Airtop3

Specifications

About Airtop3

Airtop3 is a ruggedized small-form-factor fanless IoT edge server with remarkable performance, features and cooling.

The ruggedized aluminium case is specially designed to generate natural airflow by the waste heat of the CPU and GPU which allows Airtop3 to dissipate up to 300W without using a fan and operate at a wide temperature range.

Airtop3 has high RAM and storage capacity and plentiful networking and I/O ports. It is also modular and easy to service.

Main features

- Fanless cooling by Natural Airflow Technology
- Core i9 9900K 8-core CPU + Quadro RTX 4000 graphics
- Up to 128 GB RAM and 6 storage devices
- Rich networking and I/O with support for extension cards

- Compact 7.5 liter all-aluminium housing
- User-friendly industrial design with tool-free service
- Wide temperature range
- 5 year warranty

t: +27 12 342 3449 | e: sales@brandwagon.co.za | w: www.brandwagon.co.za

Overview

Performance

Airtop3 supports octa-core 9th generation Intel® Xeon® E Processors and Intel® Core™ i9 Processors, including the highest power 95W Xeon E 2288G / Core i9-9900K. The maximum RAM capacity is 128 GB DDR4-2666.

Storage is comprised of 6 devices – two NVMe SSDs – up to 2 TB each and four 2.5″ SATA 3 HDD/SSD with RAID support. For networking Airtop3 includes two GbE ports and support for Wi-Fi 802.11ac and 4G modem. I/O includes 3 4K displays, 6 USB 3.1 ports, 3 RS232 and audio.

This feature set may be satisfactory in some cases, but IoT has many specialized applications – deep learning may require a discrete GPU, automotive applications often require high capacity of high-speed storage, machine vision usually utilizes integrated PoE ports.

For these use cases and other, Airtop3 offers functional enhancements.

Enhancements

Enhanced graphics

Airtop3 has a PCIe x16 (PEG) slot with Natural Airflow passive cooling that supports up to 160W Quadro RTX 4000 graphics card. This powerful CPU + GPU setup is effective for low latency edge analytics workloads involving image recognition, machine learning or inferencing.

The four displays of the graphics card can work in tandem with the integrated graphics for a total of seven 4K displays.

Enhanced storage

The standard two NVMe cards and four 2.5″ SATA SSD/HDD support up to 20 GB with RST or software RAID and are passively cooled in a dedicated thermal zone.

Storage can be enhanced using Airtop3's NVM3 card installed in the PEG slot. NVM3 supports additional three NVMe cards up to NF1 30110 form factor.

NVM3 enables remarkable data rate of over 9500 MBps and increases max storage capacity to over 60 TB. It allows installing SSDs with power loss protection (PLP).

Enhanced networking

Dual Gbit Ethernet (Intel i210 + Intel i219) and optional WiFi 802.11ac + 4G/LTE modem are available as a standard. For higher bandwidth, dual 10 GbE card can be installed in the PEG slot. Extra networking capabilities can be added using a FACE Module

FM-LAN adds 4 independent GbE ports – useful for routing applications

FM-PoE adds 4 GbE ports, each with 802.3af PoE source which simplifies setups involving IP cameras

FM-OPLN adds 2 GbE SFP+ optical LAN ports which enables longer range, better immunity and higher security

brand
wagon

Overview

Natural Airflow

Natural Airflow (NAF) technology generates airflow without a fan.

The airflow is generated by the waste heat of the CPU and the GPU, and cools them down in the process.

Below is an explanation of the NAF elements:

The CPU and GPU each is thermally-coupled to a specially-designed massive copper plate using best-in-class TIM. Each copper plate is CNC-machined and mirror-polished.

Airtop3 is using high-performance flat heat-pipes – with 25 channels each. Three such heatpipes are arranged in a criss-cross array and pressed together against the copper-plate with direct large area thermal coupling between them. This structure distributes heat evenly on the face of the air-tubes panel. The thermal performance of the heatpipe-structure is comparable to a vapor chamber, but on a much larger scale.

The air-tubes panel doubles the cooling efficiency of a conventional heatsink. It achieves that by utilizing 14 air-tubes, each air-tube stimulates airflow by the stack-effect. The air-tubes panel is made of a single block of aluminium that undergoes multiple processing steps:

State-of-the-art extrusion with 14 cavities

Machining

Multi-layer coating for optimal balance between heat-dissipation and touch temperature

The result is a compact, near-flat passive heat-exchange element that can dissipate up to 160W.

Durability

The 7.5 liter housing is all-aluminium made of die-cast and extruded parts with precision machining for seamless fit, shock and vibration resistance.

There are no moving parts in Airtop3 and no filters, so Airtop3 is maintenance free. Since no mechanical wearing is involved Airtop3 reliability is not reduced over time, therefore Airtop3 ships with a 5 year warranty.

Natural Airflow cooling is effective at a wide temperature range. Airtop3 can be ordered at a temperature range of up to -40°C to 70°C.

Modularity and monitoring

Airtop3 supports Compulab FACE Modules (Function And Connectivity Extension Modules) which enable various application specific networking and I/O capabilities. A new FACE Module designed specifically for Airtop3 – FM-AT3 adds 2x USB 3.1 gen 2 (one USB type-C) + 1x USB 3.1 gen 1, front audio jacks, mini-PCIe socket with SIM card, micro-SD and diagnostics LEDs for troubleshooting RAM, BIOS and display issues.

It is very easy to install RAM and storage devices in Airtop3 thanks to the clamshell tool-free opening.

Airtop3 includes the I3M OLED display – for displaying vital runtime information including clock rate, temperature and power consumption.

brand wagon |

Airtop3 : Specifications and Models

System	Airtop3	
CPU	**Intel Xeon E3 2288G | Intel Core i9-9900K | Compatible 9th generation Xeon E and Core processors**	See Airtop3 build-to-order for a complete list of available CPUs. Other compatible CPUs can be installed for volume orders.
Chipset	**Intel C246 Chipset**	
RAM	**Up to 128 GB DDR4 ECC | non-ECC**	4x DIMM DDR4-2666 ECC | Non-ECC (unbuffered)
Storage	**2x NVMe**	M.2 key M 2280 | 2260 | 2242 | 2230 PCIe x4
	4x 2.5" HDD / SSD	4x disks up to 9.5mm | 2x 15mm disks
	Optional NVM3 card with 3x NVMe	3x NVMe M.2 key M 2260 | 2280 | 22110 | NF1 30110
Graphics & Display	**Integrated Intel UHD Graphics 630**	2x DisplayPort 1.2 – 4K @ 60 Hz HDMI 1.4 – 4K @ 24 Hz
	Optional discrete graphics card NVIDIA QUADRO RTX 4000 | GEFORCE GTX 1660 Ti	***Note:*** *integrated graphics can work in conjunction with discrete graphics for a total of 7 simultaneous displays.*
Networking	**LAN**	On-board: dual Gbit Ethernet (Intel I219 + Intel I210) Optional FACE Module: 4x GbE | 4x GbE + PoE | 2x optical LAN | Ethernet bypass
	Wireless LAN* 802.11ac dual antenna + BT 4.2	Add-on M.2 key E 2230 + 2x RP-SMA antennas. User can install another Wireless LAN adapter. * Optional
	Cellular communication* LTE/WCDMA/GSM/GNSS	Add-on M.2 key B 3042 + 2x RP-SMA antennas On-board micro-SIM socket. * Optional
I/O	**USB**	6x USB 3.1 gen 1 type-A on-board (back panel) By default (with FM-At2C FACE Module, in front panel): 1x USB 3.1 gen 2 type C 1x USB 3.1 gen 2 type A 1x USB 3.1 gen 1 type A
	Audio	On-board Realtek ALC1150 audio codec with line-out | mic | optical S/PDIF By default (with FM-At2C FACE Module, in front panel): Extra Realtek ALC1150 audio codec with headphones-out | mic Audio over HDMI | DP
	3x RS232 serial port	3x full-UART Extra 6 serial ports available with optional FM-SER FACE Module

Extensions	FACE Module (Function and Connectivity Extension Module)	FACE Module	Features
		FM-AT3	Built-in-self-test | USB type C + 2x USB type A | audio | micro-SD | mini-PCIe
		FM-POE	4x Gbit Ethernet with PoE (PSE) | 2x USB 2.0
		FM-LANE4U4	4x Gbit Ethernet | 4x USB 2.0
		FM-OPLN	2x Optical Gbit Ethernet (SFP+) | 2x USB 2.0
		FM-EBP	Gigabit Ethernet bypass
		FM-SER	6x RS232 / RS485
		FM-XTDM2	2x mini-PCIe

brand wagon

Airtop3 : Specifications and Models

Extensions	**PCIe x16 standard-height single-slot**	Used for discrete graphics card (GeForce or Quadro) / NVM3 card / 10 GbE card / another full-height PCIe card
	M.2 key E M.2 key B + micro-SIM socket	Normally used for optional WiFi and 4G card
Extra Features	**Natural air (NAF) cooling**	Fanless* natural convection cooling with no moving parts. *CPU, graphics card and PSU are all passively cooled. No case-fan or any other active cooling is required.*
	Redundant power	2x DC inputs with automatic failover.
	Trusted platform module 2.0*	
	I3M (integrated interactive information monitor)	An integrated OLED display with navigation keypad for displaying real time power consumption, temperatures and system information.
	Digital power & reset management using FPGA	Provides precise power-sequencing timing and system voltage monitoring.
	Clamshell opening | tool-free service	Case opens by pressing the top-bar. RAM modules and HDD-cartridge require no tools for installation*. *Other devices may require a Phillips screwdriver*
	System diagnostics LEDs	Discrete LED indicators of RAM detection, BIOS post HDMI and DisplayPort detection for quick case of booting issues.
	Configurable Auto-on	System behavior on power resume can be set to – On (S0) – Off (S5) – Last state
BIOS & OS	**BIOS**	
	AMI Aptio V	
	Operating systems: Windows 10 Professional | Linux Mint	Compatible with other Windows 10 variants. Compatible with other Linux variants. Compatible with other hypervisors and operating systems (e.g. ESXi, FreeBSD)
Power	**Input voltage range 17V – 24V** **Power consumption 8W – 300W**	Power consumption depends on – CPU and graphics card – System load – Installed devices – Connected peripherals
Temperature & Humidity	**Operating temperature range Up to -40°C to 70°C*** **Relative humidity 5% – 95% non-condensing**	*When ordered in industrial temperature range. Commercial and extended temperature range are also available.*
Dimensions & Weight	**Dimensions 10 cm (W) x 30 cm (H) x 25.5 cm (D) Weight 6 Kg to 9 Kg***	*Weight depends on configuration*
Housing & Cooling	**All aluminum housing**	
	Natural air	
Mounting	**Wall mounting bracket***	*Sold separately*
	DIN-rail mounting bracket*	*Sold separately*

brand wagon

Airtop3 : Specifications and Models

Left panel labels:
- Line-out
- Line in
- Optical S/PDIF
- 2x Gbit Ethernet LAN
- 6x USB 3.1 gen 1
- DC in (with redundancy)
- DisplayPort 2 (integrated)
- HDMI (integrated)
- DisplayPort 1 (integrated)
- Clamshell door lock
- Kensington cable lock
- Disk cartridge 4x 2.5" SATA3 6 Gbps HDD / SSD
- 4x WiFi / 4G antennas
- 3x RS232 COM ports
- Graphics card display ports

Center panel labels:
- M.2 E-key (WiFi, behind cartridge)
- M.2 B-key + micro SIM (4G, behind cartridge)
- 2x M.2 M-key 2280 for NVMe PCIe X4 (behind cartridge)
- Top bar
- Disk cartridge ejector
- RTC battery
- 4x DDR4 UDIMM
- Mini PCIe
- FM-AT2C FACE Module
- Remote power button conn.
- Micro SD
- Micro SIM for Mini PCIe
- Auxiliary PCIe power
- PCIe X16 socket
- Clamshell door
- CPU LGA1151 socket 9th gen Core C246 chipset (mounted on other side of motherboard)
- Graphics card

Right panel labels:
- I³M OLED display
- I³M keypad
- Power button
- Indicator LED - BIOS
- Indicator LED - RAM
- Indicator LED - HDMI
- Indicator LED - DisplayPort
- USB 3.1 gen 1
- USB 3.1 gen 2
- USB 3.1 gen 2 type C
- Headphones
- Microphone

200W by traditional passive cooling

Natural Airflow Cooling → 50% footprint

Use both walls → 25% footprint

50 cm × 50 cm

t: +27 12 342 3449 | *e:* sales@brandwagon.co.za | *w:* www.brandwagon.co.za

brand wagon