



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