

ACO-6000

In-Vehicle Fanless Embedded System with LGA 1151 socket
for Intel® 6th/7th Gen. (Skylake/Kaby Lake) Desktop Processor



FEATURES

- LGA 1151 socket for 6th/7th Gen. Intel® Core™ i7/i5/i3, Pentium®, or Celeron® Desktop Processor
- Intel® Q170 Chipset
- 2x 260-pin DDR4 SO-DIMM, up to 32GB
- Triple independent display
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 4x 2.5" SATA HDD bay and 2x mSATA supporting
- 4x Full-size mini PCIe
- 4x SIM socket
- 4x RS-232/422/485, 6x USB 3.0, 16-bit Isolated digital I/O
- 9 to 48 VDC wide range power input
- -25 °C to 70 °C extended operating temperature
- Power ignition management

SPECIFICATIONS

System

Processor
Support 6th & 7th Gen Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® Desktop Processor (LGA 1151)
- 7th Gen Intel® Core™ i7-7700T, Quad Core, 8MB cache, up to 3.8 GHz
- 7th Gen Intel® Core™ i5-7500T, Quad Core, 6MB cache, up to 3.3 GHz
- 7th Gen Intel® Core™ i3-7101TE, Dual Core, 3MB Cache, 3.4 GHz
- 6th Gen Intel® Core™ i7-6700TE, Quad Core, 8MB Cache, up to 3.4 GHz
- 6th Gen Intel® Core™ i5-6500TE, Quad Core, 6MB Cache, up to 3.3 GHz
- 6th Gen Intel® Core™ i3-6100TE, Dual Core, 4MB Cache, 2.7 GHz
- Intel® Pentium® G4400TE, Dual Core, 3MB Cache, 2.4 GHz
- Intel® Celeron® G3900TE, Dual Core, 2MB Cache, 2.3 GHz

System Chipset	Intel® Q170 Express Chipset
LAN Chipset	GbE1: Intel® I210-AT (Support Wake-on-LAN and PXE) GbE2: Intel® I219LM (Support Wake-on-LAN and PXE)
Audio Codec	Realtek ALC888S
System Memory	2x 260-Pin DDR4 1866/2133MHz SO-DIMM. Max. up to 32GB
BIOS	AMI 128Mbit SPI BIOS
Watchdog	Software Programmable Supports 1~255 sec. System Reset

Display

DVI	1x DVI-I
DisplayPort	2x DisplayPort
Multiple Display	Triple Display

Storage

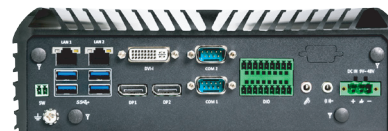
SSD/HDD	2x Internal 2.5" SATA HDD Bay 2x Removable 2.5" SATA HDD Bay Support RAID 0, 1, 5, 10
mSATA	2x mSATA (Shared with 2x mini-PCIe)
SIM Socket	2x External SIM socket 2x Internal SIM socket

Expansion

Mini PCI Express	4x Full-size mini-PCIe
4-Port GbE (Optional)	Up to two 4-port GbE modules with Intel® I210-AT Chipset RJ-45 or M12 connector with PoE option One Universal I/O Slot occupied for one 4-port module

Operating System

Windows	Windows 10, Windows 8.1, WES8.1, Windows 7, WES7
Linux	Linux kernel 4.X



I/O

COM	2x RS-232/422/485 (rear) 2x RS-232/422/485 (internal)
USB	6x USB 3.0 (4x rear/2x front)
LAN	2x GbE RJ45 (rear)
Audio	1x Mic-in, 1x Speaker-out, 2W+2W (rear)
DIO	8 in / 8 out (Isolated, rear)
Universal I/O Slot	2x Universal I/O Slots (front)
Others	6x WiFi Antenna Holes (2x front/4x rear) 1x Power Switch (front), 1x AT/ATX Switch (front) PC/Vehicle Mode, Vehicle Voltage, Delay Off Time (front) 1x Remote Power On/Off (rear)

Power

Power Mode	Vehicle or PC (AT/ATX)
Power Input	9 ~ 48 VDC
Power Ignition Management	Delay On/Off Battery Voltage Monitoring (12V/24V)
Power Connector	3-pin Terminal Block
Power Protection	OVP (Over Voltage Protection) OCP (Over Current Protection) RPP (Reverse Polarity Protection)
Power Adapter*	Optional 220W

Environment†

Operating Temp.	-25 °C to 70 °C (-13 °F to 158 °F)
Storage Temp.	-30 °C to 85 °C (-22 °F to 185 °F)
Relative Humidity	10% to 95% (non-condensing)
Vibration	With SSD: 5 Grms, 5 - 500 Hz, 0.5 hr/axis With HDD: 1 Grms, 5 - 500 Hz, 0.5 hr/axis
Shock	With SSD: 50G, half sine, 11ms
Certification	CE, FCC Class A, E-Mark, EN50121-3-2

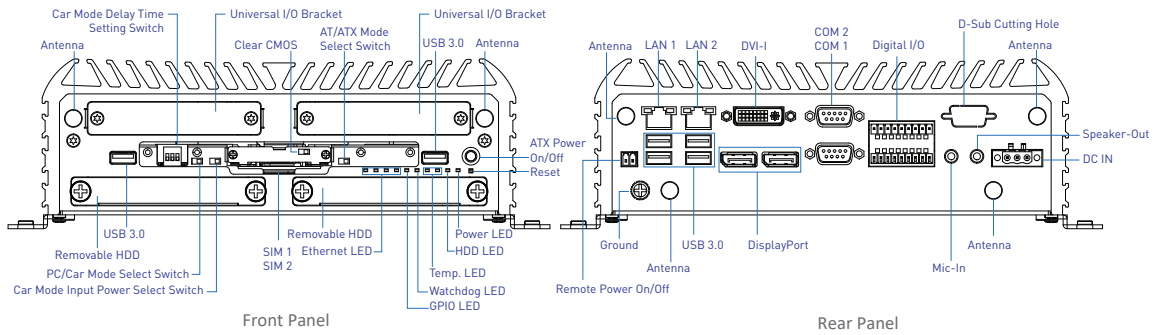
Physical

Construction	Extruded Aluminum with Heavy Duty Metal
Dimension (W x D x H)	240 x 261 x 79 mm 9.5" x 10.3" x 3.1"
Weight	4.37 kg (9.61 lb)
Mounting	Wall Mount
Packing List	1x ACO-6000 Rugged In-Vehicle Fanless System 1x Wall-mount Bracket 1x DVI to VGA Adapter

* For detailed performance specification, please refer to the data sheet or consult with the technical team.

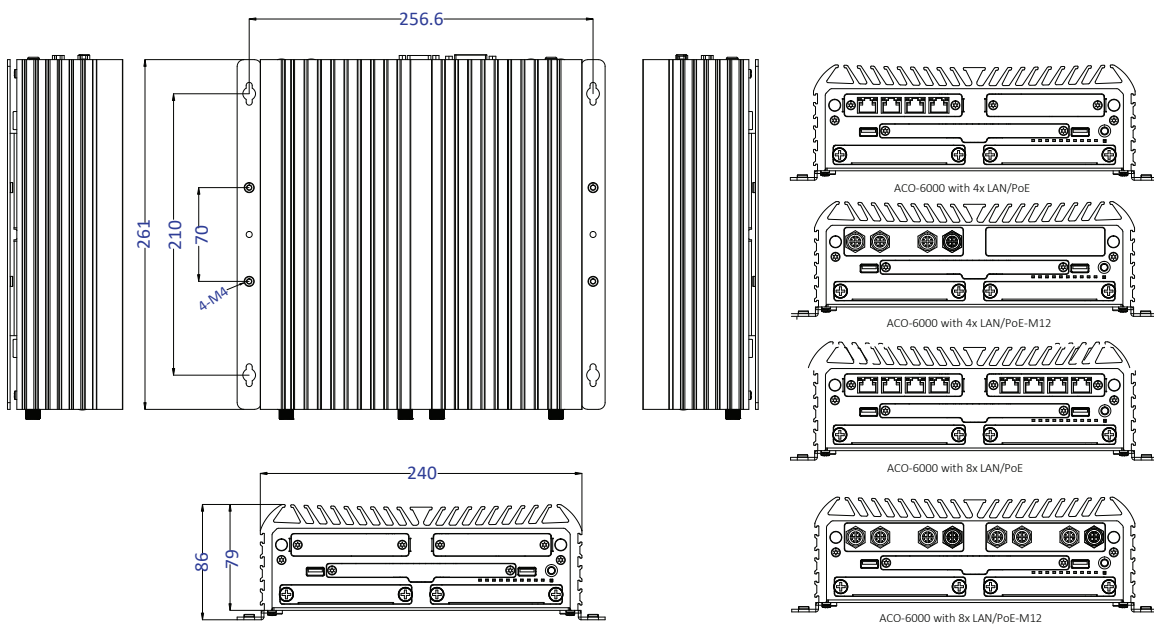
† The environmental specification covers the bare bone systems and does not include other components environmental specification.

I/O LAYOUT



DIMENSION

Unit: mm



ORDERING INFO

Part No.	Description
ACO-6000	Rugged in-vehicle fanless embedded system with LGA 1151 for Intel® 6th/7th Gen Processor with Q170 PCH, 2x DDR4 SO-DIMM, 2x DP, 1x DVI-I, 2x COM, 6x USB 3.0, 2x USB 2.0, 2x GbE, 2x mSATA/mini-PCIe, 1x M.2, 4x SATA III (2x Internal/2x Removable), 2x SIM, 16-bit GPIO, 9-48VDC

OPTIONAL ACCESSORIES

Part No.	Description
PSENETA6000-4L	4-port GbE cableless module 4x RJ-45
PSENETA6000-4L-M12	4-port GbE cableless module 4x M12
PSENETA6000-4P	4-port PoE GbE cableless module 4x RJ-45
PSENETA6000-4P-M12	4-port PoE GbE cableless module 4x M12
1-E09A12001	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch
1-E09A22001	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch

ACO-6011E/P

In-Vehicle Fanless Embedded System with LGA 1151 socket
for Intel® 6th/7th Gen. Processor, with 1x PCIe x16 or PCI Expansion

FEATURES

- LGA 1151 socket for 6th/7th Gen. Intel® Core™ i7/i5/i3, Pentium®, or Celeron® Desktop Processor
- Intel® Q170 Chipset
- 2x 260-pin DDR4 SO-DIMM, up to 32GB
- Triple independent display
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 4x 2.5" SATA HDD bay and 2x mSATA supporting
- 4x Full-size mini PCIe
- 4x SIM socket
- 1x PCIe x16 (ACO-6011E) or 1x PCI (ACO-6011P)
- 4x RS-232/422/485, 6x USB 3.0, 16-bit Isolated digital I/O
- 9 to 48 VDC wide range power input
- -25 °C to 70 °C extended operating temperature
- Power ignition management

SPECIFICATIONS

System

Processor
Support 6th & 7th Gen Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® Desktop Processor (LGA 1151)
- 7th Gen Intel® Core™ i7-7700T, Quad Core, 8MB cache, up to 3.8 GHz
- 7th Gen Intel® Core™ i5-7500T, Quad Core, 6MB cache, up to 3.3 GHz
- 7th Gen Intel® Core™ i3-7101TE, Dual Core, 3MB Cache, 3.4 GHz
- 6th Gen Intel® Core™ i7-6700TE, Quad Core, 8MB Cache, up to 3.4 GHz
- 6th Gen Intel® Core™ i5-6500TE, Quad Core, 6MB Cache, up to 3.3 GHz
- 6th Gen Intel® Core™ i3-6100TE, Dual Core, 4MB Cache, 2.7 GHz
- Intel® Pentium® G4400TE, Dual Core, 3MB Cache, 2.4 GHz
- Intel® Celeron® G3900TE, Dual Core, 2MB Cache, 2.3 GHz

System Chipset	Intel® Q170 Express Chipset
LAN Chipset	GbE1: Intel® I210-AT (Support Wake-on-LAN and PXE) GbE2: Intel® I219LM (Support Wake-on-LAN and PXE)
Audio Codec	Realtek ALC888S
System Memory	2x 260-Pin DDR4 1866/2133MHz SO-DIMM. Max. up to 32GB
BIOS	AMI 128Mbit SPI BIOS
Watchdog	Software Programmable Supports 1~255 sec. System Reset

Display

DVI	1x DVI-I
DisplayPort	2x DisplayPort
Multiple Display	Triple Display

Storage

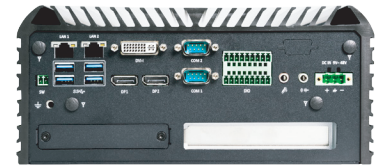
SSD/HDD	2x Internal 2.5" SATA HDD Bay 2x Removable 2.5" SATA HDD Bay Support RAID 0, 1, 5, 10
mSATA	2x mSATA (Shared with 2x mini-PCIe)
SIM Socket	2x External SIM socket 2x Internal SIM socket

Expansion

Mini PCI Express	4x Full-size mini-PCIe
PCIe/PCI	1x PCIe x16 (ACO-6011E) 1x PCI (ACO-6011P) Full height, half length (10.65 x 174 mm)
4-Port GbE (Optional)	Up to two 4-port GbE modules with Intel® I210-AT Chipset RJ-45 or M12 connector with PoE option One Universal I/O Slot occupied for one 4-port module

Operating System

Windows	Windows 10, Windows 8.1, WES8.1, Windows 7, WES7
Linux	Linux kernel 4.X



I/O

COM	2x RS-232/422/485 (rear) 2x RS-232/422/485 (internal)
USB	6x USB 3.0 (4x rear/2x front)
LAN	2x GbE RJ45 (rear)
Audio	1x Mic-in, 1x Speaker-out, 2W+2W (rear)
DIO	8 in / 8 out (Isolated, rear)
Universal I/O Slot	3x Universal I/O Slots (2x front, 1x rear)
Others	6x WiFi Antenna Holes (2x front/4x rear) 1x Power Switch (front), 1x AT/ATX Switch (front) PC/Vehicle Mode, Vehicle Voltage, Delay Off Time (front) 1x Remote Power On/Off (rear)

Power

Power Mode	Vehicle or PC (AT/ATX)
Power Input	9 ~ 48 VDC
Power Ignition Management	Delay On/Off Battery Voltage Monitoring (12V/24V)
Power Connector	3-pin Terminal Block
Power Protection	OVP (Over Voltage Protection) OCP (Over Current Protection) RPP (Reverse Polarity Protection)

Power Adapter* Optional 220W

Environment†

Operating Temp.	-25 °C to 70 °C (-13 °F to 158 °F)
Storage Temp.	-30 °C to 85 °C (-22 °F to 185 °F)
Relative Humidity	10% to 95% (non-condensing)
Vibration	With SSD: 5 Grms, 5 - 500 Hz, 0.5 hr/axis With HDD: 1 Grms, 5 - 500 Hz, 0.5 hr/axis
Shock	With SSD: 50G, half sine, 11ms
Certification	CE, FCC Class A, E-Mark, EN50121-3-2

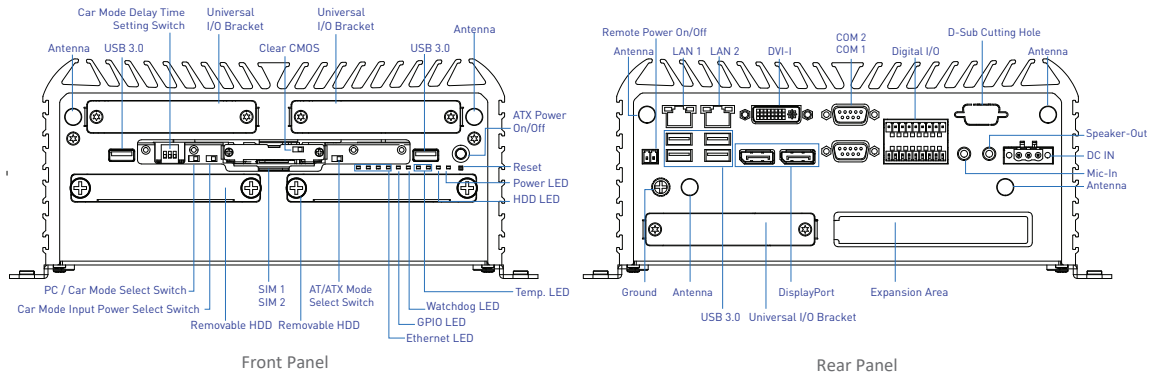
Physical

Construction	Extruded Aluminum with Heavy Duty Metal
Dimension (W x D x H)	240 x 261 x 107 mm 9.5" x 10.3" x 4.2"
Weight	4.96 kg
Mounting	Wall Mount
Packing List	1x ACO-6011x Rugged In-Vehicle Fanless System 1x Wall-mount Bracket 1x DVI to VGA Adapter

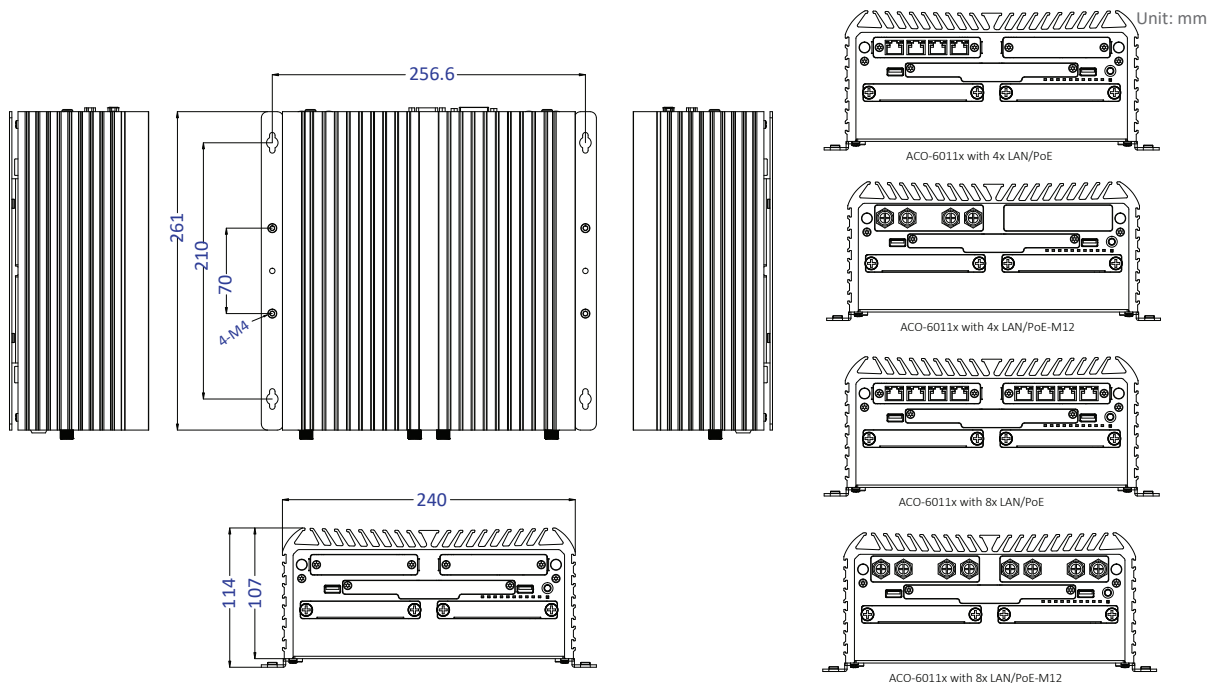
* For detailed performance specification, please refer to the data sheet or consult with the technical team.

† The environmental specification covers the bare bone systems and does not include other components environmental specification.

I/O LAYOUT



DIMENSION



ORDERING INFO

Part No.	Description
ACO-6011E	Rugged in-vehicle fanless embedded system with LGA 1151 for Intel® 6th/7th Gen Processor with Q170 PCH, 2x DDR4 SO-DIMM, 2x DP, 1x DVI-I, 2x COM, 6x USB 3.0, 2x USB 2.0, 2x GbE, 2x mSATA/mini-PCIe, 1x M.2, 4x SATA III (2x Internal/2x Removable), 2x SIM, 16-bit GPIO, 9-48VDC, 1x PCIe x16
ACO-6011P	Rugged in-vehicle fanless embedded system with LGA 1151 for Intel® 6th/7th Gen Processor with Q170 PCH, 2x DDR4 SO-DIMM, 2x DP, 1x DVI-I, 2x COM, 6x USB 3.0, 2x USB 2.0, 2x GbE, 2x mSATA/mini-PCIe, 1x M.2, 4x SATA III (2x Internal/2x Removable), 2x SIM, 16-bit GPIO, 9-48VDC, 1x PCI

OPTIONAL ACCESSORIES

Part No.	Description
PSENETA6000-4L	4-port GbE cableless module 4x RJ-45
PSENETA6000-4L-M12	4-port GbE cableless module 4x M12
PSENETA6000-4P	4-port PoE GbE cableless module 4x RJ-45
PSENETA6000-4P-M12	4-port PoE GbE cableless module 4x M12
1-E09A12001	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch
1-E09A22001	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch