



## IN-VEHICLE COMPUTER

## ACO-6000-CML-1E

In-Vehicle Computer with LGA 1200 for Intel 10th Gen CPU & W480E PCH, 2x LAN, 1x PCIe



## Specifications

## System

<b>Processor</b>	
Support 10th Gen Intel® CML S Processor (LGA 1200, 65W/35W TDP)	
- Intel® Xeon® W-1290TE, 10 Cores, 20MB Cache, up to 4.5 GHz	
- Intel® Xeon® W-1270TE, 8 Cores, 16MB Cache, up to 4.4 GHz	
- Intel® Xeon® W-1250TE, 6 Cores, 12MB Cache, up to 3.8 GHz	
- Intel® Core™ i9-10900E, 10 Cores, 20MB Cache, up to 4.7 GHz	
- Intel® Core™ i9-10900TE, 10 Cores, 20MB Cache, up to 4.5 GHz	
- Intel® Core™ i7-10700E, 8 Core, 16MB Cache, up to 4.5 GHz	
- Intel® Core™ i7-10700TE, 8 Cores, 16MB cache, up to 4.4 GHz	
- Intel® Core™ i5-10500T, 6 Cores, 12MB Cache, up to 4.2 GHz	
- Intel® Core™ i5-10500TE, 6 Core, 12MB Cache, 3.7 GHz	
- Intel® Core™ i3-10100T, 4 Cores, 6MB cache, up to 3.8 GHz	
- Intel® Core™ i3-10100TE, 4 Cores, 9MB Cache, up to 3.6 GHz	
System Chipset	Intel® W480E Chipset
LAN Chipset	GbE1: Intel I219 (Support Wake-on-LAN and PXE) GbE2: Intel I210 (Support Wake-on-LAN and PXE)
Audio Codec	Realtek ALC888S
System Memory	2x 260-Pin DDR4 2666/2933MHz SODIMM. Max. up to 64GB (ECC and Non-ECC)
Graphics	Intel® UHD Graphics 630
BIOS	AMI 256Mbit SPI BIOS
Watchdog	Software Programmable Supports 1~255 sec. System Reset
TPM	TPM 2.0

## Display

Display Port	2x DisplayPort, support resolution 4096 x 2304, DP++
DVI	1x DVI-I, support resolution 1920 x 1200
Multiple Display	Triple Display
VGA	Yes (by optional split cable)

## Storage

M.2	1x M.2 (E Key, PCIe x1, USB 2.0, 2230, Support CNVi)
SIM Socket	2x External SIM socket (Mini PCIe attached)
SSD/HDD	1x Internal 2.5" SATA HDD/SSD Bay (support H=9mm) 2x Removable 2.5" SATA HDD/SSD Bay (support H=7mm, Hot-swappable) Support RAID 0, 1, 5

## Expansion

Mini PCIe	2x Full-size Mini PCIe
PCI	1x PCI (Optional)
PCIe	1x PCIe x16

## Expansion Modules

- Occupied One Universal I/O Slot:
- 4-port GbE module with Intel® I350 Chipset, RJ-45 or M12 connector (PoE optional)
  - 4-Port USB with Renesas uPD720201K8 host controller (share PCIe Gen2 x1 bandwidth)

## I/O

Audio	1x Mic-in, 1x Line-out
CAN	2x CAN 2.0 A/B 2-pin Internal header
COM	2x RS-232/422/485 ; 6x RS-232/422/485 (internal)
DIO	8 in / 8 out (Isolated)
LAN	2x RJ45
Universal I/O Bracket	2x Universal I/O Bracket (By mini PCIe interface)
USB	6x USB 3.2 Gen 2 (10 Gbps) 3x USB 3.2 Gen 1 (5 Gbps, 1x Internal) 2x USB 2.0 header (internal)

## Features

- LGA 1200 socket for 10th Gen. Intel® CML S Processor (65W/35W TDP)
- Intel® W480E chipset
- 2x DDR4 2666/2933MHz SODIMM. Max. up to 64GB
- Triple Independent Display by 1x DVI-I and 2x DisplayPort
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 2x Full-size Mini PCIe for communication or expansion modules, 2x SIM socket
- 3x 2.5" SATA HDD Bay (1x Internal) with RAID 0, 1, 5 support
- 1x M.2 (E Key, PCIe x1, USB 2.0, 2230, Support CNVi)
- 8x RS-232/422/485 (6x internal), 6x USB 3.2 Gen 2, 3x USB 3.2 Gen 1 (1x internal)
- 8x DI + 8x DO with isolation
- 9 to 48 or 48 to 110VDC Wide Range Power Input Supporting AT/ATX Mode
- Wide Operating Temperature -25°C to 70°C (35W/65W CPU)
- TPM 2.0 Supported
- Power ignition management

Others	5x WiFi Antenna Holes 1x Power Switch, 1x AT/ATX Switch, 1x Remote Power On/Off 1x PC/Car Mode Switch, 1x Delay Time Switch 1x Removable CMOS Battery 4x 4-Pin Power Connector, 1x 4-PIN FAN Connector
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## Operating System

Windows	Windows 10
Linux	Linux kernel

## Power

Power Adapter	Optional AC/DC 24V/5A, 120W Optional AC/DC 24V/9.2A, 220W Optional AC/DC 24V/11.67A, 280W
Power Mode	AT, ATX
Power Ignition Sensing	Power Ignition Management
Power Supply Voltage	9~48VDC 48~110VDC (Optional)
Power Connector	5-pin Terminal Block (9~48VDC) 3-pin Terminal Block (48~110VDC, Optional)
Power Protection	OVP (Over Voltage Protection); OCP (Over Current Protection) Reverse Protection

## Environment

Operating Temperature	-25°C to 70°C (35W/65W CPU)
Storage Temperature	-30°C to 85°C
Relative Humidity	10% to 95% (non-condensing)
Certification	CE, FCC Class A, E-Mark, EMC Conformity with EN50155 & EN50121-3-2
Vibration	With SSD: 3 Grms, 5 - 500 Hz, 0.5 hr/axis With HDD: 1 Grms, 5 - 500 Hz, 0.5 hr/axis
Shock	With SSD: 20G, half sine, 11ms

## Physical

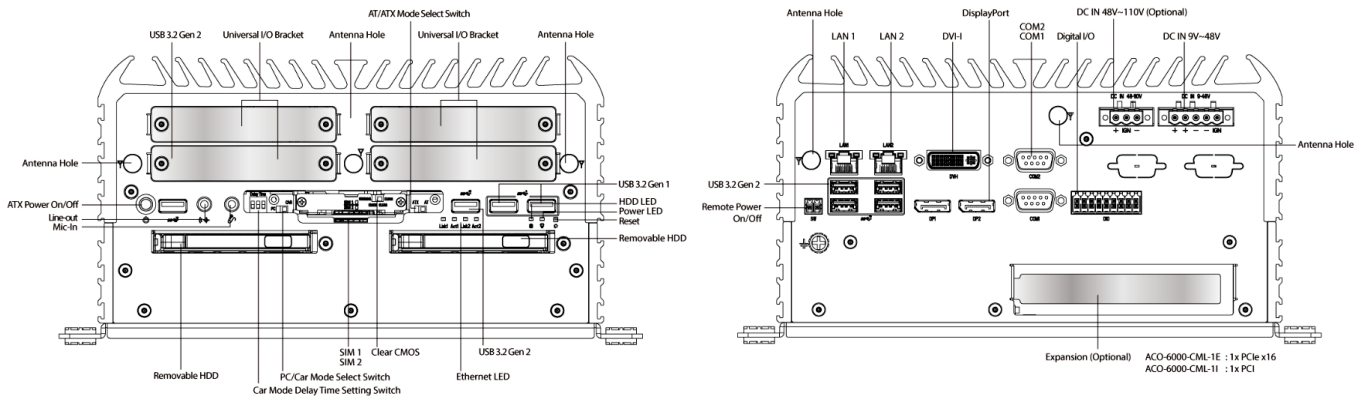
Dimensions	240 (W) x 261 (D) x 127.3 (H) mm
Construction	Extruded Aluminum with Heavy Duty Metal
Mounting Options	Wall Mounting

\* For 10th Gen Intel CPUs configured to run at 65W, operating temperatures will be limited to 70°C.

\*\* 65W CPUS may experience thermal throttling depending on extreme application workloads; this is also due to an increase in the physical CPU cores from the Intel silicon (up to 10 cores). Please note, this does not indicate system malfunction or problems in the fanless design. Please consult our embedded engineers for the best configuration to match your application requirements.

\*\*\* All specifications and photos are subject to change without notice.

## External I/O Mechanical Layout



### Available Modules



USB Module: 4x USB 3.0 Ports



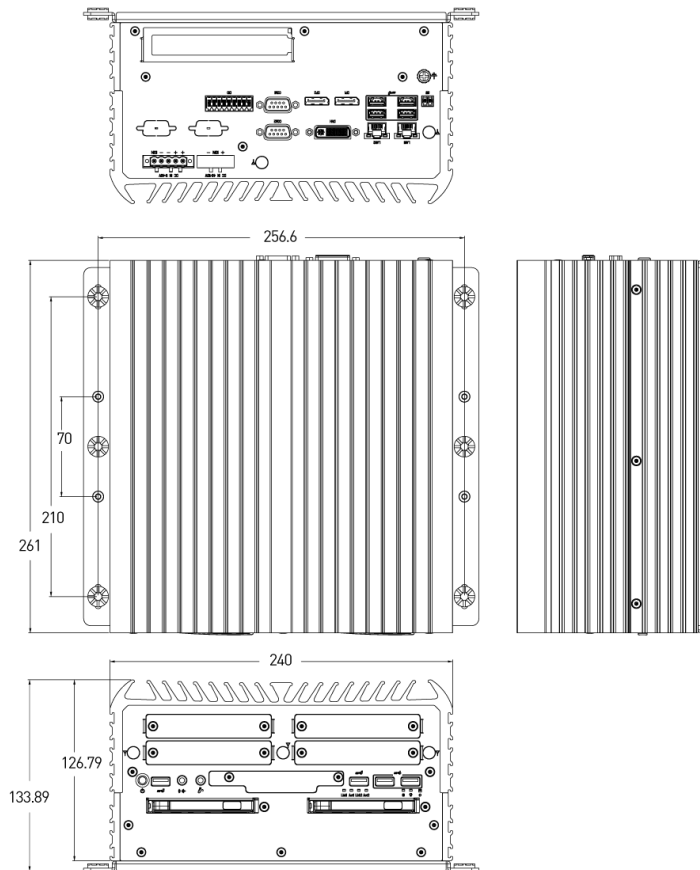
LAN/POE Module: 4x RJ45 LAN/POE Ports



M12 Module: 4x M12 LAN/POE Ports

## Dimension

Unit: mm



## Available Models

Model No.	Description
ACO-6000-CML-1E	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 1x PCIe
ACO-6000-CML-1E-16U3	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 24x USB, 1x PCIe
ACO-6000-CML-1E-16L	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 18x LAN, 1x PCIe
ACO-6000-CML-1E-16LM12	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 LAN, 1x PCIe
ACO-6000-CML-1E-16P	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 16x PoE, 1x PCIe
ACO-6000-CML-1E-16PM12	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 PoE, 1x PCIe
ACO-6000-CML-1E-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 1x PCIe
ACO-6000-CML-1E-16U3-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 24x USB, 1x PCIe
ACO-6000-CML-1E-16L-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 18x LAN, 1x PCIe
ACO-6000-CML-1E-16LM12-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 LAN, 1x PCIe
ACO-6000-CML-1E-16P-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 16x PoE, 1x PCIe
ACO-6000-CML-1E-16PM12-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 PoE, 1x PCIe
ACO-6000-CML-1I	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 1x PCI
ACO-6000-CML-1I-16U3	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 24x USB, 1x PCI
ACO-6000-CML-1I-16L	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 18x LAN, 1x PCI
ACO-6000-CML-1I-16LM12	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 LAN, 1x PCI
ACO-6000-CML-1I-16P	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 16x PoE, 1x PCI
ACO-6000-CML-1I-16PM12	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 PoE, 1x PCI
ACO-6000-CML-1I-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 1x PCI
ACO-6000-CML-1I-16U3-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 24x USB, 1x PCI
ACO-6000-CML-1I-16L-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 18x LAN, 1x PCI
ACO-6000-CML-1I-16LM12-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 LAN, 1x PCI
ACO-6000-CML-1I-16P-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E PCH, 2x LAN, 16x PoE, 1x PCI
ACO-6000-CML-1I-16PM12-110V	In-Vehicle Fanless Computer with LGA 1200 for Intel 10th Gen CPU and W480E, 2x LAN, 16x M12 PoE, 1x PCI

## Optional Accessories

Model No.	Description
1-E09A12002	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch
1-E09A22102	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch
1-E09A22801	Adapter AC/DC 24V/11.67A 280W with 3pin Terminal Block Plug 5.0mm Pitch
1-TPCD00002	Power Cord, European Type, 180cm
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm
SFICBL022	Power Cord, 3-pin US Type, 180cm

## Packing List

1x ACO-6000-CML Series Embedded System  
 1x Wall Mount Kit  
 1x Accessory Kit  
 1x DVI to VGA Adapter

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