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Airtop2 – a compact fanless PC for harsh environments with Xeon and Quadro

Yokneam, Israel 14-Feb-2018 - Compulab is introducing Airtop2 – a high-performance ruggedized fanless PC for edge computing and industrial applications that require deployment in harsh conditions. Based on Intel® Xeon® Processor E3-1275 v6 with an optional NVIDIA Quadro P4000 – both passively cooled using Compulab proprietary Natural Airflow technology and with a volume of just 7.5 liter - Airtop2 redefines the performance level of compact fanless PCs.
Other remarkable features of Airtop2 are up to 64 GB DDR4, high-performance storage sub-system with 2x NVMe + 4x 2.5" SATA SSDs / HDDs, tool-free service and a broad selection of FACE Module extensions.
Airtop2 is available at an industrial temperature range of -40°C to 70°C and ships with 5 year warranty.
Note: Airtop2 is intended for professional applications. A variant of Airtop2 intended for silent-PC enthusiasts named "Airtop2 Inferno" powered by GeForce GTX 1080 graphics card will be introduce separately during Feb-2018.

Natural Airflow technology

Passive cooling is silent, reliable and requires no maintenance. Airtop2 achieves fourfold improvement in passive-cooling efficiency by Compulab's Natural Airflow cooling technology - a novel heat-exchange system that stimulates airflow without moving parts, and by cooling each of the 3 major heat sources (CPU, GPU and storage devices) using a dedicated thermal zone independent of the other two.

Natural Airflow (NAF) technology is based on a multi-stage heat-exchanger. The first stage is a mirror-polished copper-plate attached to the hot spot. The 2nd stage is a set of high-performance flat heat-pipes arranged in a crisscross array that spread the heat evenly onto the surface of the air-tubes panel. The last stage is upward airflow generated inside the air-tubes by the stack effect due to the temperature gradient between the air-tubes and the air within.

Natural Airflow cooling is effective at an extremely broad temperature range. This allows Airtop2 to operate under load at ambient temperatures exceeding 70°C. NAF cooling is not subject to clogging, is not sensitive to dust and moisture and requires no maintenance thanks to not having any moving parts, filters or tight airways found in computers with traditional forced-air cooling.

Industrial design

Despite being small and fanless Airtop2 excels in ease-of-use. RAM and storage-devices are easy to reach with a tool-free clamshell opening mechanism. The front panel incorporates the I^3M (Integrated Interactive Information Monitor) which shows on an embedded OLED display data like temperatures and power which the I^3M acquires from the motherboard and operating system in real time.
"With a 2nd generation product like Airtop2 we usually observe high customer satisfaction" said Irad Stavi, Chief Product Officer at Compulab. "NAF cooling worked extremely well in Airtop1 and is now considered field-proven technology. In Airtop2 the core components - CPU, graphics and RAM are modernized with increased capacity and performance, the storage system is completely revamped and is now not only on-par with storage of current small-form-factor PCs but has best-in-class performance, capacity, cooling and serviceability. Professionals and enthusiasts alike have a keen interest in Airtop2 but while professionals focus on ruggedization and modularity, enthusiasts care for performance and silent operation. Airtop2 is geared towards professionals. For enthusiasts we are introducing an enhanced-performance variant – the Airtop2 Inferno."
Airtop2 7.5 liter housing is all-aluminium. The die-cast and machined parts fit seamlessly to make a ruggedized enclosure with functional elegance.

Motherboard and core-components

Airtop2 core-components are selected to provide balanced high performance for the most demanding edge-computing workloads. Core-components comprise of a Xeon-E3 CPU coupled with a Quadro GPU (both cooled passively) supplemented by up to 64 GB DDR4.
The motherboard is designed from the ground up to combine effective NAF cooling, optimal serviceability and enhanced reliability. The motherboard includes many novelties like redundant power supplies, sockets facing the clamshell door for simple tool-free upgrades and rigid-flex PCIe adapter to install full-height cards parallel to the motherboard.
"A design goal of Airtop2 is to be able to operate unattended indefinitely." said Yuval Sela, Airtop hardware architect. "For that we completely redesigned one of the most sensitive circuits on a motherboard– power sequencing. Instead of an analog power-sequencing circuit Airtop2 has a dedicated programmable logic device that monitors power control signals. It allows an always-accurate response to changes in power-states and fluctuations in external power. This brings a new level of reliability and stability to Airtop2."

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Storage

For storage Airtop2 has dual M.2 2280 NVMe with measured data rate of 3500 MB/s and additional 4x 2.5 SATA HDD/SSD. All storage devices can be configured to work in RAID. To prevent throttling, heat from all storage devices is dissipated by conduction into a dedicated heatsink. All storage devices are easily accessible.
Applications that require higher storage performance can utilize the NVM3 card that occupies the PCIe X16 slot and accepts 3x NVMe 2280 / 22110 / 30110 (NGSFF). Using NVM3 Airtop2 achieves a remarkable data rate of 9500 MB/s.

Graphics and display

Airtop2 is the only small-form-factor PC in the market that includes a passively-cooled 120W graphics card. Airtop2 can drive the displays of discrete and integrated graphics simultaneously for a total of 7 4K displays.
Having a ruggedized, small, silent and maintenance-free system with workstation-class graphics is beneficial in control rooms, outdoor digital signage and many other use-cases. With the increasing use of GPUs for computation Airtop2 opens new possibilities for running computation-intensive applications in harsh environments.
The graphics card in Airtop2 can be upgraded. Compulab supplies a ready-to-use NAF-cooled graphics card that is easy to install.

Modularity

Airtop2 supports extension cards in multiple form factors including PCIe X16, 2x M.2 cards and miniPCIe. In addition Airtop2 supports Compulab FACE Modules (Function And Connectivity Extension Modules) that currently include 4x Gbit Etherent, 4x PoE, 2x Optical LAN, 6x serial ports and more.

Built-in diagnostics

Airtop2 incorporates built-in diagnostics LEDs on the front panel that provide immediate visual indication of the initialization process – RAM detection, BIOS POST and detected displays. This feature saves precious technician time during troubleshooting. Further system information is available on the I^3M display.

Specifications

Features

CPU
Intel® Xeon® Processor E3-1275 v6
Intel® Core™ i7-7700 Processor
Chipset
Intel® C236 Chipset
Memory
Dual channel unbuffered DDR4-2400 ECC/non ECC up to 64 GB (4x DIMM slots)
Graphics & display
Integrated Intel HD Graphics 630 - 2x DisplayPort 1.2 (4K @ 60 Hz) + HDMI 1.4 (4K @ 24 Hz)
Optional NVIDIA Quadro P4000 8 GB - 4x DisplayPort 1.4 (5K @ 60 Hz | 4K @ 120 Hz)
Optional GeForce GTX 1060 6 GB – 3x DisplayPort 1.4 (4K @ 120 Hz) + HDMI 2.0b (4K @ 60 Hz)
Note: Airtop2 can operate 7 displays (integrated + discrete graphics) simultaneously
Storage
2x NVMe | SATA - M.2 M-key 2280 | 2260 | 2242 | 2230 - PCIe x4 | SATA 3 6 Gbps
4x 2.5” SATA 3.0 HDD/SSD with RAID support
Optional NVM3 card with 3x NVMe - 3x NVME M.2 M-key 2260 | 2280 | 22110 - NGSFF support
LAN
2x Gbit Ethernet (integrated)
4x Gbit Ethernet (optional, using FACE Module)
Wireless
WiFi 802.11ac + BT 4.2 (M.2 E-key)
Cellular data communication (M.2 B-key) + micro-SIM socket
miniPCIe with micro-SIM socket (on FC-AT2 FACE Module)
4x SMA antennas
USB
6x USB 3.0 type-A (rear panel)
2x USB 3.0 type-A (front panel, on FC-AT2 FACE Module)

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Audio
Realtek ALC1150 audio codec
Optical S/PDIF output (Toslink)
HDMI audio
Line-out
Mic-in
Extra ALC1150 audio codec (on FC-AT2 FACE Module)
Line-out (front panel)
Mic-in (front panel)
Serial
3x RS232 ports (2x full-UART + 1x RX/TX)
Extension cards
1x PCIe x16 Gen 3 (shared with graphics card)
1x M.2 E-key (normally used for WiFi adapter)
1x M.2 B-key (normally used for 4G modem)
Compulab Function And Connectivity Extension Module (FACE Module) (normally used for FC-AT2, other FACE Modules available)

Extra features

Natural airflow (NAF) cooling
Fanless natural convection cooling with no moving parts.
Redundant power
2x DC inputs with automatic failover.
Trusted platform module 2.0
Integrated in chipset. Optional discrete TPM.
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.
System diagnostics LEDs
Discrete LED indicators of RAM detection, BIOS post HDMI and DisplayPort detection for quick field diagnostics in case of booting issues.
Auto-on
System boots automatically when power is resumed.

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)

Operating conditions

Input voltage range
19V – 24V (+/- 10%)
Power consumption
8W – 240W
Power consumption depends on
– CPU and graphics card
– System load
– Installed devices
– Connected peripherals

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Operating temperature range
Standard: 0°C – 45°C
Extended: -20°C – 70°C
Industrial: -40°C – 70°C
Relative humidity
5% – 95% non-condensing

Mechanical specifications

Housing
All aluminum case, passive cooling
Tool-free clamshell opening with Kensington lock
Dimensions
10 cm (w) x 30 cm (h) x 25.5 cm (d) – 4” (w) x 12” (h) x 10” (d)
Weight: 4.5 – 7.5 kg (depending on configuration)
Mounting
Wall mounting bracket
DIN rail mounting

Price and availability

Airtop2 is available now from Compulab starting from $1335.
To order Airtop2 online check https://fit-iot.com/web/product/airtop2-build-to-order

For more information

https://fit-iot.com/web/products/airtop2
Media kit: https://fit-iot.com/web/products/airtop2/airtop2-gallery

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