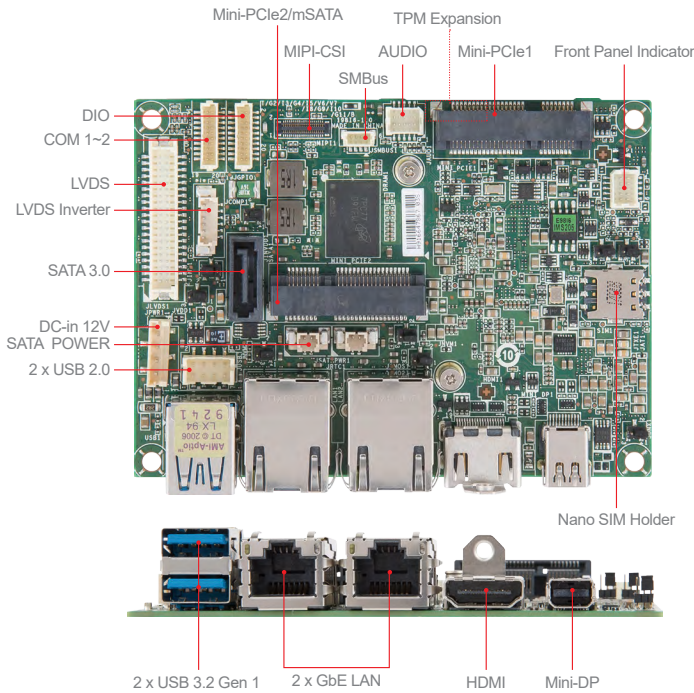


# MS-9816

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



## Features

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

## Ordering Information

Part Number	Description
919-9816-006	MS-9816 10, Apollo Lake-I E3940 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE
919-9816-007	MS-9816 10, Apollo Lake-I E3930 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE
919-9816-009	MS-9816 10, Apollo Lake N4200 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE
919-9816-010	MS-9816 10, Apollo Lake N3350 F1 Stepping, Onboard LPDDR4 4GB, 1*HDMI, 1*LVDS, 1*Mini-DP, 1*MIPI, 2*Mini-Pcie, 2*USB3.0, 2*USB2.0, 1*SATA3.0, 2*COM, 2*LAN, DC 12V, SINGLE

## Packing List

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

## Specifications

Processor	CPU	Apollo Lake SKUs	Apollo Lake-I SKUs
		Intel® Pentium® Processor N4200, QC, 6W Intel® Celeron® Processor N3350, DC, 6W Intel® Celeron® Processor J3455, QC, 10W	Intel® Atom™ x5 Processor E3940, QC, 9.5W Intel® Atom™ x5 Processor E3930, DC, 6.5 W
Memory	Frequency	N4200, 1.1 GHz, up to 2.5 GHz N3350, 1.1 GHz, up to 2.4 GHz J3455, 1.5 GHz, up to 2.3 GHz	E3940, 1.6 GHz, up to 1.8 GHz E3930, 1.3 GHz, up to 1.8 GHz
	L2 Cache	2M	
	CPU Type	BGA	
	Chipset	Integrated in SoC	
	BIOS	AMI	
Display	Technology	Single-channel LPDDR4 2133MHz	
	Max. Capacity	Up to 4GB	
	Socket	Onboard	
Ethernet	Controller	Intel® HD Graphics	Depends on CPU
	Graphic Memory	Dual Channel 18/24-bit	
	LVDS	N/A	
	eDP	N/A	
	VGA	N/A	
	DVI	N/A	
	HDMI	1	
	DisplayPort	1 (Mini-Displayport)	
	Multiple Display	3 independent displays	
	Display Interface	LVDS up to 1920 x 1200 @60Hz HDMI up to 3840 x 2160 @30Hz Mini-DP up to 4096 x 2160 @60Hz	
Audio	Controller	2 x Intel® I211-AT GbE LAN	2 x Intel® I210-IT GbE LAN
	Controller	Realtek® ALC887-VD2-CG HD Audio Codec	
Super I/O	Controller	Fintek F81866AD-I	
	Watchdog Timer	256-level Watchdog Timer	
H/W Monitor	Smart Fan	N/A	
	TPM	Controller Pin header	
I/O Interface	USB	2 x USB 2.0 (internal) 2 x USB 3.2 Gen 1 (rear)	
	Serial	2 x COM ports (internal) COM1: RS-232/422/485, 0V/5V/12V COM2: RS-232/422/485, 0V/5V/12V	
	GPIO	16-bits (8 x GPI; 8 x GPO), 5V	
Expansion Slot	Mini-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)	
	Storage	SATA mSATA	1 x SATA 3.0 1 (Shared with Mini-PCIe Half-size)
Power Supply	DC	DC-in 12V	
	ATX	N/A	
Environment	Operating Temperature	-10 ~ 60°C Note: Thermal Test w/ Airflow:0.7m/s	-40 ~ 85°C Note: Thermal Test w/ Airflow:0.7m/s
	Operating Humidity	10 ~ 90%, non-condensing	
	Storage Temperature	-20 ~ 80°C	-40 ~ 85°C
	Storage Humidity	10 ~ 90%, non-condensing	
Form Factor	Dimensions	101 x 73mm (Pico-ITX)	
	Weight	0.27 kg	
Certification	EMC	FCC, CE, RCM, VCCI, BSMI	
Software Platform	OS Support	Windows 10 IoT Enterprise LTSC/SAC 1809 (64-bit, RS5) Linux Fedora 25 (by request) Linux Ubuntu 16.04 (by request)	

## Optional Item

Part Number	Description
E31-0805900-K08	Heatspreader for Apollo Lake-I
E31-0805910-K08	Heatspreader for Apollo Lake