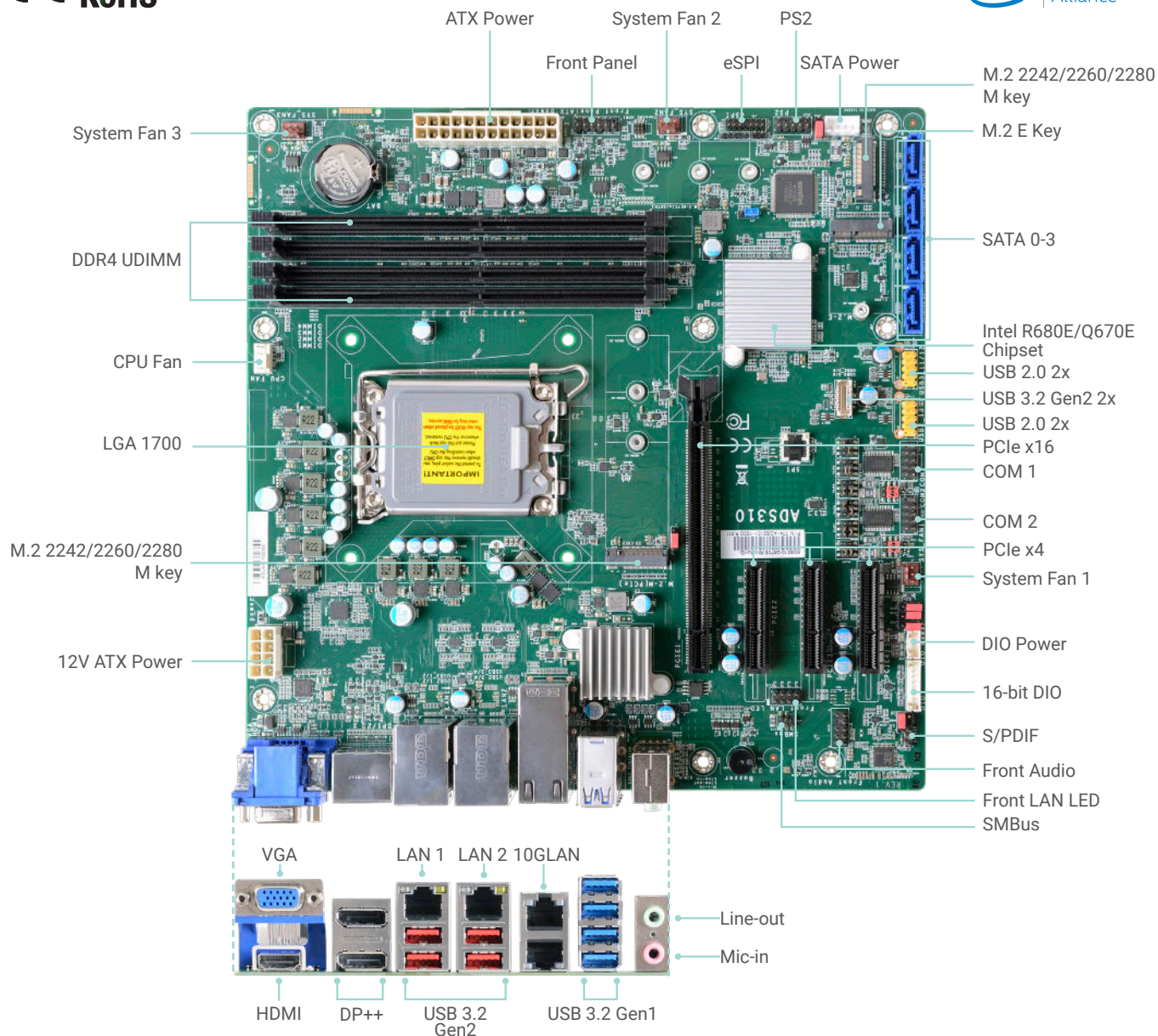


# ADS310-R680E/Q670E

12th Gen Intel® Core™  
Desktop  
microATX



Top View

## KEY FEATURES



### DDR4

4 DDR4 UDIMM up to 128GB



### 8K High Resolution

Supports 8K/ 4K resolution



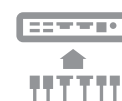
### Quad Displays

VGA, 2 DP++, HDMI 2.0a



### Multiple Expansion

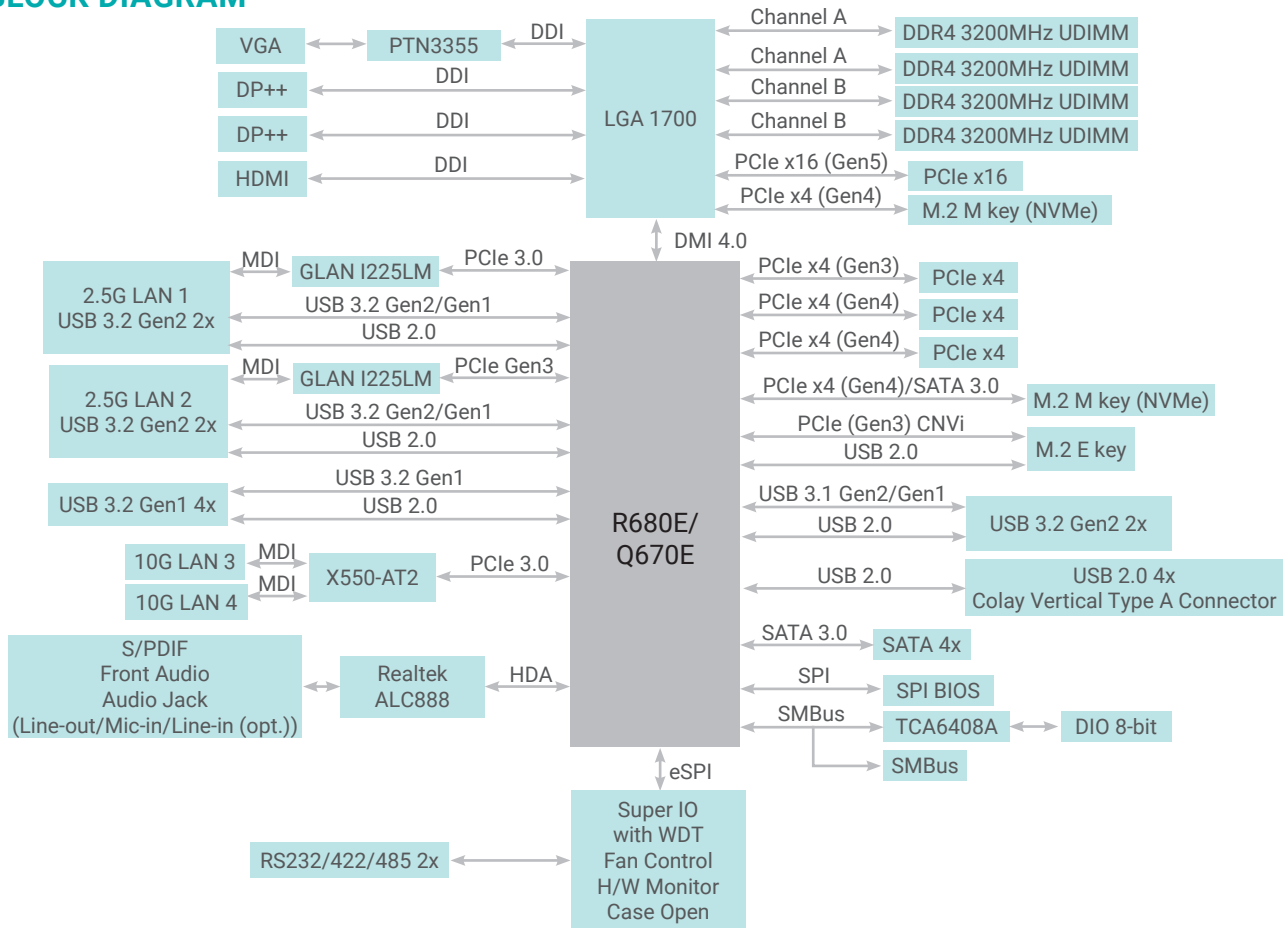
1 PCIe x16, 3 PCIe x4, 1 M.2 E key, 2 M.2 M key, 4 SATA 3.0



### Rich I/O

2 Intel 10GbE, 2 Intel 2.5GbE, 2 COM, 6 USB 3.2 Gen 2, 4 USB 3.2 Gen 1, 4 USB 2.0

## BLOCK DIAGRAM



## MECHANICAL DRAWING



## SPECIFICATION

|                              |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                              |
|------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| System                       | Processor      | 12th Generation Intel® LGA 1700 Socket Processors, TDP support up to 125W<br>Intel® Core™ i9-12900E (16 Cores, 30M Cache, up to 5.0 GHz); 65W<br>Intel® Core™ i9-12900TE (16 Cores, 30M Cache, up to 4.8 GHz); 35W<br>Intel® Core™ i7-12700E (12 Cores, 25M Cache, up to 4.8 GHz); 65W<br>Intel® Core™ i7-12700TE (12 Cores, 25M Cache, up to 4.6 GHz); 35W<br>Intel® Core™ i5-12500E (6 Cores, 18M Cache, up to 4.5 GHz); 65W<br>Intel® Core™ i5-12500TE (6 Cores, 18M Cache, up to 4.3 GHz); 35W<br>Intel® Core™ i3-12100E (4 Cores, 12M Cache, up to 4.2 GHz); 60W<br>Intel® Core™ i3-12100TE (4 Cores, 12M Cache, up to 4.0 GHz); 35W<br>Intel® Pentium® G7400E (2 Cores, 6M Cache, 3.6 GHz); 46W<br>Intel® Pentium® G7400TE (2 Cores, 6M Cache, 3.0 GHz); 35W<br>Intel® Celeron® G6900E (2 Cores, 4M Cache, 3.0 GHz); 46W<br>Intel® Celeron® G6900TE (2 Cores, 4M Cache, 2.4 GHz); 35W |                                                                                                                              |
|                              | Chipset        | Intel® R680E/Q670E Chipset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              |
|                              | Memory         | Four 288-pin DIMM up to 128GB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Dual Channel DDR4 3200 MHz (ECC support: R680E only)                                                                         |
|                              | BIOS           | AMI SPI 256Mbit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                              |
| Graphics                     | Controller     | Intel® HD Gen 9 Graphics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                              |
|                              | Feature        | OpenGL 4.5, DirectX 12, OpenCL 2.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                              |
|                              |                | HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                              |
|                              |                | HW Encode: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                              |
|                              | Display        | 1 x VGA<br>2 x DP++<br>1 x HDMI 2.0a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | VGA: resolution up to 1920x1200 @ 60Hz<br>DP++: resolution up to 7680x4320 @ 60Hz<br>HDMI: resolution up to 4096x2160 @ 24Hz |
| Expansion                    | Quad Displays  | VGA + 2 DP++ + HDMI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|                              | Interface      | 1 x PCIe x16 (Gen 5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                              |
|                              |                | 2 x PCIe x4 (Gen 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|                              |                | 1 x PCIe x4 (Gen 3) (R680E: x4 signal; Q670E: x1 signal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                              |
|                              |                | 1 x M.2 2230 E key (PCIe/USB 2.0/Intel CNVi support) (Discrete Wifi 6E support)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                              |
|                              |                | 1 x M.2 2242/2260/2280 M key (PCIe x4 Gen3 NVMe/SATA/Intel Optane Memory support)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                              |
|                              |                | 1 x M.2 2242/2260/2280 M key (PCIe x4 Gen3 NVMe/Intel Optane Memory support)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                              |
| Audio                        | Audio Codec    | Realtek ALC888                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                              |
| Ethernet                     | Controller     | 2 x Intel® I225LM PCIe (10M/100M/1000Mbps/2.5G) (only Xeon, Core i9/i7/i5 support iAMT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                              |
|                              |                | 2 x Intel® x550-AT2 (10 GBASE-T/1 GbE/100 Mbps)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                              |
| Rear I/O                     | Ethernet       | 2 x 2.5GbE (RJ-45)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                              |
|                              |                | 2 x 10GbE (RJ-45)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                              |
|                              | USB            | 4 x USB 3.2 Gen 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                              |
|                              |                | 4 x USB 3.2 Gen 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                              |
|                              | Display        | 2 x DP++<br>1 x HDMI 2.0a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 x VGA                                                                                                                      |
| Internal I/O                 | Audio          | 1 x Line-out<br>1 x Mic-in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 x Line-in (opt. by request, MOQ required)                                                                                  |
|                              | Serial         | 2 x RS-232/422/485 (RS-232 w/ power) (2.54mm pitch)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|                              | USB            | 2 x USB 3.2 Gen2 Key B box header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                              |
|                              |                | 4 x USB 2.0 (2.54mm pitch) (colay vertical Type A, MOQ required)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                              |
|                              | Audio          | 1 x Front Audio Header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 x S/PDIF                                                                                                                   |
|                              | SATA           | 4 x SATA 3.0 (up to 6Gb/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RAID 0/1/5/10                                                                                                                |
|                              | PS/2           | 1 x PS/2 (2.54mm pitch)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                              |
|                              | DIO            | 1 x 8-bit DIO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                              |
| Watchdog Timer               | SMBus          | 1 x SMBus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                              |
|                              |                | System Reset, Programmable via Software from 1 to 255 Seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                              |
| Security                     | TPM            | Nuvoton TPM 2.0 (opt., MOQ required)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                              |
| Power                        | Type           | ATX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|                              | Connector      | 8-pin ATX 12V power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|                              |                | 24-pin ATX power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                              |
|                              | Consumption    | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
| OS Support                   | RTC Battery    | CR2032 Coin Cell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                              |
|                              | Microsoft      | Windows 10 IoT Enterprise 64-bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                              |
| Environment                  | Linux          | Linux                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                              |
|                              | Temperature    | Operating: -5 to 65°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                              |
|                              |                | Storage: -30 to 60°C with RTC Battery; -40 to 85°C without RTC Battery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                              |
|                              | Humidity       | Operating: 5 to 95% RH<br>Storage: 5 to 95% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                              |
| Mechanism                    | MTBF           | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|                              | Dimensions     | microATX Form Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                              |
|                              |                | 244mm (9.6") x 244mm (9.6")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                              |
|                              | Height         | PCB: 1.6mm<br>Top Side: TBD Bottom Side: TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                              |
| Standards and Certifications | Certifications | CE, FCC Class B, RoHS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                              |

## ORDERING INFORMATION

| Model Name      | P/N              | Memory  | GbE | RS-232/422/485 | USB 3.2 Gen2 | USB 3.2 Gen1 | USB 2.0 | Power                    | Thermal | Temp.      |
|-----------------|------------------|---------|-----|----------------|--------------|--------------|---------|--------------------------|---------|------------|
| ADS310-R680EIRM | 770-ADS3101-000G | 4 UDIMM | 4   | 2              | 6            | 10           | 14      | 24-pin ATX/8-pin ATX 12V | Active  | -5 to 65°C |
| ADS310-Q670EIRM | 770-ADS3101-100G | 4 UDIMM | 4   | 2              | 6            | 10           | 14      | 24-pin ATX/8-pin ATX 12V | Active  | -5 to 65°C |

## PACKING LIST

|                                                 |                 |
|-------------------------------------------------|-----------------|
| 1 ADS310-R680E/Q670E motherboard                |                 |
| 1 COM port cable (Length: 300mm, 2 x COM ports) | A81-015026-023G |
| 1 Serial ATA data cable (Length: 500mm)         | 332-553001-005G |
| 1 I/O shield                                    | TBD             |

## OPTIONAL ITEMS

|                                                  |                 |
|--------------------------------------------------|-----------------|
| USB 2.0 port cable (Length: 350/398mm)           | A81-001066-016G |
| USB 3.2 Gen2 port cable (Length: 350mm)          | A81-001075-017G |
| COM port cable (Length: 300mm, 2 x COM ports)    | A81-015026-023G |
| Serial ATA data cable (Length: 500mm, W/LOCK)    | 332-553001-005G |
| Thermal solution (For 35W, Height: 29.39mm)      | A71-101136-000G |
| Thermal solution (For 65W, Height: 46mm)         | A71-101137-000G |
| Thermal solution (For 95W/125W, Height: 125.3mm) | A71-101138-000G |
| DP to HDMI Dongle                                | 612-D2H13M-000G |
| M.2-COM4 (M.2 serial port module)                | 770-M2COM1-000G |
| M.2-2LAN (M.2 LAN port module)                   | 770-M22LN1-000G |
| M.2-2PSE (M.2 PSE module)                        | 770-M22PS1-000G |