VCCI, BSMI (Class B)		
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Windows 7 (32/64-bit) (Intel® Skylake-S Series CPU Only) Windows 8.1 (64-bit) (Intel® Skylake-S Series CPU Only) Linux Fedora 23 (by request) Linux Ubuntu 16.04 (by request)		

# MS-98B5

ATX with 4th Gen Intel® Core™ i7/i5/i3/Pentium®/Celeron® Processor and Intel® H81/Q87 for High-Performance Solution



## Features

- Intel® Haswell Series CPU to maximize performance
- 4 DDR3/DDR3L 1600MHz UDIMMs up to 32GB
- Supports DisplayPort, DVI-I, Dual Intel® GbE LAN and AMT 9.0
- 6 SATA 3.0, 6 COM, 4 USB 3.0, 8 USB 2.0
- Supports ATX power

## Ordering Information

Part Number	Description
919-98B5-001	MS-98B5 10 Q87, ATX, LGA1150, 4*DDR3, 1*D-VI-I+2*DisplayPort 1.2a +4*USB3.0+8*USB2.0+6*SATA3.0+6*COM+2*GbE LAN+ATX POWER, RoHS
919-98B5-002	MS-98B5 10 OPT:A, H81, ATX, LGA1150, 2*DDR3, 1*D-VI-I+2*DisplayPort 1.2a +2*USB3.0+8*USB2.0+2*SATA3.0+2*SATA2.0+6*COM+2*GbE LAN+ATX POWER, RoHS

## Packing List

Part Number	Description	Quantity
K14-1018004-V03	Internal COM Port Cable with Bracket, 510mm	2
K18-1025011-V03	Internal LPT Cable with Bracket, 300mm	1
K1B-3008012-E06	Internal USB2.0, 330mm	1
K1D-1008261-V03	SATA Cable, 500mm	2
K39-3002004-E06	External PS/2 Y-Cable, 190mm	1
E21-98B5010-C22	I/O Shielding	1
G71-SEDC159-N56	Driver DVD	1

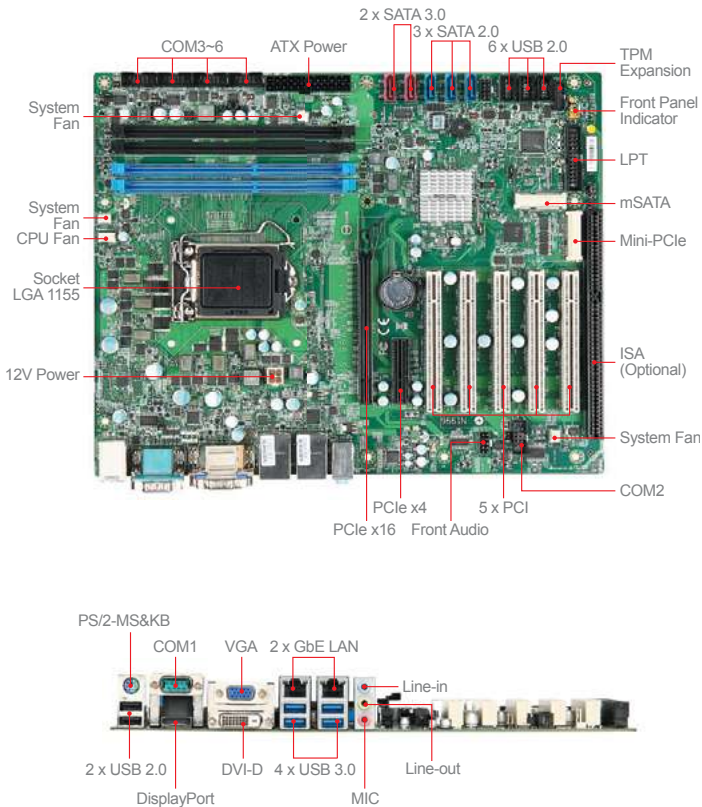
## Specifications

<b>Processor</b>	CPU	4th Gen Intel® Core™ i7/i5/i3/Pentium®/Celeron® Processor, Max. 95W
	Frequency	2.4GHz~4.0 GHz (Depends on CPU)
	L2 Cache	2M~8M (Depends on CPU)
	CPU Type	Socket (LGA 1150)
	Chipset	Intel® H81/Q87 Express
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3/DDR3L 1333/1600MHz
	Max. Capacity	Up to 32GB
<b>Display</b>	Socket	4 x 240-pin DIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	DVI	1 (DVI-I)
	DisplayPort	1
<b>Ethernet</b>	Multiple Display	2 independent displays (H81 SKU) 3 independent displays (Q87 SKU)
	Display Interface	VGA up to 1920 x 1080 @60Hz DVI-D up to 2560 x 1600 @60Hz DP up to 2560 x 1600 @60Hz
<b>Ethernet</b>	Controller	1 x Intel® I217-LM GbE LAN PHY 1 x Intel® I210-AT GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866AD-I
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	8 x USB 2.0 (Q87: 2 x rear; 6 x internal; H81: 4 x rear; 4 x internal) 4 x USB 3.0 (Q87: 4 x rear; H81: 2 x rear)
	Serial	6 x COM ports (COM1~2: rear, COM3~6: 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
<b>Expansion Slot</b>	PCIe x16	1
	PCIe x1	3
	PCI	3
	M.2	N/A
	Mini-PCle	2 x Full-size (Q87 only)
<b>Storage</b>	SATA	6 x SATA 3.0 (H81 SKU: 2 x SATA 2.0, 2 x SATA 3.0) (Q87 SKU: RAID 0/1/5/10)
	DC	N/A
<b>Power Supply</b>	ATX	ATX-Power 24P, 12V-4P
	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
<b>Environment</b>	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	305 x 244mm (ATX)
	Weight	0.70 kg
<b>Form Factor</b>	Weight	0.70 kg
<b>Certification</b>	EMC	FCC, CE, RCM VCCI, BSMI (Class A)
<b>Software Platform</b>	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit) Windows 10 (64-bit)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
EPC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-98A9

ATX with 3rd Gen Intel® Core™ i7/i5/i3/Pentium®/Celeron® Processor and Intel® Q77 for High-Performance Solution



## Features

- Intel® Ivy Bridge and Sandy Bridge Series CPU to maximize performance
- Supports 4 DDR3 1600MHz UDIMM up to 32GB
- Supports DisplayPort, DVI-D, VGA and dual Intel® GbE LAN
- 2 SATA 3.0, 3 SATA 2.0, mSATA, 6 COM, 4 USB 3.0, and 8 USB 2.0
- Supports AMT 8.0
- Supports ISA slot (optional)
- Supports ATX power

## Ordering Information

Part Number	Description
919-98A9-001	MS-98A9 VER 1.1 INTEL IVY BRIDGE+Q77, 4*DDR3, 1*VGA+1*DVI,1*DP, 10*USB 2.0, 4*USB 3.0, 2*GbE LAN, 1*Mini-PCle, 1*mSATA, 3*SATA2, 2*SATA3, with ISA
919-98A9-002	MS-98A9 VER 1.1 INTEL IVY BRIDGE+Q77, 4*DDR3, 1*VGA+1*DVI,1*DP, 10*USB 2.0, 4*USB 3.0, 2*GbE LAN, 1*Mini-PCle, 1*mSATA, 3*SATA2, 2*SATA3, without ISA

## Packing List

Part Number	Description	Quantity
K14-1018004-V03	Internal COM Port Cable with Bracket, 510mm	2
K18-1025011-V03	Internal LPT Cable with Bracket, 300mm	1
K1B-3008012-E06	Internal USB2.0, 330mm	1
K39-3002004-E06	External PS/2 Y-Cable, 190mm	1
K1D-1080054-E06	SATA Cable, 625mm	2
E21-98A9010-C22	I/O Shielding	1
G71-SEDC078-J24	Driver DVD	1

## Specifications

<b>Processor</b>	CPU	3rd Gen Intel® Core™ i7/i5/i3/Pentium®/Celeron® Processor, Max.95W
	Frequency	2.8GHz~3.9 GHz (Depends on CPU)
	L2 Cache	3M~8M (Depends on CPU)
	CPU Type	Socket (LGA 1155)
	Chipset	Intel® Q77 Express
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR3 1333/1600MHz
	Max. Capacity	Up to 32GB
<b>Display</b>	Socket	4 x 240-pin DIMMs
	Controller	Intel® HD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	VGA	1
	DVI	1 (DVI-D)
<b>Ethernet</b>	DisplayPort	1
	Multiple Display	2 independent displays (SNB CPU only) 3 independent displays (IVB CPU only)
	Display Interface	VGA up to 1920 x 1080 @60Hz DVI-D up to 1920 x 1200 @60Hz DP up to 2560 x 1600 @60Hz HDMI up to 1920 x 1200 @60Hz
	Controller	1 x Intel® 82579LM GbE LAN PHY 1 x Intel® 82583V GbE LAN
<b>Audio</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>Super I/O</b>	Controller	Fintek F81866
<b>H/W Monitor</b>	Watchdog Timer	256-level Watchdog Timer
	Smart Fan	Yes
<b>TPM</b>	Controller	Pin header
<b>I/O Interface</b>	USB	4 x USB 3.0 (rear) 8 x USB 2.0 (2 x rear; 6 x internal)
	Serial	6 x COM ports (COM1: rear, COM2~6: internal) COM1~2: RS-232/422/485, 0V/5V/12V COM3~6: RS-232, 0V/5V/12V
	Parallel	1
	PS/2	1
	GPIO	8-bits (4 x GPI; 4 x GPO), 5V
	<b>Expansion Slot</b>	PCIe x16
PCIe x4		1
PCI		5
M.2		N/A
Mini-PCle		1 x Full-size
<b>Storage</b>	SATA	2 x SATA 3.0; 3 x SATA 2.0 (support RAID 0, 1, 5, 10)
	mSATA	1
<b>Power Supply</b>	DC	N/A
	ATX	ATX-Power 24P, 12V-4P
<b>Environment</b>	Operating Temperature	0 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
<b>Form Factor</b>	Storage Humidity	10 ~ 90%, non-condensing
	Dimensions	305 x 244mm (ATX)
	Weight	0.75 kg
<b>Certification</b>	EMC	FCC Class A, CE, RCM, VCCI, BSMI
<b>Software Platform</b>	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8 (32/64-bit)
		* 1 x ISA Slot (optional)



# MS-99C9

Compact-Size DC to DC Converter Module 140W With OCP/OVP Protection

NEW



1x2 pin DC-in

1x4 pin DC-out

## Features

- 140W Total Power
- Wide DC Input Range: +9~36V; DC Output: +12V/11.6A
- Supports over voltage/current protection
- Supports voltage reverse protection
- Operating Temperature Range: -40C~85C
- Efficiency up to 95%

## Ordering Information

Part Number	Description
919-99C9-102	DC IN 9~36V port, DC out 12V, WT

## Packing List

Part Number	Description	Quantity
NA1-1020073-SR2	DC-in Phoenix Connector 1x2 Pin	1

## Application



Automation



Transportation



Medical



Energy

## Specifications

Power Supply	DC Input	DC-in 9~36V, DC-out 12V
	AC Input	N/A
Environment	Operating Temperature	-40 ~ 85°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions (W x D x H)	122 x 23 mm (DC to DC Converter Module)
	Weight	0.046 kg
Certification	EMC	CE, FCC Class A, BSMI, VCCI, RCM
Software Platform	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (64-bit) Linux

## Optional Item

Form Factor	Model	CPU
Pico-ITX	MS-98I6	Intel® Apollo Lake / Apollo Lake-I
	MS-98H6	Intel® Braswell
3.5"	MS-98L3	Intel® Whiskey Lake-U
	MS-98H3	Intel® Kaby Lake-U / Skylake-U
	MS-98E6	Intel® Apollo Lake / Apollo Lake-I
	MS-98G6	Intel® Bay Trail-D/M
	MS-98F6	Intel® Bay Trail-D/M
	MS-98F3	Intel® Haswell-U / Broadwell-U
EPIC	MS-98H5	Intel® Apollo Lake / Apollo Lake-I
	MS-98K1	Intel® Kaby Lake-S / Skylake-S
	MS-98J4	Intel® Kaby Lake-U / Skylake-U
	MS-98B1	Intel® Apollo Lake / Apollo Lake-I
Mini-ITX	MS-98J0	Intel® Apollo Lake / Apollo Lake-I
	MS-9892	Intel® Apollo Lake / Apollo Lake-I
	MS-98F1	Intel® Braswell
	MS-98I0	Intel® Braswell
	MS-98F5	Intel® Bay Trail-D
	MS-98E3	Intel® Bay Trail-D/M
Compact-Size Box PC	MS-9A89	Intel® Kaby Lake-U / Apollo Lake / Apollo Lake-I
In-Vehicle/Transportation Box PC	MS-9B17	Intel® Apollo Lake
Din Rail Slim Box PC	MS-9A77	Intel® Kaby Lake-U/Skylake-U
	MS-9A97	Intel® Apollo Lake

MS-99C9

MS-9A97

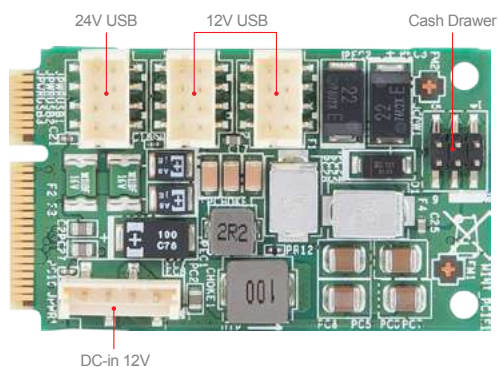


Industrial Computer  
COM Express Board  
Open Board  
Pico-ITX Board  
3.5" Board  
EPIC Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# MS-99C5

Full-Size Mini-PCle SBC in Multi-I/O Function with Power USB & Expansion Card for POS Application

**NEW**



Specifications		
I/O Interface	USB	1 x 24V Power USB (by cable) 2 x 12V Power USB (by cable)
	Power Supply	DC ATX
Environment	DC	DC-in 12V
	ATX	N/A
	Operating Temperature	0 ~ 60°C
Environment	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
Form Factor	Dimensions	47.75 x 30mm (Full-Size Mini-PCle)
	Weight	0.01 kg
Certification	EMC	CE, FCC Class A, BSMI, VCCI, RCM
Software Platform	OS Support	Windows XP (32/64-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 (32/64-bit) Fedora 25 Ubuntu 16.04

- ### Features
- Multi-I/O function with 1\*24V power USB, 2\*12V power USB and 1\*cash drawer
  - Mini-PCle interface can meet various system expansion requests
  - Supports cash drawer with RJ11 by cable (for POS application)

### Ordering Information

Part Number	Description
Coming soon	

### POS Application



### Compatible Embedded Boards & Systems

Model	Form Factor	CPU
MS-9892	Mini-ITX	Intel® Apollo Lake/Apollo Lake-I
MS-98E1	Mini-ITX	Intel® Kaby Lake/Skylake
MS-98E2	Micro-ATX	Intel® Kaby Lake/Skylake
MS-98H9 V2.0	ATX	Intel® Core™ i7/i5/ i3 Pentium®/Celeron®
MS-9A89	Compact-Size Box PC	Intel® Kaby Lake-ULT or Apollo Lake-I

### Packing List

Part Number	Description
Coming soon	



# MS-98C5

Intel® Smart Display Module Large (SDM-L) with 8th Gen Intel® Whiskey Lake ULT Core™ i7/i5/i3/Celeron® Platform

NEW



Thin 2mm



## Features

- Intel® SDM-L form factor for easy installation & maintenance
- 2\*DDR4 2400MHz SO-DIMMs slots up to 32GB memory
- 2 independent displays: Golden Finger (HDMI 2.0, DP 1.2) & Front Bracket (HDMI 1.4)
- Supports Real 4K resolution
- Supports iAMT 12 (depend on CPU)
- Optimized for digital signage, KIOSK, professional monitor, POS, interactive flat panel display, and more.
- Future-proofed card edge connector supports multiple generations of Intel® processors, functionality, and display resolutions.

## Ordering Information

Part Number	Description
Coming soon	

## Packing List

Part Number	Description
Coming soon	

## Application



Digital Signage



Interactive Display



KIOSK



POS

## Specifications

<b>Processor</b>	CPU	8th Gen Intel® Whiskey Lake ULT Core™ i7/i5/i3/Celeron® Processor, QC/DC, 15W
	Frequency	1.6GHz~2.2GHz(Depends on CPU)
	L2 Cache	4M~8M (Depends on CPU)
	CPU Type	BGA
	Chipset	N/A
<b>Memory</b>	BIOS	AMI
	Technology	Dual-channel DDR4 2400 MHz
	Max. Capacity	Up to 32 GB
<b>Display</b>	Socket	2 x 260-pin SO-DIMM
	Controller	Intel® UHD Graphics
	Graphic Memory	Shared system memory up to 1.7 GB SDRAM
	HDMI	2 (1*HDMI1.4 rear, 1*HDMI2.0 through PCIe x8 gold finger)
<b>Ethernet</b>	DisplayPort	1 (through PCIe x8 gold finger)
	Multiple Display	2 independent displays
	Display Interface	HDMI1.4 up to 4096 x 2160 @24Hz HDMI2.0 up to 4096 x 2160 @60Hz DP up to 4096 x 2340 @60Hz
<b>Audio</b>	Controller	1 x Intel® I219LM GbE LAN PHY
<b>Super I/O</b>	Controller	Realtek® ALC887 HD Audio Codec
<b>H/W Monitor</b>	Controller	Fintek F81866AD-I
	Watchdog Timer	256-level Watchdog Timer
<b>TPM</b>	Smart Fan	Yes
	Controller	Infineon SLB9665TT2.0 (default) Pin header (by BOM option)
	USB	3 x USB 3.0 Gen1/USB3.1 Gen2 (depends on CPU) (2x rear, 1 x internal through PCIe x8) 2 x USB 3.0 (2x rear)
<b>I/O Interface</b>	Serial	2 x COM ports (internal) COM1-2: RS-232 , 0V
	GPIO	N/A
	PCIe x8	1 (gold finger, the pin define follows Intel® SDM specifications) (1x DP1.2,1x HDMI 2.0, 1x USB 3.1, 1x PCIe, 1x UART, 2x I2C)
<b>Expansion Slot</b>	M.2	1 x E Key (PCIe x1/ USB 2.0), 2230 1 x M Key (PCIe x4/ SATA 3.0), 2242
	Mini-PCIe	N/A
<b>Storage</b>	SATA	N/A
<b>Power Supply</b>	DC	DC-in 12V (via gold finger, power from SDM Host monitor)
	ATX	N/A
<b>Environment</b>	Operating Temperature	-10 ~ 60°C
	Operating Humidity	10 ~ 90%, non-condensing
	Storage Temperature	-20 ~ 80°C
	Storage Humidity	10 ~ 90%, non-condensing
<b>Form Factor</b>	Dimensions	175 x 100mm (Intel® SDM-L)
	Weight	0.23 kg
<b>Certification</b>	EMC	FCC, CE, VCCI, RCM
<b>Software Platform</b>	OS Support	Windows 10 (64-bit) Windows 10 IoT Enterprise RS5 (64-bit) Linux Ubuntu & Fedora (kernel 4.19)

Industrial Computer  
COM Express Board  
Seven Board  
Pico-ITX Board  
3.5" Board  
Epic Board  
PICO-MG Board  
Mini-ITX Board  
Micro-ATX Board  
ATX Board  
Compact-Size DC/DC  
Full-Size Mini-PCle  
Intel® SDM

# ***msi***<sup>®</sup> *IPC*

E-mail: [ipcsales@msi.com](mailto:ipcsales@msi.com)

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